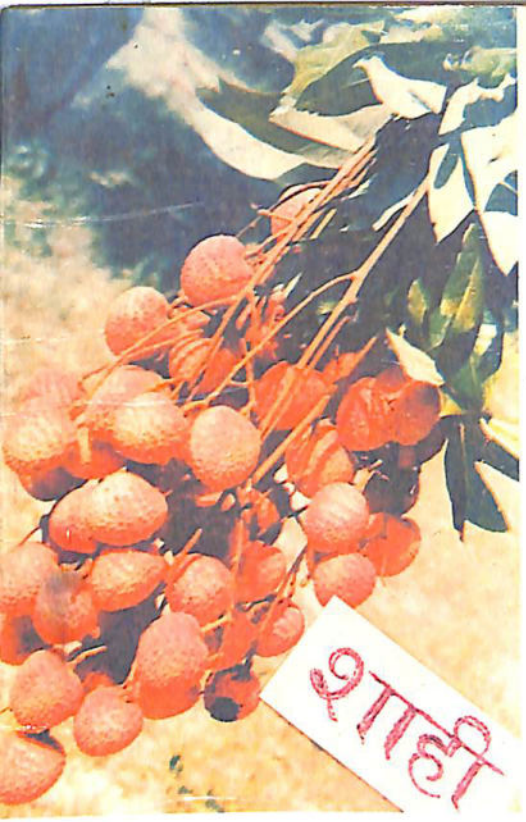
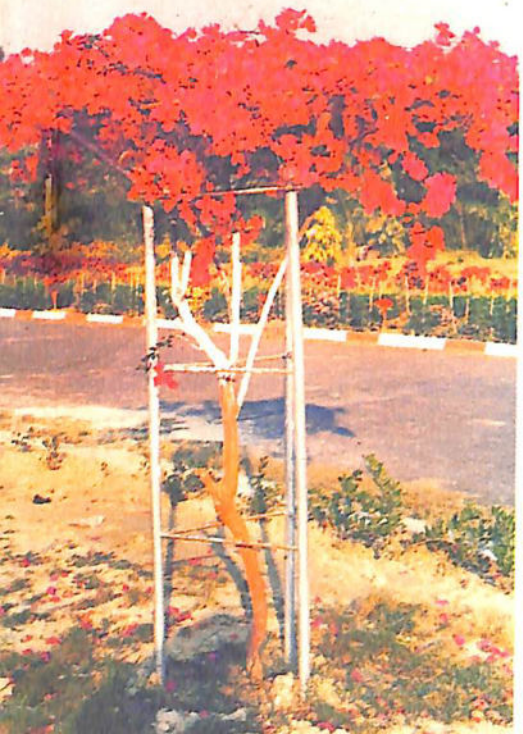


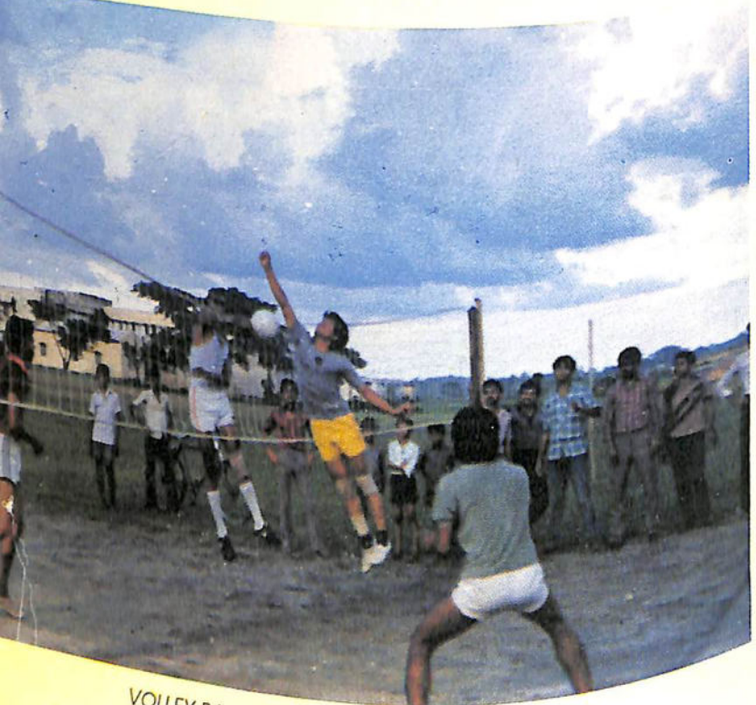
ANNUAL REPORT 1987-88

RAJENDRA AGRICULTURAL UNIVERSITY, BIHAR

PUSA – SAMASTIPUR. PIN 848125



RIVEDI, VICE - CHANCELLOR ADDRESSING STAFF AND STUDENTS ON THE
DENCE DAY



VOLLEY

ANNUAL REPORT

1987-88

RAJENDRA AGRICULTURAL UNIVERSITY
PUSA (SAMASTIPUR), BIHAR

PREFACE

The Annual Report of an organisation is not only an account of the progress of activities and programmes during the year under report but also an analysis of the direction in which it is moving and the achievements made by it in terms of short-term and long-term objectives set forth.

It is in this context that the present annual report is to be viewed. No report of this kind can accommodate all that have been done and accomplished in teaching, research, Extension Education & training, seed production and organisational management yet we have made efforts to include as much as we could lay our hands on and could have access to the varieties of information through the various reports received from different Faculties, Colleges, Institutions and Directorates of the University as well as from our own personal knowledge of events.

The cooperation and help received from all Deans, Directors, Officers, Heads of Institutions, Heads of Departments and scientists have been of immense help in compiling the annual report.

The Planning Cell is grateful to Dr. N. N. Sharma, Ex-Director, Planning for the pains taken by him in preparation of the Annual Report. Shri Kameshwar Mishra of Planning Cell deserves special mention. Dr. J. N. Choudhary, Associate Professor of Agril. Economics helped a lot in proof-reading and editing work. Dr. H. P. Mishra, Associate Professor of Floriculture could get the Blocks of Colour Photographs and cover design made in Calcutta which could make the report attractive. Shri D. Dutta, University Press Manager expedited the printing work.

The quality and contents of the 'Annual Report' could be what the readers would find because of the keen interest of and guidance from the Vice-Chancellor for which the Planning Cell is very much grateful.

P. N. Jha
DEAN, AGRICULTURE
AND
Director, Planning

Placa : PUSA
Dated : 2 October, 1989
Bapu's birthday
to whom Agricultural and
Rural Development was so dear.

RAU's Objectives

- To impart education in different branches of Agriculture and allied branches of learning.
- Furthering the advancement of learning and prosecution of research in Agriculture.
- Undertaking the extension of such services, specially to rural people of the state.
- Helping the State Government in supplying breeder's seeds towards production and multiplication of foundation and certified seeds.
- To plan, organise and conduct on—campus and off-campus training programmes for different functionaries and client groups in order to develop human resource capability in Agricultural and Rural development.

Vice-Chancellor's Introduction

Significant news at RAU during the year 1987-88 included the excessive rainfall throughout its jurisdiction. The rainfall recorded was more than the double of the normal. It was one of the highest during the last one hundred years. Tirhut College of Agriculture, Dholi one of Constituent Units of this University suffered heavily due to a breach in the near-by embankment. A large number of Crops including experiments were damaged.

Apart from the bitter experience of excessive rainfall otherwise delightful situation provided ample opportunity to maintain the high standards of teaching, research & extension schedule during the year. Construction schedule for the staff quarters & Communication Centre at the headquarters & other construction work at the main and sub-stations progressed well. New degree programme of Fisheries & dairy technology were started during the year.

Some 892 students were on roll in various U. G. degree programmes. This figure for different M. Sc. programme was 159 and for Ph. D. it was 64. In various faculties 71 students qualified for Master's degree and 15 for Ph. D. degree. The figure would have been very high, had the students not joined their services in the middle of their teaching programme. The existing trimester system was changed to semester system in all the Colleges beginning with 1986-87 session. However, several courses were concurrently running to make the switch over smooth.

During the year under report several research projects were in operation. Dedication of the Scientists marked the release of a number of Crop Varieties and other useful innovations for the benefit of the farmers.

The University is fully alive to the problems of naturally handicapped areas, which have suffered a lot in the past and where the fruits/impact of green revolution are yet to be realised. The RAU has developed alternate land use systems for such situations and has developed contingency cropping plans to mitigate the ill-effects of aberrant weather conditions. It has been widely realised that the final goal of development is not the yield per hectare but the income per house-hold; and hence the RAU is working to meet this goal through various types of research and extension education activities. A project on the Scientific management of Wetlands is also on the anvil. As a matter of fact, the RAU,

Some 892 students were on roll in various U. G. degree programmes. This figure for different M. Sc. programme was 159 and for Ph. D. it was 64. In various faculties 71 students qualified for Master's degree and 15 for Ph. D. degree. The figure would have been very high, had the students not joined their services in the middle of their teaching programme. The existing trimester system was changed to semester system in all the Colleges beginning with 1986-87 session. However, several courses were concurrently running to make the switch over smooth.

During the year under report several research projects were in operation. Dedication of the Scientists marked the release of a number of Crop Varieties and other useful innovations for the benefit of the farmers.

The University is fully alive to the problems of naturally handicapped areas, which have suffered a lot in the past and where the fruits/impact of green revolution are yet to be realised. The RAU has developed alternate land use systems for such situations and has developed contingency cropping plans to mitigate the ill-effects of aberrant weather conditions. It has been widely realised that the final goal of development is not the yield per hectare but the income per house-hold; and hence the RAU is working to meet this goal through various types of research and extension education activities. A project on the Scientific management of Wetlands is also on the anvil. As a matter of fact, the RAU,

besides working on the irrigated farming systems, is also attaching utmost importance torwards the improvements of rainfed as well as water logged areas, so that the challenges for augumenting production having a respectable match with our food targets in the 21 st Century could be met with. It is a big task, but the RAU has waged the war to win the front; and the war steadily goes on. The present report is an attempt to provide a glimpse of the efforts of RAU made during the year 1987-88 to meet its objectives and enable the state to achieve self-reliance in the farm sector. Several research papers were published by the Scientists of this University in Journals of National and International repute.

Extension Education activities including Lab to Land programme, National Service Scheme, National Demonstration on farmer's field, Kisan melas, Training of different types of clientele, Oilseed and Pulses development programme under Prime Minister's 20 point Programme went on successfully benefitting the farmers, spread over the Jurisdiction of this University. The extension department also published a large number of booklets, bulletins & hand-notes in Hindi, which got appreciation at the hands of the farmers and also administrators.

The University Library also continued to add useful books & Journals to its valuable collections.

At the Seed processing Plant, Dholi 283 quintals of Breeders, 3435 quintals of Foundation and 740 quintals of Truthful seeds were processed.

To cope with the increased academic, research and extension activities new appointments in various categories were made.

Lack of adequate and timely financial assistance from the State Goverment is causing hinderance in the smooth running of the University. Efforts are being made to sort out this difficulty.

The present report is an attempt to provide a glimpse of the efforts of RAU made during the year 1987-88 to meet its objectives and enable the state to achieve self reliance in the farm sector. In bringing out this report the concerned Scientists, Deans, Directors, Registrar and other officers worked with devotion. Director, Planning worked hard to bring out the report.

G. Trivedi

(**G. Trivedi**)
Vice-Chancellor.
RAU Bihar, Pusa

To cope with the increased academic, research and extension activities new appointments in various categories were made.

Lack of adequate and timely financial assistance from the State Goverment is causing hinderance in the smooth running of the University. Efforts are being made to sort out this difficulty.

The present report is an attempt to provide a glimpse of the efforts of RAU made during the year 1987-88 to meet its objectives and enable the state to achieve self reliance in the farm sector. In bringing out this report the concerned Scientists, Deans, Directors, Registrar and other officers worked with devotion. Director, Planning worked hard to bring out the report.

G. Trivedi

(G. Trivedi)
Vice-Chancellor.
RAU Bihar, Pusa

CONTENTS

ADMINISTRATION

H. E. Dr. P. Venkatsubbiah
Chancellor
H. E. Dr. G. N. Sinha
Chancellor

1. BORD OF MANAGEMENT :

Ex.-Official Members :

Dr. Gopaljee Trivedi (Chairman)
Vice-Chancellor

Sri N. K. Sinha/Sri S. N. Sinha
Agril. Production Commissioner

Dr. D. N. Ram
Director of Agriculture

Dr. H. S. Sinha
Director of Animal Husbandry

Dr. P. S. Prasad
Director of Fisheries
Dr. (Mrs) P. L. Srivastava

One Dean from different Faculties (By rotation for 2 years)
Dr. B. N. Choudhary/Dr. P. N. Jha

One Director of the University (By rotation for 2 years)
Dr. R. P. Roy Sharma/Dr. R. B. Ram
One Head of University Department (by rotation for 2 years)

Other members :
Dr. R. P. Devdas
One Women Specialist in Home Science
Dr. C. Prasad
One I. C. A. R. representative
—×—
One Progressive farmers
Dr. K. L. Chadha
One Eminent Agril. Scientist
Sri Dataram Mishra
Distinguished industrialist/manufacturer having special interest in Agril./Rural development

SENATE

Ex-Official members :

H.E. Dr. P.Venkatsubbaih/H. E. Dr. G. N. Singh, Chancellor

Dr. Gopaljee Trivedi
Vice-Chancellor

Sri N. K. Sinha/Sri S. N. Sinha
Agril. Production Commissioner/Secretary, Deptt. of Agril.

Dr. C. M. Jha
Food Commissioner

Sri D. P. Ram
Special /Addl/Joint Secretary of deptt of Agril.

Sri A. K. Mukherjee
Special/Addl/Joint Secretary of deptt. of Animal Husbandry

—×—

Chief Conservator of Forest

Dr. D. N. Ram
Director of Agriculture, Bihar

Dr. H. S. Sinha
Director of Animal Husbandry, Bihar

Dr. P. S. Prasad
Director of Fisheries, Bihar

Sri M. P. Sinha
J. D. A. [Education], Directorate of Agricultural, Bihar

Dr. P. P. Jha
Director [Research], RAU

Dr. G. Trivedi
Director [Extn. Education]
All Deans of Faculties
Dr. A. K. Srivastava
Dr. R. N. Singh

Dr. [Mrs] P. L. Srivastava
Dr. R. K. Rai
Dr. P. N. Jha
Dr. M. K. Sinha

All Principals of constituent Colleges

Dr. N. N. Sharma
Dr. T. P. Singh
Dr. R. S. Singh

All Directors of Institutes/Seed farms/ Students welfare

Dr. B. P. Sahi
Dr. R. K. Singh
Dr. J. N. Singh
Dr. S. N. Ojha

Other Members :

Seven Representative members from Bihar Legislative Assembly :

1. Sri Jay Kumar Palit
2. ,, Rajo Singh
3. ,, Raghunath Pandey
4. ,, Ram Lakhan Singh Yadav
5. ,, Ram Chandra Paswan
6. ,, Gunanand Jha
7. ,, Suraj Mandal

Two representative members from Bihar Legislative Council :

1. Sri Manjay Lal
2. ,, Nagendra Jha

Six Teachers other than Principals & Deans :

1. Sri Devendra Prasad
2. ,, Jagmohan Singh
3. Dr. C. Prasad
4. Dr. D. D Sharma
5. Mrs. T. S. Seela
6. Dr. B. C. Mal

Four persons to be nominated by :

1. Bihar State Agro-Industries Development Corporation
   Sri O. N. Trivedi
2. Bihar State Agril. Marketing Board
3. Bihar Rajya Beej Nigam
   Dr. R. N. Sahay, M. D.
4. Bihar Fruit & Vegetable Development Corporation
   Dr. R. B. Sinha, M. D.

One representative of Employees (other than teachers)

1.

Two farmers' representative (to be nominated by the Chancellor)

1. Smt. Ramsukumari Devi
2. Sri Mathura Das

Two eminent agricultural Scientists (nominate by Chancellor)

1. Prof. S. C. Mandal
2. Dr. T. R. Mehta

Two eminent.Scientists (nominated by Chancellor) :

1. Dr. K. S. Bilgrami
2. Dr. R. P. Roy

One meritorious student (nominated by V. C.) :

1. Sri Umesh Kumar

One student (distinguished in sports & extra curricular activities)-nomineted by V. C.

1. Sri R. N. Mishra

3. ACADEMIC COUNCIL

The Academic Council of the University consisted of the following members.

(i) The Vice-Chancellor, as the ex-officio Chairman;
(ii) All Deans;
(iii) All Directors;
(iv) All Principals of different Colleges;

(v) All Chairmen of the post graduate Departments;

(vi) Three teachers of colleges on terms and conditions prescribed by the Statutes;

(vii) One Associate Professor and one Assistant Professor to be nominated by Vice-Chancellor by rotation for terms prescribed in the Statutes;

(viii) Director of Resident Instruction of Birsa Agril. University Kanke, Ranchi.

(ix) Two other members, nominated by the Board of Management after the approval of the Chancellor;

(x) The Registrar, as the non-member Secretary.

4. MEETINGS OF DIFFERENT AUTHORITIES

During the period under report :

(A) One meeting of the Senate was held.

(B) Five meetings of the Board of Management were held and

(C) Two meetings of the Academic Council were held.

5. IMPORTANT DECISIONS OF DIFFERENT AUTHORITIES

5. 1 BOARD OF MANAGEMENT :

5.1.1 As per decision of the Board of Management following important appointments were made during the year.

[i] Chief Scientist-cum-University Professors-

(ii) Director of Administration.

(iii) Director of Extension Education [Against lien vacancy].

(iv) Dean [Agril.] [against lien vacancy].

[v] Assoc. Dean-cum-Director, SGIDT, Patna.

[vi] Assoc. Dean-cum-Principal [Against lien vacancy], T. C. A., Dholi.

[vii] Deputy Registrar.

[viii] 18 Associate Professors also were appointed during the period.

5. 1. 2 Personal Promotion :

During the period under report seven Assistant Prof. were promoted to the post of Associate Professor.

5. 1. 3 Other Important Dicisions :

[i] The superannuation age of teachers was raised to 62 years from 60 years.

[ii] The post of planning Officer was redesignated as Director, Planning and Monitering.

5.2 SENATE :

[i] Annual Report of the University for the years 1985-86 and 1986-87 were discussed and approved.

[ii] The Senate also passed the Annual Account of the University for the year 1985-86, revised Budget for the year 1986-87 and Budget estimate of 1987-88.

[.ii] The Senate also proposed that some new deptts. like the Department of Food and Technology may be started and deptts of Horticulture may be devided into the Departments of Fruits, Department of Vegetable, Departments of Medicinal & aromatic plant, Department of Spices, Department of Flower and Department of Tuber Crops.

[iv] It was also proposed that a Mali Training Programme may be started in this University.

5.3. ACADEMIC COUNCIL :

Some of the important decisions taken In Academic Council meetings are given below :

[i] Some important amendments in

the Regulations on Resident Instruction were effected to make them more effective and realistic.

[ii] The four point scale was replaced by 10 point scale of evaluation for the students and necessary amendements in Regulation on Resident Instruction were incorporated regarding introduction of 10 point scale.

[iii] The name of Soil Survey Scheme was changed to Soil Survey and Land Use Planning Scheme.

[iv] Seats in Ph. D. programme in Agronomy was raised to 5 and Entomology to 3 whereas seats in M. Sc. Genetics programme was raised to six.

[v] The Academic Council recommended the starting of Master's degree programme in the Departments of Farm Machinary, Irrigation & Drainage and Post Harvest Technology in the College of Agril. Engineering with intake Capacity of 3, 3 and 2 respectively.

[vi] The Academic Council also recommended the starting of Ph.D. programme in the Departments of Genetics and Plant Physiology in the College of Basic Science & Humanities with an intake capacity of 2 in each department.

[vii] It was also recommended that M.Sc. programme in the Department of Bio-Chemistry may also be started with an intake capacity of 2 only.

[viii] The Academic Council also recommended the starting of M. V. Sc. programme in the Departments of Veterinary Gynaecology, Veterinary Surgery & Radiology and Veterinary Public Health with intake capacity of 4, 4 and 3 respectively.

[ix] It was also recommended to start Ph. D. Programme in Veterinary Anatomy and Veterinary Microbiology with intake capacity of 2 and 3 respectively.

[x] An ward in the memory of Late Dr. M. K. Sinha was instituted according to which student submitting best thesis for M. Sc. programme in the Department of Soil Science shall be awarded a Plaque and a Cash Award of Rs. 500/-

[xi] Conversion formula for conversion of OGPA to percentage of marks was revised.

[xii] Cources of studies for 5 years B. V.Sc. and A.H. programme was approved.

1. ACADEMIC ACTIVITIES

RESIDENT INSTRUCTION

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

1.1 Faculty of Post-graduate studies :

[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.

1.1.2 Basic Sciences :

[i] Statistics & Mathematics
[ii] Botany & Plant Physiology
[iii] Genetics.

1 1.3 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

1.2 Faculty of Agriculture :

[i] Bihar Agricultural College, Sabour, Bhagalpur.
[ii] Tirhut College of Agriculture, Dholi, Muzaffarpur.

1.3 Faculty of Animal Husbandry :

[i] Bihar Veterinary College, Patna-14.
[ii] Sanjay Gandhi Institute of Dairy Technology, Lohia Nagar, Patna.
[iii] College of Fisheries, Tirhut College of Agriculture, Campus—Dholi [Muzaffarpur].

1. 4. Faculty of Home Science :

[i] College of Home Science, Pusa [Samastipur].

1. 5. Faculty of Basic Science & Humanities :

[i] College of Basic Science & Humanities, Pusa [Samastipur].

1. 6. Faculty of Agricultural Engineering :

[i] College of Agricultural Engineering, Pusa [Samastipur].

2. DEGREES AWARDED :

The University imparts instruction leading to the following degrees ;

2. 1. 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. Agricultural Engineering
[vi] B. F. Sc.

2. 2. Post-graduate level programme :

2. 2. 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

2.2.2 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

2.2.3 M. Sc./M.Sc. (Agril.) degree in :

[i] Agricultural Statistics
[ii] Botany and Plant Physiology
[iii] Genetics

2.2.4 Ph. D. degree level programme in :

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

3. SYSTEM OF EDUCATION :

The University is following semester system of Education since Academic Session, 1985-86.

4. COURSES :

The course curriculum for different degree programmes under semester system of Education has been formulated and they are being regularly reviewed and revised keeping into consideration the need and utility of the courses.

5. Regulations :

Detailed regulation on Resident Instruction for semester system of education has been prepared and adopted.

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 is given below :—

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

Sl. No.	Name of student	Major subject & title of Thesis
1	2	3
	Plant Breeding and Genetics	
1.	Md. Firdaus Noor	"Studies on estimates of stability performance in Gram [*Cicer arietinum* L.]".
2.	Jai Prakash Pandey	"Genetic Divergence and character associations in Finger, Millet, [*Eluesine Coracana* L. Gaertn]."
3.	Praveen Kumar Jha	"Variability and Inter-relationship of some Biochemical and Agronomical Traits in Maize [*Zea mays* L.]".
4.	Abinash Srivastava	"Isozyme Studies in Mung [*Vigna radiata* L. Wilozek[".
5.	Ashok Kumar	"Genetic varibility and correlation Studies in Hull-less Burley [*Hordium Vulgara* L.]".
	Agronomy	
1.	Bijay Kumar Singh	"Response of Sugarcane to different irrigation scheduling methods".
2.	Shubhendu Kr. Verma	"Effeciency of Cultural and Chemical methods of Weed Control in Wheat".
3.	Girish Kumar Singh	"Studies on Productivity of Wheat as Influenced by Plant Geometry and Nitrogen Fertilization".
4.	Tapan Kanti Choudhary	"Effect of Seed rates, fertility levels and weed control practices on growth, yield and quality of wheat".
5.	Jeevendra Pratap Singh	"To investigate the response of early Sugarcane Varieties to different levels of N-Fertilization".

1	2	3
6.	Ramesh Chandra Srivastava	"Effect of N-levels and Growth Regulants on Growth Yield attributes and Yield of Sweet Potato".
7.	Shrawan Kumar Sah	"Effect of Major Production Factor on the Yield and Quality of Sugarcane.
8,	Mahendra Narayan Singh	"To Determine the Response of Cheena Varieties to Nitrogen and Phosphorus".
9.	Bipin Kumar Singh	"To find out the Nitrogen Requirement of Wheat Sown at Different Dates under Irrigated Conditions".
10.	Anand Kumar Rai	"Studies on Application of Fertilizer as per critical Need of Wheat [*Triticum aestivum* L.] Plant".
11.	Sanjay Kumar Sinha	"Influence of sources and Levels of Potassic Fertilizer on the Growth, Yield and Quality of Tobacco".
12.	Umesh Prasad Mandal	"Response of Wheat Varieties to Different Nitrogen Levels under Rainfed condition".
13.	Madan Kumar Das	"Comparision of Ring Planting System of Sugarcane with Conventional Row Planting of Sugarcane for Yield and Economics in North Bihar Condition".
14.	Ashok Kumar Sinha	"Response of Hill-Less Barley [*Hordeum Vulgare* L] Cultivars to Various Levels of Seeds and under normal Sown Irrigated situation".
15.	Ravi Kumar	"To find out suitable Seeding time and Variety for Summer Cultivation of Sesamum under North Bihar Condition".
16.	Pradyuman Pd. Singh	"Productivity of wheat under Rainfed late Sown Condition".
17.	Anirudh Kumar	"Systems of cropping and Fertility levels in chickpea-wheat crop combinations under limited supply of Irrigation".

1	2	3
6.	Ramesh Chandra Srivastava	"Effect of N-levels and Growth Regulants on Growth Yield attributes and Yield of Sweet Potato".
7.	Shrawan Kumar Sah	"Effect of Major Production Factor on the Yield and Quality of Sugarcane.
8.	Mahendra Narayan Singh	"To Determine the Response of Cheena Varieties to Nitrogen and Phosphorus".
9.	Bipin Kumar Singh	"To find out the Nitrogen Requirement of Wheat Sown at Different Dates under Irrigated Conditions".
10.	Anand Kumar Rai	"Studies on Application of Fertilizer as per critical Need of Wheat [*Triticum aestivum* L.] Plant".
11.	Sanjay Kumar Sinha	"Influence of sources and Levels of Potassic Fertilizer on the Growth, Yield and Quality of Tobacco".
12.	Umesh Prasad Mandal	"Response of Wheat Varieties to Different Nitrogen Levels under Rainfed condition".
13.	Madan Kumar Das	"Comparision of Ring Planting System of Sugarcane with Conventional Row Planting of Sugarcane for Yield and Economics in North Bihar Condition".
14.	Ashok Kumar Sinha	"Response of Hill-Less Barley [*Hordeum Vulgare* L] Cultivars to Various Levels of Seeds and under normal Sown Irrigated situation".
15.	Ravi Kumar	"To find out suitable Seeding time and Variety for Summer Cultivation of Sesamum under North Bihar Condition".
16.	Pradyuman Pd. Singh	"Productivity of wheat under Rainfed late Sown Condition".
17.	Anirudh Kumar	"Systems of cropping and Fertility levels in chickpea-wheat crop combinations under limited supply of Irrigation".

THE HON'BLE GOVERNER AND CHANCELLOR INSPECTING A GUARD OF HONOUR BY THE N.C.C. CADETS

GIRLS OF THE COLLEGE OF HOME SCIENCE ENGAGED IN CO-CURRICULAR ACTIVITIES

DEMONSTRATION ON TURMERIC VARIETY - R.H. 10

MAIZE DEMONSTRATION IN ADOPTED VILLAGE

DEMONSTRATION ON TURMERIC VARIETY - R.H. 10

MAIZE DEMONSTRATION IN ADOPTED VILLAGE

1	2	3
		Entomology & Agril. zoology
1.	Pashupati Singh	"Residues of Fenitrothion and Monocrophos in/ on Pigeon Pea".
2.	Mohammed Nayeem Ashraf	"Studies on the Bioefficacy of insecticides against *Spodoptera litura* Feb. with special reference to the residues of endosulfan in/on chewing tobacco".
3.	Udayan Mukherjee	"Effectiveness of neem *(Azadirachta indica* A. Juss.) products against rice weevil (*Sitophilus* oryzae L.) in wheat seed".
4.	Md. Hasan Shahid	"Bionomics and Control of Gram Pod Borer (*Heliothis* armigera Hubner)".
5.	Mithilesh Kumar Tiwari	"Varietal Registance against stem Bovens in Deepwater rice".
6.	Kiran Kumari	"Varietal Raction, Growth Potential and Control of *Callosobruchus Chinenis* (Linn.)".
		Plant Pathology
1.	Itendra Deb	"Studies on *Sclerptinia scierotiorum* occurring at Pusa.
2.	Rama Kant Sharma	"Studies on Seed Mycoflora of Chickpea (Cicer arietinum L.) and their Control".
3.	Mrityunjay Kumar Paul	"Some Studies on Papaya (Caricus Papaya L.) Mosaic disease".
4.	Ranjit Bhaumik	"Studies on Seed Mycoflora Associated with Barley (Hordeum Vulgare L.) Seed".
5.	Sri Ram Singh	"Studies on the development of red rot disease (c.o. *C. falcatum* went) vis-a-vis, micronutrients, juice quality and genotypic reaction in sugarcane".
6.	Ajoy Kuma:-	"Studies on Bacterial diseases of Betelvine (Piper betle L.)".
7.	Uma Shankar Jha	"Studies on some of the Fungal disease of Mango in Bihar".

1	2	3
	Extension Education	
1.	Satyandra Narain Singh	"Differential attitude of users and non-users of biogas technology in respect of Janta and KVIC model in North Bihar".
2.	Sushil Kumar	"A comparative study of adoption behaviour of contract and non-contract farmers under I & V systems".
3.	Md. Inul Haque	"A study on Training Needs of Village Extension Workers in Training and visit System of Agricultural Extension in Muzaffarpur District of North Bihar".
4.	Ashok Kumar Ojha	"A Study on attitudes of teachers and students towards the performance of trimester system of agricultural education in Bihar".
5	Uday Shanker Prasad	"A Study on awareness Utilisation and repayment of Rural Credit in Purnea District".
6.	Shambhu Prasad Singh	"Training needs of Farmers in Relation to HYV of Maize in Adopted Villages of KVK Munger".
6.	Satya Narain Prasad Verma	"A study on adoption of Scientific Sugarcane Cultivation in Samastipur District of Bihar".
	Soil Sciences	
1.	Kamleshwari Mandal	"Effect of insecticides on rice under different levels of Nitrogen".
2.	Murlidhar Yadav	',Relative Performance of Urea Based Nitrogenous Fertilizers in Sugarcane in Calcareous Soil".
3.	Binay Kumar Choudhary	"Studies on cation Exchange behaviour of some Soils of Bihar".
4.	Subhas Chandra Jaiswal	"Effect of Longterm Application of Manures and Fertilizers on Fertility Status of Soil in a fixed Crop Rotation".

1	2	3
	Extension Education	
1.	Satyandra Narain Singh	"Differential attitude of users and non-users of biogas technology in respect of Janta and KVIC model in North Bihar".
2.	Sushil Kumar	"A comparative study of adoption behaviour of contract and non-contract farmers under I & V systems".
3.	Md. Inul Haque	"A study on Training Needs of Village Extension Workers in Training and visit System of Agricultural Extension in Muzaffarpur District of North Bihar".
4.	Ashok Kumar Ojha	"A Study on attitudes of teachers and students towards the performance of trimester system of agricultural education in Bihar".
5	Uday Shanker Prasad	"A Study on awareness Utilisation and repayment of Rural Credit in Purnea District".
6.	Shambhu Prasad Singh	"Training needs of Farmers in Relation to HYV of Maize in Adopted Villages of KVK Munger".
6.	Satya Narain Prasad Verma	"A study on adoption of Scientific Sugarcane Cultivation in Samastipur District of Bihar".
	Soil Sciences	
1.	Kamleshwari Mandal	"Effect of insecticides on rice under different levels of Nitrogen".
2.	Murlidhar Yadav	',Relative Performance of Urea Based Nitrogenous Fertilizers in Sugarcane in Calcareous Soil".
3.	Binay Kumar Choudhary	"Studies on cation Exchange behaviour of some Soils of Bihar".
4.	Subhas Chandra Jaiswal	"Effect of Longterm Application of Manures and Fertilizers on Fertility Status of Soil in a fixed Crop Rotation".

1	2	3
5.	Padmanava Dhar	"Influence of Fluvic Acid on TransPort Processes of Iron in Soils and its uptake by Paddy Seedlings".
6.	Ranjan Laik	"Reaction products of Phosphatic Fertilizers in Alluvial Soils and their Evaluation as sources of phosphate for Plants."
	Horticulture (Pomology)	
1.	Anil Kumar Verma	"Studies on Some Vegetative and Pomological Characteristics of Five Cultivers of Litchi."
2.	Ashok Kumar Agrawal	"Role of Etiolation and indole Butyric Acid on Root induction in Air-Layers of Guava *(Psidium guajava Linn)* Cv Sardar".
3.	K. Lal Duhawma	"Studies on the effect of Plant Growth Regulators on Fruit drop development and quality of Litchi *(Litchi chinensis)* some."
4.	Syed Zafrul Hoda	"Studies on the effect of Etiolation and growth Regulator treatment on air Layering Litchi *(Litchi Chinensis)* sonn."
5.	Yadunandan Prasad Yadav	"Effect of Nitrogen on Growth Fruiting and Quality on Guava (Psidium guajava L.)".
6.	Pradip Taran	"Studies on the effect of Calcium, Potassium and Plant Growth Regulators on Fruit Development and Quality of GUAVA cu Allahabad Safeda".
7.	Alot Datta	"Studies on the Effect of Plant Growth substances for fruit Retention in Mango (Mangifera indica L.) cv Langra".
	Horticulture (Olericulture)	
8.	Vijay Kumar Singh	"Genetic Variability in Brinjal *(Solanum Melongena* L)".
9.	Om Prakash Kumar	"Exploitation of Heterosis in Bhindi *(Abelmoschus esculentus* L) Moench".

1	2	3
	Agriculture Economics	
1.	Ravindra Kumar	"Income, saving and Economic Rationale of Investiment on Farm Households of Bihar Sharif Block of Nalanda District (Bihar)".
2.	Ashok Kumar Prasad	"A study on Trend in Area, Production and Productivity of Pulses in Bihar".
3.	Lalit Chandra Das	"A study on Growth Trend and Inter District Disparities in the Productivity of Paddy in Assam".
4.	Prakash Kumar Verma	"A study of the Influence of Different Sosio-Economic Factors on Productivity of the Similar Farm Size".
5.	Balram Sahu	"A study on Repayment of Dairy Loans Financed under I.R.D.P. (Block Muraul Muzaffarpur)".
	Botany & Plant Pathology	
1.	Ram Kishor Roy	"Shysiology of Iron Efficient/Inefficient Rice Genotypes in a Calcarious Soil".
2.	Nakul Prasad Mandal	"Post Anthesis source 'Sink Ratio' Alternation and its Impack on Physiological Parameters in Maize (Zea Mays L)".
	(b) List of students qualified for M. V. Sc. degree	
	Veterinary Microbiology	
1.	Neelam Kumari	"Study on Fungi Associate with Poultry Feeds with Particular Reference to Afla toxin and its in Vivo Effect".
2.	Sanjay Kumar Sinha	"Study on cell Mediated Immune Response in Rice to Food and Mouth Disease (FMD) virus Serotype "O".
	Veterinary Medicine	
1.	Bhuvaneshwar Singh	"Studies on Subacute Rumintal Acidosis in Cattle and Buffaloes".

1	2	3
		Agriculture Economics
1.	Ravindra Kumar	"Income, saving and Economic Rationale of Investiment on Farm Households of Bihar Sharif Block of Nalanda District (Bihar)".
2.	Ashok Kumar Prasad	"A study on Trend in Area, Production and Productivity of Pulses in Bihar".
3.	Lalit Chandra Das	"A study on Growth Trend and Inter District Disparities in the Productivity of Paddy in Assam".
4.	Prakash Kumar Verma	"A study of the Influence of Different Sosio-Economic Factors on Productivity of the Similar Farm Size".
5.	Balram Sahu	"A study on Repayment of Dairy Loans Financed under I.R.D.P. (Block Muraul Muzaffarpur)".
		Botany & Plant Pathology
1.	Ram Kishor Roy	"Shysiology of Iron Efficient/Inefficient Rice Genotypes in a Calcarious Soil".
2.	Nakul Prasad Mandal	"Post Anthesis source 'Sink Ratio' Alternation and its Impack on Physiological Parameters in Maize (Zea Mays L)".

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

		Veterinary Microbiology
1.	Neelam Kumari	"Study on Fungi Associate with Poultry Feeds with Particular Reference to Afla toxin and its in Vivo Effect".
2.	Sanjay Kumar Sinha	"Study on cell Mediated Immune Response in Rice to Food and Mouth Disease (FMD) virus Serotype "O".
		Veterinary Medicine
1.	Bhuvaneshwar Singh	"Studies on Subacute Rumintal Acidosis in Cattle and Buffaloes".

1	2	3
2.	Surinder Kumar Gupta	"Clinico-biochemical changes and chemotherapy of Bovine Babesiosis".

(C) List of studens qualified for Ph. D. degree

		Agronomy
1.	Triloki Nath Prasad	"Effect of Irrigation and Pattern of sowing on different intercrops with Winter Maize".
2.	Braj Lal Mandal	"Integrated Weed Management in Ground Nut *(Arachis hypoquaes* LINN.)"
3.	Anil Kumar	"Studies on the growth and Yield structure of Green gram under various nutrient management system in two different Agro-echnological situation".
4.	Shiva Dayal Prasad	"Studies on the effect of Soil moisture stress at different stages of growth under varying nitrogen levels on the development, yield and quality of Rabi Hybrid Maize."
		Plant Pathology
1.	Jai Prakash Sharma	"Studies on Epidemiology and losses due to Major *(Helminthosporiosis* on Maize *(Zea Mays* L*)* in North Bihar"
2.	Shive Pujan Pandey	"Studies on some Virused of Tomato *Lycopersicon esculentum* Mill.)."
3.	Naresh Bihari Dwivedi	"Studies on Sugarcane Culmicolous smut Caused by *Ustilago Scitaminea* (Sydow)."
		Soil Science
1.	Shambhu Saran Prasad	"Tracer studies on the chemistry of phosphorus and its transformation in alluvial soils of Bihar"
2.	Ramawater Singh	"Studies on the Genesis of Soils Developed in Catenary Sequences and their intepretative Grouping in some of the Soil Associations of Subernrekha Irrigation Command".

1	2	3
3.	Shiv Nandan Choudhary	"Studies on Influence of Pyrite-*Enriched Organic* Wastes and Pyrites on Iron and Sulphur Nutrition on crops."

Plant Breeding and Genetics

1.	Valluru Raja Gopal Reddy	"Analysis of Genetic Divergence Heterosis & Combining Ability in Peanut *(Arachis hypogaea* L.)"

Horticulture (Pomology)

1.	Mohammd Nurula Hoda	"Studies on the effect of Ethrel, CCC and GA sprays on bearing of Mango *Mangifera indica* L.)"

Agriculture Economics

1.	Rajeshwar Tiwary	"A Study on Dynamics of Sugarcane Production in North Bihar."

1	2	3
3.	Shiv Nandan Choudhary	"Studies on Influence of Pyrite-*Enriched Organic* Wastes and Pyrites on Iron and Sulphur Nutrition on crops."
	Plant Breeding and Genetics	
1.	Valluru Raja Gopal Reddy	"Analysis of Genetic Divergence Heterosis & Combining Ability in Peanut *(Arachis hypogaea* L.)"
	Horticulture (Pomology)	
1.	Mohammd Nurula Hoda	"Studies on the effect of Ethrel, CCC and GA sprays on bearing of Mango *Mangifera indica* L.)"
	Agriculture Economics	
1.	Rajeshwar Tiwary	"A Study on Dynamics of Sugarcane Production in North Bihar."

Research Activities

With the establishment of Birsa Agricultural University at Kanke, Ranchi during the year 1981-82 the responsibility of Agriculture and Animal Husbandry research of the plateau region comprising the divisions of Chhotanagpur and Santhal Parganas came under the jurisdiction of this newly created university.

Rajendra Agricultural University now comprises the divisions of Patna, Gaya, Bhagalpur, Saharsa, Darbhanga, Tirhut and Saran.

Problems in Agriculture are location specific & as such with the active support of the I.C.A.R. under its National Agricultural Research Project (NARP) the area falling under the jurisdiction of this University has been deliniated into the following 3 major agro-climatic zones, based on rain fall, temper-ature, terrain and soil charecteristics.

ZONE 1. North West elluvial plane :

This zone comprises the districts of west and east Champaran, Gopalganj, Sitamarhi, Siwan, Muzaffarpur, Vaishali, Madubani, Darbhanga and Samastipur, with an area of 32665 Km^2. This zone comprises 18.77 % of the state area and 31.51 % of state population. The average density of population is 673 per Km^2. The western portion of this zone [West Champaran] is least populated with a density of while Darbhang in the eastern part of this zone most thickly populated with a density of 376 persons per Km^2.

The Research Stations/Sub stations falling in this zone are [i] Regional Research Institute, Dholi, [ii] Sugarcane Research Institute, Pusa, [iii] Animal Production Research Institute, Pusa, [iv] Regional Research Sub-station, Madhopur [West Champaran], [v] Banana Research Station Hajipur, [vi] Deep Water Rice Research Station, Biraul [Darbhanga], [vii] Rice Research Sub-station, Jhanjarpur [Madhubani] and [viii] Horticulture Research Station, Birauli, [Samastipur].

ZONE 2. North East alluvial plane :

This zone comprises the districts of Purnia, Katihar, Saharsa and Begusarai and covers 11.96 % [20797.4 Km^2] of the total state land area. This zone comprises 13.51 % of the state population and the density of population is the highest in Begusarai district [795 persons per Km^2] and lowest in Purnia district [452 persons per Km^2]. The average density of population of this zone is 453 persons per Km^2.

The Research Stations/Sub-statsons is this zone are [i] Regional Research Station, Agwanpur [Saharsa], [ii] Regional Research Sub-station, Jalalgarh [Purnia], [iii] Jute Research Station, Katihar [iv] Irrigation Research Station, Madhepura, [v] Irrigation Research Sub-station, Araria [Surnia].

ZONE 3 South Bihar alluvial plane :

This zone comprises the districts of Gaya, Aurangabad, Rohtas, Bhojpur, Patna, Nalanda, Munger and Bhagalpur. The total area is 44875.5 Km^2 which represents 25.7 per Km^2 of the State.

The most thickly populated district is Patna [947 persons per Km^2], while the least thickly populated district is Rohtas [328 persons per Km^2]. The average density is 465 persons per Km^2. The total population of this zone is about 2.08 crores which represents 29.80 % of the state population.

Zone III has further been subdivided into two sub-zones. Zone III [a] comprises the districts of Bhagalpur and Munger where as zone III [b] comprises the district of Patna, Rohtas, Bhojpur, Aurangabad, Gaya, Nawadah and Nalanda.

The Research Station/Sub-station in this zone are [i] Regional Research Station, Sabour [Bhagalpur], [ii] Horticulture Research Station, Sabour [Bhagalpur], [iii] Regional Research Station, Mithapur, Patna, [iv] Regional Research Substation, Munger, [v] Rice Research Substation, Tilaundha [Bhagalpur].

[vi] Irrigation Research Station, Bikaramganj [Rohtas] and [vii] and Lives Stock Research Station, Phulwarisharif.

With the identification of different agro-climatic zones under the jurisdiction of this University, most of the researches that are now being planned, are to cater to the needs of the farmers of the res-pective zone.

The field of research activity got widened with the establishment of new colleges and faculties like college of Basic Science and Humanities, College of Home Science, Sanjay Gandhi Intitute of Dairy Technology, College of Fisheries, College of Agril. Engineering. Apart from the above some new departments have also been added in the faculty agriculture such as department of Agro-meteorology, Agro-forestry and Nematology.

The Research activities being carried out in the different faculties are being co-ordinated by the Director of Research at the University Headquarters.

The salient research achievements during the year under report are listed below faculties wise :

FACULTY OF AGRICULTURE

1. Rice :This University is doing good work in developing prominent rice varieties for various agroclimatic zones falling in its jurisdiction.

Variety released for general cultivation :

1. BIET 1008 : [Kanak]- It is a semi-dwarf variety and matures in 130-135 days. Grain type is long and bold. It is suitable for irrigated medium lands.

2. TCA 80-4 [Rajshree]-It is tall variety and matures in 150-155 days. Grain type is medium stander. It is suitable for shallow rain fall low land.

3 TCA 72 [Sudha]—It is a tall variety suitable for deep water land [where water is lm deep]. It has long and bold grain with red kernel.

Rice Breeding
ZONE I

—42 cross combinations were grown at Pusa and 237 single plant selections were made for further evaluation.

—Natural cytoplasmic male sterile plants were identified in the variety BR 34 and TCA 72.

The most thickly populated district is Patna [947 persons per Km^2], while the least thickly populated district is Rohtas [328 persons per Km^2]. The average density is 465 persons per Km^2. The total population of this zone is about 2.08 crores which represents 29.80 % of the state population.

Zone III has further been subdivided into two sub-zones. Zone III [a] comprises the districts of Bhagalpur and Munger where as zone III [b] comprises the district of Patna, Rohtas, Bhojpur, Aurangabad, Gaya, Nawadah and Nalanda.

The Research Station/Sub-station in this zone are [i] Regional Research Station, Sabour [Bhagalpur], [ii] Horticulture Research Station, Sabour [Bhagalpur], [iii] Regional Research Station, Mithapur, Patna, [iv] Regional Research Substation, Munger, [v] Rice Research Substation, Tilaundha [Bhagalpur].

[vi] Irrigation Research Station, Bikaramganj [Rohtas] and [vii] and Lives Stock Research Station, Phulwarisharif.

With the identification of different agro-climatic zones under the jurisdiction of this University, most of the researches that are now being planned, are to cater to the needs of the farmers of the res-pective zone.

The field of 'research activity got widened with the establishment of new colleges and faculties like college of Basic Science and Humanities, College of Home Science, Sanjay Gandhi Intitute of Dairy Technology, College of Fisheries, College of Agril. Engineering. Apart from the above some new departments have also been added in the faculty agriculture such as department of Agro-meteorology, Agro-forestry and Nematology.

The Research activities being carried out in the different faculties are being co-ordinated by the Director of Research at the University Headquarters.

The salient research achievements during the year under report are listed below faculties wise :

FACULTY OF AGRICULTURE

1. Rice :This University is doing good work in developing prominent rice varieties for various agroclimatic zones falling in its jurisdiction.

Variety released for general cultivation :

1. BIET 1008 : [Kanak]- It is a semi-dwarf variety and matures in 130-135 days. Grain type is long and bold. It is suitable for irrigated medium lands.

2. TCA 80-4 [Rajshree]-It is tall variety and matures in 150-155 days. Grain type is medium stander. It is suitable for shallow rain fall low land.

3 TCA 72 [Sudha]—It is a tall variety suitable for deep water land [where water is 1m deep]. It has long and bold grain with red kernel.

Rice Breeding

ZONE I

—42 cross combinations were grown at Pusa and 237 single plant selections were made for further evaluation.

—Natural cytoplasmic male sterile plants were identified in the variety BR 34 and TCA 72.

—Male sterile mutant in the variety Saket 4 was identified as a result of treatment with Mutagen. The following varieties were identified as promising :

I Summer-IET 6148, IET 8674

II Kharif-Very Early-SBRES 31-1-1 [irrigated]

Early —I E T 6148

Midearly —I E T 8320, URR 238

Medium—BR 153-2B-10-1-3, BIET 836

III Kharif-Deep water—TCA 214, TCA 177 [rainfed]

Floating type—TCA 282, TCA 4

IV For adoptive research-IET 6148

V For minikit-Summar early-IET 6248

—Mid Early —UPR 238

—Deep Water —TCA 177

Saline and alkaline tolerant-IR 4568

JONE II

Breeding work has been taken up in the newly established Regional Research Station at Agwanpur and its Sub-stations.

Zone III [A]

—A total number of 351 germplasms were grow at Sabour and Tilaundha for maintenance and evaluation.

—A large number of breeding lines were grown from 27 cross combinations and 941 single plants were selected for further evaluation.

—Desirable mutants were selected from Pusa 33, Pusa 2-21, Rasi and Boro.

—The following promising cultures were selected :

[i] For summer season—IET 8674, IET 6148

[ii] For Boro season —ES 29-3-3, ES 1-2-3

[iii] For Kharif [Irrigated] :
Very Early—IRSB 34-69-1, ES 31-1-1
Mid Early —IET 8320, IET 8787
Medium —TRM 2-43, IR 9719-98-2
Fine Scented—SBR 80-642-3
SBR 80-643-14-1-1

[iv] For Kharif [rainfed]
Deep water—Desaria—3, CN 706-2-26
Submergence tolerant—SBR3015-406-74-4-3-1
SBR 3013-11-11-11-1-2:
IR 218-20-58-1-65
IR 33383-9-1-1-3

[v] For Adaptive Research : ES 29-3-3, IET 7664

ZONE III [B]

—895 germplasms were grown at Patna for maintenace and evaluation.

—450 breeding lines were grown from 245 cross combinations.

— selections were made for further evaluation.

—under *hybrid rice* programme 21 clones were evaluated for identifying the restorer and maintaniners. 11 restorer, 2 postial restorers and 8 maintainers were identified.

—Desirable mutants were selected from Sujata, Pusa 33, BR 34 & Mahsoori.

—The followings cultures were found to be promising.

1. **Irrigated :**

Early —B 3622, CTb-5-44
Mid Early—IET 9671, UPR 238-42-2-3
Medium —BR 153-2B-10-1-3, IR 9710-98-2
Late —IET 1129-B-3-1 RP 1057-393-1
Fine Scented—SBSR 80-642-3 IET 10365

2. **Rainfed :**

Shallow rainfed lowland : IET 7598, CN 540 : Barogar 6, IET 9090 9 TCA-24.

3. Bacterial Blight tolerant : Nigeria 5, IET 10844, IR 54×72-8-22.

4 Adaptive Research Trial : BIET 836. IR 13540, FPAR 7360 RAO 77-1 RAU 83-82-4 RAU PTI 10-4-97.

5. Minikit Testing : RAU 77-2 [Medium] RAU 83-82-5 [Late] RAU PTI 10-4-97 [late] FPAR 7360.

Rice Agronomy

Zone-I

—IET 3279 and UPR-238 were found to be promising in Zn and Fe dificient areas.

—IET 1986 was found to be promising for long duration rainfed situation.

—*Sesbania rostrata* as a green manure crop was found to be better than the traditional *sesbania aculeata.*

Zone-II

—Screening Varieties for medium lands and rainfed low lands and to be taken after jute are in progress.

Zone-III (a)

—Varieties IR 456-50-2 and IR 135-40-56-3-2-1 were found to be promising (mid duration group).

—Application of phosphorus in two splits (75% basal and 25% 20 days after transplanting) was found to be as effective as basal.

Zone-III (b)

—Optimum plant population was found to be 40-42 hills per squire metre.

—Two split application of nitrogen for short duration, three for medium duration and four for long duration varieties.

—*Sesbania rostrata* was better than *Sesbania aculeata.*

—For summer season IET 3279 and IET 6223 were the promising.

—For medium duration IR 340-56-3-2 and IR 456-503-2-5 and for long duration FPAR 7360 were promising varieties.

Rice Physiology

—Blue Green Algae inoculation was found to add 20-30 kg N/ha to the rice

1. **Irrigated :**

Early —B 3622, CTb-5-44
Mid Early—IET 9671, UPR 238-42-2-3
Medium —BR 153-2B-10-1-3, IR 9710-98-2
Late —IET 1129-B-3-1 RP 1057-393-1
Fine Scented—SBSR 80-642-3 IET 10365

2. **Rainfed :**

Shallow rainfed lowland : IET 7598, CN 540 : Barogar 6, IET 9090 9 TCA-24.

3. Bacterial Blight tolerant : Nigeria 5, IET 10844, IR 54×72-8-22.

4 Adaptive Research Trial : BIET 836, IR 13540, FPAR 7360 RAO 77-1 RAU 83-82-4 RAU PTI 10-4-97.

5. Minikit Testing : RAU 77-2 [Medium] RAU 83-82-5 [Late] RAU PTI 10-4-97 [late] FPAR 7360.

Rice Agronomy

Zone-I

—IET 3279 and UPR-238 were found to be promising in Zn and Fe dificient areas.

—IET 1986 was found to be promising for long duration rainfed situation.

—*Sesbania rostrata* as a green manure crop was found to be better than the traditional *sesbania aculeata*.

Zone-II

—Screening Varieties for medium lands and rainfed low lands and to be taken after jute are in progress.

Zone-III (a)

—Varieties IR 456-50-2 and IR 135-40-56-3-2-1 were found to be promising (mid duration group).

—Application of phosphorus in two splits (75% basal and 25% 20 days after transplanting) was found to be as effective as basal.

Zone-III (b)

—Optimum plant population was found to be 40-42 hills per squire metre.

—Two split application of nitrogen for short duration, three for medium duration and four for long duration varieties.

—*Sesbania rostrata* was better than *Sesbania aculeata*.

—For summer season IET 3279 and IET 6223 were the promising.

—For medium duration IR 340-56-3-2 and IR 456-503-2-5 and for long duration FPAR 7360 were promising varieties.

Rice Physiology

—Blue Green Algae inoculation was found to add 20-30 kg N/ha to the rice crop. About 1 tonnes of BCA was sold to the farmers.

—It was found that *Azolla pinnata* can be grown through out the year under Patna condition.

Rice Pathology

The following promising entries were identified for further evaluation against Bacterial Blight.

—International B. B. nursery —3 entries

—International Rice observation nursery —3 entries

—Bacterial Blight resistant varieties —8 (IET series)

—National Screening nursery —9 entries (IET series)

—State Screening nursery —7 entries

—Difoltan gave constantly better result followed by Blitox-50 and Dithan-M-45 against False smut and sheath rot diseases.

2. WHEAT :

The main object of the wheat improvement programme has been to evolve high yielding disease resistaut varieties suitable for different agro-climatic situations of the State under rainfed, normal, irrigated and late sown irrigated conditions. The programme also aims at testing and investigating the suitability of wheat varieties bread at different Breeding Centres in the country and recommend them for cultivation if found suitable.

-Based on performance in the State trials conducted at Patna; Pusa and Sabour, four varieties of Sabour Centre *Viz*; RWP-1015, 1016, 1017 and 1018 were recommended for testing in the All India Co-ordinated Trial.

-Variety BK-3016 was identified and processed for release and notification.

-620 indigenous and exotic varieties were maintained and evaluated for their ancillary characters, maturity and disease resistance.

-270 varieties incorporated in the National Germplams Screen Nursery were also screened,

-In the hybridazation programme 24 cross combinations were identified.

-Varieties RWS-3225, RWS-3224 and RWS-3256 were found to be promising in late group.

-Cross sowing of wheat at normal seed rate was found to be effective in reducing weed population considerably resulting in higher yield.

-Varieties HP-1102, BR-280, BR-326, BR-3016 and K-8020 were found to be resistant to alternaria leaf blight.

3. MAIZE :

Maize has some unique features which make it specially significant for the state of Bihar. Of all food grain, maize has shown the highest yield potential in field experiments and demonstrations. It can play a very important role in wiping out the acute food shortage of cereal in Bihar and India.

Bihar has been the pioneer in the development of the suitable technologies and varieties for rabi maize cultivation in India. Realising the bottle neck of non-availability of good healthy and genuine hybrid seeds in the way of maize production of the state, maize research team developed agronomically uniform composite varieties like Lakshmi and Hement, serving to the best interest of the farmers.

KHARIF :

During *Kharif* Season of 1987, a very heavy precipitetion of 875 2 mm. in August, 1987, followed by 714.4 mm. in the month of September, 1987, left the crop completely damaged. The rain in August and September '87 was 681.7 and 577.4 mm. in excess to the August and September '86 rainfall. The total rainfall during May to October '87 was 2008.5 mm. which again was 1057.9 mm. more for the same period during Kharif '86.

RABI :

The main emphasis was directed for the development of conventional and non-conventional hybrids suiting to the vaious situations. Among the white crosses, five hybrids developed at Dholi *Viz* , [CM-400 x CM 300] x pant 7421; [M9xCM 101]; [Texp 161-1 x Texp. 104] x [MS DR-120 x PKMS-49]; [M9 x CM 300]; and [Texp. 231-1 x Texp. 162-1]; PKMS-49 x MSDR-30] significantly excelled the best check Hemant Composite. The range of yield superiority was obtained from 29 to 43.40 per cent over check. Among the yellow crosses, entries, [M6 x CM 202], and [M17 x CM 111] registered yield superiority over Ganga-5 with the increase of 46.48, 35.83 and 27.78 per cent respectively.

At Dholi in the co-ordinated trials, entries, BH-40333, [M9 x CM 400] and [CM 400x CM 300] x Pant 7421 in the full season maturity group, R2 composite and comp 1366 in the early maturity group were found to be promising and exhibited 45.59, 27.36, 14.93, 18,33 and 13.69per cent respectively increase over the best checks.

At Sabour, in the co-ordinated trials, EH 25774, [CM 400×CM 300]×Pant 7421, EH 2556 and EH 25206 in the late maturity group were found to be significantly superior to all checks [Ganga 5, Deccan 103, EH 513, Vijay & 54 J 54] composite 306 was significantly superior to check Hunies in the medium maturity group PK × Hnnies-U 24 × MCU 3 MV – 93 and PK × Hunies-U 24 × MCU 314 found to be significantly superior to check Hunies

Significant yield reduction was recorded in respect of all the varieties sown after 20th November. Hybrids Deccan 103 M EH 40184 and Hemant composite maintained their yield superiority under optimum sown condition. The varieties Hemant composite and Hi-Starch gave higher yield under late sown condition *i. e.*, 10 to 20 December. Maize, Potato intercropping was found to be compatible and profitable when maize sowing was done in the other alternate ridges planted with potato 15 days earlier, giving potato yield of 183 q/ha and 36 q/ha of maize grain, For late sowing transplanting of maize seedling of different maturity were tried. The yield obtained from 15, 30 and 45 days old seedlings sown 15, 30 and

Bihar has been the pioneer in the development of the suitable technologies and varieties for rabi maize cultivation in India. Realising the bottle neck of non-availability of good healthy and genuine hybrid seeds in the way of maize production of the state, maize research team developed agronomically uniform composite varieties like Lakshmi and Hement, serving to the best interest of the farmers.

KHARIF :

During *Kharif* Season of 1987, a very heavy precipitetion of 875 2 mm. in August, 1987, followed by 714.4 mm. in the month of September, 1987, left the crop completely damaged. The rain in August and September '87 was 681.7 and 577.4 mm. in excess to the August and September '86 rainfall. The total rainfall during May to October '87 was 2008.5 mm. which again was 1057.9 mm. more for the same period during Kharif '86.

RABI :

The main emphasis was directed for the development of conventional and non-conventional hybrids suiting to the vaious situations. Among the white crosses, five hybrids developed at Dholi *Viz* , [CM-400 x CM 300] x pant 7421; [M9xCM 101]; [Texp 161-1 x Texp. 104] x [MS DR-120 x PKMS-49]; [M9 x CM 300]; and [Texp. 231-1 x Texp. 162-1]; PKMS-49 x MSDR-30] significantly excelled the best check Hemant Composite. The range of yield superiority was obtained from 29 to 43.40 per cent over check. Among the yellow crosses, entries, [M6 x CM 202], and [M17 x CM 111] registered yield superiority over Ganga-5 with the increase of 46.48, 35.83 and 27.78 per cent respectively.

At Dholi in the co-ordinated trials, entries, BH-40333, [M9 x CM 400] and [CM 400x CM 300] x Pant 7421 in the full season maturity group, R2 composite and comp 1366 in the early maturity group were found to be promising and exhibited 45.59, 27.36, 14.93, 18,33 and 13.69per cent respectively increase over the best checks.

At Sabour, in the co-ordinated trials, EH 25774, [CM 400×CM 300] × Pant 7421, EH 2556 and EH 25206 in the late maturity group were found to be significantly superior to all checks [Ganga 5, Deccan 103, EH 513, Vijay & 54 J 54] composite 306 was significantly superior to check Hunies in the medium maturity group PK × Hnnies-U 24 × MCU 3 MV – 93 and PK × Hunics-U 24 × MCU 314 found to be significantly superior to check Hunies.

Significant yield reduction was recorded in respect of all the varieties sown after 20th November. Hybrids Deccan 103 M EH 40184 and Hemant composite maintained their yield superiority under optimum sown condition. The varieties Hemant composite and Hi-Starch gave higher yield under late sown conditions *i. e.*, 10 to 20 December. Maize, Potato intercropping was found to be compatible and profitable when maize sowing was done in the other alternate ridges planted with potato 15 days earlier, giving potato yield of 183 q/ha and 36 q/ha of maize grain, For late sowing transplanting of maize seedling of different maturity were tried. The yield obtained from 15, 30 and 45 days old seedlings sown 15, 30 and 45 days after normal sowing was recorded to be 31, 37 and 38 q/ha respectively.

Rogor-5 G, Carbofuran 3 G, Quinalphos-4 G and Phorate-109 were superior to control regarding the percentage of infested plants and grain yield. However, phorate gave the lowest percentage of infestation, but was at par with quinalphos and Carbofuran and highest yield but was at par with the above insectcides.

A total of 67 genotypes of different maturity groups were screened against turcicum leaf blight (TIB), common rust and late blight, only 17 entries showed in-built resistance to these diseases.

To minimise the incidence of common rus , 4 spraying of 0.2% Dithane M-45 at weekly intervals was observed to be most effective as it decreased the disease intensity to 1.8 as against 3.9 in the check. After appearance of rust on the leaves, 44% losses can be saved by spraying Dithan M-45 at weekly intervals.

4. Millets

Among the 12 Co-ordinated Centres on small millets, Dholi has been the Centre of excellence for millet research in the country. At this Centre multidisciplinary researches are carried out on different millet crops.

4.1 Ragi

—Mid duration (115-120 days) variety RAU-8 which was developed at Dholi Centre has been released on All India basis. It gave consis antly higher yields than the standard checks under different agro-climatic zones of the country. It has shown resistance to helminthosporiosis and blast disease. Yet another promising variety was BHRN-4/84-2.

—Variety RAU-8 recorded the highest grain yield and application of Nitrogen in three equal splits was found to be better. Transplanting maintained its superiority over broadcast and drilling methods.

—Out of 65 entries screened against helminthosporiosis and blast diseases only 17 entries were graded as resistant.

—Phosalene 35 EC @ .05% proved to be the best in controlling pest of this crop.

4.2 Prosomillet

—Variety RAU-M-7 maintained its superiority during this year also. It was found to be resistant to helminthosporium.

—Out of 14 germplasm collected entry No. 9615 gave the highest grain yield.

—In the advanced generation of crosses RAUM-2×RAUM-1 and BR-2×4929 were the promising ones.

—40 kg of nitrogen was found to be the optimum for this crop. Inter-cropping of this crop with Moong and Kalai were found to hold promise.

—71 entries were screened against helminthosporium, out of which 13 were highly resistant, 27 resistant, 13 moderately resistant, 15 suspectable and 3 highly suspectable.

4.3 Italian Millet

—In the initial yield evaluation and

station trials RAU-12 gave significantly higher yield.

4.4 Bernyard Millet :

RAU-11, RAU-12 and RAU-10 were found to be the promising varieties.

5. OIL SEEDS

5.1 Oil Seeds (Kharif) :

The *Kharif* season of 1987 was not favourable for oilseeeds with the result that the sesamum experiments at Sabour could not be conducted and groundnut experiments at Sabour & Dholi were sesamum experiment at Dholi were adversely affected due to continuous rain. It was only at Madhopur that some results were obtained on the varital experiments on these two crops.

Sesamum :

—In co-ordinated trials at Dholi [Zone I] five varieties *viz*; OMT-11-6-5, OMT-11-6-3, TC-383, TC-326 and HT-6 were found to be superior to Krishna.

—At Madhopur [Zone I] RD-46 was found to be better than Krishna.

Groundnut :

—At Dholi [Zone I] in varietal trial early variety AK-12-24 and late variety M-13 continued to give superior performance.

—AT Madhopur TCGS-4 in early group gave better performence. In late group CSMG-12 was found to be better than M-13.

5.2 OIL SEEDS (RABI)

Zone I

Rapeseed & Mustard :

—At Dholi Centre in late sown conditions RAURD-1002 [Mustard] was found to be promising.

—Cultures PR-8604, Rohini, Vardan; RK-8602, RH-8146, RW-613-1, DIARA-367, RW-5435 and BR-2 performed better than the respective national zonal and local checks.

—Under high alkalinity/salinity conditions, varieties Kranti and NDR-8501 were found to be promising.

—In Tori variety RAUTS-17 maintained its superiority. Variety RAUDT was found to be the earliest (88 days)

Linseed

—Varieties Subhra and T-397 continued to be the best performers.

Castor

—Castor variety SPS-43-3 gave the highest seed yield.

Zone II (A)

—Tori variety RAU-TS-17 maintained its superiority at Sabour Station also.

—Yellow sarson varieties NDYS-2, YSK-8061 and YSK-8602 were found to be better performers under irrigated conditions. But in rainfed condition local check (66-197-3) continued to be better performer.

Linseed

—Varieties BAU-147 and Subhra were found to be promising.

station trials RAU-12 gave significantly higher yield.

4.4 Bernyard Millet :

RAU-11, RAU-12 and RAU-10 were found to be the promising varieties.

5. OIL SEEDS

5.1 Oil Seeds (Kharif) :

The *Kharif* season of 1987 was not favourable for oilseeeds with the result that the sesamum experiments at Sabour could not be conducted and groundnut experiments at Sabour & Dholi were sesamum experiment at Dholi were adversely affected due to continuous rain. It was only at Madhopur that some results were obtained on the varital experiments on these two crops.

Sesamum :

—In co-ordinated trials at Dholi [Zone I] five varieties *viz*; OMT-11-6-5, OMT-11-6-3, TC-383, TC-326 and HT-6 were found to be superior to Krishna.

—At Madhopur [Zone I] RD-46 was found to be better than Krishna.

Groundnut :

—At Dholi [Zone I] in varietal trial early variety AK-12-24 and late variety M-13 continued to give superior performance.

—AT Madhopur TCGS-4 in early group gave better performence. In late group CSMG-12 was found to be better than M-13.

5.2 OIL SEEDS (RABI)

Zone I

Rapeseed & Mustard :

—At Dholi Centre in late sown conditions RAURD-1002 [Mustard] was found to be promising.

—Cultures PR-8604, Rohini, Vardan; RK-8602, RH-8146, RW-613-1, DIARA-367, RW-5435 and BR-2 performed better than the respective national zonal and local checks.

—Under high alkalinity/salinity conditions, varieties Kranti and NDR-8501 were found to be promising.

—In Tori variety RAUTS-17 maintained its superiority. Variety RAUDT was found to be the earliest (88 days)

Linseed

—Varieties Subhra and T-397 continued to be the best performers.

Castor

—Castor variety SPS-43-3 gave the highest seed yield.

Zone II (A)

—Tori variety RAU-TS-17 maintained its superiority at Sabour Station also.

—Yellow sarson varieties NDYS-2, YSK-8061 and YSK-8602 were found to be better performers under irrigated conditions. But in rainfed condition local check (66-197-3) continued to be better performer.

Linseed

—Varieties BAU-147 and Subhra were found to be promising.

6. PULSES

1. Arhar

—Variety EA-1 was identified in the early group and was recommended for putting in farmers field for testing its performance.

—In the late maturity group DA-86-10 and DA-86-C were found to be promising.

—Among medium maturity group DA-21 was found to be better than BR-116.

—In the late maturity group DA-108 and DA-105 were found to be promissing.

—Among the lines tested in co-ordinated varietal trial, the variety PDR-86-1 from Kanpur and Pusa-3 from IARI appeared promising.

—In another co-ordinated trial for pre-Rabi season the variety DA-11 (Sharad) out yielded all other varieties.

7.2 Gram :

—SG-2 developed at Sabour was released for cultivation in Zone III [A].

—DHG-82-4 was identified for on-farm test.

DHG 82-10 was identified for late sowing.

—C_{8-80} developed at Sabour was identified for on-farm test.

—Promising wilt & blight resistant varieties were identified.

7.3 Lentil

—L4126 was found to be promising at Sabour and Dholi.

—PL 77-2 developed at Patna was identified for release by All India Coordinated units of Eastern U. P. & Bihar.

—L9-12 and Pant L 406 continued to be the best varieties for *Paira* Croping.

7.4 Peas

—Variety 'Rachna' was found to be resistant to Powdery mildew, A number of other lines were also found to be promising.

—SP-8/66-8 and SP 80-220-15 developed at Sabour were identified for on-farm test.

7.5 Mongbean :

—A new mung line 11/395 was identified as promising.

—DHM 101 and DHM 102 having resistance to YMV and better seed colour were selected.

7.6 Rajma & Bakala :

—PDR 14 variety of Rajma was found to be promising-

—DHB 1 Variety of Bakala was found to be promising.

—Inclusion of Rajma in Paddy and Maize based rotation holds promise.

7. JUTE :

—Variety JRO-7835 maintained its superiority in this year also.

—Variety KTC-1 evolved at Katihar was included in the All India Co-ordinated Trials at six different locations and the performance was found to be encouraging.

—The hybrid produced by making annual process between male sterile lines

and KTC-194 as pollen parent recorded highest fibre yield.

—On the basis of different X-ray inadiated tre-atments given to variety JRO-632 some complete male strile lines were isolated and crossed with the parent variety JRO-632 for further studies.

—The herbicide fasilade was found to provde complete control of grassy weeds when applied @ 600 gms a. i./ha as post emergence spray 21 days after sowing of copsularis jute.

***

8. FRUITS :

1. Mango :

38 established cultivars have been collected.

A new cultivar *Belkhas* was found to be promissing.

A fruit quality test of 99 cultivars established at Sabour indicated that Alfanso, Dasheri, Bharat Bhog, Langra, Kala Maldah, Kalapahar and Sipia are the best.

32 Chance seedlings have been collected.

Hybrid No 92 and Hybrid No. 104 appeared to be promissin.

Mango malformation was more on Hemsagar, Gulabkhas, Kurkkane and Bombai.

Application of demeton was found to be most effective in controlling mango short gall.

2. Litchi :

A collection of 24 promising varieties from different parts of the Country has been made.

Hybrids are under Screening.

Spraying with 400 ppm of Ethrel advanced the harvest span by 8.5 days.

Spraying of 2 % urea delayed ripening by 12 days

3. Guava :

270 plants of 10 cross combinations.

4. Citrus :

A collection of 35 cultivars are being maintained.

5. Banana :

Bhimkel and Nepali chinia were found to be promising at Hajipur.

Carbofuran @ 1 kg/ha to followed by quinolphos 25 EC @ 0.5 kg/ha was found to be effective in controlling Banana weevil and beetle.

6. Coconut

Variety King dwarf was found to b promising at Sabour.

7. Miscallenous fruits

Collections of Pineapple, Jackfru Ber, Amla, Mulbery, Beal, Pomogranat Jamun etc; were maintained during t year.

9. VEGETABLES

1. Bhindi

—Hybrid Vigour studies revealed superiority of PEN 57×71-14 over o F_1 hybrids yielding 120.75 q/ha as aga 120.75 q/ha of Pusa Sawani.

and KTC-194 as pollen parent recorded highest fibre yield.

—On the basis of different X-ray inadiated tre-atments given to variety JRO-632 some complete male strile lines were isolated and crossed with the parent variety JRO-632 for further studies.

—The herbicide fasilade was found to provde complete control of grassy weeds when applied @ 600 gms a. i./ha as post emergence spray 21 days after sowing of copsularis jute.

***

8. FRUITS :

1. Mango :

38 established cultivars have been collected.

A new cultivar *Belkhas* was found to be promissing.

A fruit quality test of 99 cultivars established at Sabour indicated that Alfanso, Dasheri, Bharat Bhog, Langra, Kala Maldah, Kalapahar and Sipia are the best.

32 Chance seedlings have been collected.

Hybrid No 92 and Hybrid No. 104 appeared to be promissin.

Mango malformation was more on Hemsagar, Gulabkhas, Kurkkane and Bombai.

Application of demeton was found to be most effective in controlling mango shoot gall.

2. Litchi :

A collection of 24 promising varieties from different parts of the Country has been made.

Hybrids are under Screening.

Spraying with 400 ppm of Ethrel advanced the harvest span by 8.5 days.

Spraying of 2 % urea delayed ripening by 12 days.

3. Guava :

270 plants of 10 cross combinations.

4. Citrus :

A collection of 35 cultivars are being maintained.

5. Banana :

Bhimkel and Nepali chinia were found to be promising at Hajipur.

Carbofuran @ 1 kg/ha to followed by quinolphos 25 EC @ 0.5 kg/ha was found to be effective in controlling Banana weevil and beetle.

6. Coconut

Variety King dwarf was found to b promising at Sabour.

7. Miscallenous fruits

Collections of Pineapple, Jackfruit Ber, Amla, Mulbery, Beal, Pomogranate Jamun etc; were maintained during the year.

9. VEGETABLES

1. Bhindi

—Hybrid Vigour studies revealed the superiority of PEN 57×71-14 over other F_1 hybrids yielding 120.75 q/ha as against 120.75 q/ha of Pusa Sawani.

—Out of 11 cultivars PBN 57 was found superior to all Others exhibiting only 8% incidence of Y.V.M. even 90 days after sowing.

2. Brinjal

—All the experiments were adversely affected due to unprecedented rainfall from Jan. '87 to Oct. '87.

—The F_1 hybrids of Annamalai Sel.× Azad Kranti, Ann. Sel. × Long Green; Long green × PBR 129-5, Ann. Sel. × Banaras Giant and Mukhakeshi×Banaras Giant yielded more than the standard PBR 129-5.

—PBR 6 (Long group) was found to be promising.

—PBR 129-5 and Annamalai improved selection were found to be resistant to Phomopsis disease.

—Synthetic pyrathroids Controlled shoot and fruit borer effectively.

3. Chillies

—Sabour Angar recorded the highest fresh red pods.

—72-70, Pusa Jwala and 67-191 were also found to be promising.

4. Bottle gourd :

Sel 78 2 (Patna Selection) maintained its superiority in 'On-Farm tests'.

5. Cucumber :

Sel 72-5 recorded the highest yield.

6. Onion :

The variety Arka Kalyan proved to be the best.

7. Tomato :

Out of 149 collection, 11 were found to be promising Sel 21 and Pant T_8 amongst the indeterminate type and KS-2 and Punjab Keshari amongs the determinates were the best.

8. Experiments were also conducted on Peas, pointed gourd, water melon *etc.*

10. SPICES :

Experiments were conducted on different aspects of Turmeric, Ginger, Coriander, Fenugreck, Fennel, Omum and Nigella.

Variety R. A. 9 of omum; Nigella variety ROV 18 were found to be promising

R D 44 A of Coriander aud RF 17A of Fenugreek was proming.

Variety Rio-de-Janeino of Ginger gave 30% higher yield over local check.

Turmeric-moong; Turmeric+Paddy seedling-Peas were found to be promising rotations.

11. TUEER CROPS

Researches were conducted on Sweet-potato, mishrikand (Yambean), 01 (amorphoppallus) Arvi [Colocasia]; Suthani & Fur [Lesser and greater Yam], winged-bean, Colens [Chines potato] and tapioca.

Varieties 47, OP-21 of Sweet potato were found to be promising.

Variety 170 was found to be 100% free from weevil damage and can serve as donor parent.

Kalmegh variety of Sweet Potato emerged as the most early maturing.

Arvi variety Saharshra-mukhi out-yielded all others.

Arvi+Onion [1.31] gave the maximum net return.

Suthni Variety D. E. 11 an entry from C, T. C. R. I. Trivandrum recorded the highest yield.

01 [Amorppophalles] gave maximum yield of 185 q/ha with 150 Kg N and 150 Kg K_2O per hectare.

Soaking of corms for 12 hours in Agrimycin solution controlled the leaf blight disease.

12. SUGARCANE

—A record number of crosses were made both at Pusa [15] and Coimbatore [32] involving parents with high tonnage, better quality characters and resistant to stress environmental conditions, diseases and pests.

—A record number of seedlings [23, 280] were raised cut of the fluff received from Pusa and Coimbatore crosses and transferred to second ground nursery.

—Altogether, 1464 clones were evaluated in C_1 generation for quanititative and qualitative characters, 170 clones have been selected and transferred to C_2 generation.

—Altogether, 8 clones were named in B. O. and COP series

Early : B.O. 115; B.O. 118

Mid-Early : B.O. 116; B.O. 117; B.O. 119, COP 8602

Main season : COP 8601, COP 8603.

—Among the varieties in pipeline B. O. 114 showed highest rind hardness and absolutely on cavity followed by B. O. 111 for rind hardness and B. O. 110 for cavity.

—Variety X 52300 was identified to be good promising early variety by recording significantly higher yield than standard [B.O. 99 & B.O. 90] with maximum sucrose content in juice [App. I].

—Irrigation at 0.7 IW/CP ratio or at 80 % sheath moisture was found conductive for higher yield of sugarcane.

—Under the experiment, relative efficiency of different phosphatic fertilizers, there was a significant improvement in yield with the use of phosphate upto 75 kg P_2O_5/ha Water soluble [SSP] and water insoluble [MRP] are at par with respect to cane yield and juice quality 75 kg P_2O_5/ha seems to be the optimum dose for sugarcane.

—Pyrilla population was found to be low to medium while black bug incidence was recorded to be 20 to 30 percent on plant basis during June to August, 1986 in Chakia, Motihari, Gopalganj and Marhowarh Sugar factory reserved areas. In course of Pest survey alongwith their natural enemines, *Stenobracone deesne* Cam. and *Apentalis flaviaes* Com, the larval and pupal parasite of borer, respectively, were found in almost all cane growing areas; however, *Tetrastichus pyrillae* Crwf. and *Bpiricania melanoleuca Elotcher* the Egg and nymphal & adult parasite of Pyrilla, respectively were recorded in Marhowarah,

Kalmegh variety of Sweet Potato emerged as the most early maturing.

Arvi variety Saharshra-mukhi out-yielded all others.

Arvi+Onion [1.31] gave the maximum net return.

Suthni Variety D. E. 11 an entry from C, T. C. R. I. Trivandrum recorded the highest yield.

01 [Amorppophalles] gave maximum yield of 185 q/ha with 150 Kg N and 150 Kg K_2O per hectere.

Soaking of corms for 12 hours in Agrimycin solution controlled the leaf blight disease.

12. SUGARCANE

—A record number of crosses were made both at Pusa [15] and Coimbatore [32] involving parents with high tonnage, better quality characters and resistant to stress environmental conditions, diseases and pests.

—A record number of seedlings [23, 280] were raised cut of the fluff received from Pusa and Coimbatore crosses and transferred to second ground nursery.

—Altogether, 1464 clones were evaluated in C_1 generation for quanititative and qualitative characters, 170 clones have been selected and transferred to C_2 generation.

—Altogether, 8 clones were named in B. O. and COP series

Early : B.O. 115; B.O. 118

Mid-Early : B.O. 116; B.O. 117; B.O. 119, COP 8602

Main season : COP 8601, COP 8603.

—Among the varieties in pipeline B. O. 114 showed highest rind hardness and absolutely on cavity followed by B. O. 111 for rind hardness and B. O. 110 for cavity.

—Variety X 52300 was identified to be good promising early variety by recording significantly higher yield than standard [B.O. 99 & B.O. 90] with maximum sucrose content in juice [App. I].

—Irrigation at 0.7 IW/CP ratio or at 80 % sheath moisture was found conducive for higher yield of sugarcane.

—Under the experiment, relative efficiency of different phosphatic fertilizers, there was a significant improvement in yield with the use of phosphate upto 75 kg P_2O_5/ha Water soluble [SSP] and water insoluble [MRP] are at par with respect to cane yield and juice quality 75 kg P_2O_5/ha seems to be the optimum dose for sugarcane.

—Pyrilla population was found to be low to medium while black bug incidence was recorded to be 20 to 30 percent on plant basis during June to August, 1986 in Chakia, Motihari, Gopalganj and Marhowarh Sugar factory reserved areas. In course of Pest survey alongwith their natural enemines, *Stenobracone deesne* Cam. and *Apentalis flaviaes* Com, the larval and pupal parasite of borer, respectively, were found in almost all cane growing areas; however, *Tetrastichus pyrillae* Crwf. and *Bpiricania melanoleuca Elotcher* the Egg and nymphal & adult parasite of Pyrilla, respectively were recorded in Marhowarah, Majhoulia and Riga Sugar Factory area. The overall parasitization was 2.7 percent with a maximum of 7.5 percent in case of borer while in case of pyrilla, egg and nymphal and adult parasitization was 60.5 percent and 22.2 percent, respectively.

—The efficacy of different insecticides was assessed against shoot borer *(C. infuscatellns)* under field condition. Among the insecticides, gamma BHC @ 1.0 kg a.i./ha was found to be significantly superior and at par with phorate 10G in respect of reducing pest incidence. Maximum yield [661.83 q/ha] was obtained from the plot treated with gamma BHC [HCH].

—Among the coordinated varieties tested, varieties B.O. 110, B.O. 111, B.O. 112, B.O. 113, B.O.114, and COX 7918 were found resistant to moderately resistant against red-rot and resistant to smut as well as to wilt.

—In AICRP trial, out of 20 varieties tested against red-rot by plug, nodal and whorl methods of inoculation, no disease was observed even in single variety when they were inoculated with whorl and nodal methods. In plug method, varieties, CO 6812, COJ 75, 77, S-78, 1038, COLK 7710, COx 8121, and COS 8122 showed resistant reaction, whereas, CO 7217, S-78-1019, COLK 7701, 7711, COS 767 and COS 770 were graded as moderately resistant.

13. SEED TECHNOLOGY

—Soaking of seeds in 0.2 % KNO_3 and Pre-drying at 40°C for 5 days were effective in breaking the dormancy of Ragi. Soaking in 3 % thiourea for 1 hr. was effective in breaking dormancy of only KM-13 and BR-2 [out of five varieties].

—In Bakla out of seven methods tested, small incision on seed coat was found to be the most effective in breaking seed dormancy without any harmful effect followed by scarification. But scarification increased the number of abnormal seedlings.

—Scarification over sand paper was also effective in breaking the dormancy of lentil and urd [except on urd 80-3-5]. But it had no effect on Bakla.

—From the data it appears that harvesting of wheat seed from 42 to 56 days after anthesis is good for quality seed Production.

—The seeds of Wheat, Maize, Jute, Bajra, Sorghum and onion were stored in cloth bags under ambient conditions in different agroclimatic conditions of this country. The results of experiment conducted at Dholi revealed that only Maize seeds could maintain germination upto certification standard after 4 months of storage.

—The results of experiment conducted to study the effect of seed size and spacing an growth and yield of Potato indicated that with the increase in seed size of tuber from 20 to 50 cms and reduction in spacing from 60 to 40 cms the yield of tuber was increased significantly. The highest yield of tuber was obtained when tuber of 50 gms. were sown at 40 x 20 cm. spacing.

SEED PROCESSING

The seed processing unit at Tirhut College of Agriculture, Dholi processed the following quantity of seeds during the year.

Crop	Kind of Seed (Quintals)		
	Breeder	Foundation	Truthful
Paddy	96.00	1900.00	400.00
Wheat	154.00	1370.00	225.00
Maize [Kharif]	1.00	—	—
Maize [Rabi]	10.00	75.00	10.00
Oilseed [Kharif]	1.00	5.00	—
Oilseed [Rabi]	4.00	30.00	50.00
Pulses [Kharif]	8.50	3 50	5.00
Pulses [Rabi]	9.00	51.00	50.00
	283.50	3434.50	740.00

14. FACULTY OF BASIC SCIENCE & HUMANITIES :

Since the inception of Faculty of Basic Sciences and Humanities in November 1981, the Departments in the Faculty have effectively been involved in developing strong supporting programme in teaching and research for the advantage of the students from other Faculty as well the students of Faculty of Basic Sciences and Humanities. In order to cater the basic needs of the Agriculturists, each Department has developed strong need based applied research in the field of crop science. The Social cience Departments of the Faculty have been working on the problems to get the feed-back from the society for analysing the social and economical constraints responsible for the slow adoption of technology in the area of crop husbandry and other allied crop based Agro-industrialization. The researches are being carried out in the Faculty of Basic Sciences and Humanities to provide strong support to the applied researches in crop husbandry and also in formulating new strategy to overcome the limitations to crop yield.

The Department of Statistics and Mathematics has been involved in evaluating the agricultural efficiency of different districts in Bihar. Based on the level of agril, progress in different districts of Bihar. the districts have been grouped into agriculturally most developed and the least developed ones. The Department has also worked out the growth rate of area, production and productivity of eight crops (Rice, Wheat, Maize, Gram, Arhar, Khesari, Pea. Sugarcane, Potato and Jute). A forecasting model for wheat production has also been worked out and greater efficiency of this model has been obtained with yield forecasting.

Department of Botany and Plant Physiology had developed a criteria for screening Fe.efficient rice genotypes having high phenolic compounds, Fe/Zn ratio and peroxidase activity. In another study with the allelopathic interactions amongst *Parthenium* and *Cassia*, it has been demonstrated that the seed germination and seedling growht of *Parthenium* are inhibited by the use of the seed extract of *Cassia*.

The Department of Biochemistry is engaged in working out the biochemical index which could effectively and conveniently be utilized in screening the Maize genotypes for their resistance toward water logging and for such purpose the

department is working on number of enzymes and metabolic steps which include carbon reduction process. The general biochemical analysis revealed restricted metabiolism, adversely affecting the crop with characteristic stunted growth leading to senesence. In another study related to Biogas project, the Department has demonstrated that there is no direct relationship between cellulose content of the wastes and gas production during fermentive biogas formation.

The Department of Genetics has made some headway in producing the True Potato Seeds [TPS] through conventional breeding and has demonstrated the possibility of commercial crop raising through TPS technology. The Department has also made some biometrical studies on yield, disease, disease resistance, grain quality and ecological adoptation to rainfed and irrigated conditions of hexaploid wheat, made contributions in the induction of cytoplasmic male sterility [CMS] in rice, Genetic and biochemical basis of resistance to sterility mosaic in pigeonpea, in producing plantlets from tissue culture technique in crop plants and Genetical studies in the salt tolerance in *Rhizobium lequminosarum*.

The Department of Microbilogy has been involved in developing cheap technology for the large scale production of edible mushroom, rich in protein alongwith the identification of *spamn* suitable for this area. The Department has successfully grown the edible mushroom *Volvoriella volvaces* at a temperature range of 28-33°C and the scientists are working out the technology for growing mushroom, the year round. The Department has also contributed in identifying and improving the methods for detoxifying the Khesari from toxins where by the nutritive quality of the Khesari remains unaffected. In the study concerning Ganga water pollution, the Department has identified several pathogenic bacteria and also the coliphages have been isolated and characterized and their role in purifying the Ganga water from the pollutants have been enumerated.

The Department of Zoology has collected seven species of predatory mites on *Acaria Litchi*. A biological control of the litchi mite with *Amblyscius largoensis* as a predator has been identified. Six species of fruit flies have been collected from Pusa and its adjoining area. These flies are the serious pest of cucurbitaceous plants and fruit crops. The Department has also initiated work in the population ecology and control of giant African Snail which has assumed the serious pest status in Bihar.

The Department of Sociology and Psychology has significantly contributed in identifying the important socio-psychological disabilities in relation to the developmental perspective of the Dusadh, which is a well recognized drown troden community of the State. Based on the data collected, the Department is engaged in working out the modalities for their upliftment in the society and improvement in their socio-economic conditions. The department is also engaged in working out the socio-cultural constraints of wheat production in the adjoining blocks of Samastipur district.

Department of Economics and Business Management has evaluated the impact of technological change on the economic eonditions of Agricultural labour in Bihar, made some studies on the implementation and impact of fixation of minimum wages in agriculture in Mushehri block and analysed the management factor in cultivation under different farm size groups in North Bihar.

Beside, teaching and research activities, the Faculty has also developed a strong counseling unit in major allied departments to Agriculture for the advisement of students specially at post-graduate level and the research scientists by providing technical know how, in handling instuments, perfecting technique of research and analysis of data in the central instrumentation cell and the computer centre.

Department of Economics and Business Management has evaluated the impact of technological change on the economic conditions of Agricultural labour in Bihar, made some studies on the implementation and impact of fixation of minimum wages in agriculture in Mushehri block and analysed the management factor in cultivation under different farm size groups in North Bihar.

Beside, teaching and research activities, the Faculty has also developed a strong counseling unit in major allied departments to Agriculture for the advisement of students specially at post-graduate level and the research scientists by providing technical know how, in handling instuments, perfecting technique of research and analysis of data in the central instrumentation cell and the computer centre.

Faculty of Agricultural Engineering

Agricultural Engineering Research aims at increasing agricultural production and productivity through technology developed and perfected in the discipline. Very limited facility (man, material and finance) did not allow the research to progress to the level of satisfaction of all concern never the less affort is continuing to show some tangible output with the help of ICAR schemes and Departmental projects. Research efforts of agricultural engineers stationed at Sabour, Patna, Madhopur, Bikramganj, Madhepura, Munger and Agwanpur also deaserve mention.

Agricultural Engineering research is guided by the five departments : Farm Machinery, Farm Energy, Irrigation and Drainage, Soil Conservation and Post Harvest Technology and Agricultural Structure. Although Agricultural Engineering Research was initiated in the state nearly three decades ago but its alround impact is still to be felt baring in the form of extensive use of Chaff cutter, pump, tractor with cultivator and power thresher. Similar to these, there are large number of items developed and perfected in the country which hardly require further research support and can be popularised among Bihar Farmers. Therefore, what we need is strong will and determination backed by organised extension programme to show the results. Achievement of the year under report is the following :—

A study of three crop rotations with three crop components indicated superiority of Paddy-Wheat-Mung and Paddy-Maize Urd rotations over Maize-Potato-Mung in terms of energy consumption in farm operations. Reaper proved cheaper by Rs. 112/ha as compared to traditional harvesting in addition to other advantages. Hand Maize sheler developed at Bihar Agricultural College, Sabour reported excelled performance as compared to others of same category (Shelling output is four times than manual). Useful projects under Power Tiller Scheme Pusa; ARI, Patna and NARP, Agwanpur are progressing satisfactorilly.

Bullock drawn speed multiplier has many uses in agricultural operations. The project is in advance stage of progress. Snag detected in power train is being rectified. Amber charkha run with solar energy may prove boon for rural population. A time bound project on this aspect is progressing as scheduled. Usefulness of windmill under Pusa condition has been demonstrated. A mill of this size can command 0.5-1.0 ha mung during Feb.-April. Similarly the work on solar water heater is also in progress.

High penetration resistance at 15-30 cm depth at many locations in Pusa Farm was observed to restrict the root penetration an important factor for higher crop yield. The remedy of such a problem existing in many parts of Bihar due to frequent shallow tillage practices may prove very useful. A separate project has been planned on this aspect by adding suitable tillage tool in land preparation schedule. Projects have all so been planned to tackle the problems of chaur land.

Combined analysis of 3 years data suggested 120 m^2 as optimum size of check basin for wheat in calcareous soil. Brick lining appears a long term solution of seepage loss problems from irrigation channels. However, 1:1 mixtures of clay and cow dug plaster in channel was found equally effective in checking waterloss but for a short duration of 3-4 months. Closer spacing of cavity wells was found to decrease the specific discharge by 35 % (pumping of two wells simultaneously of 58-80 cm spacing). Reduction in 3-well combination was observed to be 47%. A survey conducted in the area under BAC, Sabour command indicated 1.25-1.5 ha command area of bamboo tubewell using 5 HP diesel engine. A separate project on irrigation-cum-drainage is in progress to develop plan for linking chaur with natural drain.

Chilli drying is an important operation. Open Yard sun drying results in inferior grade produce. Cabinet type solar dryer has been developed and final testing is in progress. Uusefulness of thin layer dryer for certain farm produce cannot be overlooked. A lab model has been developed to study drying parameters under controlled conditions. Attempts are being made to test and recommend rice milling machinery for this region. Two such projects are in concluding phase in this college. Post harvest scheme has also proposed projects to be taken-up on priority basis. To mention a few, post harvest losses and their evaluation at stages for important crops of this region are in progress.

Combined analysis of 3 years data suggested 120 m^3 as optimum size of check basin for wheat in calcareous soil. Brick lining appears a long term solution of seepage loss problems from irrigation channels. However, 1:1 mixtures of clay and cow dug plaster in channel was found equally effective in checking waterloss but for a short duration of 3-4 months. Closer spacing of cavity wells was found to decrease the specific discharge by 35 % (pumping of two wells simultaneously of 58-80 cm spacing). Reduction in 3- well combination was observed to be 47%. A survey conducted in the area under BAC, Sabour command indicated 1.25-1.5 ha command area of bamboo tubewell using 5 HP diesel engine. A separate project on irrigation-cum-drainage is in progress to develop plan for linking chaur with natural drain.

Chilli drying is an important operation. Open Yard sun drying results in inferior grade produce. Cabinet type solar dryer has been developed and final testing is in progress. Unsefulness of thin layer dryer for certain farm produce cannot be overlooked. A lab model has been developed to study drying parameters under controlled conditions. Attempts are being made to test and recommend rice milling machinery for this region. Two such projects are in concluding phase in this college. Post harvest scheme has also proposed projects to be taken-up on priority basis. To mention a few, post harvest losses and their evaluation at stages for important crops of this region are in progress.

Animal Husbandry and Veterinary Sciences

1. Animal Reproduction Section :

Studies on-conception failure in Cattle :

The over-all incidence of conception failure in Cattle reared at Cattle Farm, Pusa during the period of 1979-87 was found to be 10.9%. The incidence was found to be higher in crossbreds as compared to Haryana Cattle. Similarly the incidence of conception failure in low (0-3 litres/day), moderate (3 6 litres/day) and high (above 6 litres/day) milk yielding cows were found to be 0.00%, 28.57% and 71.43% respectively, thereby indicating a very high incidence of conception failure in high milk yielders.

The incidence of conception failure was observed to be higher following inseminations with frozen Semen as compared to liquid semen. Like wise, the incidence was found to be higher in summer season and lowest in spring and autumn season.

Pregnancy results of intra-uterine fusion of broad-spectrum antimicrobial agents 12 hours post insemination in conception failure cases revealed that Gentamicin (Lisarin) yielded the best results followed by ampicillin and trimethoprim and ulphamethoxazole combinations.

Milk Production :

Total milk produced at Pusa during the year 1987-88 was 144850 litres as compared to 166974 litres produced during 1986-87.

The wet average of the herd during the year under report was 6.038 litres as against that of 6.357 litres in 1986-87.

The herd average was estimated to be 4.621 litres and was higher as compared to 4.582 litres obtained during 1986-87.

2. Animal Nutrition :

To investigate the replacement of maize by small millets in poultry ration, experiment was conducted on 200-day old brolier chicks randomly divided into five groups of 40 chicks in each treatments replicated twice. The dietary treatment consisted of control *viz.*, all maize diet and other four experimental groups in which maize was replaced to the extent of 25 %, 50 %, 75 %, and 100 % by Bajra. Chicks were fed started ration from 0-5 weeks and finisher ration from 5-8 weeks of age. The chicks were raised on deep litter.

No significant difference in body weight gain was observed between control group and other experimental groups except 75 % replacement group. Feed conversion ratio was found to be the lowest [2.95 kg/kg grain] in 25 % replacement group and was not significantly different either from control group of 50 % replacement group.

From economic point of view, 25 % and 50 % replacement group proved to be the most economical on the basis of cost/kg live weight.

On the basis of above findings, it can be concluded that 50 % of maize in normal mation of broliers can be safely

replaced by Bajra without affecting the performance of broliers.

Anatomy :

—Intravital staining with 1 % aquous solution of evens blue was done before embalming.

The mammary glands of both ewe & doe were drained into the mammary lymph nodes [Superficial inguinal lymph nodes] by several lymph veesels.

The efferent lymph vessels of the said nodes coursed dossed & craniad, at the caudal margin of the external pugic artery into the inguinal canal.

After reaching the level cranial to the iliac crest, these vessels gave rise to a number of smaller branches which terminated as afferents of medial iliac lymph nodes in doe.

In ewe, one or two of these lymph vessels also drained into the lateral iliac lymph node.

Both in ewe & doe, lymphatics of mammary gland of one side did not communicate with the lymphatics of the other side.

4. Animal Breeding & Genetics :

Studies on genetics of adaption of cross-bred cattle :

Data on cross-bred and Hariana cattle were generated at the Cattle Fatm Pusa. The data collected for the erythrocytic count on 239 Hariana and 169 J×H half-breds of five physiological states (lactating & dry cows, heifers and male and female claves) were analysed. Results have shown that seasons, physiological states and genetic groups of animals had highly significant influence on total erythrocytic count. Animals maintained during January-June months had higher count of erythrocyte than the animals maintained during other months.

5. Parasitology :

(i) The Department has attained special honour in being selected for the establishment of a Centre for research on an International Project Under Indo-US Agricultural Research Programme by getting sanction for "All India Coordinated Research Project on Intracellular blood protista with special reference to immuno-prophylaxis and control". The Research work has already commenced w. e. f. December 1, 1987. Besides this, work is also under progress on several on going projects of this department as presented below :

The studies on the prevalence of tick-born haemoprotozoan diseases in general cattle population of north & central Bihar, conducted on a total of 322 cattle revealed a very high incidence of theileriosis annulata exotic (25.00%) & cross-bred (14.59%) cattle as compared to the indigenous stock (4.82%).

This was coupled with similar higher rate of infestation of cattle with atleast species of the ixodid ticks i. e. *Boophilus microplus Hyalomma anatolicum anatolicum, H. marginatum isaaci* and *Haemaphysalis* bispinosa. Next to theileriosis annulata, cattle of all breeds were found to be infected with Anaplasmosis and Babesiosis. The work is in progress.

replaced by Bajra without affecting the performance of broliers.

Anatomy :

—Intravital staining with 1 % aquous solution of evens blue was done before embalming.

The mammary glands of both ewe & doe were drained into the mammary lymph nodes [Superficial inguinal lymph nodes] by several lymph veesels.

The efferent lymph vessels of the said nodes coursed dossed & craniad, at the caudal margin of the external pugic artery into the inguinal canal.

After reaching the level cranial to the iliac crest, these vessels gave rise to a number of smaller branches which terminated as afferents of medial iliac lymph nodes in doe.

In ewe, one or two of these lymph vessels also drained into the lateral iliac lymph node.

Both in ewe & doe, lymphatics of mammary gland of one side did not communicate with the lymphatics of the other side.

4. Animal Breeding & Genetics :

Studies on genetics of adaption of cross-bred cattle :

Data on cross-bred and Hariana cattle were generated at the Cattle Fatm Pusa. The data collected for the erythrocytic count on 239 Hariana and 169 J×H half-breds of five physiological states (lactating & dry cows, heifers and male and female claves) were analysed. Results have shown that seasons, physiological states and genetic groups of animals had highly significant influence on total erythrocytic count. Animals maintained during January-June months had higher count of erythrocyte than the animals maintained during other months.

5. Parasitology :

(i) The Department has attained special honour in being selected for the establishment of a Centre for research on an International Project Under Indo-US Agricultural Research Programme by getting sanction for "All India Coordinated Research Project on Intracellular blood protista with special reference to immuno-prophylaxis and control". The Research work has already commenced w. e. f. December 1, 1987. Besides this, work is also under progress on several on going projects of this department as presented below :

The studies on the prevalence of tick-born haemoprotozoan diseases in general cattle population of north & central Bihar, conducted on a total of 322 cattle revealed a very high incidence of theileriosis annulata exotic (25.00%) & cross-bred (14.59%) cattle as compared to the indigenous stock (4.82%).

This was coupled with similar higher rate of infestation of cattle with atleast 4 species of the ixodid ticks i. e. *Boophilus microplus Hyalomma anatolicum anatolicum, H. marginatum isaaci* and *Haemaphysalis* bispinosa. Next to theileriosis annulata, cattle of all breeds were found to be infected with Anaplasmosis and Babesiosis. The work is in progress.

[ii] Studies on the Epidemiological aspects of health care and management of zoo animals [Proposed to be submitted to the department of Environments, wide life and forest, Government of India.

Prior to submission of this project to the Department of Environments, wild life and forests, Govt. of India a preliminary survey was conducted by screening faceal samples of zoo animals to assess the economic impact of such investigation with a view to formulate a better health care programme for zoo animals. The animals included in such studies were leopard, Bear, Tigers, Deer, Langoor, Golden Monky, Hog Deer and Neelgaie. These animals were found positive for ggs of *Ascaris, Ancylostoma Strongy oides Fasciola* and Amphistomes (from *Neelgai* only) Bacteriological cultures of faecal samples revealed the presence of *E. coli* infection in a few animals.

6. Gynaecology :

Studies of research project "Immunological and physiochemical characteristics of oestrual cervical mucus of normal and repeat breeder cows. That oestrous mucus samples were collected from repeat breeder cows for the detection of antibodies against sperm. Out of 21 samples 11 proved positive for the presence of antibodies. The titre of antibodies varied from 1:320 to/1 : 340.

7. Vety. Medicine :

"Studies on Clinical mastitis and its therepy".

During the present study, clinical mastitis was recorded in 47 cows 30 buffaloes [irrespective of breed and no. of quarters involved'.

The cows had atrophy of affected teats/quarter & there was complete absence of milk secretion. Lactation wise occurrence of mastitis revealed high in the 7th and 6th lactations in cows and buffaloes respectively. The most common pathogens isolated in cows were Staphylococcus 24 (53.3%), Streptococcus 9 (20%), *E. coli* 6 (13.3%), Pseudomonas 2 [4.4%] and mixed infection of Streptococcus and Staphylococcus 3 [6.7%] and of staphylococcus and *E. coli* 1 [2.2%]. In case of buffaloes, the most common pathogens encountered were Staphylocal spp. 13 [43.3%] Streptococcal spp. 9 [30%], *E. coli* 4 [13.3%], Corynebacterium spp. 1 [3.3%], Yeast 1 [3.3%] and mixed infection of Staphylococcusand *E. coli* 2 [6.7%]. Regarding therapeutic efficacy of Penicure-D and Alinocomycin against these infection Penicure-D was found statisfactory.

8. Pathology :

Pathology of Mycoplasmal infection in respiratory & reproductive organs of sheep and goats :

Microscopic examination; 25.8% revealed different types of pathological changes. The prominent findings were suppurative and Bronchopneumonia. Two cases of maedi were also noticed.

On experimental study with *M. mycoils* sub. sp. *mycoids* in goats, revealed, the clinical symptoms were rise in temperature from 4 days post inoculation which continued upto 18th DPI. Other symptoms noticed were nasal discharge, lacrimation, coughing and sneezing anorexca, dysponea and depression.

9. Pharmacology :

Pharmacokinetics of Doxycyctine in Buffalo calves :—

Plasms level of doxycyctine obtained at various time intervals. The drug maintained i.s therepeutic concentration [0.05 kg/ml] from 5 mts to 2 hrs. only. The drug was detectable, in all the samples upto 10 hrs. The drug was detectable in 3 out of 5 animals upto 30 hrs.

10. Veterinary Microbiology :

Response of macrophages in the Recovery of Bovine and Laboratory Animals from Foot and Mouth Disease Virus Infection :-

A total of 68 FMD outbreak were attended. The clinical samples collected from 68 FMD aud outbreaks revealed presence of virus in 37 (54.41%) cases while 31 (45.59%) samples including 14 showing anti-complementary activity were found to be negative. Out of 37 positive samples, the maximum of 19 (19.94%) were due to serotype 'O' the followed by "Asia-1' 8 (11.76%) "A-22" (8.82%) and type C 4 [5.88].

Cellular immune response to FMD virus type "O" was ascertained by delayed types of hypersentivity i. e. Specific increase of skin of FMDV sensitized are challenged gunea pigs. Specific increase in skin was found to vary from 1.9 to 2.2 mm over the normal skin.

11. Food Science & Technology :

Preparation of quality animal casing and scum meal from goat intestine :

The prevalence of the parasitic infection in the goat intesting collected from public slaugther house of intestive for casing production. It was observed that the level of infection in monsoon was highest i.e. 80.42%., followed by winter and summer with 73.73 and 68.00% respectively.

12. Surgery & Radiology :

Studies on cystoplasty with preserved bladder in bovine :

All togethee 30 experiments of cystoplasties with preserved urinary bladders were conducled in buffalo calves. The following observations were made in between 80 to 120 post-operative days.

a. Clinical examinations.
b. BUN estimation.
c. Gross examination.
d. Histopathological studies.

The clinical manifestations like rumination, defacation appetite, urination, and urine colour were normal in operated animals till observation period and average post-operative temperature, pulse and respiration varried between 100.4 'F' to 101.8 'F', 46 to 62/min. and 18 te 29/min. respectively.

Average post-operative level of urea nitrozon in blood [BUN] in individual animal varried in between 32.4 to 40.6 mg/ 100 ml of blood. Gradual regenaration of bladder tissues around the preserved bladder graft was clearly observed histologically in operated animals.

9. Pharmacology :

Pharmacokinetics of Doxycyctine in Buffalo calves :—

Plasms level of doxycyctine obtained at various time intervals. The drug maintained i.s therepeutic concentration [0.05 kg/ml] from 5 mts to 2 hrs. only. The drug was detectable, in all the samples upto 10 hrs. The drug was detectable in 3 out of 5 animals upto 30 hrs.

10. Veterinary Microbiology :

Response of macrophages in the Recovery of Bovine and Laboratory Animals from Foot and Mouth Disease Virus Infection :-

A total of 68 FMD outbreak were attended. The clinical samples collected from 68 FMD aud outbreaks revealed presence of virus in 37 (54.41%) cases while 31 (45.59%) samples including 14 showing anti-complementary activity were found to be negative. Out of 37 positive samples, the maximum of 19 (19.94%) were due to serotype 'O' the followed by "Asia-1" 8 (11.76%) "A-22" (8.82%) and type C 4 [5.88].

Cellular immune response to FMD virus type "O" was ascertained by delayed types of hypersentivity i. e. Specific increase of skin of FMDV sensitized are challenged gunea pigs. Specific increase in skin was found to vary from 1.9 to 2.2 mm over the normal skin.

11. Food Science & Technology :

Preparation of quality animal casing and scum meal from goat intestine :

The prevalence of the parasitic infection in the goat intesting collected from public slaugther house of intestive for casing production. It was observed that the level of infection in monsoon was highest i.e. 80.42%., followed by winter and summer with 73.73 and 68.00% respectively.

12. Surgery & Radiology :

Studies on cystoplasty with preserved bladder in bovine :

All togethee 30 experiments of cystoplasties with preserved urinary bladders were conducted in buffalo calves. The following observations were made in between 80 to 120 post-operative days.

a. Clinical examinations.
b. BUN estimation.
c. Gross examination.
d. Histopathological studies.

The clinical manifestations like rumination, defacation appetite, urination, and urine colour were normal in operated animals till observation period and average post-operative temperature, pulse and respiration varried between 100.4 'F to 101.8 'F', 46 to 62/min. and 18 to 29/min. respectively.

Average post-operative level of urea nitrozon in blood [BUN] in individual animal varried in between 32.4 to 40.6 mg/100 ml of blood. Gradual regenaration of bladder tissues around the preserved bladder graft was clearly observed histologically in operated animals.

17. COLLEGE OF FISHERIES

A four year degree programme in Fishery Sc. (B F Sc) was started in January, 1987 under Rajendra Agricultural University, Pusa, Bihar at Tirhut College of Agriculture, Dholi with the advisement of Padmashree Dr. V. G. Jhingran. The intake capacity was tentatively fixed as 10 only and 8 students were admitted in first year B. F. Sc. in 1987 during which the College had teaching staff strength of only 3 which consisted of one Associate Professor and two instructors The strength of teaching staff has now increased to 5 with the appointment of two Assistant Professor-cum-junior Scientists for the College in different branches of fishery science in 1989. Simultaneously, the total strength of the students also increased following the admission of two fresh batches of students in 1988. At present, the total strength of students in the College is 16 consisting of 3 batches and staff strength is 5 which consists of one Associate Professor (Fishery Biology), 2 Assistant Professors in different subjects like pond soil Microbiology, Biochemistry and Nutrition and two instructors,

The staff of the College of Fisheries are actively involved in teaching, research and extension work which is evident from the number of scientific research papers published in different journals of India as well as abroad. Till date the total number of research papers published is 10. In the field of fisheries research, important achievements made by the staff are :

1. Research paper entitled "Pollution Effects on Ecobiology of Benthic Macro Invertebrates in River Ganga at Patna (Bihar) India" was accepted for presentation in the "International conference on Environmental Bioassay Techniques and their Application" University of Lancaster, England, U. K. held on 11th to 14th July, 1988.

2. Three research papers were presented by the Junior Scientists of the College in the "First Indian Fisheries Forum" conducted by Asian Fisheries Society, Indian Branch held at College of Fisheries, Mangalore, Karnataka from 4th to 8th December, 1987 in different fields of fisheries.

3. One of the Junior Scientists of this College was deputed to present a paper entitled "Vicissitude of Exotic Fishes introduced in Bihar" conducted by Asian Fisheries Society, Indian Branch held at College of Fisheries on 25th and 26th May, 1988.

4. Two extension papers were accepted for publication in different Journals of the country.

5. A popular article entitled "River pollution and Fisheries" written by the students of this College under the guidance of the teaching staff of this college was published in the national daily "Hindustan Times" on the occasion of "Environmental Day" on the 5th June, 1988.

In addition to the above, research work, the college staff is being pursued in areas like Fish breeding and fish seed production. The staff and students of the College of Fisheries are actively involved in fish seed production activities. In 1987 and 1988 the total number of fish seed produced were as follows :

Species	Total number of seed produced	
	1987	1988
Rohu	1,50,000	40,000
Mrigal	1,60,000	—

From the above record, the active participation of students & staff of College of Fisheries contributing to Fish seed production is apparent.

The staff and students actively participated in the "Kisan Mela" in 1987 and 1988. A separate Fisheries stall was installed in which scientific instruments and apparatus were displayed and information was disseminated on different aspects of fisheries with a view to extending knowledge about the recent advances in fisheries to farmers. The stall attracted a wide variety of visitors who were enthusiastic to know about different fields of fisheries like Fish culture, Fish breeding and Seed production, Aquarium keeping, Fish Disease control, Integrated farming [Paddy-cum-fish-culture, Livestock-cum-fish cul ure] etc. The staff of the college were actively involved during Kisan Mela in extending the information as well as suggesting remedies to the field problems of fish farmers.

On the occasion of Kisan Mela, response of Bihar people to fish pickles was evaluated. Fish pickles were provided to the interested public and their opinion was elicided. It was found that more than 75 % of the stall-visitors accepted the fish pickles in regard to its teste & quality. Some of the private entrepreuners were interested in taking up the preparation of fish pickles on a commercial scale under the guidance of College of Fisheries. As this product was prepared using fishes of low commercial value, this venture can prove in effecient utilization of trash fish and also in increase the returns thereby making this proposition economically feasible and more viable.

During Kisan Mela, several book-lets on fish culture, fish breeding, Paddy-cum-fish culture etc. were distributed to farmers, it is worthy to note that some of the booklets were prepared by the students of the College under the quidance of the College staff.

In addition to the above, research work, the college staff is being pursued in areas like Fish breeding and fish seed production. The staff and students of the College of Fisheries are actively involved in fish seed production activities. In 1987 and 1988 the total number of fish seed produced were as follows :

Species	Total number of seed produced	
	1987	1988
Rohu	1,50,000	40,000
Mrigal	1,60,000	—

From the above record, the active participation of students & staff of College of Fisheries contributing to Fish seed production is apparent.

The staff and students actively participated in the "Kisan Mela" in 1987 and 1988. A separate Fisheries stall was installed in which scientific instruments and apparatus were displayed and information was disseminated on different aspects of fisheries with a view to extending knowledge about the recent advances in fisheries to farmers. The stall attracted a wide variety of visitors who were enthusiastic to know about different fields of fisheries like Fish culture, Fish breeding and Seed production, Aquarium keeping, Fish Disease control, Integrated farming [Paddy-cum-fish-culture, Livestock-cum-fish culture] etc. The staff of the college were actively involved during Kisan Mela in extending the information as well as suggesting remedies to the field problems of fish farmers.

On the occasion of Kisan Mela, response of Bihar people to fish pickles was evaluated. Fish pickles were provided to the interested public and their opinion was elicided. It was found that more than 75 % of the stall-visitors accepted the fish pickles in regard to its teste & quality. Some of the private entrepreuners were interested in taking up the preparation of fish pickles on a commercial scale under the guidance of College of Fisheries. As this product was prepared using fishes of low commercial value, this venture can prove in effecient utilization of trash fish and also in increase the returns thereby making this proposition economically feasible and more viable.

During Kisan Mela, several book-lets on fish culture, fish breeding, Paddy-cum-fish culture etc. were distributed to fish farmers, it is worthy to note that some of the booklets were prepared by the students of the College under the quidance of the College staff.

EXTENSION EDUCATION ACTIVITIES

Extension Education is one of the triple functions of the University; other two being teching and research. Directorate of Extension Education is the Co-ordinating Unit for the first-line transfer of technology programmes in the area jurisdiction of the State. There are three specialized wings in Extension Education Directorate, namely, (a) Training (b) Information and Communication and (c) Farm Advisory Service. The Technology transfer functions of the Directorate are channelized through these wings. In other than Pusa Campus, it is the Department of Extension Education which Co-ordinates the extension education programmes.

TRAINING PROGRAMMES

The Directorate of Extension Education organised/Co-ordinated a number of traning programmes for the field functionaries of Department of Agriculture, Input Manufacturing firms, Cane Department, I. A. S. Probationers, Progressive Farmers and Farm Women at different campuses and Stations of the University. Monthly Workshops for the senior Extension Officers under T & V project were organised regularly at Pusa, Sabour, Patna, Bodh Gaya and Agwanpur Centres.

Crop specialists also participated in various traning programmes at State, District, Block and Village level. A Brief highlight of important programmes organised/coordinated by the Training Unit of Directorate of Extension Education during the year 1987-88 are presented as under :

1. On Campus Trainings :

1.1 UNICEF-Sponsored training programme on Enterpreneurship for Development of Women and Children in Rural Development was organised by the Home Science College. In all 250 lady trainees participated in this training.

1.2 A training on "Soil Testing and Fertilizer use" under USAID assistance was organised at Pusa from 11th August to 10th September, 1987. Trainees from Meghalaya, Tripura, Assam and Bihar State participated in this training.

1.3 In Nepal at Jitpur, Sugar Cane Scientists of the University imparted training on Sugar Cane Production Technology, In this programme recent technologies for increasing Sugarcane/Sugar production were communicated to the field Extension Officers of Nepal.

1.4 An Inter-State Training-cum-Discussion seminar on winter Maize sponsored by Government of India was organised at Dholi Campus from 18-1-88 to 25-1-88. Subject-Matter Specialists from A. P., M.P., Orissa and Bihar participated in this Seminar.

1.5 Eight crop production technology training programmes on Summer Maize, Kharif Maize, Kharif Rice, wheat and Pulses sponsored by the Government of India were organised at Pusa, Sabour and Patna campuses. About 200 field functionaries of the

Department of Agriculture, Bihar participated in these programmes.

1.6 Three workshops on "Orientation, Communication and Extension Teaching Methods" were organised by the experts of Extension Education Institute, Nilokheri at Pusa and Sabour campuses. As many as 26 Master Trainers of Monthly Workshop, 21 field level Extension Officers of Department of Agriculture and Scientists of Krishi Vigyan Kendra, Banka & Munger took part in these workshops for six days.

1.7 Two training-cum-discussion seminars on Oilseed Production Technology were organised, one at Pusa and Second at Sabour campus in October, '87. As many as 46 Extension Officers of Department of Agriculture, Bihar participated in these programmes.

1.8 A seven-day training programme on recent advances in Agriculture including Dairy, Fisheries and Home Science Technology was organised for ten I. A. S. probationers posted at Muzaffarpur, Hazaribagh, Purnea, Palamu Ranchi, Munger, Dhanbad, Chaibasa, Gaya and Patna districts.

1.9 A.R.S. probationers deputed by the ICAR received intensive field training in collecting field data on level of adoption of improved farm practices. They were exposed to research/extension activities of the University.

1.10 A number of specialised training programmes under Special Rice Production Programme were organised at Pusa, Patna & Sabour campuses of the University. Over 800 progressive farmers from selected Blocks were imparted field-based training for increasing rice production. A team consisting of Breeder, Pathologist, Entimologist and Rice Agronomist was constituted separately for each division of Bihar for providing intensive guidance to rice growing farmers.

1.11 A training-cum-discussion seminar on *"Use of Phosphate in Kharif Crops"* was organised at Pusa in Collaboration with M/S Hindustan Lever Ltd. Scientists of the University presented papers and discussed field problems with 35 participating extension Officers.

1.12 The Scientists of College of Agricultural Engineering and of Soil-Science and Agronomy Departments participated in the training programme organised by Training Division of water and Land Management Institute, Khagaul, Patna.

1.13. A monthly workshop-cum-training programme for increasing Sugarcane Production in Bihar was organised in every month at the Sugarcane Research Institute, Pusa for the Cane Development Officers and other Field Officers of Sugarcane Department of Bihar. During 1987-88, about 200 Extension Officers participated in this programme.

1.14. A training programme on Sugarcane ratoon management and Gur Making was organised at Banka in February, 1988 in which 148 progressive farmers

Department of Agriculture, Bihar participated in these programmes.

1.6 Three workshops on "Orientation, Communication and Extension Teaching Methods" were organised by the experts of Extension Education Institute, Nilokheri at Pusa and Sabour campuses. As many as 26 Master Trainers of Monthly Workshop, 21 field level Extension Officers of Department of Agriculture and Scientists of Krishi Vigyan Kendra, Banka & Munger took part in these workshops for six days.

1.7 Two training-cum-discussion seminars on Oilseed Production Technology were organised, one at Pusa and Second at Sabour campus in October, '87. As many as 46 Extension Officers of Department of Agriculture, Bihar participated in these programmes.

1.8 A seven-day training programme on recent advances in Agriculture including Dairy, Fisheries and Home Science Technology was organised for ten I. A. S. probationers posted at Muzaffarpur, Hazaribagh, Purnea, Palamu Ranchi, Munger, Dhanbad, Chaibasa, Gaya and Patna districts.

1.9 A.R.S. probationers deputed by the ICAR received intensive field training in collecting field data on level of adoption of improved farm practices. They were exposed to research/extension activities of the University.

1.10 A number of specialised training programmes under Special Rice Production Programme were organised at Pusa, Patna & Sabour campuses of the University. Over 800 progressive farmers from selected Blocks were imparted field-based training for increasing rice production. A team consisting of Breeder, Pathologist, Entomologist and Rice Agronomist was constituted separately for each division of Bihar for providing intensive guidance to rice growing farmers.

1.11 A training-cum-discussion seminar on "Use of Phosphate in Kharif Crops", was organised at Pusa in Collaboration with M/S Hindustan Lever Ltd. Scientists of the University presented papers and discussed field problems with 35 participating extension Officers.

1.12 The Scientists of College of Agricultural Engineering and of Soil-Science and Agronomy Departments participated in the training programme organised by Training Division of water and Land Management Institute, Khagaul, Patna.

1.13. A monthly workshop-cum-training programme for increasing Sugarcane Production in Bihar was organised in every month at the Sugarcane Research Institute, Pusa for the Cane Development Officers and other Field Officers of Sugarcane Department of Bihar. During 1987-88, about 200 Extension Officers participated in this programme.

1.14. A training programme on Sugarcane ratoon management and Gur Making was organised at Banka in February, 1988 in which 148 progressive farmers

A.P.C. AND V.C. ALONGWITH AG. SCIENTISTS VISITING GROUNDNUT DEMONSTRATION

RAJMA A NEW INTRODUCTION IN NORTH BIHAR

DR. P. N. JHA, DEAN AGRICULTURE ADDRESSING THE SMALL AND MARGINAL FARMERS PARTICIPATING IN KISAN MELA, WHILE DR. G TRIVEDI. V.C., PRESIDES. SRI R.C. ARORA, RURAL DEVELOPMENT EXPERT AND COMMISSIONE R. BIHAR WAS THE CHIEF GUEST

and Extension Officers of Bhagalpur Division participated.

1.15. A training programme on Water Management for the Assistant Engineers (Irrigation) was organised under the guidance of Dean, College of Agril. Engineering, Pusa. Sixty five Assistant Engineers and Executive Engineers participated in this programme.

1.16. Crop specialists of University participated in training programmes organised by Indo-British Fertilizer Education Project at Madhubani, Crop Seminar at Saraisa Seva Kendra, Patores and at Vaishali (CAPART). About 1000 farmers and Extension Officers participated in these programmes on different dates.

1.17. A two-week practical training programme on Bee-Keeping was organised at Pusa campus in the month of March, 88 by the Department of Entomology for starting Bee-Keeping as a source of income at village level for self-employment.

1.18. A National level workshop-cum-seminar on Rice Production Technology was organised at Patna from 25th to 28th April '88 in which top level Rice Scientists from different states participated and a further plan for various agro-climatic zones was finalised.

1.19. A National Workshop on All India Co-ordinated Project on Oilseed crops was organised at Patna from 22nd to 25th April '88. Scientists engaged in research/extension programmes on Oilseed from different States of the Country participated in the workshop. And A future plan of action for promoting oilseed production was finalised.

1.20. A practical training porogramme on Blue Green Algae and Azolla was organised in the month of August '87 at Agricultural Research Institute, Patna. About 64 Extension Officers and farmers were benefitted by this programme.

1.21. On the occasion of World Food Day on 16th Oct., 87 a special field day was organised at Agricultural Research Institute, Mithapur, Patna in which ever 200 farmers participated. The Student Volunteers of N.S.S. Unit of T.C.A., Dholi also organised a training programme at Mirapur village. About 150 farmers were benefitted from this training programme. Scientists of the College imparted training to the farmers.

1.22. A group of 88 farmers from Uttar Pradesh visited Pusa & another group of 25 farmers from Assam State visited Sabour Campus in the month of March and April '88, respectively. Crop scientists discussed with the farmers about the technologies developed by this University.

2. MONTHLY WORKSHOP :

The Monthly Workshops were organised regularly in each month for two days at the main and sub campus of University at Pusa, Sabour, Patna, Agwanpur (Saharsa) and Bodh Gaya. District Agri-

cultural Officers, Subdivisional Agricultural Officers, Subject Matter Specialists and Assistant Agronomists (Adaptive Research) working under T & V participated in the Monthly Workshop. Local field problems were discussed thoroughly with the Master Trainees of the University. On the second day, field and laboratory visits were organised and messages in the form of hand-out in Hindi were distributed among the participating Extension Officers.

3. NATIONAL DEMONSTRATION PROJECT :

Two National Demonstration Projects sponsored by I.C.A.R. are being operated by this University. One is located in Gaya district and another in Vaishali district. Project-wise achivements (1987-88) are given below :

3.1. National Demonstration Project Gaya :

Altogether 50 demonstrations were conducted in *Kharif* season, 34 demonstrations in *Rabi* and 15 in Summer season in three Blocks, namely Bodh-Gaya, Manpur and Gaya-Sader. The demonstrations, which were conducted in cluster, covered five crops namely, Rice (Varieties-Rajshree, Radha, Sujata IR 36 and Saket-4), Wheat (Varieties-H. P. 1209, K 8020, HUW 55, UP 115) and Rye (Variety-Varuna), Lentil (Variety-L-9-12), Gram (Variety-RAU 52) and Potato (Variety-Kufri Sinduri), Moong (Varieties-Sona, and PS 16 and Til (Variety-Krishna).

Performance in some of the demonstrations in rotations of 3 and 2 crops in a year was as under :

Name of rotations	No. of demands	Crops	Av. Yield q/ha.
Rice-Rye-Til	2	Rice	40.93
		Rye	12.95
Rice-Lentil-Moong	3	Rice	41.71
		Lentil	11.93
Rice-Wheat-Rice	2	Rice	40.25
Rice-Rye-Rice	1	Rice	49.25
		Rye	14.62
Rice-Wheat-Till	1	Rice	88.50
Rice-Rye-Moong	5	Rice	40.96
		Rye	11.95
Rice-Wheat	10	Rice	40.98
Rice-Rye	4	Rice	40.98
		Rye	11.56
Rice-Potato	3	Rice	40.30
		Potato	211.16
Rice-Gram	2	Rice	46.62
Rice-Rice	1	Rice	43.25
Rice	6	Rice	39.10

cultural Officers, Subdivisional Agricultural Officers, Subject Matter Specialists and Assistant Agronomists (Adaptive Research) working under T & V participated in the Monthly Workshop. Local field problems were discussed thoroughly with the Master Trainees of the University. On the second day, field and laboratory visits were organised and messages in the form of hand-out in Hindi were distributed among the participating Extension Officers.

3. NATIONAL DEMONSTRATION PROJECT :

Two National Demonstration Projects sponsored by I.C.A.R. are being operated by this University. One is located in Gaya district and another in Vaishali district. Project-wise achivements (1987-88) are given below :

3.1. National Demonstration Project Gaya :

Altogether 50 demonstrations were conducted in *Kharif* season, 34 demonstrations in *Rabi* and 15 in Summer season in three Blocks, namely Bodh-Gaya, Manpur and Gaya-Sader. The demonstrations, which were conducted in cluster, covered five crops namely, Rice (Varieties-Rajshree, Radha, Sujata IR 36 and Saket-4), Wheat (Varieties-H. P. 1209, K 8020, HUW 55, UP 115) and Rye (Variety-Varuna), Lentil (Variety-L-9-12), Gram (Variety-RAU 52) and Potato (Variety-Kufri Sinduri), Moong (Varieties-Sona, and PS 16 and Til (Variety-Krishna).

Performance in some of the demonstrations in rotations of 3 and 2 crops in a year was as under :

Name of rotations	No. of demands	Crops	Av. Yield q/ha.
Rice-Rye-Til	2	Rice	40.93
		Rye	12.95
Rice-Lentil-Moong	3	Rice	41.71
		Lentil	11.93
Rice-Wheat-Rice	2	Rice	40.25
Rice-Rye-Rice	1	Rice	49.25
		Rye	14.62
Rice-Wheat-Till	1	Rice	88.50
Rice-Rye-Moong	5	Rice	40.96
		Rye	11.95
Rice-Wheat	10	Rice	40.98
Rice-Rye	4	Rice	40.98
		Rye	11.56
Rice-Potato	3	Rice	40.30
		Potato	211.16
Rice-Gram	2	Rice	46.62
Rice-Rice	1	Rice	43.25
Rice	6	Rice	39.10

Variety-wise Performance :

There were 40 demonstrations on rice having 12, 10, 8, 5 and 5 demonstrations with Sujata, IR 36, Radha, Rajshree and Sita, respectively. The average yields obtained under these demonstrations were 41.28, 40.23, 41.42, 46.30 and 41.78 q/ha., respectively. Demonstrations on Rye were conducted with Varuna variety. In 13 demonstrations with Varuna, the average yield was 12.32 q/ha. The average yields of L 9-12 variety of Lentil [3 demonstrations] and Kufri Sinduri of Potato [3 demonstrations] were 11.93 and 211.16 q/ha. respectively.

Unfortunately, the demonstrations an arhar conducted with varieties BR-65 and T-2, failed due to heavy rain and flood.

Besides varietal demonstrations, Method demonstrations in application of Rhizobium Culture in Pulse crops were also conducted both during Kharif and Rabi.

3.2 National Demonstration Project, Vaishali

This project is located at Hajipur. As many as 101 demonstrations were conducted. Of these, there were 55 in Kharif, 40 in Rabi and 6 in Summer seasons The demonstrations were spread in 4 Community Development Blocks and it covered 7 crops, namely, Rice, Wheat, Maize, Rye, Gram, Arhar and Moong.

The average yield of rice variety, Radha [5 demonstrations], IR 36 [3 demonstrations], Sita [18 demonstrations],Sujata [3 demonstrations] & Jaishree [3 demonstrations] were 44.0, 40.50, 36.50, 38.50 and 37.0 q/ha. respectively. The average yield of Rye [Veriety-Varuna] was 14.5 q/ha. For amendments of Saline-alkali, Soil, Pyrites @ 2.5 tonnes per hectare and Zinc Sulphate @ 25 kg/ha. were used in demonstrations on paddy [Variety-Sita].

4. OPERATIONAL RESEARCH PROJECT

There are four Operational Research Projects in this University. These are located in Munger, Saharsa, and Samastipur districts. Munger district has two ORPS, one at Binda Diara and another in Barahiya-Mokamah Tal areas. Project-wise achievements are presented in the following paragraphs :

4.1 Operational Research Project, Binda Diara :

Operational Research Project, Binda Diara, Munger started in the year 1985. The project aimed to develop improved farm packages for Binda Diara, one of the diaras of the Ganges which had so far remained without the fruits of developing agricultural science offered to people in other areas. The research conducted in farmers fields helped to disseminate better technology to the fields of other farmers also. Achievements of the Project made during 1987-88 are given below .

On farm trials were conducted in all the three seasons. In summer, 6 demonstrations were conducted. In varietal trial of cucumber, Japanese green long gave highest yield of 136.70 q/ha. Balam Khira variety was found to yield maximum [95.3 q/ha]. In manurial trials on water melon. Sugarbaby variety was identified to be the most suitable as it yielded to the tune of 223.1 q/ha. Among bottle gourd varieties.

PSP long yielded maximum which was 176.6 q/ha.

In cereal crops, Summer maize variety Ganga Safed-2 produced 37.7 q/ha., yield in comparison to Suwan [33.4 q/ha.], Diara composit [25.6 q/ha.] and Tilbulia [21.3 q/ha]. However, its average yield was 32.0 q/ha. In rice, Pusa-33 and Saket-4 were tested and yields of 28.0 q/ha. and 30.0 q/ha. respectively were obtained.

During rabi season of 1987-88, Sixteen demonstrations were conducted in Diara area. Tomato varieties were tested at three different locations. It was observed that the variety Pusa ruby produced the highest yield [303.6 q/ha.] and the varieties Marglobe, H.S. 101 and Punjab Chhohara produced 272.3, 260 9 and 243.2 q/ha. respectively, the average being 270.0 q/ha.

In a varietal-cum-manurial trial on Potato, it was interesting to note that the Potato variety Kufari Sinduri gave higher yield at higher level of fertilization [100 kg N+80 kg P_2O_5 +80 kg K_2O, per hectre] i. e. 266.2 q/ha. in comparison to variety O.N. 1645 [259.8 q/ha.].

In the demonstrations conducted under NODP programme, the highest yield recorded in Rye was 11.7 q/ha. and in Toria 8.5 q/ha. In Pulses, a new exploratory trial of Rajmas with variety Malviya-15 was conducted at farmer's fields and 11.3 q/ha. average yield was recorded.

4.2 Operational Research Project, Agwanpur, Saharsa

This project was shifted from Adhaura to Agwanpur only during the month of December, 1987. Hence, a limited number of demonstrations and trials were conduted during the period under report.

During *rabi* [1987-88], the promising varieties of wheat viz., HD 2285, RR 21 and HD 2329 were tried in Narayanpur [Nawhatta block] and Mahpura villages [Mahishi block]. Variety HD 2285 produced highest yield on both the locations i. e., 34.20, and 30.00 quintals per hectare, followed by RR-21 [30.70 and 29.30 q/ha. respectively] and HD 2329 [28.00 and 20.80 q/ha. rispectively].

The scientists of this project imparted training to the farmers of the locality. They also organised a Kisan gosthi.

4.4 Operational Research Project, Barahiya Tal Area.

This scheme has been functioning from 5th Nov., 1985 in Barhiya Mokameh Tal area with a view to find out suitable technology of pulse for the area and study the constraints of pulse production in tal area. Since its inception, the suitability of a number of technology for increasing higher yield of Pulses in Tal area has been successfully tested.

During rabi 1987-88, the trials/demonstrations were conducted mainly on Gram and Lentil.

A number of varieties of Gram and Lentil were tested in Fazil, Gordhowa, Kothawa - Maharam Chak Tal, Birupur Tal, Ghaghra [Mor] Tal and Daraunki Tal area of Barahiya-Mokamah Tal.

Variety RAU 52 of gram yielded 18.90 q/ha. followed by varieties DHG 82-12 and SGS 82.2 [18.00 quintals/ha. each]. The yield of local check was 12.70 q/ha.

PSP long yielded maximum which was 176.6 q/ha.

In cereal crops, Summer maize variety Ganga Safed-2 produced 37.7 q/ha., yield in comparison to Suwan [33.4 q/ha.], Diara composit [25.6 q/ha.] and Tilbulia [21.3 q/ha]. However, its average yield was 32.0 q/ha. In rice, Pusa-33 and Saket-4 were tested and yields of 28.0 q/ha. and 30.0 q/ha. respectively were obtained.

During rabi season of 1987-88, Sixteen demonstrations were conducted in Diara area. Tomato varieties were tested at three different locations. It was observed that the variety Pusa ruby produced the highest yield [303.6 q/ha.] and the varieties Marglobe, H.S. 101 and Punjab Chhohara produced 272.3, 260 9 and 243.2 q/ha. respectively, the average being 270.0 q/ha.

In a varietal-cum-manurial trial on Potato, it was interesting to note that the Potato variety Kufari Sinduri gave higher yield at higher level of fertilization [100 kg N+80 kg P_2O_5 +80 kg K_2O, per hectre] i. e. 266.2 q/ha. in comparison to variety O.N. 1645 [259.8 q/ha.].

In the demonstrations conducted under NODP programme, the highest yield recorded in Rye was 11.7 q/ha. and in Toria 8.5 q/ha. In Pulses, a new exploratory trial of Rajmas with variety Malviya-15 was conducted at farmer's fields and 11.3 q/ha. average yield was recorded.

4.2 Operational Research Project, Agwaupur, Saharsa

This project was shifted from Adhaura to Agwanpur only during the month of December, 1987. Hence, a limited number of demonstrations and trials were conduted during the period under report.

During *rabi* [1987-88], the promising varieties of wheat *viz.*, HD 2285, RR 21 and HD 2329 were tried in Narayanpur [Nawhatta block] and Mahpura villages [Mahishi block]. Variety HD 2285 produced highest yield on both the locations i. e., 34.20, and 30.00 quintals per hectare, followed by RR-21 [30.70 and 29.30 q/ha. respectively] and HD 2329 [28.00 and 20.80 q/ha. rispectively].

The scientists of this project imparted training to the farmers of the locality. They also organised a Kisan gosthi.

4.4 Operational Research Project, Barahiya Tal Area.

This scheme has been functioning from 5th Nov., 1985 in Barhiya Mokameh Tal area with a view to find out suitable technology of pulse for the area and study the constraints of pulse production in tal area. Since its inception, the suitability of a number of technology for increasing higher yield of Pulses in Tal area has been successfully tested.

During rabi 1987-88, the trials/demonstrations were conducted mainly on Gram and Lentil.

A number of varieties of Gram and Lentil were tested in Fazil, Gordhowa, Kothawa - Maharam Chak Tal, Birupur Tal, Ghaghra [Mor] Tal and Daraunki Tal area of Barahiya-Mokamah Tal.

Variety RAU 52 of gram yielded 18.90 q/ha. followed by varieties DHG 82-12 and SGS 82.2 [18.00 quintals/ha. each]. The yield of local check was 12.70 q/ha.

These yield levels were Obtained when full package of practices were adopted. The trials were conducted in different lacations of the tal area. Similarly encouraging results were recorded in trials on Lentil, Varieties PL 77-2 and PL 639 which gave yield of 17 q/ha. each on the otherehand, variety PL 77-22 (Arun) yielded 14.66 q/ha. and L-9-12 13.50 q/ha. The yield in local check was only 12.70 q/ha.

Further, in one of the trials to control seedling mortality in gram and lentil, it was observed that the seed treatment with Bavistin reduced the damage significantly and increased the yield of Gram and Lentil crops.

4.5 Operational Research Projects for SC/OBC

As many 300 Scheduled Caste families selected from five villages namely; Harpur, Dighra, Gaura, Birauli and Morsand served as beneficiaries under this project. The families were selected in July, 1985 on the besis of their low socio-economic status. The activities under project since then were focussed on increasing productivity and income of the adopted families.

The achievements of this project during 1987-88 are as follows :

4.5.1 Four training programmes on Summer Pulses, Kharif Paddy and development of Kitchen garden were organised, Seventy participants received skill training in each of these trainings. One training in fruit plantation was also organised in the village in which 17 persons attended. Twenty five packets of vegetable seeds, each containig smaller packets of seeds of Brinjal, Ladies finger, Chillies, Tomato and Bottle-gourd were distributed among the adopted families for Kitchen as well as commercial farming, where-ever possible.

4. 5. 2 Nine demonstrations on Summer moong, variety-NP 18 were conducted in the field of farmers of Harpur Dighra, Gaura and Birauli villages. A maximum yield of 6.5 q/ha. was obtained in these demonstrations.

4. 5. 3 In the Kharif season, 28 demonstrations on paddy with variety, Rajendra Dhan 201, and 30 demonstrations of paddy with variety Mansoori were conducted in Birauli, Harpur and Dighra Villages. The variety RD 201 produced an average yield of 19.00 q/ha. where as the variety Mansoori produced an average yield of 17.5 q/ha. The crop had largely suffered due to flood.

4. 5. 4 Technical advance on scientific cultivation of Maize resulted in increase in yield of adopted families, from 24.6 q/ha. in (1985-86) to 43.1 q/ha, in 1987-88. Similarly, the efforts helped to increase wheat yield from 17.4 q/ha. in 1985-86 to 21.0 q/ha. in 1987-88.

4. 5. 5 As many as 21 Mango, 40 L'tchi 2 Guava plants were provided to the adopted farmers of Birauli Village on subsidised rate for development of their nutritional garden.

4. 5. 6 Under the Child immunization programme,270 Children were vaccinated against Polio, Mizzles, DPT, D. T., Tetanus and typhoid diseases.

4. 5. 7 Under bee-keeping programme, 12 persons of adopted families selected from four villages were imparted training. Ten Bee-keeping boxes were given to them as critical input from the project fund.

4. 5. 8 A field-day on summer moong was organised in Birauli village in which 26 farmers participated. A field day on Kharif paddy was also organised in which 14 farmers participated.

5. Krishi Vigyan Kendra :

There are three KVKs under this University. They are located at Munger, Banka (Bhagalpur) and Agwanpur (Saharsa). K. V. K., Munger is the oldest one which was started in 1979-80 followed by Krishi Vigyan Kendra, Banka in 1983 and Krishi Vigyan Kendra, Agwanpur in 1985. KVK-wise achievents for the year 1987-88 are given in the following paragraphs.

5.1 Krishi Vigyan Kendra, Munger :

As many as 487 trainees were trained in one-day 'On-Campus' training. In the one-day Off-Campus training, 1514 persons were imparted skill training. Further, Two Six-days training were organised, One On-Campus and another Off-Campus. In On-Campus training, 174 persons participated while 75 persons were benefitted from the Off-Campus training.

Five inter-disciplinary trainings were also organised by the Kendras in which 2250 persons participated. Major emphasis of these training programme were on Weed Control, raising nutritional garden, pest and disease control, growing commercial and drought resistant fruit plants, proper management of live-stock & repair and maintenance of machines and agricultural tools.

Very encouraging result of demonstration on Oilseeds under N. O. D. P at Singhia Village (Munger) was obtained in which 40 % increase in yield of Oilseed was recorded.

Besides, 21 Collaborative trainings were conducted alongwith Department of Agriculture, Nehru Yuwak Kendra, Angan-Bari IBEE Project, IFFCO and Munger Co-operative Dairy.

Under Lab-to-Land programme at this centre, 25 farm families were selected in two villages, namely, Basauni and Hemjapur. University Scientists imparted trainings to the adopted farmers on crop-production and horticulture. Similarly, 10 demonstrations were conducted on two varieties of Rye and the average yield of 13.50 and 12.50 q/ha., respectively were obtained. Two demonstrations on Tori with average yield of 9.0 g/ha. 5 demonstrations on Lentil with 18.0 g/ha. and 5 demonstrations on Pea with 16.0 g/ha. were also conducted. Under N O D P, demonstrations on Oilseeds were conducted on Rye variety Varuna.

A large number of demonstrations were also conducted by the KVK, Munger on farmers' fields. Paddy varieties, Pusa 2-21 (transplanted), NC. 1626 (direct sown) and IET-6148 (rainfed) yielded 28.35, 18.20 and 20.50 q/ha., respectively. In demonstration on Maize, variety, Laxmi; an yield of 42 q/ha. was obtained Likewise, seven demonstrations on M. P. Chari, Seven on Teosente, Seven on Methi and two on

4. 5. 7 Under bee-keeping programme, 12 persons of adopted families selected from four villages were imparted training. Ten Bee-keeping boxes were given to them as critical input from the project fund.

4. 5. 8 A field-day on summer moong was organised in Birauli village in which 26 farmers participated. A field day on Kharif paddy was also organised in which 14 farmers participated.

5. Krishi Vigyan Kendra :

There are three KVKs under this University. They are located at Munger, Banka (Bhagalpur) and Agwanpur (Saharsa). K. V. K., Munger is the oldest one which was started in 1979-80 followed by Krishi Vigyan Kendra, Banka in 1983 and Krishi Vigyan Kendra, Agwanpur in 1985. KVK-wise achievents for the year 1987-88 are given in the following paragraphs.

5.1 Krishi Vigyan Kendra, Munger :

As many as 487 trainees were trained in one-day 'On-Campus' training. In the one-day Off-Campus training, 1514 persons were imparted skill training. Further, Two Six-days training were organised, One On-Campus and another Off-Campus. In On-Campus training, 174 persons participated while 75 persons were benefitted from the Off-Campus training.

Five inter-disciplinary trainings were also organised by the Kendras in which 2250 persons participated. Major emphasis of these training programme were on Weed Control, raising nutritional garden, pest and disease control, growing commercial and drought resistant fruit plants, proper management of live-stock & repair and maintenance of machines and agricultural tools.

Very encouraging result of demonstration on Oilseeds under N. O. D. P at Singhia Village (Munger) was obtained in which 40 % increase in yield of Oilseed was recorded.

Besides, 21 Collaborative trainings were conducted alongwith Department of Agriculture, Nehru Yuwak Kendra, Angan-Bari IBEE Project, IFFCO and Munger Co-operative Dairy.

Under Lab-to-Land programme at this centre, 25 farm families were selected in two villages, namely, Basauni and Hemjapur. University Scientists imparted trainings to the adopted farmers on crop-production and horticulture. Similarly, 10 demonstrations were conducted on two varieties of Rye and the average yield of 13.50 and 12.50 q/ha., respectively were obtained. Two demonstrations on Tori with average yield of 9.0 g/ha. 5 demonstrations on Lentil with 18.0 g/ha. and 5 demonstrations on Pea with 16.0 g/ha. were also conducted. Under N O D P, demonstrations on Oilseeds were conducted on Rye variety Varuna.

A large number of demonstrations were also conducted by the KVK, Munger on farmers' fields. Paddy varieties, Pusa 2-21 (transplanted), NC. 1626 (direct sown) and IET-6148 (rainfed) yielded 28.35, 18.20 and 20.50 q/ha., respectively. In demonstration on Maize, variety, Laxmi; an yield of 42 q/ha. was obtained Likewise, seven demonstrations on M. P. Chari, Seven on Teosente, Seven on Methi and two on

Berseem were also conducted. The average yield of Berseem was 200-225 q/ha. This was 25.50 q/ha more than the previous yields in the village.

Besides, 2057 fruit plants were distributed among the farmers of the adopted villages.

In addition, two field-days were organised at village Salarpur and Lagma.

Also, three farm trials were conducted in wheat, two at Sandalpur village and one at Laliadih, in which a maximum yield of 34 0 q/ha. was found in Laliadih village.

In other extension activities, 12 cyclo-styled leaflets, Krishi Sandesh and a monthly news-letter were distributed among farmers every month. Four popular articles were published in different journals. Sixteen radio-talks were given by the Kendra's Scientists.

5 2 Krishi Vigyan Kendra, Agwanpur (Saharsa) :

During year 1987-88, One-day On-Campus and Off-Campus training were organised. As many as 344 persons were trained in On-Campus while 562 persons were imparted training in Off-Campus programmes.

Under Lab - to - Land Programme NODP, Kendra organised trainings for adopted farmers. There were 6 On-Campus and 10 Of-Campus trainings organised in which a total of 120 and 215 persons were trained.

Kendra conducted 26 demonstrations on paddy variety, Sita and recorded and average yield of 41.5 q/ha. while Jaishree, TCA-72 and Janki recorded yield upto 25.30, 35.0 and 22.5 q/ha., respectively.

In rabi too, 9 demonstrations on wheat and 2 each on maize and lentil were conducted. In case of wheat, a maximum yield of 40 q/ha. from variety UP-262 was obtained, In maize demonstration, Laxmi and Hemant varieties gave thd yield of 52 and 55 q/ha. respectively. Lentil (Pant-L) gave maximum yield of 11.q/ha.

In demonstrations conducted for on-farm test with 3 varieties of wheat, U. P. 262 showed maximum yield which was 50.0 q/ha.

Under Oilseed Mission programme, six compact block demonstrations were conducted in different villages. The yields of variety Varuna ranged from 6.35-11.65 b/ha. and that of Tori 6.85 q/ha. Besides, 3 field days and one farmer's day were organised in which agricultural exhibibitions and Kisan Gosthi were held.

Under seed prodution programme of the KVK, during Kharif, 87, 255 quintal seed of Sita and 224.0 quintal seed of Jaishree were produced.

5.3 Krishi Vigyan Kendra, Banka :

Thirty Seven on-campus training were organised in which 613 persons were trained. Out of the 37 trainings, 12 trainigs were organized on crop sciences in which 260 persons participated, 10 trainings were arranged in Animal Sciences which were attended by 155 trainees, 7 trainings were given in Horticulture to 99 persons and 8 trainings were imparted in

Home Science benefitting 99 trainees. Similarly, 227 trainings were organised off-campus in which 2865 persons were benefitted. Out of 227 trainings, 74 trinings were imparted in crop science (1090 trainees), 36 training in Animal Science (540 trainees) and 56 trainings in Home Science (639 trainees).

Besides, this, two sugarcane training-cum-discussion seminar were organised to provoke the farmers for adopting the suitable cane varieties. Coordinating this effort, seven demonstrations of sugarcane varieties B. O.-91 were conducted.

In dryland belt of Chanan, Katoria and Baussi block, demonstrations were conducted on mixed crops on Arhar and Maize and Arhar & Groundnut.

In the field of Animal husbandry, the frezen semen centre of KVK artificially inseminated over 300 cows with frezen semen of Holestion Freision and Jersey Breed.

6. Lab to Land Programme :

In phase IV which Commenced from April, 1986, a total of 350 farm families were allotted to this University. These families were selected from 24 villages spread in 9 districts of the State. Twelve Lab-toLand Sub-Centre were identified for implementation of the programme. Approximately, 150 scientists of the university have been associated with the programme from the beginning.

The adopted farm families were provided technical guidance by the teams of inter-disciplinary scientists. Critical inputs worth Rs 500/- per adopted family was supplied to help and motivate farmers to adopt new farm technology. Pre and mid-season training programmes along with demonstrations and field days were organised on the farms of adopted farmers. This programme has made a substantial contribution in improving the socio-economic condition of some of the poorest farm families with the knowledge for low cost and no-cost agricultural and allied technologies.

The programme has helped to increase the productivity of the major crops of the adopted villages as well as the gross income of the adopted families of different categories.

7. Regional Centre For Biogas Training

The Regional Centre for Biogas Training and Development Pusa, under the National Project on Biogas Development. is engaed in a variety of trainings. Two to three weeks training to field functionaries and masons for construction and maintenance of biogas plants, one-day users' training to acquaint the beneficiaries about the maintenance of plant and use of biogas as well as spent slurry, demonstration on spent slurry manure (Biogas manure) to show its superiority as compared to cow dung or farm yard manure and one-day training to different types of visitors likefarmers, charcha mandal members, I.A.S. officers coming for short duration training in agriculture, Home Science students and others are some of the training activities under the project. Detail achievements of the Project during the year 1987-88 are as under

7.1 Construction-cum-Maintenance Training for field functionaries and masons.

The centre has organised eight construction-cum-maintenance training for supervisory staff and masons, each of 16-days duration during 1987-88, in which 106 persons [79 supervisors and 27 masons] from different stages, like, Assam, Bihar, Orissa and West Bengal received training. In addition, 3 construction-cum-maintenance training for masons only, one each at Pusa and Madhepura in Bihar for a period of 26 days was organised. In these three training programmes, 27 masons were trained.

7.2 Field Demonstration on spent slurry manure

In order to show the superiority of spent slurry manure, 15 demonstrations [10 on wheat and 5 on rabi maize] were conducted in farmer's field In case of wheat crop, the average yield in plot treated with slurry manure increased by 3.64 q/ha. against the cow-dung manure treated plot. In case of rabi maize, the average increase was 2.69 quintals.

7.3 Users Training

Fifteen users training courses were organised in the villages in which users and non users were trained for maintenance of biogas plants, use of gas and use of spent slurry manure.

7.4 Field Study

A Field study entitled "Constraints in adoption and use of biogas technology" was conducted during 1987-88. In this study the constraints of different types and of different magnitude as percived and experienced by non users as well as users of biogas technology were identified. The study has been helpful in motivating the farmers for adopting biogas technology.

7.5 Adoption of panchayats around Pusa for Making them model Biogas

Mahamada, Harpur, Dighra, Saidpur & Malinagar panchayats were adopted to saturate them with biogas plants.

8. NATIONAL SERVICE SCHEME :

The N. S. S. strength in the University consisted of 8 Units, covering 6 Colleges under 9 Programme Officers and was Co-ordinated at the University level by the Programme Coordinator under the averall guidance of Director, Extension Education. There were 94 girls amongst 799 enrolled student volunteers during the period under report. All the newly admitted student Volunteers were duly oriented in their respective Units. Three Programme Officers were deployed to TORC, Narendrapur, where they completed their training successfully. The Advisory Committee at the University level reviewed the achievements of 1987-88 and approved the programme planned for 1988-89, under the Chairmanship of the Vice-Chancellor.

8. 1 Allcviation of poverty through generation of higher income :

Student-Volunteers rendered technical advisory service, to the farmers on production technology of oilseeds, Pulses, Rice and Spices; maintenance of cattle health, improvement of cattle breed; poultry and fisheries and modern but economic ways of home-management practices. Cattle were vaccinated against contagious diseases and quality seeds of high yielding

varieties of different crops were distributed in adopted villages.

Trainings were organised for garment making, embroidory and knitting for women members of Mahila Mandal at village Bhuskaul. Altogether 53 women-members completed the training successfully.

8. 2 Mass Functional Literacy :

Student-Volunteers were involved to function both as the motivator and the Instructor to carry out this programme. Altogether 109 volunteers successfully participated and enrolled 327 learners, out of which a total of 118 learners achieved the prescribed standard of literacy and functional education. A poster compaign was also organised in village Bhithi to create general awareness amongst the mass towards the burning problem of illiteracy. Manuscripts with illustrations on three title were prepared in the writers' Workshop organised by N. S. S. at Pusa.

8.3 Better Environment :

Under this programme, "Van-Mahotsav" was organised in village Bhithi., in College campuse of B. A. C., Sabour and T. C. A., Dholi.

8.4 Flood Relief work :

During the unpresedented flood in the region, student-Volunteers, teachers and staff-members of Tirhut College of Agriculture, Dholi organised relief camp in the College campus and provided shelter, food, clothings and medicines to victims of flood and heavy monsoon affecting villages Maraul, Mirapur, Raini and Bhithi.

8.5 General Awareness :

In order to create general awareness amongst mass towards important national problems. "Quami Ekta Divas" "World Food Day" National Integration Week" 40 th Anniversary of Independence Day" "Childrens Day", and "World Women's Day" were organised by different N. S. S. Units. One these occasions, Eassy competiton, debate, symposium and cultural programmes were organised to convey the broad messages of these events.

8.6 Health and Hygiene :

In collaboration with the Rotary Club, B. A. C. Sabour organised a Special Eye Camp at Sabour High School in which student volunteers rendered all the required physical assistance to attend on the patients.

8.7 Special Camp.

A special camp was organised at village Bhuskaul with the central objective of YOUTH FOR ALLEVIATION OF POVERTY through extension of home-science technology, by the N. S. S. Unit of College of Home Science, Pusa from 5th to 14th Feb., '88. The camp strength consisted of 50 girl students, 15 village Youth 11 teachers, 10 social leaders and 75 trainees and 475 regular visitors.

The campers organised the Mahila Mandal consisting of 75 members. The socio-economic survey of the entire village (165 families) was completed. Production training programmes were organised for

varieties of different crops were distributed in adopted villages.

Trainings were organised for garment making, embroidory and knitting for women members of Mahila Mandal at village Bhuskaul. Altogether 53 women-members completed the training successfully.

8. 2 Mass Functional Literacy :

Student-Volunteers were involved to function both as the motivator and the Instructor to carry out this programme. Altogether 109 volunteers successfully participated and enrolled 327 learners, out of which a total of 118 learners achieved the prescribed standard of literacy and functional education. A poster compaign was also organised in village Bhithi to create general awareness amongst the mass towards the burning problem of illiteracy. Manuscripts with illustrations on three title were prepared in the writers' Workshop organised by N. S. S. at Pusa.

8.3 Better Environment :

Under this programme, "Van-Mahotsav" was organised in village Bhithi., in College campuse of B. A. C., Sabour and T. C. A., Dholi.

8.4 Flood Relief work :

During the unpresedented flood in the region, student-Volunteers, teachers and staff-members of Tirhut College of Agriculture, Dholi organised relief camp in the College campus and provided shelter, food, clothings and medicines to victims of flood and heavy monsoon affecting villages Maraul, Mirapur, Raini and Bhithi.

8.5 General Awareness :

In order to create general awareness amongst mass towards important national problems. "Quami Ekta Divas" "World Food Day" National Integration Week" 40 th Anniversary of Independence Day" "Childrens Day", and "World Women's Day" were organised by different N. S. S. Units. One these occasions, Eassy competiton, debate, symposium and cultural programmes were organised to convey the broad messages of these events.

8.6 Health and Hygiene :

In collaboration with the Rotary Club, B. A. C. Sabour organised a Special Eye Camp at Sabour High School in which student volunteers rendered all the required physical assistance to attend on the patients.

8.7 Special Camp.

A special camp was organised at village Bhuskaul with the central objective of YOUTH FOR ALLEVIATION OF POVERTY through extension of home-science technology, by the N. S. S. Unit of College of Home Science, Pusa from 5th to 14th Feb., '88. The camp strength consisted of 50 girl students, 15 village Youth 11 teachers, 10 social leaders and 75 trainees and 475 regular visitors.

The campers organised the Mahila Mandal consisting of 75 members. The socio-economic survey of the entire village (165 families) was completed. Production training programmes were organised for

soap. doll and candle making, fruit preservation, construction of smokelless chulha, garment making, knitting and embroidory and cultivation of mushreoms, Preliminary steps and procedures were completed for organization and registration of 'Mahila Audyogic Sahyog Samiti' in the village. The village was adopted for integrated rural development programme by the N. S. S. Unit in collaboration with the Pusa Branch of Central Bank of India.

Other notable achievements of this camp were plantation of 750 saplings of economic and ornamental values; cleaning of 16 wells and water disinfectation; health check up of women folk; vaccination of children against polio-BCG, and triple antigens. Different items of food, as cheap sources of nutrition for mothers and children were demonstrated. Inter school games, sports and cultural programmes were organised. A debate and symposium was also held to focus the evils of dowry in which members of Mahila Mandal participated. The camp was visited by a large number of dignitries from the Govt. Deptts. of Bihar, and Central Govt. besides the University.

9. OTHER EXTENSION ACTIVITIES :

Rajendra Agricultural University, Pusa during the year 1987-88 published 20 Books/Bulleitines/News letter/Research Journals/Folders and Diaries Out of these publications, Adhunik Kisan Diary and Faslon Ki Package Pranali had been on hot demand by the extension workers and farmers.

On the other hand, Kisan Melas were organised at three places in the State at B. A. C., Sabour (Bhagalpur), A. R. I., Mithapur (Patna) and Main Campus, Pusa. All together, 19000 farmers including farm women visited these Kisan Melas.

More than 300 soil and plant samples brought by the farmers were analised after which scientific recommendations, were made. In the three melas, 175 farmers received prized in different competetions for their best entries in different crops and live-stock.

9.1 Art & Photography :

All the Campuses of the University including the Head quarter at Pusa have Art and Photography Section. This section, besides providing support to the research work of lhe Scientists by way of helping them with timely preparation of slides and Photographs of their activities, covered the Kisan Melas field days, visit of Scientists and other guest, and a large variety of programmes & meetings. The Artists of this Unit produced 150 Posters, 300 Charts, 160 Book cover/Folders, 300 banners, 320 Name plates, 1600 cassettes, 300 slids designs/100 meeting charts, 100 badges, 100 Histograms and mass and wrote 1000 field boards.

9.2 Farmers advisory services :

In the previous year, More than 200 letters from farmers were replied. It has been noted that number of farmers seeking technical advice through letter has been on increase year after year.

On the otherhand, Scientists paid visit to alarge number of villages & fields in the country side in almost all the dis-

tricts under the jurisdiction of the University. Similarly, farmers both of Bihar as well as other states, scientists and Agril. Extension Officers visited R.A.U. To quote a few, a team of 45 farmers of Gopalganj Block under special Rice production programme, World Bank Team, U.S.A.I.D. evaluation team, a team of central Government, a group of 80 B.A.Os V.L.Ws. & Senior Agril. Extension Officer of Agril. Deptt. of Darbhanga. Bharat Jan Vigyan Jatha, 20 traines of E.T C., Mushahari (Muzaffarpur), 85 farmers from Punjab & Maharashtra and group of 70 farmers from Gujrat State visited the University during the year under report.

9.3 Post-flood Agricultural Activities :

The unprecedented flood of last year during August had destreyed the Kharif crops completely. A post flood strategy was developed by the University. Seven teams consisting of Scientists of different disciplines such as Agronomy., Entomology, Plant Pathology, Horticulture, Animal Husbandry and Home Science were constituted to educate and provide appropriate technical advice to the farmers of the flood affected villages, so as to compensate the losses caused by the flood by adopting appropriate technology of kharif and rabi. These villages were spread in four Blocks namely, Muraul, Sakra, Kalyanpur and Pusa.

9.4 Home Science Extension Activities :

Home Scientists conducted a number of Extension programmes. Some of them were trainings on Interprenurship ten-days camp in villages and organising exhibitions, demonstrations, conducting Mahila Gosthies and giving article in Adhunik Kisan Megazine of the University.

9.5 I. R. D. P. :

Tirhut College of Agriculture, Dholi adopted nine villages under I. R. D. P. They are Muraul, Lautan, Itha, Dwarikapur, Malpur, Raini, Balua, Nemopur and Bakhari. One day training programme was organised for Kharif crop in which 556 farmers participated. As many as 71 crop demonstrations were conducted and 3 field days were organised. Also, 192 farmers were provided short term loans total amount being Rs. 1,15,200/- in cash with a subsidy @ Rs. 500 per head. Co-operative departments distributed Rs. 8,01,670/- in cash and Rs. 5,32,360 in the form of fertilizers, among the 726 farmers of 9 adopted villages.

9.6 Animal Production Activities :

A total of 868 Gynaocological as well clinical cases of farmers animals were examined and advised treatments. As many as 286 cows were artificially inseminated and farmers were advised on proper feeding of their live-stock vaccination deworming. Symtoms of heat, best time for artificial insemination etc. Besides, the Dairy Scientists gave 8.—Radio and 2—T. V. talks published 4 extension articles and participated in 5 Kisan Gosthi and 2 Kisan Mela.

DEMONSTRATION IN FARMERS FIELD ON ARHAR VARIETY - SHARAD

HIGH SUGARED SUGARCANE VARIETY - B.O. 102