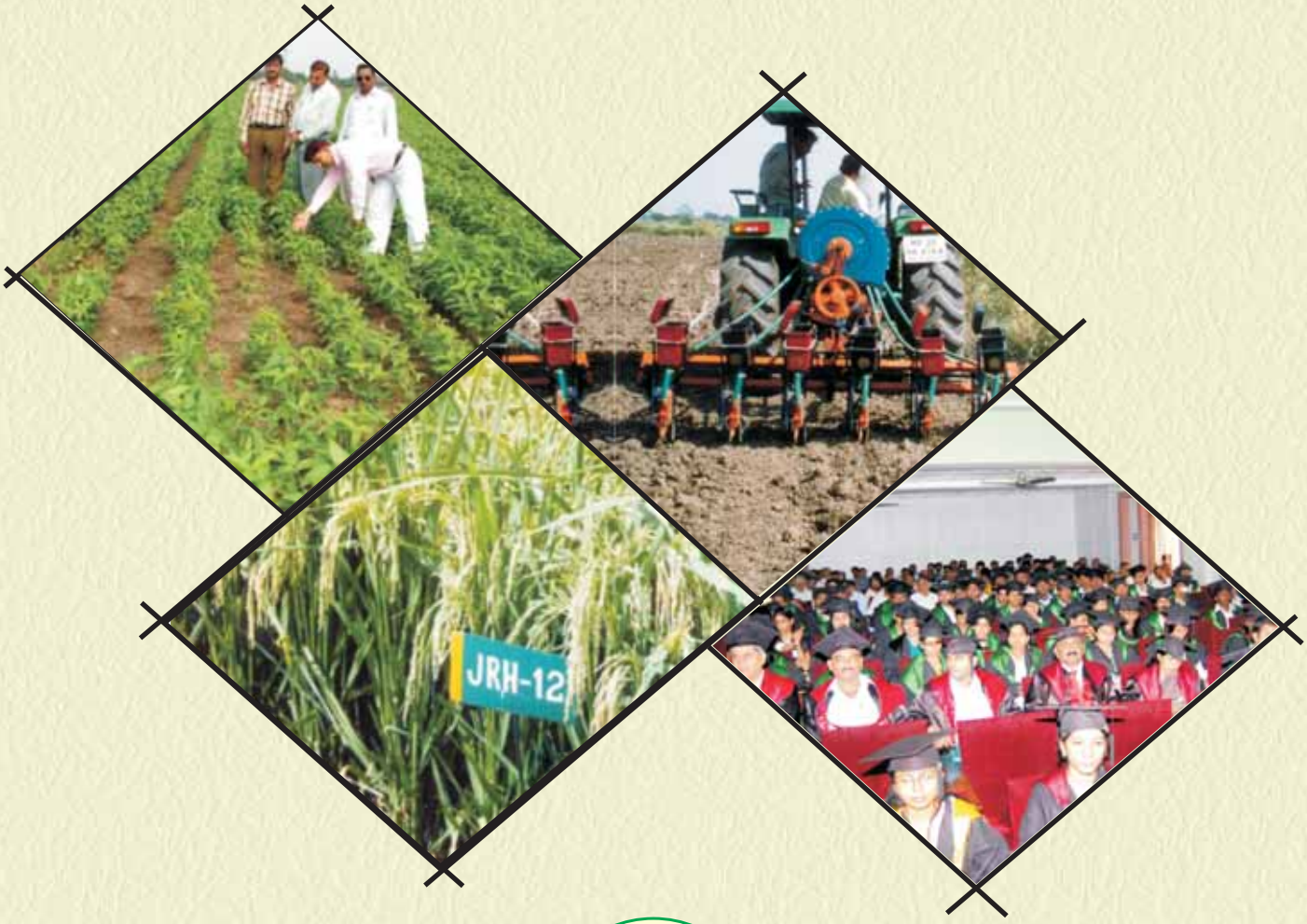
ANNUAL REPORT

2010-2011



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Jawaharlal Nehru Krishi Vishwa Vidyalaya

Krishi Nagar, Jabalpur 482 004 (M.P.), India

ANNUAL REPORT

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Jawaharlal Nehru Krishi Vishwa Vidyalaya
Jabalpur 482004 (M.P.)

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Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur 482 004 (M.P.)

CONTENTS

Foreword

Preface

Introduction 1

Present Status 2

Historical Landmarks 3

Mission 5

Mandate 5

Members of the Statutory Bodies 5

Organisation setup of the University 7

Education 11

Research 31

Extension 73

Farms 95

Students' Welfare 119

New Construction/ Infrastructure Development Work 124

Prof. Vijay Singh Tomar
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FOREWORD

Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur is stimulated with the conscientiousness of teaching research and extension in the field of agriculture for the state of Madhya Pradesh. The University is continuously engaged in developing admirable production and protection technologies for enhancing productivity and production of agriculture sector. The University has ushered in agricultural development with human resource development, technology back up and effectual extension. The University has contributed substantially to the overall agricultural growth of the State.

Human resource development is one of the essential components of the University and the efforts have been made for strengthening libraries, laboratories and communication facilities. University has utilized the fund provided under development grant successfully and vigorously promoted the students in getting placement apart from admission for higher education at global level.

The Annual Report of Jawaharlal Nehru Krishi Vishwa Vidyalaya for 2010-2011 highlights significant achievements made under different teaching, research and extension programmes. Concerted efforts of scientists have paid dividends in terms of release and notification of number of varieties with the availability of quality Breeder seed. Accelerated programme on germplasm conservation, utilization and addressing biodiversity issues with diversification of agriculture and technological development in all the fields has augmented production and diversification.

Molecular marker technology for mapping and tagging of important genes of various crops has been given priority with development of mapping population. Research to mitigate impact of climate change on kharif crops with efforts to improve heat tolerance in rabi crops has given encouraging results.

Demonstration of technologies has clearly indicated the potential of high yielding varieties and production and protection technologies with 20-25%increse in economic yield. Under Adoption of chickpea in rice fallow land shows farmers response towards new technologies. Among resource conservation technology, incorporation of crop residue led to enhance soil organic carbon, whereas raised bed planting led to 20-32 % increase in soybean production with minimum risk.

The University is successfully harnessing national and international collaborations and has developed strong linkages with ICRISAT and CIMMYT, SAUs and ICAR.

The overall growth and development of the University has been possible with the able support of Indian Council of Agricultural Research, New Delhi and Government of Madhya Pradesh. It is the essence of the achievement on reforms, financial utilization, resource mobilization, capacity building and fund utilization.

I appreciate the efforts made by the team in compiling the report meticulously. It is hoped that the report would given an insight of the developments and would be useful to all of those who are engaged in agricultural research, teaching and extension activities.

(V.S. Tomar)

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PREFACE

Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur has been a pioneer institution in the field of agricultural research and development in Madhya Pradesh. The institution has maintained its tradition of excellence this year too and has contributed towards the upliftment of the farming community of the State and Country. The three major areas of activities namely education, research and extension had been sincerely addressed to and attended by the staff of the University during the year 2009-10. Excellent performance of JNKVV farms at National level is a remarkable achievement of the Institution that is recognised for its highest production of breeder seed. Other activities of the institution are also presented briefly in this report.

I express my gratitude to Hon'ble Vice Chancellor for his valuable guidance and encouragement in the preparation of the report. I also convey my sincere thanks to the editorial committee and to all those who have contributed in the preparation of this report.

(P.K. Mishra)

INTRODUCTION

Jawaharlal Nehru Krishi Vishwa Vidyalaya (JNKVV), Jabalpur named after Pt. Jawaharlal Nehru, the architect of modern India, came into existence on October 2, 1964. JNKVV is the State Agriculture University in Madhya Pradesh manning research, extension and education in agricultural and allied sciences.

On the recommendation of the University Education Commission under the Chairmanship of Dr. S. Radhakrishnan in 1949 and the two Joint Indo American Teams on Agricultural Research and Education in 1954-55 and 1959-60, it was decided to set up an Agricultural University in the state on the pattern of Land Grant Colleges of the United States of America. Accordingly, Jawaharlal Nehru Krishi Vishwa Vidyalaya (JNKVV) was established by transferring the existing Govt. Colleges of Agriculture (six) and Veterinary Sciences (two) under an Act of Madhya Pradesh legislature passed in 1963. In accordance the Statutes were framed. J.N. Krishi Vishwa Vidyalaya was inaugurated by Late Smt. Indira Gandhi, the then Minister of Broadcasting, Govt. of India, in 1964, with an integrated mandate of teaching, research and extension, covering 12 agro-climatic zones. Though the Vishwa Vidyalaya was formally inaugurated on 2nd October 1964, most of its constituent colleges and research stations are quite old. The University had to part with the creation of sister universities Indira Gandhi Krishi Vishwavidyalaya (IGKV) at Raipur in 1987, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior in 2008 and Madhya Pradesh Pashu Chikitsa Vigyan Vishwa Vidyalaya, Jabalpur in 2009.

The constituent Agricultural Research Station at Powarkheda (1903) is older than the Agricultural Research Institute (ARI) of Pusa, Bihar (now IARI) which came into being in 1905. The location and year of establishment of the Colleges of JNKVV are presented in Table 1.

Table 1: Location and year of establishment of Colleges of JNKVV

Name of the College and location	Year of establishment
Faculty of Agriculture	
College of Agriculture, Jabalpur	1955
College of Agriculture, Rewa	1955
College of Agriculture, Tikamgarh	2004
College of Agriculture, Ganjbasoda	2007
Faculty of Agricultural Engineering	
College of Agricultural Engineering, Jabalpur	1966
Other	
Dryland Horticulture Research and Training Centre, Garhakota, Sagar	2006
Horticulture Vocational Education Institute, Rangua, Garhakota, Sagar	2008

PRESENT STATUS

The University had to part with Chhattisgarh comprising three agro-climatic zones of the State with the creation of a sister university Indira Gandhi Krishi Vishwa Vidyalaya at Raipur in 1987. Consequently, four Research Stations and the College of Agriculture, Raipur had gone to IGKVV, but two new Colleges at Khandwa and Mandsaur were established in the same year to cater to the needs of Malwa plateau and Nimar valley zones of the State, respectively.

A new Agriculture University named as Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya was created in August 2008, with its Headquarter at Gwalior, by transferring four Agriculture colleges located at Indore, Sehore, Khandwa and Gwalior, one College of Horticulture located at Mandsaur, one College of Veterinary Science & Animal Husbandry located at Mhow, several research stations and Krishi Vigyan Kendras of JNKVV to the new University.

A new Veterinary University, i.e., Madhya Pradesh Pashu Chikitsa Vigyan Vishwa Vidyalaya, Jabalpur has been established in November 2009 at Jabalpur and the College of Veterinary Science & A.H., Jabalpur, MHOW and Rewa have been transferred to the new University.

At present, the Vishwa Vidyalaya has four colleges of Agriculture, and one college of Agricultural Engineering. There are 12 research stations and 20 KVKs.

The area covered by the University is not only large but also diversified. Since its inception the university has made laudable progress and has come to the expectations of the people of the state by greatly benefiting the farming community.

The University has a lion's share in the development of human resources. It has so far produced number of graduates, post graduates, Ph.D. and PG Diploma holders, who are rendering services in the field of agriculture and allied sciences not only in the state but in other parts of the country and overseas.

The Indo British operational research project, which was started in 1979 and converted later in to watershed project has been a land mark. In the same year the operational research project for tribal area attained creditability.The pioneering research and extension efforts in enhancing the productivity of soybean by the JNKVV Scientists coupled with the enterprising farmers and State Department of Agriculture is obviously a landmark by which the state is now known as "Soya State". The area and production of soybean have tremendously increased. The establishment of Soya-oil extraction plants within the state paves the way for the export of DOC (De-oiled cake). Systematic studies on cultivation and breeding of soybean during late 1960's triggered the oilseed revolution. Its miraculous impact on socio-economic status of farmers and edible oil sector in India is a landmark. The agro-techniques developed under Dry Land Farming Project which was started in 1970, have proved to be a boon to more than 70% of the farmers. In the field of live stock improvement, commendable work has been done on breeding of high yielding cows, buffaloes and pigs. An indigenous hen Krishna-J with better economic viability has been evolved for rural and tribal poultry keeping.

Appreciable effort in the direction of evolving advanced agricultural technologies and its dissemination to the farmers of the State is reflected in the gradual improvement of agricultural production in the State during the past four decades.

Historical Landmarks

1963 Establishment of University as per M.P. Legislative Assembly Act. No. 12 of 1963 and its notification in M.P. Gazette of 25th May, 1963

1964 Padma Bhusan (Late) Dr. J.S. Patel was appointed as first Vice Chancellor in October, 1964

1964 Transfer of six Agriculture Colleges, two Veterinary Colleges and 19 Research Farms of Government of M.P. to Vishwa Vidyalaya

1966 Establishment of Faculty of Agricultural Engineering

1967 First Convocation of the University, chaired by Dr. J.S. Patel, the then Hon'ble Vice Chancellor, JNKVV and Addressed by Dr. V.K.R.V. Rao, Central Minister for Education and Human Resources on 10th January

1967 Start of College of Agricultural Engineering

1969 Second convocation of the University, chaired by the then Hon'ble Vice Chancellor Dr. L.S. Negi and addressed by His Excellency, the then Vice President of India, Dr. G.S. Pathak on 1st March

1970 Third Convocation of the University, chaired by the then Vice Chancellor Dr. L.S. Negi and addressed by Shri Govind Narayan Singh the then Hon'ble Chief Minister of M.P. on 12th January

1971 Fourth Convocation of the University chaired by the then Vice Chancellor Dr. L.S. Negi and addressed by His Excellency the then Governor of M.P. Dr. Satya Narayan Singh on 12th April

1973 Fifth Convocation of the University, held at College of Agriculture Indore and chaired by the then Vice Chancellor, Dr. C. Thakur and addressed by His Excellency the then Governor of M.P. and Chancellor Dr. Satya Narayan Singh on 15th April

1984 Establishment of College of Veterinary Science and Animal Husbandry at Anjora district Durg (now with IGKVV)

1987 College of Agriculture at Khandwa and Mandsaur were established

1988 The then Hon'ble Central Minister of State for Agriculture, Shri Harikrishna Shastri visited the Vishwa Vidyalaya

1988 The degree programme in Forestry started in College of Agriculture, Jabalpur

1989 Silver Jubilee of the establishment of the University was celebrated on 2nd October. The then Chief Minister of M.P. Shri Motilal Vora and Minister for Agriculture Shri Shivbhanu Singh Solanki were the Guests of Honour.1989 Celebration of Nehru Centenary was held round the year

1997 The then Prime Minister of India, Shri I.K. Gujral, the then Central Minister for Agriculture, Shri Chaturanand Mishra, His Excellency, the then Governor of M.P. Shri Mohammad Shafi Qureshi and the then Chief Minister of M.P. Shri Digvijay Singh visited the Vishwa Vidyalaya

1999 Golden Jubilee of College of Veterinary Sciences & Animal Husbandry, Jabalpur was celebrated.

2000 Golden Jubilee of College of Agriculture, Gwalior was celebrated

2001 Sixth Convocation of the University, chaired by His Excellency the then Governor of M.P., Dr. Bhai Mahavir and addressed by the then Director General, ICAR, Padma Bhusan, Dr. R.S. Paroda on 10th April

2002 Seventh Convocation of the University, presided by His Excellency the then Governor of M.P. and Chancellor of JNKVV, Dr. Bhai Mahavir, Dr. Sompal, Member, Planning Commission delivered the Convocation Address

2002 College of Agriculture, Mandsaur, converted into College of Horticulture

2004 College of Agriculture, Tikamgarh inaugurated by Hon'ble Chief Minister of Madhya Pradesh

2004 Centenary celebration of Zonal Agricultural Research Station, Powarkheda was held. Dr. Mangala Rai, Secretary, DARE and Director General, ICAR, New Delhi was the Chief Guest

2005 Niche Area Project on Centre of Excellence on Medicinal and Aromatic Plants, Department of Crop and Herbal Physiology, JNKVV, Jabalpur

2006 Eighth Convocation of the University, presided by His Excellency the Governor of M.P. and Chancellor of JNKVV, Dr. Balram Jakhar

2006 Golden Jubilee of College of Agriculture, Jabalpur was celebrated

2007 Vocational Training Institute for Dryland Horticulture was established at Garhakota, District Sagar

2007 College of Agriculture, Ganjbasoda was established

2007 College of Veterinary Science & A.H. at Rewa was established

2008 In clause 31 under No. 1484850 of trademark "JAWAHAR" has been registered by JNKVV, Jabalpur

2008 Creation of Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya at Gwalior by transferring 4 colleges of Agriculture , one college of Veterinary Science & A.H., few Research Stations and few KVKs under the jurisdiction of JNKVV to new University

2009 JNKVV hosted AGRIUNISPORTS from March 3-6, 2009

2009 Ninth Convocation of JNKVV held on 20th October 2009. Dr. Mangala Rai, Secretary, DARE and DG, ICAR, New Delhi was the Chief Guest

2009 Veterinary University (Madhya Pradesh Pashu Chikitsa Vigyan Vishwa Vidyalaya) created at Jabalpur and College of Veterinary Science & A.H., Jabalpur and Rewa under the jurisdiction of JNKVV, Jabalpur have been transferred to the new University

2010 Tenth Convocation of JNKVV held on 25th June 2010. Prof. Gurdev Singh Khush, World Food Prize Winner, University of California, Davis, USA was the Chief Guest.

Jawaharlal Nehru Krishi Vishwa Vidyalaya

Mission

To gain recognition as well knit organization for providing agriculture human resources, research and extension education base for enhancing productivity, profitability and sustainability of agriculture based production systems and quality of rural livelihood in the State of Madhya Pradesh.

Mandate

- To serve as a center of teaching and training in the field of agriculture and its allied sciences
- To conduct applied and basic research in Agricultural and allied sciences
- Transfer of technology to farmers, extension personnel and organizations engaged in agricultural development through various extension programmes

Objectives

- Making provision for the education in agriculture and other allied sciences
- Furthering the prosecution of research, particularly in agriculture and other allied sciences
- Undertaking field extension programme and
- Such other purposes related to the aforesaid with the object of improving the level of living of rural people as the State Government may, by notification, direct.

Members of the Statutory Bodies

Members, Board of Management

- Prof. Gautam Kalloo
  Vice Chancellor
  JNKVV, Jabalpur
  Chairman
- Shri I.N.S. Dani
  Principal Secretary
  Farmers Welfare and Agril.
  Development Department
  M.P. Government
  Mantralaya, Bhopal (M.P.)
- Shri G.P. Singhai
  Secretary
  Department of Finance
  M.P. Government
  Mantralaya, Bhopal (M.P.)
- Dr. B.S. Chundawat
  Ex-Vice Chancellor
  Gujarat Agril. University
  C/45, Pratap Nagar,
  Near Royal Academy, Udaipur
- Dr. Yogendrapal Gupta
  E-4, Pusa Apartments, Sector 15
  Rohini, Delhi-85
- Dr. Rajpal Singh
  278-A, Durgesh Vihar
  JK Road, Bhopal 462041
- Shri Virendra Singh Rana
  Rana House, Mohan Nagar, Thatipur
  Gwalior 474001 (M.P.)
- Ku. Parveen Saba
  H.No. 154
  New Devki Nagar, Berasia Road
  Bhopal (M.P.)
- Dr. Daya Singh Balain
  Ex-Dy. Director General Animal
  Science and Ex-Director, NDRI
  50/Niyaypuri
  Near Stadium, Karnal
- Dr. Preetam Chandra
  Director
  Central Institute of Agricultural
  Engineering (CIAE), Bhopal (M.P.)
- Shri Kedarnath Shukla
  M.L.A.
  Kamal Kuti, Kotha, Ward No.15
  Sidhi, Dist. Sidhi (M.P.)
- Shri Narendra Tripathi
  M.L.A.
  Gandhi Ward, Panagar
- Shri Sunil Jaiswal
  M.L.A.
  Shristi 40, Civil Lines
  Dist. Narsinghpur (M.P.)
  Jabapur (M.P.)

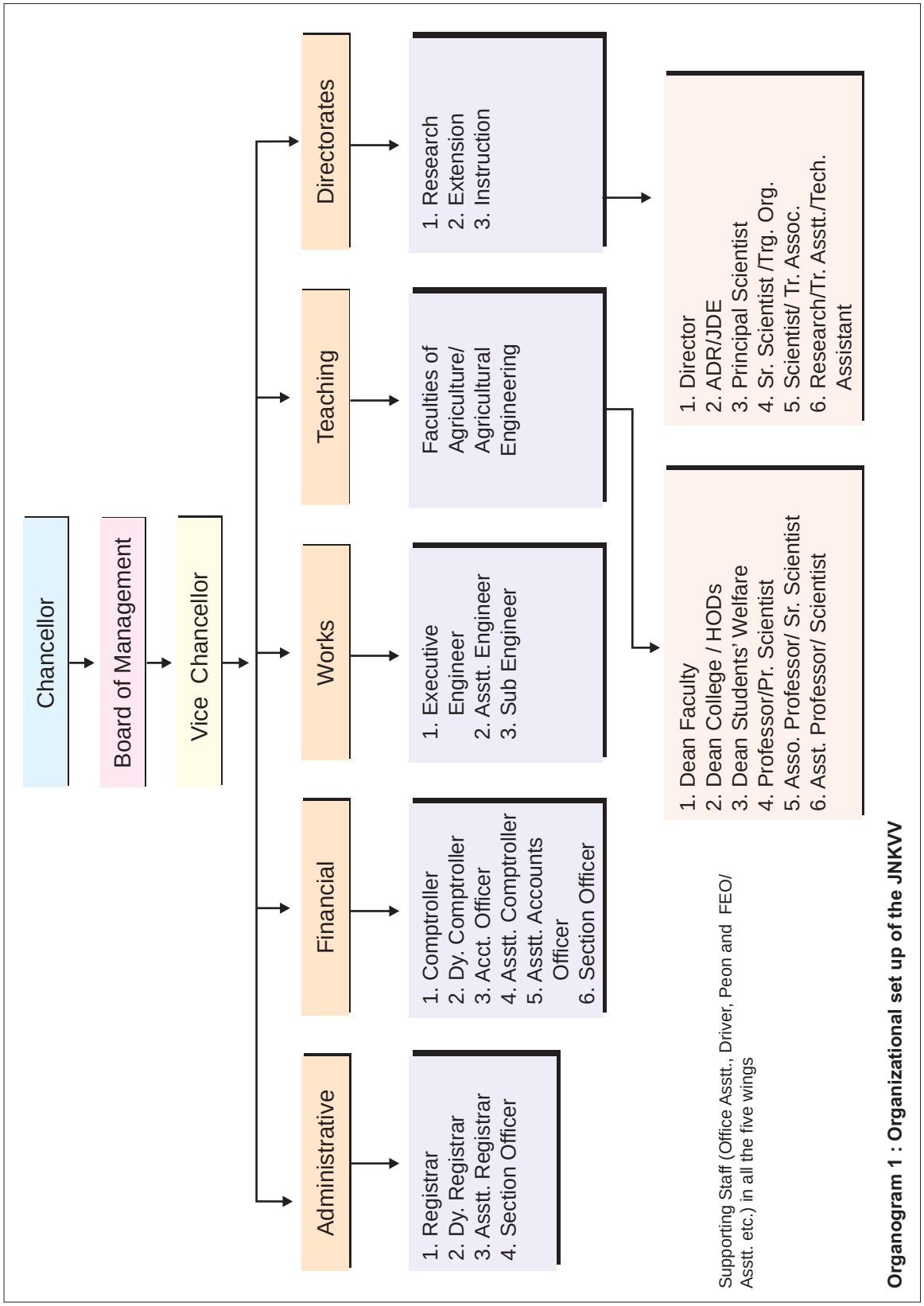
- Shri B.B. Mishra
  Registrar & Secretary
  JNKVV, Jabalpur

Members, Academic Council

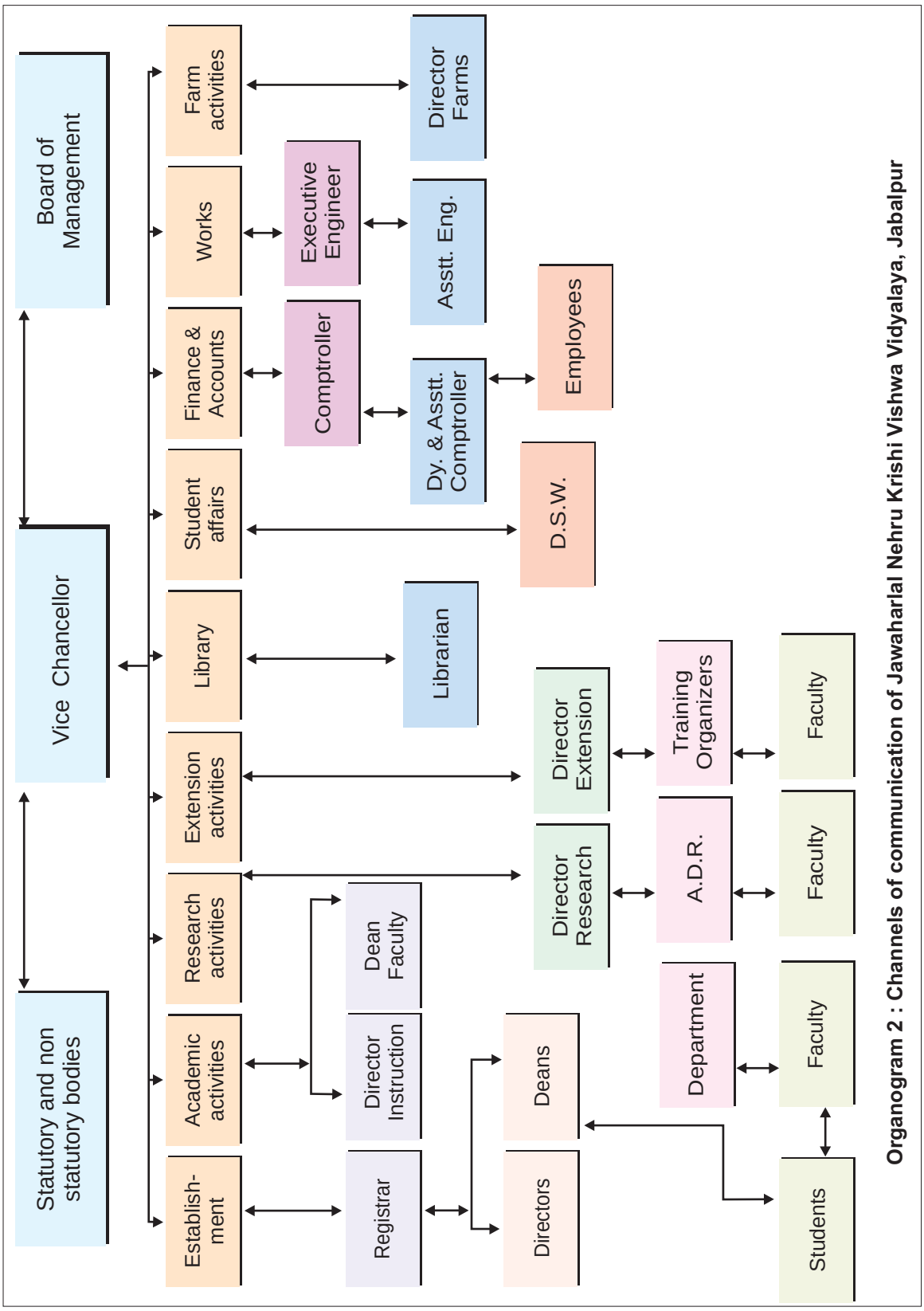
- Prof. Gautam Kalloo
  Vice Chancellor
  JNKVV, Jabalpur
  Chairman
- Dr. S.S. Tomar
  Dean, Faculty of Agriculture &
  Director Research Services
  JNKVV, Jabalpur
- Dr. P.K. Jain
  Director Extension Services
  JNKVV, Jabalpur
- Dr. N.K. Seth
  Dean, College of Agril. Engineering
  JNKVV, Jabalpur
- Dr. N.K. Raghuwanshi
  Professor & Head (Ag. Eco. & FM)
  JNKVV, Jabalpur
- Dr. K.L. Mishra
  Associate Professor
  College of Agricultural Engineering
  JNKVV, Jabalpur
- Dr. J.M. Nigam
  Ex-Dean, Veterinary Sci. & A.H. (JNKVV)
  Palampur
- Dr. A.S. Tiwari
  Retd. Dean Faculty of Agriculture (JNKVV)
  5, Saraswati Nagar No.1, Behind AG Off.
  Gwalior (M.P.)
- Shri B.B. Mishra
  Registrar & Secretary
  JNKVV, Jabalpur

Members, Administrative Council

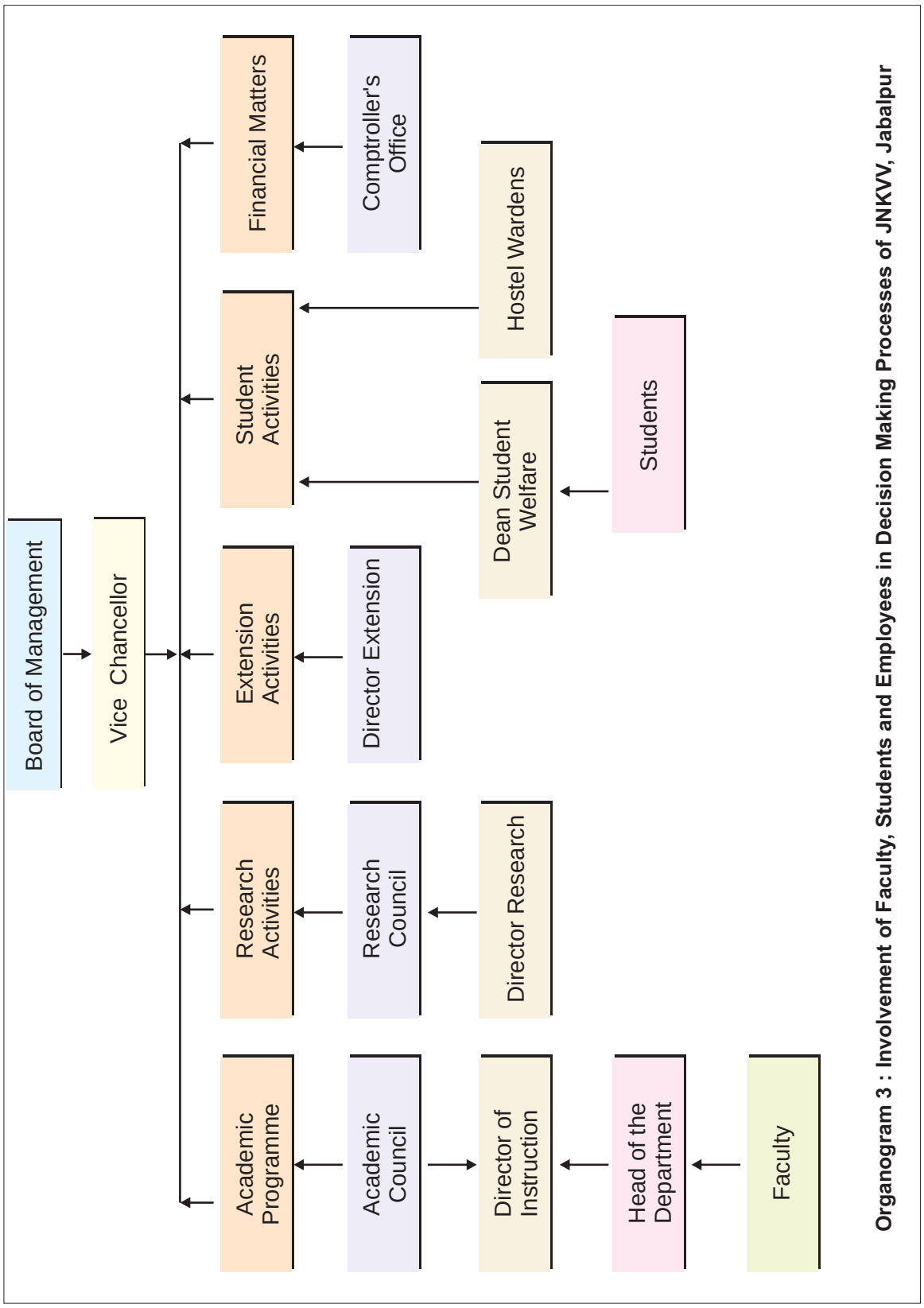
- Prof. Gautam Kalloo
  Vice Chancellor
  JNKVV, Jabalpur
  Chairman
- Shri G.S. Kurveti
  Comptroller
  JNKVV, Jabalpur
- Dr. S.S. Tomar
  Dean, Faculty of Agriculture &
  Director Research Services
  JNKVV, Jabalpur
- Dr. O.P. Veda
  Director Instruction
  JNKVV, Jabalpur
- Dr. N.K. Seth
  Dean, College of Agril. Engineering
  JNKVV, Jabalpur
- Dr. P.K. Jain
  Director Extension Services
  JNKVV, Jabalpur
- Dr. S.K. Rao
  Director Farms &
  Dean, College of Agriculture
  Rewa
- Dr. P.K. Mishra
  Dean, College of Agriculture
  Tikamgarh
- Dr. P.K. Bisen
  Dean Students Welfare
  JNKVV, Jabalpur
- Dr. D.K. Mishra
  Professor & Head (Plant Breeding)
  JNKVV, Jabalpur
- Dr. Suman Kumar
  Professor & Head (Food Science)
  JNKVV, Jabalpur
- Dr. Deva Kant
  Professor & Head (Soil & Water Engg.)
  JNKVV, Jabalpur
- Shri B.B. Mishra
  Registrar & Secretary
  JNKVV, Jabalpur



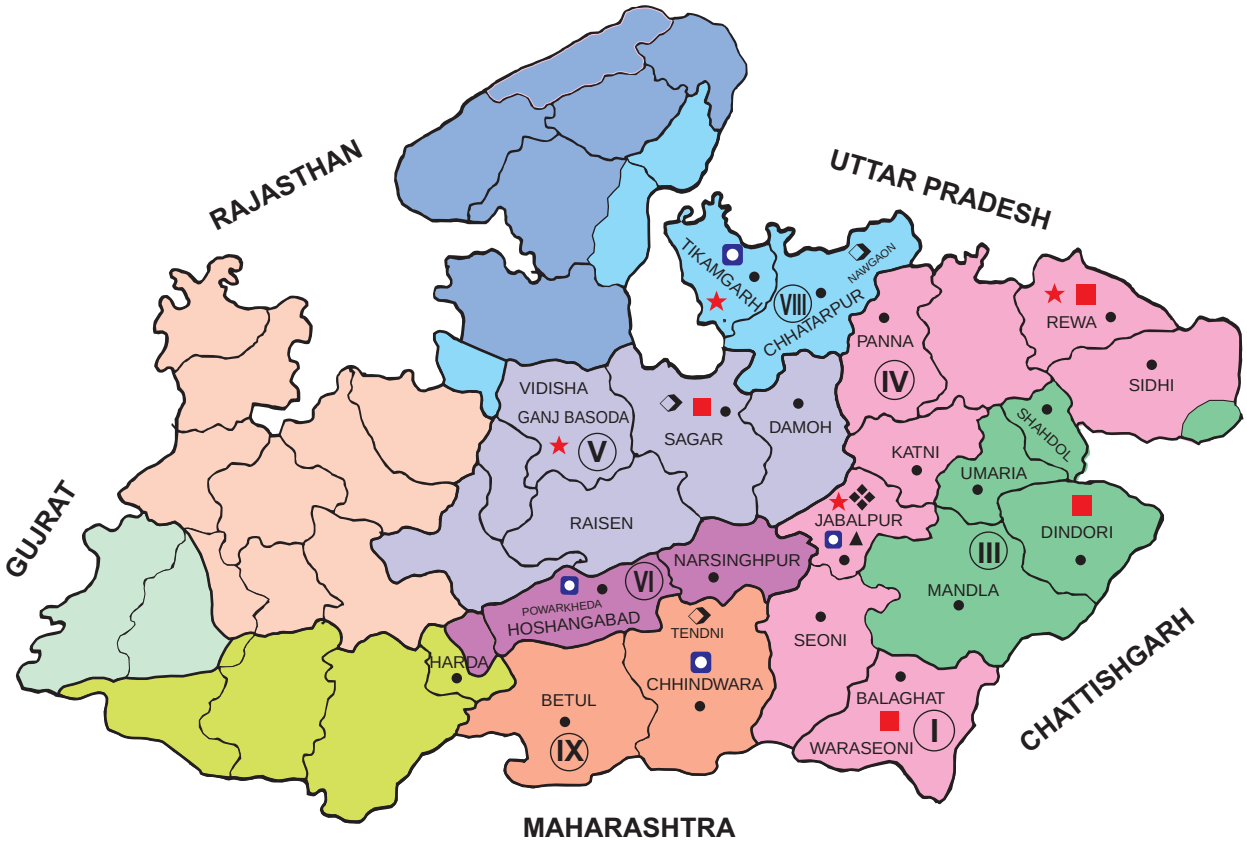
Organogram 1 : Organizational set up of the JNKVV



Organogram 2 : Channels of communication of Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur



Organogram 3 : Involvement of Faculty, Students and Employees in Decision Making Processes of JNKVV, Jabalpur



RESEARCH STATIONS & COLLEGES

- ❖ MAIN CAMPUS
- ★ AGRICULTURE COLLEGE
- ▲ AGRIL. ENGINEERING COLLEGE
- ■ ZONAL AGRIL. RES. STATION
- ■ REGIONAL AGRIL. RES. STATION
- ◇ SUB-STATION
- ● KRISHI VIGYAN KENDRA

AGROCLIMATIC ZONES

- **I.** CHHATTISGARH PLAINS (Balaghat District)
- **III.** NORTHERN HILLS ZONE OF CHHATTISGARH (Shahdol, Umaria, Mandla & Dindori Districts)
- **IV.** KYMORE PLATEAU AND SATPURA HILLS
- **V.** VINDHYAN PLATEAU
- **VIII.** BUNDELKHAND ZONE
- **IX.** SATPURA PLATEAU

EDUCATION

Jawaharlal Nehru Krishi Vishwa Vidyalaya has been the seat of Agro-Technology and Human Resource Development in Central India. Its prime mission is to impart education in agriculture and its allied sciences so as to provide human resource for meeting the future challenges.

The University has two Faculties viz. Agriculture (four constituent colleges at Jabalpur, Rewa, Tikamgarh and Ganj Basoda) and Agricultural Engineering (Jabalpur) with 13 and 6 departments, respectively.

Academic programmes

The University offers three Bachelor's Degree programmes viz. B.Sc. (Ag.), B.Sc. (Forestry) and B.Tech. The Masters' Degree programmes are available in thirteen departments under Agriculture Faculty and in three departments in the Faculty of Agricultural Engineering. The programme on Master of Agri-Business Management is also available under Agiculture Faculty. Doctoral degree programmes are available in nine departments of Agriculture Faculty and in three departments of Agricultural Engineering Faculty.

Departments in different Faculties

Agriculture	Agricultural Engineering
• Agricultural Biotechnology	• Agricultural Structures & Environmental Engineering
• Agricultural Eco. & Farm Management	• Applied Physics & Agril. Meteorology
• Agronomy	• Farm Machinery & Power
• Entomology	• Instrument Development & Service Centre
• Extension Education	• Post Harvest Process & Food Engineering
• Food Science & Technology	• Soil & Water Engineering
• Forestry	
• Horticulture	
• Mathematics & Statistics	
• Plant Breeding & Genetics	
• Plant Pathology	
• Plant Physiology	
• Soil Science & Agricultural Chemistry	

In addition the University has also started diploma courses in Horticulture on (1) Seed Production & (2) Nursery Management, at Horticulture Vocational Education Institute, Rangua, Garhakota, District Sagar, from the academic session 2008-09. The Diploma courses are of two years duration (4 semesters) with a capacity of 40 students in each course.

Twenty nine students of first batch (2008-09) holding Diploma in Horticulture from "Horticulture Vocational Education Institute" Garhakota, District-Sagar were placed in different districts on the post of Horticulture Assistant in Panchayat and Rural Development Department, Govt. of M.P. due to keen interest and continuous efforts of Pt. Gopal Bhargava, Minister, Govt. of M.P.

Admission

Undergraduate Degree Programme

Admission to Undergraduate degree programmes is through pre-entrance test conducted by Professional Examination Board, Bhopal. The availability of seats under different UG/PG/Ph.D. programmes is mentioned in the table given below.

Reservation of seats

Fifty per cent of seats are reserved for various reserve categories of candidates as detailed below, in accordance with the rules laid down by the Government for permanent residents of M.P. State.

As per the guidelines of IVth Deans' Committee of ICAR, the courses on Experiential Learning for UG students of Agriculture and Forestry has been started from 2nd Semester of the Academic Session 2010-11 at all the colleges of Agriculture

Postgraduate Degree Programme

The Director of Instruction co-ordinates the entire postgraduate programme of the university. The Director recommends the constitution of an Advisory Committee of each post graduate student admitted in the university based on the proposal of the respective Head of the Department. The Director scrutinizes the plan of work of each postgraduate student in his programme of study including thesis-research undertaken by the student for the degree programme. The Director of Instruction also recommends the appointment of external examiner, for evaluating the thesis of every postgraduate student. The Registrar issues the notification regarding the declaration of results and the award of the Degree. The Advisory Committee is constituted for each student, drawn from different faculties depending on the research topic. Inter campus movement is also allowed to the students for the conduct of their research for utilizing the expertise and infrastructure facilities available. Inter disciplinary approach in the post graduate programme is adopted and the students

Availability of seats in different programmes at JNKVV under the Faculty of Agriculture and Agricultural Engineering

Programmes	Availability of seats				
	Free	ICAR	Payment	NRI	Total
B.Sc. (Ag.)	200	30	40	10	280
B.Sc. (Forestry)	20	3	4	1	28
M.Sc. (Ag./Horticulture/Forestry)	156	38	140	-	334
M.B.A. (Agri-Business)	15	-	15	-	30
Ph.D.	32	7	24	-	63
B.Tech.	60	9	12	3	84
M.Tech.	18	3	18	2	41
Ph.D.	12	2	12	1	27

register courses of other disciplines also. Six new non-credit courses have also been introduced from 2009-10, as proposed by ICAR.

Theses Evaluation

Every student admitted to the PG programme in the university, is required to submit a thesis towards partial fulfilment of the PG programme. The thesis of the student should be of such a nature as to indicate the student's potentiality for conducting research. The thesis shall be on a topic falling within the field of major subject and shall be the result of the students' own work. A certificate to this effect duly endorsed by the Professor and Head and the Major Advisor shall accompany the thesis at the time of submission for evaluation by the external examiner.

Inter-institutional collaboration of the PG Programme

The JNKVV is imparting education at the Under Graduate and Post Graduate levels in the Faculties of Agriculture, including Forestry, and Agricultural Engineering. The university has established close linkages with other national and international research institutes in conducting collaborative research programmes at Post Graduate level. In these programmes, Post Graduate students complete their course work at JNKVV and carry out theses research work at other institutes. Institutes at which students have conducted their theses research include International Centre for Genetic Engineering and Biotechnology (ICGEB), New Delhi; International Crop Research Institute for Semi Arid Tropics (ICRISAT), Patancheru, Hyderabad (Andhra Pradesh), National Research Center for Weed Science (NRCWS), Bhabha Atomic Research Centre (BARC), Central Institute for Cotton Research (CICR), Nagpur etc. The University has signed MoUs with various research organizations and private institutes e.g. Jain Irrigations Pvt. Ltd., etc. to conduct collaborative research in various fields of agriculture and agricultural engineering.

Process of Development and Revision of Course Curriculum

Heads of the departments develop and propose for revision of course curricula after thorough discussion with the teachers of the departments. They prepare detailed course out line for all the courses to be revised along with names of prescribed text and reference books. The revised course curriculum is first discussed in the faculty meetings and after approval; the proposal is submitted for consideration and approval before the Academic Council. The revised course curriculum after due approval of Academic Council, is printed and circulated amongst the staff and students for implementation. If highest governing body like ICAR develops any model course curricula for UG and PG courses and asks for its implementation, the proposal is placed in the Academic Council for approval

The new UG course curriculum as proposed by the fourth Deans Committee has been implemented at the university w.e.f. the academic session 2007-08. The new course curriculum at Master's and Doctoral level Programmes, as recommended by ICAR, has been implemented w.e.f. the Academic session 2009-10 in all the constituent colleges of the Vishwa Vidyalaya.

Upgradation of Teaching Facilities

Under the one time catch up grant received from ICAR, works on renovation/ modernization of class rooms, laboratories, hostels, departments, library and other teaching facilities have been carried out at all the campii.

Centre of Advanced Faculty Training

ICAR, New Delhi, has recognized the Department of Soil Science and Agril. Chemistry, College of Agriculture, Jabalpur as Centre of Advanced Studies in Soil Science and Agril. Chemistry w.e.f. 1995. The centre is engaged in organizing various training programmes, in which scientists/ teachers and

other research workers from different states participate and update their knowledge and skill. In all these training programmes besides JNKVV trainers, eminent scientists, resource persons from other universities and subject matter specialists from various fields of specialization are invited to deliver lectures.

UG Admissions

Students are admitted in Bachelor degree programme through pre-entrance test (PAT/PET) conducted by Professional Examination Board, Bhopal. The admission (Table 2) for free seats are given as per (PAT/PET) merit list, whereas, 20% of intake capacity is through payment seat and 5% for NRI/Foreign National as per approval of the State Government. In addition to this, 15% seats are filled based on ICAR All India Entrance Test performance. Admission to Post Graduate programme (Table 3) is based on merit. The benefit of reservation to different categories (SC - 15%, ST- 21% and OBC-14%) is given at both the UG and PG levels as per policy of State Government.

The University offers Post Graduate degree programmes in agriculture at Colleges of Agriculture, Jabalpur and Rewa and in agricultural engineering at College of Agricultural Engineering, Jabalpur.

Human Resource Development

Human Resource Development is one of the most important functions of the University. Since its establishment, the University has produced 16,290 Graduates and 6,835 Post Graduates (till 2009-2010) academic session) who are rendering their valuable services in the field of agriculture and allied sectors in the country and abroad.

Educational structure

The quality education is the top most priority with main thrust on improving the infrastructure and teaching capabilities of the faculty. The ongoing courses of B.Sc. (Agriculture), B.Sc. (Forestry) and B. Tech have been restructured from the academic year 2007-08 as per 4th Deans Committee Report of the ICAR. The course curriculum of Post Graduate programmes have been revised as per ICAR guidelines and implemented from the academic session 2009-10.

All the educational programmes is through Semester system with 10 point scale for

Table 2: Intake capacity in UG programmes offered by the University

S.No.	Colleges	Number of Seats			
		Free (All Category)	Payment + NRI (20%) (5%)	ICAR (15%)	Total
1	**Agriculture B.Sc. (Ag.)**				
	Jabalpur	60	15	09	84
	Rewa	60	15	09	84
	Tikamgarh	40	10	06	56
	Ganj Basoda	40	10	06	56
	Sub Total 1	**200**	**50**	**30**	**280**
2	**Forestry B.Sc. (Forestry)**				
	Jabalpur	20	05	03	28
	Sub Total 2	**20**	**05**	**03**	**28**
3	**Agricultural Engineering (B.Tech.)**				
	Jabalpur	60	15	09	84
	Sub Total 3	**60**	**15**	**09**	**84**
	Grand Total (1+2+3)	**280**	**70**	**42**	**392**

Table 3: Intake capacity in PG programmes

S.No.	Colleges	Numbe of Seats	
		Free *	Payment
1.	**Agriculture M.Sc. (Ag.)**		
	1. Jabalpur	127	111
	2. Rewa	30	30
	3. Tikamgarh	14	14
	Sub Total	**171**	**155**
2.	**Forestry M.Sc. (Forestry)**		
	Jabalpur	**04**	**02**
3.	**M.B.A. (Ag.)**		
	Jabalpur	**15**	**15**
4.	**Agriculture Engineering M.Tech.**		
	Jabalpur	**18**	**18**
	Grand Total (1+2+3+4)	**208**	**190**
	Ph.D.		
	1. Jabalpur	30	22
	2. Rewa	2	2
	Total	**32**	**24**

* 25% seats of intake capacity are reserved for ICAR candidates.

evaluation. The Academic Council of the University is responsible for review and modification of the *curricula* and *syllabi*, periodically. Apart from theory and practical courses some innovative programmes are also introduced to expose the students to the real farming and farmers conditions, viz. Rural Agricultural Work Experience (RAWE) and FAWE. Experiential Learning / Hands on Training programme for UG students for providing adequate confidence and entrepreneurial skills to start vocation has been introduced as per recommendation of 4th Deans' Committee.

All the constituent colleges, except College of Agriculture, Tikamgarh and Ganjbasoda are equipped with adequate facilities to carry out teaching and research activities.

Upgradation of teaching facilities

Under the one time ketchup grant received form ICAR, works on renovation/ modernization of classrooms, laboratories, hostels, library and other teaching facilities have been carried out at all the campii during last two years.

High-Tech Horticulture Complex

The foundation stone of High-Tech Horticulture Complex was laid at JNKVV, Jabalpur by Dr. Arvind Kumar, DDG (Agril. Education), ICAR, New Delhi on April 23, 2010. Dr. Kumar expressed the role of high tech horticulture in the development of technology for improving the socio-economic conditions of the farmers and opening of new avenues for entrepreneurs.

NTS

Forty one students availed NTS during 2010-11.

Rural Agricultural Work Experience

The Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur has implemented the RAWE Programme as per the recommendation of 4th Dean's Committee (ICAR) for Final Year students of B.Sc. (Ag.) in the First Semester 2010-11 commenced on July 5th, 2010. As per guidelines manual has been prepared for the students for their work to be taken up in the villages. Before leaving for their placement students have been briefed about the programme.

Field preparation activities by the RAWE students

Students demonstrating seed treatment activities

Students demonstrating plant protection work by using sprayers

Apart from the work mentioned in the manual, students participated in the Krishi Vigyan Kendra activities in planning, implementation and monitoring of OFTs, FLDs, survey, organizing field days, kisan mela, kisan sangoshti, Scientific Advisory Committee meeting, conducting PRA, collection of germplasm, problem faced in adoption of technology by the farmers, helping farmers in solving their agricultural problems, helping farmers in taking soil samples, making farm plan, social activities etc.

The students were placed in selected villages under the jurisdiction of KVK, in one village a group of 5-7 students were placed and are being monitored by KVK staff as well as by a committee constituted by the Dean, College of Agriculture time to time. The students also participated in activities taken under NAIP through NGOs.

The 231 students under RAWE were placed in various Krishi Vigyan Kendra of different colleges with the programme as mentioned below:

RAWE Programme

All the students were placed in adopted villages of Krishi Vigyan Kendra to work with the host farmers for a period of 6 months. The students were actively involved in crop production technology of Kharif and Rabi crops grown in the selected villages of KVK Chhindwara, Betul, Seoni, Mandla and Dindori. Students learnt the field activities by doing it with host farmers & scientists. They were exposed about the problems of crop production and protection technology, fruit and vegetable technology, insect pest management etc. Besides this, students have collected the farmer field problems which were solved by the scientist of KVK and again this was told to the farming community. In this way the feed back mechanism are made by the students under this programme. The RAWE students were also involved and participated in various social activity like pulse polio Campaign, Environmental protection and cultural activities. The school dropped out students have also been educated by the students of RAWE. The rural developmental programmes which are being implemented by various agencies, the students of RAWE

RAWE students are sorting of the crop

Students are digging the soil for Irrigation of the plants

Students are feeding the birds in the poultry cages

made their visit to such departmental organization and agencies for knowing its methodology and working pattern of the organization. In this way students are trained so that they may have confidence and motivation to work for village development as and when they are assigned such type of duty and responsibility.

As far as the course rural economics is concerned, all the students have collected data of socio economic status of the farming community, analyzed it and under stood the actual conditions of the farming community. Based on this, they worked skillfully with the farmers. Farmers who were not adopting improved seeds and plant protection chemicals and also reluctant to use improved implements, now they are using it after getting motivation from the boys and girls of the RAWE programme.

During the RAWE programme, course teachers of different departments made their visit to KVK villages where the students are placed for monitoring and evaluated the activities done by the students under this programme. Training on Vermi-compost, mushroom cultivation and vegetable production have also been organized by the staff and students of KVK which was attended by large number of farmers and students also learnt the practices. The scientist of KVK also trained the students in connection to all the activities of field crops for development of the skills among the students.

Outcome:

- Skill development
- Building confidence
- Enhancement of practical knowledge
- Expertise in organization various field activities
- Increasing competence in solving field problems
- Bridging the gap between Research and field
- Transfer of Technology

Experiential Learning Programme

As per the guidelines of IVth Deans committee of ICAR, the courses on Experiential Learning for UG students of Agriculture and Forestry has been started from 2nd semester of the academic session 2010-2011 in all the colleges of JNKVV. The module wise and College wise number of students registered are given in table 4.

Experiential Learning Programme for Forestry

In this programme, 22 students of B.Sc. (Forestry) IVth year IInd semester participated and helped in transfer of technology.

Guest Lecture

- Prof. Gurdev S. Khush, Adjunct Professor, University of California, Davis, USA and World Food Prize winner delivered a special lecture on June 25, 2010 on “How to Overcome Threats to Global Food Security”.

Table 4: Experiential Learning Programme

S.No.	Name of Module	Number of students registered			
		Jabalpur	Rewa	Tikamgarh	Ganjbasoda
1.	Crop Production	25	45	08	12
2.	Crop Protection	--	04	13	12
3.	Horticulture	25	04	08	--
4.	Post Harvest Technology & Value Addition	20	--	--	--
5.	Basic Science	08	--	--	--
6.	Agri Business	25	--	--	--
7.	Forestry	22	--	--	--
	Total	**125**	**53**	**29**	**24**

- Dr. Samuel L. White, Alcorn State University, Dr. Dovi Alipoe, Director Global Programme, Dr. Dalton Mcafee, Extension Administrator, Dr. Alton Johnson, Interim Research Director, Dr. C.R. Reddy, Research Asstt. Professor and Mr. Ashwani Shrivastava, Chief Extension Associate visited various units of JNKVV, Jabalpur on June 14, 2010 and signed a MoU. The areas of cooperation include subject of mutual consent and contribution to education, research and training in the areas of biotechnology, organic farming, agribusiness management, plant breeding and genetics, medicinal plants and natural products, climate change, extension, technology transfer, information technology, bio-fuel & small farm development.
- Dr. T. C. Thakur, National Professor (ICAR) Farm Machinery & Power Engineering, G. B. Pant University of Agriculture & Technology, Pantnagar, delivered a talk on "Subsoil Health Management: Issues and Strategies" on 19.08.2010 at College of Agricultural Engineering, JNKVV, Jabalpur
- The Faculty of Alcorn State University (USA) visited JNKVV, Jabalpur on December 6th, 2010 to explore opportunities for research, extension and teaching programmes.
- Dr. Ashok Mishra, Coordinator PG Research & Training, Jain Irrigation System Ltd. Jalgaon (Maharashtra) delivered a lecture on "Corporate Profile" on December 8th, 2010 in the meeting hall of Director of Research Services, JNKVV, Jabalpur.
- Dr. R.S. Sunderam, Senior Rice Scientist, Directorate of Rice Research, ICAR, Hyderabad (A.P.) delivered a lecture on " Molecular Breeding Approaches for Biotic Stress resistance in Rice" on December 8th, 2010 in the meeting hall of Director of Research Services, JNKVV, Jabalpur.
- Dr. Kulkarni, Scientist, ITC, Hyderabad (A.P.) delivered a guest lecture on December 13th, 2010 in the meeting hall of Hon'ble Vice-Chancellor, JNKVV, Jabalpur.
- Dr. P.S. Deshmukh, Emeritus Scientist, Division of Plant Physiology, IARI, New Delhi delivered a lecture on "Enhancing Chickpea Productivity under Changing Environment" on December 14th, 2010 in the meeting hall of Director of Research Services, JNKVV, Jabalpur.
- Dr. A.K. Singh, Principal Scientist, Genetics Division, IARI, New Delhi delivered a lecture on "MAS for Rice Improvement" on December 22nd, 2010.
- Dr. Major Singh, Principal Scientist, IIVR, Varanasi (U.P.) delivered a lecture on "Development of Bt Brinjal for fruit and shoot Borer Resistance" on December 28th, 2010 in the meeting hall of Director of Research Services, JNKVV, Jabalpur.
- Dr. N.K. Tyagi, ICAR, New Delhi, delivered a lecture on "Higher Agricultural Education and Research in India: Current Scenario and Strengthening for Improvement" on January 23rd, 2011.
- Dr. Satyendra Gautam, Head, Food Science and Safety Section, Food Technology Division, BARC, Mumbai delivered a lecture on "Programmed Cell Death and Altruism in Bacterial Population : Redirecting the current concept of Microbiology" on February 3rd, 2011 in the meeting hall of Director of Research Services, JNKVV, Jabalpur.
- Dr. Shiv Kumar, Principal Scientist, ICARDA (Syria), delivered a talk on "Lentil for Food Security & Rural Livelihood" on February 25th, 2011 in the meeting hall of Director of Research Services, JNKVV, Jabalpur.
- Dr Suresh Pandey, Pathologist ICRISAT, Hyderabad, Dr Saurabh Sinha, IFMI Masoori, Dr S. K Mallik, NBPGR invited to deliver special lectures for updating the

knowledge of students and technical staff of College of Agriculture, Rewa.

Seminar / Symposium / Conference / Training / Work shop etc. organized

- National Seminar on "Restructuring of Irrigated Agriculture-Status & Strate-gies" was held on March 15-17, 2011 by MPWSRP, Department of Soil Water and Engineering, College of Agriculture Engineering, JNKVV, Jabalpur. About 150 participants from various parts of the country also participated.
- College of Agriculture, Rewa conducted a three day training programme on management of seed cooperative societies from September 21-23, 2010. BPD unit participated in this programme and imparted training on business management issues in cooperative societies.
- A Workshop on "Sensitization to Scientists" was organized at College of Agriculture, Rewa on September 23, 2010 for Commercialization of Agricultural Technology in Madhya Pradesh.
- JNKVV Foundation Day Celebration: For the first time in the history of JNKVV, the Foundation Day was celebrated for a week (September 30 to October 5, 2010) by organizing various activities viz., plantation, farmer's visit, kisan goshthi and students activities. Every day the well structured programme was framed starting from 7 am to 6pm Plantation in the University campus was the major activity performed by scientists and staff. During six days, about 1000 farmers visited crop cafeteria and seed production units.

Placement Cell

There is a well established placement cell exist in the office of Dean Students Welfare. This cell is responsible for organizing campus interviews for placement of Agriculture Graduates, Post Graduates, MBA, B.Tech and M.Tech pass outs. The placement of students in different organizations from April-2010 to March-2011 are given in table 5.

Inter-Agricultural University Sports & Agriunifest

- AGRIUNISPORTS held at Kerala Agricultural, University, Thrissur (Kerala) from 16th to 20th February, 2011. In this event total 40 participants (Boys and Girls) of the University participated.
- Three students were selected from College of Agriculture, Tikamgarh to participate in the All India Inter Agriculture University Sports Meet at Trishur, Kerala, 2010-11.
- 12th AGRIUNIFEST held at Anand Agricultural University, Anand (Gujarat) from 17-22 January, 2011. A total of 25 participants and 3 Team Manager from this Vishwa Vidyalaya participated.

Inter college sports and cultural programme.

Youth Festival was organized during December 21-23, 2010 at College of Agriculture, JNKVV, Jabalpur. The function

Table 5: Employment Profile of JNKVV Graduates

S.No.	Name of Organisation	Year	No. of Students recruited	Qualification
1.	DPIP, Bhopal	12July 2010	40	M Sc (Ag) MBA
2.	IWMP Bhopal	10 Aug.2010	14	M Sc (Ag) . M.Tech.
3.	Shriram Bio Seeds Genetics India	17-18 Aug.2010	32	M Sc (Ag) MBA
4.	Pioneer	06 Sept. 2010	07	M Sc (Ag) MBA
5.	DHAN Foundation, Ratlam	8 Dec. 2010	07	M Sc (Ag) & MBA
6.	SARDA NGO	20 Dec. 2010	02	M. Sc. (Ag)
7.	Pradan NGO	27-28 Dec. 2010	05	M. Sc. (Ag)/ B Tech
8	MPRLP	02 Mar. 2011	19	M. Sc. (Ag)

was inaugurated by Prof. Gautam Kalloo, Vice-Chancellor on December 21, 2010. Total 172 students of all colleges of the Vishwa Vidyalaya participated in different competitions. Valedictory function was held on December 23rd, 2010. College of Agriculture, Rewa was awarded Best College, Fine Arts Siromani Award, Music Siromani Award and obtained 15 other awards in the cultural meet.

Question Bank and instructional materials

More than fifty Question banks of different subjects have been prepared and kept in the library for students appearing in different competitive examinations.

Online resources and internet connectivity

- Internet connectivity is already available through ERNET VSAT at the following locations:
  a. JNKVV, Jabalpur ERNET VSAT - 256 Kbps.
  b. College of Agriculture, Rewa ERNET VSAT - 256 Kbps.
  c. College of Agriculture, Tikamgarh ERNET VSAT - 256 Kbps.
  d. RARS, Chhindwara ERNET VSAT - 128 Kbps.

Internet facilities are also available through broadband/dial-up connectivity at other locations.

- The internet is being used by all the teachers, scientists and students for searching scientific literature/information and for e-mail.
- The internet is also being used by the Deans, Directors, Registrar, Comptroller and their offices for communication and other official purposes.
- In the first phase, JNKVV is one of the privileged institutes identified as node of NKN. High speed internet connectivity is available through NKN.
- The library is the powerful source for knowledge acquisition in higher education, research and extension. The JNKVV Central Library is catering the need of all constituents' colleges (Agriculture, Forestry and Agricultural Engineering) KVK's and various research stations.

The Central Library

The Central Library of JNKVV is one of the biggest Agricultural Libraries in Central India and its information can be accessed at http://www.jnkvv.nic.in/Library.html. The library attracts scholars working in agriculture, agricultural engineering, forestry, veterinary and allied faculties for information gathering and knowledge gain. The main work of library is collection, tabulation, accessioning, cataloguing, indexing and arrangement of reading material. Apart from this circulation is the major work done through circulation counter, where faculty, research scholars, under-graduate and post graduate students and staff members working in JNKVV are given facility of book borrowing for limited period of time. Central Library, JNKVV Jabalpur has maintained a very large number of separate books for its book bank scheme. It is a prestigious scheme in which the books are given to the students for a period of six months at ten (10%) price of books. Only books upto the price of Rs. 500 are kept in book bank. Six books are given to all graduate and post graduate students. During the year 2010-11 students have availed book bank facility and under book bank scheme and a revenue of Rs.58578.00 (Fifty eight thousand five hundred and seventy eight only) was generated. Central Library is having a collection of +60000 books, +10000 theses and +15 thousand bound journals.

Offline and online resources including databases are accessible at computer lab developed within the library premises. The library has an agreement with Indian Council of Agricultural research (ICAR) through which VSAT connectivity is provided. High speed internet is also accessible though National

Knowledge Support (NKN). Document Delivery Service (DDS) are provided through CeRA consortium to library users. Information support is provided to users for CeRA consortium, open access directories, open institutional repositories and open access journals. Assistance on facilitative references search is provided by library staff to its users. Reprography services and selective dissemination of information (SDI) are also given apart from reference, consultation and referral services.

Development of competitive Examinations cell (CEC)

As per the directives of Hon'ble Vice Chancellor a new section known as Competitive Examination Cell has been developed with an initiative to promote students to face competitive examinations conducted by various governmental and other agencies. Various competitively important reading materials along with multiple choice questions, solved/unsolved papers etc. are being provided to students. The section also helps its members in preparing for NET, JRF/SRF, BANK PO, IAS, PSC, UPSC TOFEL, IELTS & GRE examinations etc. Every year new books related to general knowledge, question banks, are added to this collection.

It was established with a view to collect, organize and analyze agricultural information and making it available for users. The library is catering to the need of all constituent colleges of JNKVV (Agriculture, Forestry and Agricultural Engineering) KVK's and research stations. Presently, the LIBMAN software has been installed in the library and its automation is in progress. The library is well equipped with data capturing unit, bar code scanners, thermal power printer, laser printer and photocopier. Eight computers have been installed in the library for student consultation. Internet facility is provided through LAN/Ethernet. There are 100+ CD database on different disciplines of Agriculture and Biology. All CABI-CD from 1972 onwards are available for consultation. Presently, the library is in possession of CD Rom databases viz., AGRIS, AGRICOLA, CURRENT CONTENTS, CROP, CABPEST, GENE, Agricultural Economics and Soil CD, Biological Abstracts, Annual Reviews and CAB Abstracts. Open e-journals are available to users. JNKVV has become partner of CeRA (Consortium for e-resources in Agriculture) NAIP, ICAR project under which the JCCC, Springer collection, Annual Review & CSIRO Australian journals are accessible in Central Library ARIS lab. The Central Library is linked with 30 International and 60 National Institutes/Universities under exchange programme. There are currently 85,000 entries representing 60,000 general books, textbooks, teacher reference books and 16,308 back and current volumes of foreign and Indian journals, about 6000 (PG/Ph.D.) theses and 8632 pamphlets, bulletins and reports etc. Every year, approximately 4000 new entries of literature are added. Students of the Vishwa Vidyalaya are getting facility of borrowing books through Book Bank which has 20,000 books. Every year, 3000 to 4000 new books are added to Book Bank. The outlying colleges have separate libraries. They are funded for procuring books, journals and book-bank books separately every year. The library has the following International Journals: Agronomy Journal, International Journal of Pest Management, Journal of Plant Physiology, Phytopathology, Rural Sociology, Soil Science, Crop Science Journal, Journal of Economic Entomology, Journal of Plant Physiology and Biochemistry, Journal of American Society for Horticultural Science, Scientia Horticulture, Agroforestry Systems, Euphytica, Theoretical and Applied Genetics, Journal of Food Science, and International Journal of Food Science and Technology.

MoU between JNKVV and National and International Institutes

National institutes

(a) National Research Centre for Citrus, ICAR, Nagpur
(b) Jain Irrigation System Ltd., Jalgaon

International Institutes

(a) ALCORN State University, Mississippi, United States of America
(b) School of Agricultural and Environmental Sciences, ALBAMA A&M University, Mediterrian Street, Normal AL 35762- USA

Development of Educational Museum

Educational Museum is being developed with the financial help of ICAR, New Delhi. The building of the museum will be completed this year. The Directorate is engaged in its phase wise planning which is in progress. The museum will contain all historical agricultural events of the state and will be presented theme wise.

10th Convocation of JNKVV organized

The 10th Convocation of Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur was organized on June 25, 2010. His Excellency, Shri Rameshwar Thakur, Governor of Madhya Pradesh and Chancellor of the University, declared open the Convocation and delivered the Presidential Address. Prof. Gurdev Singh Khush, World Food Prize Winner, University of California, Davis, USA delivered the Convocation Address and Prof. Gautam Kalloo, Vice Chancellor, JNKVV, Jabalpur delivered the Welcome Address and presented the brief report of University activities. Dr. Ram Rajesh Mishra, Vice Chancellor, RDVV, Jabalpur, Dr. G.P. Mishra, Vice Chancellor, MPPCVV, Jabalpur, Hon'ble Members of Board of Management, Academic Council, Directors and Deans, Head of the Departments, faculty members, other staff, esteemed guests and alumni of the JNKVV were present on the occasion. During the Convocation, International agricultural scientist, Prof. Gurdev Singh Khush was conferred the Honorary Doctorate (Honoris causa) degree by the University. Eight students were conferred the degree of Doctor of Philosophy and ten students were awarded the Vishwavidyalaya donors gold medals. Two students were awarded cash awards. A total of 1351 students of three faculties i.e., 1081 from Agriculture, 205 from Veterinary Science & A.H. and 65 from Agricultural Engineering passing out during 01.11.2008 to 30.04.2010 of undergraduate & postgraduate courses were conferred the degree during the Convocation.

Madhya Pradesh Council of Science and Technology, Bhopal has instituted a co-ordinating cell in the University. Under the auspices of this cell, papers published by scientists of the Vishwavidyalaya were

MoU with ALCORN State University, Mississippi, United States of America

MoU with Jain Irrigation System Ltd., Jalgaon

Dignitaries on the dias during the Convocation

Award of Honorary Doctorate Degree (*h.c.*) to Prof. Gurdev S. Khush by H.E. the Governor of M.P.

evaluated for awards by a committee of experts. The committee recommended awards to the following scientists under different categories: (i) Dr. V.K. Gour, Sr. Scientist Plant Breeding & Genetics, (ii) Dr. Atul Shrivastava, Sr. Scientist, Farm Machinery & Power (iii) Dr. S.K. Pandey Sr. Scientist, Horticulture, (iv) Dr. Preeti Sagar Nayak, Research Associate, Plant Physiology and (v) Miss Priya Nayar, Ph.D. Scholar, Plant Breeding and Genetics. The awards were presented by Prof. Gurdev S. Khush, Adjunct Professor, University of California, Davis, USA and World Food Prize winner on June 25, 2010. On this occasion, Dr. Khush delivered a special lecture on "How to Overcome Threats to Global Food Security". The ceremony was chaired by Prof. Gautam Kalloo, Vice Chancellor. Addressing the audience, Dr. Khush narrated global food production status and future demand. He highlighted the means and measures to overcome food insecurity problems. The programme was coordinated by Dr. S.D. Upadhyaya, Professor and Coordinator, MPCST-JNKVV Cell.

26th M.P. Young Scientist Congress

On February 28 - March 1, 2011, the National Science Day was celebrated by organising 26th M.P. Young Scientist Congress at JNKVV, Jabalpur with the sponsorship of M.P. Council of Science & Technology, Bhopal. About 170 young scientists of disciplines Agricultural Sciences, Behavioural Science/Social Science, Bio-Science, Botany, Chemistry, Engineering Science & Technology, Environmental Science & Forestry, Home Science including Textile, Food, Nutrition & Child development, Mathematics, Statistics and Computer Science, Medical Science including Pharmaceutical Science, Physics, Zoology participated and presented research papers.

Awards Received by the Scientists

The contributions of the scientists of this University have been well recognized at national level. It is reflected by a large number of Awards conferred to them.

Award of Degree to an outgoing student by H.E. the Governor of Madhya Pradesh

Galaxy of invitees, staff and degree awardees during the Convocation

Awardees on the dias along with dignitaries

Dignitaries on dias during inaugural function

ICAR honours JNKVV Scientists with National Award

Soybean is an important oilseed crop of India especially of M.P., known as Soya State. Seven years back JS 335; a wide adaptable variety covered more than 85 % of country area created mono-culturing which ultimately succumbed to most diseases and pests. This situation caused instability in the whole soybean production system. The team led by Dr. A.N. Shrivastava took this as challenge and launched research programmes on soybean to address major problems. As a result, three varieties viz., JS 93-05 (Early), JS 95-60 (Extra early) and JS 97-52 (Multiple resistant) have been released which became very popular and broke mono-culturing of JS 335. Hundred per cent area has been covered under improved varieties as a result of concrete seed production programme. The seed replacement rate has been attained up to 35%. The area (96.24 lakh hectares) and production (108.17 lakh tones) of soybean in India have realized a phenomenal growth during 2008-09. A sizeable foreign exchange around Rs. 7000 crores is being earned by Government of India each year. The substanial increase in sustainability and profitability of soybean farming has helped in the upliftment of the socio economic status of the farmers. Due to the tireless efforts of the scientists, soybean has attained first rank among oilseed crops of India, which was previously on third rank after groundnut, rapeseed and mustard. The extraordinary contribution of JNKVV scientists is well recognized by ICAR, New Delhi. ICAR has conferred the Outstanding Team Research Award for the year 2007-08 to scientists of JNKVV for this achievement. The team comprising of Dr. A.N. Shrivastava, Dr. S.K. Rao, Dr.(Mrs.) S. Rao, Dr. R.K. Varma, Dr. M.S. Bhale, Dr. D. Khare, Dr. M.K. Shrivastava and Dr. B.D. Ghode received the award on July 16, 2010 during ICAR Foundation Day at New Delhi.

National Best Teacher Award

The Bharat Ratna Dr. C. Subramaniam Award for Outstanding Teacher in Agriculture and

Dr. A.N. Shrivastava receiving the ICAR Outstanding Team Research Award

Dr. Dhirendra Khare receiving the ICAR National Best Teacher Award

Allied Sciences for the Biennium 2007-2008 was conferred on Dr. Dhirendra Khare, Associate Professor, Department of Plant Breeding and Genetics, College of Agriculture, Jabalpur by the ICAR, New Delhi for excellence in teaching in the field of Crop Science. The award was presented by Shri Sharad Pawar, Hon'ble Union Minister of Agriculture, Government of India on July 16, 2010 during the Foundation Day of ICAR, in the presence of Padam Shri Dr. M.S. Swaminathan and Dr. S. Ayyappan, Director General, ICAR and Secretary DARE.

- Oral presentation of Dhirendra Khare, P. Sahu, N. Saini, A.N. Srivastva and M.S. Bhale on “Factors affecting seed longevity of Soybean” has been awarded First Prize at National Seed Congress- 2011 held at College of Agriculture, Pune, during Jan. 29-31, 2011.
- Awards to JNKVV students for paper presentation in National Symposium on “Integrated Farming Systems for Sustainable Agriculture-Challenges and Opportunities” held at Institute of Agricultural Sciences,Bundelkhand University, Jhansi (UP) India from February 19-21, 2011: Mr. Vijay Prakash, first prize for the poster “Evaluation of indigenous and exotic large seeded accessions of kabuli chickpea (Cicer aeritinum L.) for yield attributing traits”, Miss. Stuti Mishra, second prize for oral paper on “Association analysis for yield and its attributing traits in desi chickpea under normal and high temperature condition” and Miss. Niharika Shukla third prize for the oral presentation on "Breeding and evaluation wheat genotypes for terminal heat tolerance”
- Ku. Hiranmayi Nayak (M.Sc. Agroforestry student) was awarded the second prize for oral presentation of paper “Production and benefits of bamboo species of Orissa” at the National Conference on “Rainfed and limited irrigation - problems and solutions” held at National Centre for Research on Agroforestry, Jhansi in January 2011.
- Dr. S.K. Tripathi was awarded "KPV Menon Award" of IARI, New Delhi in the National Symposium organized by the Indian Phytopathological Society held at Anand Agriculture University, Anand from Dec. 14-16, 2010. This award was conferred for best research paper presented in the International Conference on Plant Pathology in the Globalized Era at IARI, New Delhi in the year 2009.
- Ms. Stuti Mishra, M.Sc. student won the best research thesis award for Poster Presentation on the topic “Genetic variability for Phenological and yield attributing traits in desi and kabuli chickpea under high temperature condition 2010-2011” under the guidance of Dr. Anita Babbar and Dr. D.K. Mishra in “National Symposium on Food Security in context of Changing Climate” organized by 'The Society of Agriculture Professionals' in Kanpur on Oct. 30- Nov. 1, 2010. She also won the Young Scientist Award 2010-11 in “Madhya Pradesh Mahila Vigyan Sammelan 2010” held at Mata Gujari Mahila Mahavidyalaya, Jabalpur from Dec. 18-19, 2010.

VISITS ABROAD

- Dr. S. Tiwari, I/c Agricultural Biotechnology attended an International Meeting on “Multi-country Observational Study Mission on Applications of Biotechnology in the Production of High-value Crops” organized by Asian Productivity Organization from June 28 to July 2, 2010 in Taichung & Kaohsiung, China.
- Dr. (Mrs.) Anita Babbar, Senior Scientist (Plant Breeding & Genetics), Jabalpur attended a training on "Breeding of chickpea and lentil" at ICARDA, Alleppo, Syria during April 25-May 7, 2010.
- Dr. S. K. Rao, PI, BPD Unit attended international conference on business incubation held at San-Jose, USA from

April 7-15, 2011 and completed a certificate course on Management of Business Incubators.

- Dr. (Mrs.) Om Gupta, Professor & Head (Plant Pathology) participated in South Asia Traveling Workshop on Pulses held at Nepal from March 9-14, 2011 and presented the status paper on "Pulses in India: Present status and future strategy".
- Dr. R.S. Shukla, Principal Scientist, Wheat Improvement Project, Department of Plant Breeding and Genetics, Jabalpur visited Kenya for seven days to attend a course on "Standardization of stem rust (Ug99) field notes and germplasm evaluation" under the programme organized by the International Maize and Wheat Improvement Centre (CIMMYT), Mexico.

VISITS

- Dr. Shiv Kumar, Lentil Breeder and Dr. M. Intiaz, Chickpea Breeder, ICARDA, Aleppo Syria visited JNKVV, Jabalpur on Feb. 24-26, 2011. They visited ongoing research experiments on chickpea and highly appreciated the research activities. Possible areas of collaboration and strengthening of lentil program to commensurate the scope of the crop in the State was discussed with the University authorities. Dr. Shiv Kumar presented the ICARDA work and delivered talk on lentil for food, nutritional security and improved rural livelihood.
- Dr. V.D. Patil, Ex. ADG (O&P) and Project Co-ordinator and Dr. Ranganathan, Project Coordinator (Sesame and Niger) visited JNKVV, Jabalpur on Jan. 8, 2011 to review the ongoing experiments being conducted under AICRP on chickpea.
- Dr. N.K. Tyagi (ASRB member) and Dr. A.K. Singh ADG (Edn.) visited the JNKVV chickpea research fields of breeding, pathology and entomology under AICRP on chickpea at Jabalpur on January 23, 2011.
- Shri Sevaram, Principal Secretary Horticulture, Smt. Rashmi Arun Shami, Director Horticulture & Food Processing and Shri Mukesh Mishra, Dy, Secretary Agriculture, Govt. of Madhya Pradesh, Bhopal reviewed the activities of National Horticulture Mission and Medicinal Plant at JNKVV, Jabalpur on September 9, 2010. Prof. Gautam Kalloo, Vice Chancellor presided over the function. The presentations were made by the scientists of Horticulture and Medicinal Plants. The team also visited Horticulture Farm, Medicinal and Quality Analysis Lab.
- Dr. Marutisahankar Senior Scientist and P.I., CRIDA, Hyderabad visited Dryland Project Rewa from July 29-31, 2010 for the monitoring of research work and contingent planning for Madhya Pradesh for rainfed ecosystem.
- Monitoring team of AICRIP-Rice (ICAR) Project. The monitoring team of AICRP-Rice (ICAR visited Rewa. The team members included Dr. T. Ram (Plant Breeding), Dr. Chitra Shankar (Entomology), Dr. Sen Guttubel (Plant Breeding) from DRR, Hyderabad and Dr. S. Bhandarkar from Indira Gandhi Krishi Vishwavidyalaya, Raipur.

BOOKS PUBLISHED

- Experimental Designs and Survey Sampling: Methods & Applications by Dr. H.L. Sharma, Professor & Head (Mathematics & Statistics), published by Agrotech Publishing Academy, Udaipur (Rajasthan).
- Objective Statistics by Dr. K.S. Kushwaha, Deptt. of Mathematics & Statistics. Published by New India Publishing Agency, New Delhi. The book contains 19 chapters for competitive exams like ISS, SSSE, ARSB, IAS, State PSC and others.

Strengths of educational programmes

- Availability of qualified teaching staff has been a great strength of all academic programmes. A large number of awards and recognitions to the teachers of JNKVV certify this fact.
- A huge network of various teaching programmes is capable of building desired human resource development as contained in the mission and mandate of the university.
- Four colleges in the two Faculties of Agriculture and Agricultural Engineering located in different districts cater the educational needs in various parts of the State.
- Sound academic programmes with suitable course curricula modified from time to time.Research based teaching in various courses by experienced teachers.

College activities

College of Agricultural Engineering, Jabalpur

The College of Agricultural Engineering, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur was established in the year 1966. The college has B.Tech. (Agricultural Engineering) degree programme at the under graduate level and also offers degree programmes in M.Tech. and Ph.D in Farm Machinery and Power, Post Harvest Process and Food Engineering as well as Soil and Water Engineering.

The college has six departments namely Farm Agricultural Structures & Environmental Engineering, Farm Machinery and Power, Post Harvest Process and Food Engineering, Soil and Water Engineering, Instrumentation and Applied Physics and Agrometeorology. The college has strong programmes in teaching, research and extension in the field of Agricultural Engineering.

The College has externally funded research projects namely AICRP on ground water utilization , AICRP on post harvest technology, AICRP on farm implements and machinery, AICRP on renewable sources of energy for agriculture and agro based industries, AICRP on Agrometeorology, Madhya Pradesh water Restructuring Project, Experiential Learning and setting up of facility for hands of training on food and vegetables, Integrated Agromet advisory services (IAAS), Application of extended range forecast for minimizing climatic risk in rainfed ecosystem of Madhya Pradesh (ERFS).

National Seminar Organized

- A National Seminar on “Restructuring of Irrigated Agriculture–Status and Strategies” was held at College of Agricultural Engineering during March 15-17, 2011.
- More than 140 scientists, teachers and students participated and presented scientific papers in the seminar.

Number of students in hostel, facilities available/renovation in hostel facilities

There are two hostels for boys studying in College of Agricultural Engineering in UG and PG programmes. Eighty students are availing the facilities of hostel at present. Good hostel facility has been provided to PG students.

NSS

- A week named "Sadbhavna Saptah" was celebrated by the students and they collected an amount of Rs. 3300/= for promoting communal harmony, fraternity and nation integration. The amount was sent to the NFCH, New Delhi.
- About 40 students under NSS participated in Blood Donation programme on the foundation day of the Vishwa Vidyalaya.
- Participated in campus cleaning and tree plantation programme as and when required.

Honours, Award and Recognition

- Dr. Sheela Pandey, A. Pandey, R. Patel, Sandeep Chourasia presented the paper

entitled "Process development for mechanical deoiling of Soybean" in the seminar "Integrated management and conservation of natural resources for a prosperous and empowered Madhya Pradesh, 18-19 Dec., 2010 and won Second Prize.

Distinguished visitors

- Dr. B.C. Mal, Hon'ble Vice - Chancellor, Vivekanand Technical University, Chhattisgarh presided over the seminar and enlightened the present status and future strategy for irrigated agriculture to achieve better productivity of crops and water.

College of Agriculture, Tikamgarh

The College of Agriculture, Tikamgarh was established in the year 2004-05 with an intake capacity of 40 students. The students of first batch were awarded with B.Sc. (Ag.) degree in the year 2007-08. Impacting higher education in agricultural is the main pillar of this College. The quality education as per the curriculum is being provided to the students along with the practical exposure in the area of IPM, IWM, INM, Bio-technology, Soil testing, Financial management, Farm management, Livestock Production and Management, Post Harvest Management, Entrepreneurship Development under Horticulture, intercropping, Vegetable Cultivation and Fruit Crops. The Rural Agricultural Work Experience (RAWE) is an important component of the degree programme which provides direct linkage of the students with the farmers to understand practicalities of different farming situation, farming systems, cropping patterns and agriculture technologies along with economic status of the farming communities in the Bundelkhand region. Students gathered experience regarding new technologies working with farmers in the guidance of experienced faculty members throughout the semester.

During the year (2009-10) the college was more strengthen with the establishment of instructional dairy unit, furnished of laboratories with high-tech equipments and other educational materials.

Presently, three research schemes are in operation in the college viz. All India Coordinated Research Project on Oilseeds of Sesamum, this project envisages the development of various improvement techniques like crop production and crop protection, both in kharif and rabi crops.

World Bank funded scheme namely MPWSRP is in operation. The scheme undertakes various developmental aspects of the land and its produce. The project involves interdisciplinary approach for the development of farmers of Bundelkhand region. The main aim of the project is to improve the productivity of water for the enhancement of socially and environment friendly sustainable growth.

One of the most newly conceived project on Agrometerology funded by Ministry of Earth Sciences. The prime objective of the project is to provide weather forecast based agro-advise to farming community of Bundelkhand zone. The methodology involves dissemination of agromet data to the farmers in advance so that farmer can undertake various activities of agricultural operations based on weather forecasting.

Books published

- Swati Barche and K.S.Kirsd (2010) Post harvest handling of fruits ,vegetables and Flowers, Jain Brothers, New Delhi, ISBN:978-81-8360-113-9.
- Dr. P.K. Tyagi, Asstt. Professor (Agronomy). Practical Agricultural Meteorology, NIPA, New Delhi

Manual

- Dr. B.K. Dixit and Dr. B.L. Sharma, (Soil Science) prepared a manual entitled" Introduction to Soil Science".

- Dr. B.K. Dixit and Dr. B.L. Sharma, (Soil Science) prepared a manual entitled "Soil Chemistry, Soil Fertility and Nutrient Management".

College of Agriculture, Rewa

Rewa the capital of old Vindhya Pradesh before inception of Madhya Pradesh. Rewa is famous globally as homeland of *"White Tigers"*. College of Agriculture, Rewa is one of the oldest college started in 1952 administratively linked with Darbar College, Rewa, Foundation stone of College of Agriculture, was laid down on 21st October 1952 with the sanctioned amount of Rs. 95,000/- by erstwhile Shri Kailash Nath Katju (Home Minister). It is completed in 1954 by Rs. 88500/- and inaugurated by Hon'ble Deputy Governor, Vindhya Pradesh Shri Kasturi Santhanam on 26th January 1954. Shri R.C. Sharma was the Founder Principal of College of Agriculture, Rewa, who has completed the College building by "Shramdan" of students and staff member.

Rewa is situated at the latitude of 24" 30' N, longitude of 80^0 15' E, 306.06 m above from sea level and one kilometer from NH-7. Rewa comes under Kymore Plateau and Satpura Hills Agro climatic zone IV of Madhya Pradesh.

The B.Sc. (Ag.) classes started in the year 1955 with 7 students. The post graduate classes in Horticulture and Agronomy started in the year 1959 with 5 students in each subject. Lateran P.G. classes started in Agriculture Economics, Extension Agriculture, Botany were also started. In last two year i.e. 2009 and 2010 P.G. classes started in Plant Breeding and Genetics, and Plant Pathology respectively.

The New College building completed in 1968. There are 2 hostels for Boys and one for Girls in College Campus.

The College has a good Dairy with 42 cattles.

Teaching

During 2010-11 total number of 49 B.Sc. (Ag.) and 29 M.Sc. (Ag.) students have completed their degree. Teaching is being imparted through Audio Visual aids for practical purpose there are two crop cafeteria one for different crops with many lealest anxiety, and second prepared by Dept. of Entomology to record and identify the insects and their damage. Students are frequently visiting to Kuthuliya Farm by College Bus. Two hundred Seventy Five students from different categories, i.e. SC, ST and OBC have benefitted from state Govt. through scholarship. The College has opted Accidental Insurance scheme for all the students.

During 2010-11 P.G. started in plant Breeding & Genetics. At present there is P.G. Programme in five subjects more than 23693 books, 250 reference books, 1695 research journals are available for teaching.

C.D. bank on crop profile (barley) question bank are available. Classical paper (Experiments in plant Hybridization by Gregor John Mendel) is also available.

Workshop Organized

- 20-22 April, 2010 - KVK Stare level workshop Front Line Demonstration on Pulses and Oil Seed was organized at College of Agriculture, Rewa.
- 23 September, 2010 : Workshop on sensitization to scientists for commercialization of Agriculture in M.P. was successfully organized at College of Agriculture, Rewa.Dr. Dukhishyam Kar Business Manager, JNKVV, Jabalpur addressed to the scientist.
- 18 January, 2011 : One day workshop organized on "Awarecess on conservation of Biodiversity. At Agriculture College, Rewa. Chief Guest Dr. Ravindra Pastore (Commissioner, Rewa). Special guest Dr. S.K. Malik (NBPGR, New Delhi).
- 26 March, 2011: One day workshop on precision farming Technology for Enhancing the crop productivity through increasing water use efficiency in command Area.

Meeting Organized

- Seed societies meeting chaired by Dr. R. Pastore (Commissioner, Rewa) and Dr. S.K. Rao, Dean, College of Agriculture, Rewa.

Trainings

- 23 November, 2010: National Fertilizer Ltd. in collaboration with College of Agriculture, Rewa organised a training programme on balanced use of fertilizers at College of Agriculture, Rewa. Chief Guest of the function was Dr. S.K. Rao, Dean, College of Agriculture, Rewa.
- MAPWA training organized for women on Adoption of Improved Agricultural Technology on December 3-4, 2010. The function was chaired by Dr. R. Pastore, Commissioner, Rewa.
- One day training cum awareness programme on "Protection of Plant Varieties in farmers Rights (PPV & FRA's) organised on March 29, 2011.

Award

- Dr. S.K. Tripathi, Professor, Plant Pathology, College of Agriculture, Rewa received KPV Menon Award on December 4, 2010 at AAU, Anand.

RESEARCH

Introduction

Multi disciplinary research of applied nature is being conducted on Natural Resources Management, Crop Improvement, Crop Protection, Post Harvest Technology and Farm Machinery at four Zonal Agricultural Research Stations, Regional Research Stations, and Agricultural Research Stations.

Well-equipped and mechanized farms, workshops, laboratories, Agromet Center, glass and net houses, library, ARIS Cell with latest information and communication technology strengthen the activities of the University. As on date All India Coordinated Research Projects, ICAR Network Projects, NAIP, *Ad hoc* Research Projects, State Plan and Non-Plan Projects, Madhya Pradesh Mandi Funded Projects, other externally funded projects (BARC, MSSRS, MPCOST etc), Projects of Government of India (Agro-Economic Research Center, CCS etc), are in operation to carry out the research work in agriculture and allied fields, besides extending product testing facility for the corporate sector.

Research Station

Zonal Agricultural Research Station: Jabalpur, Powarkheda, Tikamgarh and Chhindwara

Regional Agricultural Research Station: Rewa, Sagar, Dindori and Waraseoni

Agricultural Research Station: Betelvine Research Centre, Navgaon (Chhattarpur), Dryland Horticultural Research Centre, Ranguan, Garhakota (Sagar), Tendini and Sausar.

The main thrust of research in the Vishwa Vidyalaya continues to be on the evolution of improved crop varieties having resistance/ tolerance to biotic and abiotic stresses and development of need based location specific improved technologies. New research programmes are also formulated to match the changed scenario of new economic policies and climate change and are being implemented. The Vishwa Vidyalaya is also concentrating on frontier areas of research such as bio-technology and molecular biology, agro-forestry, bio-energetics, organic farming including biological control of pests and diseases, bio-fertilizers, natural resource management, crop improvement, cropping system, food processing and post harvest technology, hi-tech horticulture, medicinal and aromatic plants, wasteland management, agricultural machinery and allied aspects and Integrated Farming System approach besides organic farming and conservation agriculture etc. The socio-economic studies are also carried out by the Agro-economic Center and data on cost of cultivation of major crops of the State are generated for the Commission on Agricultural Cost and Prices.

1

CROP VARIETIES DEVELOPED

Wheat MP 1201

Wheat JW 3269

Wheat JW 3288

Wheat

- **JW 1201:** It matures in 118 days, bold grain, good appearance and high protein content. It has resistant to rust and suitable for irrigated condition of Madhya Pradesh. Yield potential is 53 q ha^{-1}.
- **MP 3269:** A semi dwarf wheat released by SVRC in the month of December, 2010 for the farmers of MP under partially irrigated condition. Tolerant to drought and rusts Grains bold and sarbati. It has 42-45 q ha^{-1} yield under limited irrigation, suitable for chapatti
- **JW 3288:** A *aestivum* wheat released by CVRC (August, 2010) for RF/restricted irrigated condition of Central Zone. Bold grain, non lodging and non shattering Profuse tillering. Resistant to rust It has 45-47 q ha^{-1} yield under two irrigation.

Gram

- **JG-12:** Desi chickpea variety. It is an early (105-115 days) brown and medium seed, semi spreading profuse branching, suitable for both irrigated and rainfed conditions of MP having yield potential of 20 q ha^{-1}.

Linseed

- **PKDL 41:** It matures in 115-120 days. It has profuse secondary branching flowers and seed at top, chocolate seed colour and bold. Suitable for irrigated timely sown and late sown areas of Madhya Pradesh. Resistant to diseases and tolerant to bud fly. Yield potential is 15-17 q ha^{-1}.
- **JLS 66:** It matures in 107-114 days, short in height with white flowers and seed are light brown in colour. Moderately resistant to powdery mildew, *alternaria* blight, rust and major insect pests. Oil content 40.5% and yield potential is 22 q ha^{-1}.

Oat

- **JO61:** It matures in 145-155 days. It has broad leaves with profuse tillering at the base owned spilelets. Tolerant to loding

Gram JG 12

Linseed PKDL 41

Linseed JLS 66

Oat JO 2

Kodo JK 98

Kodo Millet DPS 9-1

and shattering. Recommended for both green and dry fodder. First cut is taken at 60-65 days. The yield potential of green fodder is 63-65 q ha^{-1} and dry yield is 110 q ha^{-1}.

Kodo

- **JK 98:** It matures in 104 days. Plants are 60 cm in height, erect, semi compact, dense ears, grain brown. Moderately resistant to head smut and resistant to shoot fly. Suitable for sole and intercropping. Yield potential is 25 qha^{-1} under rainfed conditions of Madhya Pradesh.
- **DPS 9-1:**It matures in 95-100 days. Plants are 60 cm in height, compact ears, grain brown. Moderately tolerant to shoot fly and grain smut. Moderately tolerant to drought. Yield potential is 27-30 q ha^{-1}.

Pre-released varieties

Wheat

- **MP 3304:** Early wheat tolerant to terminal heat suitable under late sown irrigated condition will be proposed for Identification in coming workshop of wheat (2011).
- **MP 3299:** Another wheat variety is in final under AICRP on wheat will also be proposed for Identification for restricted irrigated condition.

Soybean

- **JS 20-29:** It ranked first in Central Zone recording 2406 kg ha^{-1} yield over 12 locations and recorded 14 % more yield than the best check JS 97-52 (2165 kg ha^{-1}). It is an early duration culture matures in 94 days having bold seeds (13g/100 seed weight).
- **JS 20-34:** It is an extra early culture ranked sixth recorded 2204 kg/ha yield recorded 14 % more yield than early check JS 93-05 (1934 kg ha^{-1}) and 1.8% more yield than the best check JS 97-52 . It is a dwarf thermo-photo insensitive having medium seeds (12 g/100 seed weight).

Kodo Millet

- DPS 72, DPS 85, DPS 10, DPS 15, DPS 19, DPS 27, DPS 36, DPS 45, DPS 63, DPS 65, DPS 331, DPS 365, DPS 693, DPS 676, DPS 712, DPS 739, DPS 368 and DPS 637 (Yield potential of 25-30 q ha^{-1}).

Little Millet

- DLM 4, DLM 5, DLM 6, DLM 9,DLM 369, DLM 314, DLM 390, DLM 409, DLM 80 and DLM 93 (Yield potential of 8-13 q ha^{-1}).

Sesame

- Pattern of variation in quantitative and qualitative characteristics of sesame varieties over environments: All the five varieties viz. TKG-55 (1607 kg ha^{-1}), JTS-8 (1488 kg ha^{-1}), TKG-21 (1270 kg ha^{-1}), TKG-22 (1230 kg ha^{-1}) released from Tikamgarh Centre including Local Check TKG-308 (1349 kg ha^{-1}) were found to be highest seed yield.

Oat

- JO2003-91: It has been developed from a cross between Kent x UPO 50 and has performed well in different locations of

India. The green fodder yield is about 475-525 q ha^{-1} and dry matter yield 120-140 q ha^{-1}. At present this entry is in advance varietal trial.

Berseem

- **JB 2003-73:** This variety is in combined advance varietal trail. It has given better performance at different locations. It has green fodder yield of 660 q ha^{-1}, DMY (92.2 q ha^{-1}) and CPY of 13.4 q ha^{-1}.

Sugarcane

Twelve trials were conducted under the Crop Improvement Programme. In early group the promising entries were MS 07081, CoJN 07091, Co 07012, CoJN 07092, Co 06002, Co 06022, Co 05002 and CoSnk 05104. Promising entries under Mid late group were CoSnk 5104, Co 05007, CoSnk 05105, Co 06027, Co 06010, CoSnk 03632, CoJN 07094, CoJN 07093 and Co 07010.

During 2010-11, 56 crosses were attempted at National Hybridization Garden, Sugarcane Breeding Institute, Coimbatore (T.N.). Total 3266 seedlings were obtained and are planted for further evaluation.

Seed Technology

Crop production and certification

Relationship of Other Distinguishable Varieties identified in Seed Testing Laboratory with genetic impurity in GOT.

Soybean: The prime basis of sorting out ODV is the colour of hilum. Over all correctness of identification of 90.8%, for soybean advocated that ODV in soybean has positive and significant correlation with genetic impurity observed at plant level in GOT.

Chickpea: The prime basis for identification of ODV was surface of seed coat. Over all correctness of identification of 77% advocated that ODV in chickpea has positive and significant correlation with genetic impurity observed at plant level in GOT.

Lentil: The prime basis for identification of ODV seeds is the presence of black coloured seed. Present findings reveals that black seed coat colur formed in the varieties of gray mottled colour should not be considered as genetic impurity.

Mustard: The prime basis for identification of ODV was the presence of yellow coloured seed. Over all correctness of identification of 66% advocated that ODV in has positive and significant correlation with genetic impurity observed at plant level in GOT.

Micro nutrient management on quality seed production of soybean

Nearly one quintal added advantage of processed seed was observed with the application of sulphur alone or in combination with zinc over the control. Present findings revealed that zinc has positive influence on vigour index that becomes significantly superior with sulphur. The seed produced with basal application of sulphur and foliar application of zinc recorded highest vigour idex.

Cost of Nucleus and Breeder Seed production

Groundnut : With the existing price the cost benefit ratio of 1:0.95 for Breeder and 1:1.04 for Nucleus seed showed that seed production of groundnut is not a profitable venture in MP mainly due to low yield.

Kabuli chickpea: The cost benefit ratio of 1:2.69 and 1:2. 53 for Breeder and Nucleus seed, respectively showed that seed production of is a profitable venture in MP.

Effect of furrow in between rows bed (FIRB ' S) on seed production of soybean

Unprocessed and processed seed yield in ridge and furrow and raised bed methods was statistically superior to conventional method. With significantly higher vigour index (length) and vigour index (mass) in comparison to control.

Grow Out Test [Post Control Plots of Breeder Seed]

In all 292 samples of Nucleus and Breeder

seed of the 119 varieties of 22 *kharif* and *rabi* field crops produced at JNKVV were tested at Seed Technology Research Unit, Department of Plant Breeding and Genetics, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur for genetic purity through grow out test as Post Control Plot. Standardization of seed coating protocol for enhancement of seed quality during storage and in field.Seeds of maize hybrid were treated with polymer and polymer in combination with different insecticide and fungicides to standardize the seed coating protocol for enhancement of seed quality during storage and in field and their storability was further tested in cloth and 700 gauge polythene bags.

Significant differences existed as effect of the packaging materials, treatments and their interactions for seed moisture, germination% vigour index and field emergence after three months of seed storage. The germination% and field emergence was higher in seeds stored in 700 gauge polythene bag. The germination % dropped below 50% after six months storage in maize.. Among treatments polycoated seeds had the maximum germination and vigour index.

Identification of Area for Hybrid Seed Production

Pigeonpea: Hybrid seed of ICPH 2671 can be produced successfully in Kymore plateau and Satpura hills and Bundelkhand agro-climatic zones with the average hybrid seed producibility of 2242 kg ha^{-1}.

Rice: Seed of short duration hybrid can be produced successfully in Eastern part of MP mainly in Kymore Plateau and Satpura hills and Chattishgarh plains with average hybrid seed producibility yield of 4.0 q ha^{-1}. Hybrid seed can be produced during summer in Chattishgarh plains.

Maintenance Breeding of Soybean Varieties

Out of 38 varieties in active seed multiplication chain at national level, seeds of 34 varieties are maintained through single pod selection.

Assessment of seed vigour tests for relative storability and field performance of Paddy

Significant differences were visible amongst the seed lots for all the parameters recorded. The laboratory germination %, 48, 96 and 144 hours AAT and germination after 2 months storage had a significant positive correlation with each other. Field emergence had a significant positive association with first count, germination %, speed of germination and 2 months storage period and significant negative association with seedling length and electrical conductivity.

Assessment of seed vigour tests for relative storability and field performance of soybean

Significant variations existed amongst the seed lots for all the parameters recorded in soybean variety JS 97-52. Laboratory germination % had a significant positive co-relation with 48, 96, 144 and 192 hrs AAT and 2 and 4 months storage duration. Field emergence had a significant positive association with first count, lab. Germination %, seedling length, 2 and 4 months storage and negative association with electrical conductivity test.

Seed Physiology, Storage and Testing

Storability of seeds was better in Poly – lined gunny bags, bundas and HDPE bags over gunny bags for farmers saved seeds in wheat, chickpea and lentil which had been dried to safe moisture limits.

In maize, the germination%, vigour index and field emergence were higher in polykote + insecticide treated seeds. Among packaging material the germination %, field emergence and vigour index were higher in 700 gauge polythene bags as compared to cloth bag.

Seed Physiology

Assessment of seed vigour tests for relative storability and field performance of soybean.

Significant variations existed amongst the

seed lots for all the parameters recorded in soybean variety JS 97-52. Laboratory germination % had a significant positive co-relation with 48, 96, 144 and 192 hrs AAT and 2 and 4 months storage duration. AAT 48, 96, 144 and 192 hours had a significant positive association with each ther and 2 and 4 months storage period. Field emergence had a significant positive association with first count, lab. Germination %, seedling length, 2 and 4 months storage and negative association with electrical conductivity test. First count, seedling length, germination % and 2 and 4 months storage had a significant positive correlation with each other and significant negative association with electrical conductivity.

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Standardization of seed coating with synthetic polymers and additives

Seed Testing: The seed moisture ranged between 12.3 to 13.1% at the initial stage. Polycoated seeds had the maximum vigour index and seedling emergence at first and final count followed by seed priming treatment. The field emergence remained unaffected by different treatments initially being significantly maximum in control and at par with primed and polycoated seeds. Significant differences existed as effect of both the packaging materials, treatments and their interactions for seed moisture, germination% vigour index and field emergence after three months of seed storage. The germination% and field emergence was higher in seeds stored in 700 gauge polythene bag as the seeds were shade dried to safe moisture limits before packing and the absorption of moisture was less in 700 gauge polythene bag.

The germination % dropped below 50% after six months storage in maize. Effect of packaging material, treatment and their interactions were significant for Seed moisture, germination%, vigour index and field emergence. Germination%, field emergence and vigour index was higher in seeds stored in 700 guage polythene bags over those stored in cloth bags. Among treatments polycoated seeds had the maximum germination and vigour index.

Standardization of seed coating protocol for enhancement of seed quality during storage and in field

Seeds of maize hybrid were treated with polymer and polymer in combination with different insecticide and fungicides to standardize the seed coating protocol for enhancement of seed quality during storage and in field and their storability was further tested in cloth and 700 gauge polythene bags.

Significant differences existed as effect of the packaging materials, treatments and their interactions for seed moisture, germination% vigour index and field emergence after three months of seed storage. The germination% and field emergence was higher in seeds stored in 700 gauge polythene bag. The germination % dropped below 50% after six months storage in maize. Among treatments polycoated seeds had the maximum germination and vigour index.

PRODUCTION TECHNOLOGY

Rice based cropping system

- Rice-chickpea-okra, rice-mustard-moong

and rice-mustard-cowpea and rice-berseem are profitable crop sequences over existing rice wheat cropping sequence.

- Inclusion of the grain legumes viz. soybean and chickpea in place of upland rice and wheat, respectively after every two years in a fixed rice-wheat sequences proved to be superior than continuous rice-wheat cropping with regard to stability in productivity of entire cropping system as well as monitoring of soil health along with higher monetary advantages.

Soybean based cropping system

- ·Soybean-wheat-maize (fodder) are the best crop sequences with 300 % cropping intensity while jowar-wheat and soybean-wheat are profitable with 200 % cropping intensity.
- Soybean (cv JS-335) - potato (cv Kufri Jyoti) - wheat (GW 173) proved to be best intensive and need based cropping system with regard to total productivity and profit per hectare per year.
- Among the ten crop sequences tested, the soybean potato–okra cropping sequence produced the maximum SEY (159.9 $qha^{-1}year^{-1}$) closely followed by soybean–potato–sesame crop sequence (92.5 $qha^{-1}year^{-1}$) while soybean-vegetable pea–sugarcane cropping system stood in the 3rd rank.

Kodo based cropping system

Kodo-Soybean- Kodo or Kodo-Niger-Kodo crop rotation was found best for sustainable system in Dindori district.

Intercropping

- Soybean+ pigeon pea (4:2 rows and 30 cm apart intercropping under rainfed conditions in most, remunerative risk bearing and advantageous in rainfed conditions.
- Soybean +Maize intercropping in alternate rows 30 cm apart with 50 % RDF to soybean and 100 % RDF to maize led to record maximum total productivity (56.58 q/ha) yield index (152 %) and net profit (Rs 10,394/-).
- Intercropping of 2:1 Kodo millet + Pigeonpea was found superior over mixed crop of Kodo millet and pigeonpea on Farmers field as well as Research Station, Dindori.

Nutrient management:

- Application of 20: 60:20 kg NPK ha^{-1} to soybean and 120: 60:40 kg NPK ha^{-1} to wheat gave maximum production and net profit with soybean-wheat under irrigated conditions.
- Application of 80: 40:20 kg NPK ha^{-1} to pearl millet and 120:60:40 kg NPK ha^{-1} to wheat was adequate fertilizer dose for increased total grain yields (6.33 t ha^{-1}) and net profit (Rs. 18,705/-) from entire cropping system.
- Application of S 25 kg ha^{-1} and Zn 5 kg ha^{-1} through $ZnSo_4$ along with RDF in soybean-wheat system increased the productivity and net profit of cropping systems as whole.
- A low cost agro-technique for rice-wheat system consisting with in-situ green Manuring for sunhemp in drilled rice (sowing of rice-sunhemp in 4:1 rows and then incorporation of one month old sun hemp with the help of rotary weeder) and application of 75 % NPK with herbicidal weed control to both crops in rice wheat sequences was comparable to growing both crops with 100 % NPK and other recommended practice with regard to productivity and profit, besides the improvement in soil health.
- Application of 50% NPK+12 t green manure /FYM/wheat starw to rice followed by wheat with 100 % NPK as well as 75% NPK+6 t FYM/green manure/wheat straw to rice followed by 75% NPK to wheat were comparable to application of 100 % NPK to

both crops in terms of grain yield of individual crop and total productivity of entire system. The former treatments were more remunerative with the additional advantages of improvement soil health.

- Application of 40 kg N/ha gave highest grain yield of 1460 kg/ha, followed by 20 kg N/ha (1153 kgha^{-1}) in Kodo millet.
- Application of 40 kg Nha^{-1} produced highest grain yield of Little millet (1206 kgha^{-1}) as compared to no nitrogen (627 kgha^{-1}).
- Enrichment with 100% RDF (40:20:10 NPK kg/ha) to 5 t FYM ha^{-1} gave higher grain yield of Kodo millet (1689 kgha^{-1}).
- Under low fertility conditions, application of 50% RDF and inoculation with bio-fertilizers gave higher grain yield of Kodo millet (1055 kgha^{-1}) under rainfed conditions.
- Application of RDF (40:20:10: NPK kgha^{-1}) alongwith FYM 5 tha^{-1} gave significantly highest grain yield of Kodo millet (1585 kgha^{-1}), NMR (Rs. 12808 ha^{-1}) and B:C ratio (1.99).

AINP on Soil Biodiversity-Biofertilizers (SBB formerly BNF)

Total 119 blocks belonging to 40 districts of different agro-climatic zones were surveyed during soybean cropping season and 159 locations were sampled. Soybean nodule samples were brought to the laboratory and in all 990 isolations of soybean *Rhizobium* were done. From laboratory and field experimentations 10 and 15 isolates of *Bradyrhizobium* and PGPR were isolated.

Seeds inoculated with *B. japonicum* reduced the germination time at 4th and 5th DAS were recorded, in place of normal germination of 5-7 days. In field experimentations plant height, chlorophyll index (SPAD value), nodulation and plant biomass, straw and grain yields, nutrient (N, P, and K contents and uptake were taken as parameters for field efficiency evaluation.

Impact of rhizobial inoculation on soil pH and EC were found to be unaltered, but increased the contents of OC, available N, P and K in the post harvest soil samples (0-15 cm) with simultaneous increase in harvest index, nitrogen harvest index and additional BNF. The correlationships between different yield attributing characters were also established.

The best proven isolates were R11, R35, R16, R12, R33, and R30.

Long Term Fertilizer Experiments (LTFE)

The results obtained under the study as per the technical programme 2010-11 indicated that the balance use of fertilizer is essential for higher production of soybean and wheat as well as maintaining soil health. The integrated use of organic manure and balanced doses of fertilizer appears to help in achieving sustainable high productivity along with remarkable improvement in soil health. However, continuous use of sulphur free fertilizer (viz. DAP) needs to be discontinued especially under intensified cultivation of soybean – wheat system in the black soils. The salient achievements of practical utility are as below

- Continuous applications of inorganic fertilizer in balance amount for a period of nearly four decades did not contribute any adverse effect on soil health. This disapproved the notion that application of chemical fertilizer and cultivation of soil reduced the soil health (soil organic carbon).
- The conjunctive use of chemical fertilizer and FYM maintained relatively larger amount of soil organic carbon as compared to chemical fertilizer alone.
- The performance and production of test crops (soybean and wheat) is satisfactory even after nearly four decade application of inorganic fertilizers.
- Imbalance application has reduced levels of K and S nutrients in soil and showed adverse effect on plant growth resulting in low yield.

- Inclusion of organic manure (FYM) added to the additional benefits on crop yields sustainability as well as better soil health.

Micronutrient, Secondary Nutrients and Pollutant Elements in Soil and Plants (Micronutrients, MN)

Delineation work was undertaken to evaluate the available micro and secondary nutrients status of mixed red and black soils of Chhattarpur district, Madhya Pradesh. For the entire Chhattarpur district, available Zn, S and Fe deficiency in soil was observed in 56.9, 38.6 and 9.4% soil samples, respectively. Whereas, the deficiency of Zn, Fe and S were observed in 55.88%, 2.0 % and 45.10% soil samples respectively in mixed red and black soils of Rewa district of Madhya Pradesh.

Under the nutrient indexing programme for forecasting emerging nutrient deficiencies, two agro-eco-sub regions were selected in the state of Madhya Pradesh. Yield of Rice grain 3.76 and straw 4.60 t ha^{-1}, was observed with the uptake of Zn 151.0, Cu 36.1, Fe 1131, Mn 791 g ha^{-1} and S 9.8 kg ha^{-1} by paddy. Yield of wheat grain 3.87 t ha^{-1} and straw 4.55 t ha^{-1} was observed with the uptake of Zn 181.7, Cu 37.5, Fe 1047, Mn 152.8 g ha^{-1} and S 11.2 kg ha^{-1} by wheat crop in Jabalpur NID. Yield of pearl millet grain 2.5 and straw 6.9 t ha^{-1}, with the uptake of Zn 203.2, Cu 38.4, Fe 857.1, Mn 210.2 g ha^{-1} and S 10.8 kg ha^{-1} were recorded by pearl millet. After pearl millet the yield of wheat grain 3.67 and straw 4.34 t ha^{-1}, Zn 129.0, Cu 34.1, Fe 1096, Mn 181.4 g ha^{-1} and S 9.5 kg ha^{-1} were recorded by wheat crop in Morena NID.

The grain yield of rice increased significantly from 4.12 t ha^{-1} to 5.10 t ha^{-1} with the application of 40 t sludge ha^{-1}. But the periodicity and the interaction between sludge doses X periodicity for yield of rice grain and straw were found no significant. Grain yield of wheat increased significantly from 4.16 t ha^{-1} at control to 5.04 t ha^{-1} @ 40t ha^{-1} sludge. Each year sludge application significantly increased wheat grain yield (5.01 t ha^{-1}) over alternate/ 4th year application.

The application of Zn @ 5 and 10 kg ha^{-1} significantly increased the maize grain and stover yield over control. The maximum maize grain yield 4.21 t ha^{-1} and stover yield 10.77 t ha^{-1} was found at 10 kg Zn ha^{-1}.While the application of 10 t ha^{-1} FYM significantly increased the maize grain and stover yield over control. The residual effect of 10 kg Zn ha^{-1} application significantly increased the grain and straw yield of wheat over control .

The application of 60 and 120 kg N significantly increased the grain, stover, and cob stover yield of maize over control. While the maximum grain yield 4.45, stover yield 14.22 and cob stover yield 3.19 tons ha^{-1} were recorded at 180 kg N ha^{-1}. While the application of 10 kg Zn and 1 kg B ha^{-1} significantly increased the grain and stover yield of maize over control. The maximum wheat grain yield 5.97 t ha^{-1} and straw yield 7.77 t ha^{-1} was observed at 180 and 120 kg N ha^{-1} respectively. Application of 10 kg Zn, 1 kg B singly as their combined application significantly increased the wheat grain yield over control.

Application of Zn EDTA and Zinc sulphate significantly increased the Zn use efficiency over Zinc chloride, Zinc phosphate and Zinc oxide at 05% , 1% and 1% salt concentration with 0.5% lime. However, the maximum Zn use efficiency 16.05, 12.06 and 9.04% with Zn EDTA and 10.99, 10.83 and 6.98 with Zn sulphate were observed at 0.5, 1% and 1% + 0.5% lime respectively .

Application of 5 and 10 kg Zn ha^{-1} significantly increased the wheat grain and straw yield over 1.25 or 2.5 kg Zn ha^{-1} respectively but higher than that Zn levels were found at par amongst themselves for grain and straw yield.

The yield and Zn content of wheat grain and straw increased significantly with the application of 20 kg Zinc, 20kg Zn +0.5% $ZnSO_4$ spray over control. The maximum yield of wheat grain 5.7 and straw 8.81 t ha^{-1} was observed at 20 kg Zn ha^{-1}+ 0.5% $ZnSO_4$ spray.

Amongst the varieties, the minimum yield of 3.56 t ha^{-1} was recorded by HW 2004 and maximum 6.48 t ha^{-1} by variety GW-366.The maximum Zn content in grain 33.1 and straw 15.72 mg kg^{-1} was recorded with 20 kg Zn+0.5% $ZnSO_4$ spray. Variety WH 147 contain the maximum 33.35 mg kg^{-1} Zn in grain. While the GW 322 variety having the minimum 21.85 mg kg^{-1} Zn content.

Soil Test Crop Response Correlation (STCR)

Motivation for adopting innovated technology is the present need for the farmers by bagging distinctly higher yields economically. Frontline demonstration on farmers' fields is an effective approach. The soil test crop response correlation is the base for the front line demonstration related to the balanced used of chemical fertilizer and its application. The main objective of conducting FLD is to prorogate the balanced use of fertilizers in conjunction with organic manure, biofertilizers, green manuring for achieving the targeted yield of crops.

Demonstration trials two each on urid, mustard, soybean; three on gram; four on wheat, and one each on pea were conducted in different villages on farmers field of Jabalpur districts i.e. Jabalpur, Seoni, Narsinghpur, Chhindwara and Katni. The soils were montmorillonitic hypothermic Typic Hapulustert deep black taxonomically fine soil. The pH and EC of the soils ranged from 6.9 to 8.0 and 0.12 to 0.14 dsm^{-1}, respectively. The fertilizer adjustment equation used for the application of fertilizer based on soil test values for targeted yield were:

Wheat :

FN= 4.40 T – 0.40 SN
FP_2O_5 = 4.00 T – 5.73 SP
FK_2O = 2.53 T – 0.16 SK

Urid:

FN= 7.82 T – 0.39 SN
FP_2O_5 = 5.36 T – 2.62 SP
FK_2O = 10.83 T – 0.44 SK

Soybean:

FN= 5.19 T – 0.48 SN
FP_2O_5 = 5.20 T – 4.10 SP
FK_2O = 3.90 T – 0.22 SK

Gram:

FN= 3.73 T – 0.18 SN
FP_2O_5 = 5.00 T – 2.50 SP
FK_2O = 3.80 T – 0.17 SK

Mustard:

FN= 9.11 T – 0.37 SN
FP_2O_5 = 3.60 T – 0.75 SP
FK_2O = 4.66 T – 0.13 SK

Pea:

FN= 7.54 T – 0.76 SN - 1.04 FYM[N]
FP_2O_5 = 3.88 T – 1.51 SP - 1.48 FYM[P]
FK_2O = 6.33 T – 0.24 SK - 0.667 FYM[K]

The targeted yields were achieved within ± 2% to ± 30 % from affixed target. In 50% cases the targets were achieved within ±10%. In particular, the targets were achieved in 80% cases, when the fertilizer recommendation based on targeted approach coupled with 5 t FYM ha^{-1} i.e., IPNS mode was followed.

Management of Soil Health and Fertility (GPS and GIS based GOI Project)

Total 2970 soil samples were collected from 495 villages in 5 districts of MP. From Jabalpur districts, 636 soil samples were collected from 106 villages under 6 tehsils, and all the samples were analyzed. Out of total soil samples 9% were acidic, 57% neutral, 30% slightly alkaline and remaining 4% samples from Jabalpur, Patan and Shahpura tehsil were strongly alkaline. In overall view, soil samples were in safe range of EC but 40% samples were low in OC. Soil samples of 49, 52, 15, and 78 percent were in low range of available nutrient contents for N, P, K, and Zn, respectively.

From Katni district, 516 soil samples were collected from 86 villages under 7 tehsils. Soil samples 43% were found acidic, 36% neutral, 14% slightly alkaline and remaining 7% samples from Rithi, Badwara, Bahoriband and Dheemarkheda tehsils were strongly acidic.

All soil samples were in safe range of EC but 18% samples were low in OC. Low status of nutrient contents for N, P, K, and Zn were observed in 22, 49, 22, and 57 percent soil samples, respectively.

From Seoni district 750 samples were collected from 125 villages under 6 tehsils. Acidic nature of soil was recorded in 28% samples, 61% samples were neutral, 9% samples slightly alkaline and remaining 1% sample was strongly alkaline were in the safe range of EC, but low OC was found in 20% samples. The status of nutrient contents for N, P, K, S, and Zn was low as evident in 25, 36, 19, 21, and 67 percent soil samples, respectively.

M.S. Swaminathan Research Foundation (MSSRF)

The extended aim of the project is to transfer the proven innovated technology for sustainable management of natural resources in the identified watershed managed by men and women of the local community of farm landless, labour for the food and nutrition security and enhanced livelihood opportunity without disturbing environmental quality.

The project efforts have been primarily related to the sustainable natural resource management the soil and water, crop diversification, increasing productivity, developing post harvest technology as value addition introduction and promotion of bio-industrial services. This includes Participatory Technology Development (PTD) for sustainable farming system, alternative livelihood sources through bio industrial initiative in association with Govt. Department and other agencies.

Biofertilizer Production Centre (BPC)

Presently, BPC produces in mass a good number of biofertilizers viz., *Rhizobium* (individually for soybean, gram, arhar, mung/urid, and pea/lentil), *Azotobacter, Azospirillum*, BGA, PSB, Rich-organics, and *Trichoderma* for various crops during Kharif and Rabi seasons. The cultures are provided to the ultimate user farmers either directly or through different Govt. Agencies of MP, KVKs, Farms, and Research Stations of JNKVV. During this financial year the centre earned a selling record for Rs. 48,16,906/=.

Weed management

- Pre emergence application of Benthiocarb @1.5 kgha^{-1} to rice and Isoproturon @ 1 kgha^{-1} as post emergence to wheat in rice wheat sequence proved as good as to two hand weedings in terms of yield and profit.
- Pre-emergence application of 2,5-D (Na-salt) @1 kgha^{-1} with one hand weeding
- At 15-20 days after emergence effectively controls the weeds in upland rice.
- Pre-emergence application of Butachlor @1.5 kgha^{-1} rice and pre or post emergence application of Isoproturon @ 1 kgha^{-1} to wheat in rice-wheat sequences proved as good as two hand weeding in terms of yield and profit.

Forage Management

Rice bean - A new lean period fodder

Scarcity of green fodder and grazing resources in Madhya Pradesh and country wide has adversely affected the nutritional status of live stock providing milk, meat and draft power under rainfed situation and lean period. Vigna umbellata (Thumb) (Ohwi and Ohashi) has proved its superiority over leguminous fodder due to its indeterminate habit and high fodder yielding ability, tolerant to high and low moisture stress and its ability to sustain in the lean period has opened a vista as green fodder.

JRB J05-2: It has been developed by selection from local material obtained from adjoining areas of Balaghat. This entry is in advance varietals trial. It has the green fodder yield of 407qha^{-1}, 79.09qha^{-1} DMY and 14.8 % crude protein and suitable for lean period.

Soybean

JS07-11-6: It has been developed from a cross between NRC37x BR-7. The green fodder

yield of 287.0 qha^{-1}, dry matter yield of 62.4 qha^{-1} and 8.7 qha^{-1} crude protein yield.

Linseed varieties in chickpea + linseed (4:2) intercropping system

Linseed equivalent yield (LEY) did not differ significantly among different intercropping treatments. However, LEY was numerically higher when linseed variety Padmini (2269 kgha^{-1}) was intercropped with chickpea var. JG 322 followed by JLS 67 (2262 kgha^{-1}), JLT 26 (2252 kgha^{-1}) and the lowest in JLS 9 (2211 kgha^{-1}).

Net monetary returns (NMR) and B:C ratio were significantly higher in intercropping treatments than sole linseed/ chickpea. But intercropping treatments differed non-significantly among themselves. However, Padmini variety gave numerically higher NMR and B:C ratio with chickpea intercrop.

Effect of foliar spray of nutrients on seed yield and economics of sesame

Nutrient management treatment RDF-Soil application + two foliar application of urea @2% at flowering + pod formation had exhibited higher seed yield (1144 kgha^{-1}), NMR (Rs. 35,248 ha^{-1}) and B:C ratio (3.58).

Water Management

In rice the system of rice intensification (SRI) gave maximum seed yield of 44.32 qha^{-1} which was 25.52 % more than the yield (34.11 qha^{-1}) under farmers practice. The net monetary return (Rs. 51147 ha^{-1}), B:C ratio (5.91) and water expense efficiency (105.52) were also higher with SRI.

The coriander gave 1126 kg ha^{-1} seed and 4038 kg ha $^{-1}$ green leaves yield as against 4479 kg ha^{-1} of wheat yield under assured irrigation. The value of net return (Rs. 48,630 ha^{-1}) and B:C ratio (4.0) with coriander were considerably higher as compared to wheat (Rs. 38,548 ha^{-1}).

In potato the maximum and significantly higher tuber yield (238.53 q ha^{-1}) was found under drip irrigation at 0.8 PE. The water use efficiency (698.1 kg ha^{-1}–cm) was found higher under drip irrigation at 0.8 PE. As regards the planting method, the tuber yield (220.91 q ha^{-1}) was higher under ridge method when compared to that under flat bed planting (211.16 q ha^{-1}). The net monetary returns (Rs. 98,192 ha^{-1}) and B:C ratio (2.06) were also higher with drip irrigation at 0.8 PE.

In soybean, the maximum seed yield (1083 kg ha^{-1}) was found under broad bed furrow (180 X 30 cm) planting which was significantly higher over control (963 kg ha^{-1}). Net monetary return (Rs. 7,882 ha^{-1}) and B:C ratio (1.51) was also higher with broad bed furrow (180 X 30 cm) planting as compared to Control (Flat bed) 30 cm spacing NMR Rs. 6,221 ha^{-1} and B.C. ratio 1.47. The WUE 16.12 kg ha^{-1} cm was also highest is this treatment.

In vegetable pea, the maximum and significantly higher green pod yield (34.63 q ha^{-1}) was obtained in irrigation applied at 1.0 IW/CPE ratio. As regards, in phosphorous levels application of 60 kg P_2O_5 ha^{-1} gave higher green pod yield (30.33 q ha^{-1}) as compared to application of 40 kg P_2O_5 ha^{-1}

Demonstration on rice (SRI Method) in ORP

Demonstration on coriander in ORP

Drip irrigation in potato at 0.8 PE

Surface irrigation in potato at 60 mm CPE

(28.66 q ha^{-1}) . The maximum net return of Rs. 25,992 ha^{-1}, B:C ratio 1.99 and WUE 120.9 kg ha^{-1}–cm were found with irrigation applied through sprinkler at 1.0 IW/CPE ratio. Whereas, in phosphorous levels maximum net return (Rs.18,845 ha^{-1}), B:C ratio (1.68) and WUE of (108.4 kg ha^{-1}–cm) were found at phosphorous applied @80 kg P_2O_5 ha^{-1}.

Seed yield of winter maize under irrigation at 0.8 IW/CPE ratio gave maximum and significantly higher seed yield (2909 kg ha^{-1}) as compared to 0.6 IW/CPE ratio and at par with other irrigation treatments. In fertility levels, 100% and 75% RDF gave significantly higher seed yield as compared to 50% RDF alongwith bio-fertilizer. Whereas, water use efficiency was maximum with irrigation applied at 0.6 IW/CPE ratio.

PLANT PROTECTION

Insect Pest Management

Soybean

Solomon (β- cyfluthrin 9% + Imidacloprid 21% - 300 OD (w/v) @ 350 g *a.i.* ha^{-1} and Metaflumizone 22 % SC (Verismo) @ 750 g *a.i.* ha^{-1} were found to be highly effective in reducing the infestation on soybean due to insect pest complex and did not have any phytotoxic effect on the crop.

Application of *Bacillus thuringiensis* var. kurstaki @ 10^{13} spores / ha or *Heterorhabditis indica* – PDBC isolate aqueous formulation @ 2 billion infected juveniles ha^{-1} recorded significantly lowest larvae of Lepidopteran foliage feeders viz. *Chrysodeixis acuta* and *Spodoptera litura* and registered highest soybean grain yield.

Pigeonpea

Early maturing entries AL-1735, H-2000-47, AL-201, AL-1495 and H-2000-37 were least preferred by pod fly, *gram pod borer, pigeonpea plume moth*, pod bug and physiological disorder, whereas UPAS-120 was found to be promising as it recorded maximum grain yield of 1626 kg ha^{-1}.

Medium maturing entries WRG-119, RVSA-28, Guliyal local red and RVSA-59 were least preferred by gram pod borer, pigeonpea

Sprinkler irrgation. in vegetable pea at 1.0 PE

Response of vegetable pea to phosphorous level (60 kg ha^{-1})

plume moth, pod bug and physiological disorder, respectively. Genotype WRG-65 was least preferred by pod fly and was found to be promising as it recorded maximum grain yield of 1766 Kg / ha.

Treatment Spinosad 45% SC @ 73 g a.i. ha^{-1} , Emamectin benzoate 5% SG and Proclaim 5% SG @ 9 g a.i. ha^{-1} recorded minimum grain damage by pod infesting insect pest complex (*viz.* pod fly, gram pod borer, pod bug and pigeonpea plume moth, respectively) and also recorded maximum grain yield.

Treatment Acetamiprid 20SP @ 20 g a.i. ha^{-1} recorded minimum grain damage by pod fly and pod bug, respectively) and also recorded maximum grain yield.

Chemicals proved their superiority in controlling pod pest complex in comparison to microbials [*Beauveria bassiana viz.* DOR (Directorate of Oilseeds) SC formulation (@ 250 and 300 mg L^{-1}), Commercial *B. bassiana* WP (@ 1.0 and 1.5 $kgha^{-1}$) and *Bacillus thuringiensis* DOR Bt (@ 1.5 kg ha^{-1})] and botanical (Neem Seed Kernel Extract @ 5% (w/v)).

First appearance of the *H. armigera* larvae were observed on 20th November, 2010 and it remained active throughout the cropping season and was available upto 7th March 2011. The larval populations attained two distinct peaks (48th and 1st SW). Correlation studies revealed that rainfall, evaporation and morning vapour pressure exhibited significant positive while morning relative humidity exhibited significant negative influence on *H. armigera* larval population, respectively.

Four pheromone traps were installed in the pigeonpea fields. The pheromone trap catches revealed that the pest was active throughout the period of study and maximum catches were recorded during 50th and 9th SW, respectively. Correlation studies revealed that the weather factors included in the study did not exhibit any significant effect on the pheromone trap male moth catches.

Chickpea

Chemicals proved their superiority in controlling gram pod borer, *H. armigera* on chickpea in comparison to microbial HaNPV and did not have any phytotoxic effect on the crop.

Evaluation of newer chemicals and botanicals against the incidence of major insect pests of sesame.

Incidence of insect pests may be managed with foliar spray of profenophos 50EC @800 ml ha^{-1} followed by triazophos 40EC @1000 ml ha^{-1} and lambda Cyhalothrin 5EC @500 ml ha^{-1} with higher net profit. However, C:B ratio was maximum in NSKE 5% treated plots.

Sesame

Incidence of insect pests of sesame may be managed with seed treatment of chlorpyrifos 20 EC @5ml kg^{-1} seed + foliar spray of Profesnofos 50EC@2ml/l or NSKE 5% along with higher grain yield, net profit and C:B ratio.

Seasonal incidence of major insect pests of sesame in relation to biotic and abiotic factors

Incidence of *Antigastra* was negatively correlated with rainfall. Due to continued precipitation pest could not establish it self at early crop stage (30-32 SMW). But, on account of low rainfall during 33 SMW incidence started but could not increase due to high rainfall in subsequent weeks (34&36SMW). It was higher in 37 SMW (0.16 larvae per plant) due to very low rainfall (7.0mm) and decreased with comparatively high rainfall (70mm) in 38th SMW and thereafter crop reached to maturity.

Sugarcane

The Co Snk 05103 and Co 06022 (for ESB, Pyrilla & Mealy Bug), Co Snk 03632 and Co 05071 (for Pyrilla & Scale insect) of early group while Co VC 05061 (for ESB & Scale insect) exhibited multiple resistance. Although, Co Snk 05105, of mid late group, susceptible for ESB; but, for pyrilla, scale insect and mealy

bug it show multiple resistance. In early group, multiple-susceptibility exhibited in Co Snk 03754 and Co 403 (for ESB & Scale insect), Co M 0326 and Co 05082 (for Pyrilla & Scale insect); while, in mid late group Co 409 showed multiple resistance for pyrilla & Scale insect.

During the Survey, the early shoot borer and pyrilla recorded as key pests, while, scale insect, mealy bug and white fly as minor insect pests of sugarcane in the area. No bio-agent found parasitizing early shoot borer, while, nymphal cum adult parasitoid, *Epiricania melanoleuca* and egg parasitoid, *Tetrastichus pyrillae* working effectively against pyrilla. Early planted sugarcane infested comparatively less (7 to 11 %) as compared to late planted sugarcane crop (10 to 25 %) by early shoot borer. During the rainy season, 11-22 individuals of Pyrilla per leaf recorded.

In the Monitoring of insect pests, it is observed that in Co 86032 infestation of early shoot borer initiated from last week of February, reached to peak at 2nd week of May and continued up to last week of June. In the season, cumulative infestation recorded of 17.20 per cent. In 2nd phase, Pyrilla infestation observed from second last week of July and continued up to 4th week of September. Peak activity of Pyrilla (15.33 individuals/ leaf) and *Tetrastichus* (76.52 %) recorded at 35th SMW. while after a week *E. malanoleuca* also observed peak activity (24.73 live cocoons/ leaf).

In pheromone traps, capturing of the moth (ESB) start 2nd week of March, reached to peak at 21st SMW (0.48 moth/trap/day). The moths captured till the 25th SMW week (0.05 moth/ day/ trap).

Disease Management

Efficacy of available commercial formulations of bioagents and chemicals against seed and seedling diseases of soybean.

Effect on seed germination (emergence) Maximum seed emergence (80.0%) was recorded in seeds treated with chemical fungicides (Thiram + carbendazim) (0.15% each) as compared to untreated control (65.0%). Among the bio pesticides treatment with *Trichoderma viride* resulted in maximum emergence (82.0%) followed by *Trichoderma harzianum* (81.0%).Seed treatment with bacterial bioagents did influence the germination and resulted in lower emergence as compared to chemical (Thiram + carbendazim 0.15% each) and other bioagents (*Trichoderma viride*, *Trichoderma harzianum*).

Effect on seed and seedling pathogens Upon confirmation from the rotted seeds, association of *Macrophomina phaseolina, Fusarium oxysporum* and Aspergillus *flavus, Aspergillus niger* was noticed Seedling rot (post emergence) due to *Macrophomina phaseolina, Fusarium oxysporum* was noticed.

Sugarcane

In early group 5 genotypes viz., CoM 5082, Co. 0403, CoM 0326, CoN 3131 and CoSnk 3754 exhibited resistant reaction to smut disease whereas in mid late group 6 genotypes viz. CoSNK 05105, CoVSI 05121, Co 5007, CoVSI 05123, CoSnk 3822 and MS 0301were found to be resistant to smut disease under artificial condition.

During survey Sehore, Guna, Khargone, Hoshangabad, Narsinghpur Gadarwada, Devas, Burhanpur, Bankhedi, Betul and Gwalior places were undertaken. During survey, smut was noticed at all places which ranged from 8 -15 per cent and found mainly on varieties Co 419, Co 1305, Co 1307, Co 6507, Co 7219, Co 7318 and Co 86032 . However, incidence of wilt disease was found to be very low and ranged from 2.33 – 4.66 percent and noticed at Sehore, Devas, Indore and Burhanpur area. Its incidence was confined mainly on varieties Co C 671, Co 1307, Co 1305 and Co Lk 8001. In addition to these diseases mosaic, GSD, and red rot were found in traces only at few places. But YLSD is now appearing on several varieties and

ranged from 5 - 10 percent.

HORTICULTURE

Germplasm collection: Collected 56 lines of garlic from different parts and regions of Madhya Pradesh during 2009, amongst them the highest marketable yield (7.61 tha^{-1}), lowest thrips population (3.82 thrips $plant^{-1}$) and minimum disease intensity and incidence (6.38 and 3.08 %) was recorded in JAC- 27 line.

Botanicals and Bio-pesticides against thrips :Based on two years results (2009-10 and 2010-11), the lowest thrips population (05.27 thrips $plant^{-1}$) was observed in foliar application of Profenofos @ 1ml l^{-1} (Chemical check) followed by Neem crude oil @ 4% (18.54thrips/plant) with highest marketable yield (32.27 and 29.42 tha^{-1}). Hence, may be recommended for Kymore plateau and Satpura hills region.

Weed management

The application of Oxyfluorfen 23.5 % EC @ 1.5-2.0 ml/L before transplanting and application of Quizalofop Ethyl 5 % EC @ 3.0 ml/L at 30 days after transplanting during 2009-10 and 2010-11 resulted highest weed control efficiency with maximum marketable yield (29.89 tonnes/ha) and cost benefit ratio (1:2.30).

Population Dynamics of Onion thrips

Amongst the 16 planting dates during 2009-10 and 2010-11, the highest thrips population (78.03 thrips/plant) was observed in 09th standard week i.e. 26th Feb to 04 Mar. followed by 08th standard week i.e. 19th to 25th Feb. (75.30 thrips/plant) and 05th standard week i.e. 29th Jan. to 04 Feb. (74.36 thrips/plant) respectively. Whereas, Lowest population (0.13 thrips/plant) was found in 50th standard week i.e. 10th to 16th Dec. followed by 45th standard week i.e. 05th to 11th Nov. (0.90 thrips/plant.

FORESTRY

MPTS

- In provenance trial of babul, (*Acacia nilotica*) at the age of 9 month Firojpur provenance recorded significantly higher plant height (77.97 cm) and collar diameter (10.79 mm) Bilaspur provenance recorded significantly higher number of branches (20.89) per plant.
- In provenance trial of Shisham (*Dalbergia sissoo*) at the age of 6 months. Provenance T6 (PT6) and T7 (PT2) received from Jhansi recorded significantly higher plant height (57.93 and 57.20 cm) and collar diameter (4.71 and 4.99 mm) as compared to other provenances.

Agroforestry Management

- Under 12 year old agrisilviculture system (*Dalbergia sissoo*+ paddy) Significantly higher grain yield of paddy was recorded in open condition (39.86 q ha^{-1}) where as no pruning recorded the lowest grain yield (15.06 q ha^{-1}).
- 75% pruning recorded significantly higher grain yield (32.50 qha^{-1}) followed by 50% pruning (27.16 q ha^{-1}) and 25% pruning (20.97 q ha^{-1}).
- Paddy variety V2, i.e. MR-219 recorded significantly higher grain yield (29.37 q ha^{-1}) than variety IR- 36 (26.88 q ha^{-1}) and Variety GWL- 32100 (24.08 q ha^{-1}).
- Paddy + sissoo in 50% pruning is more profitable (Rs. 32,874 ha^{-1}) as compared to 25% pruning (Rs. 30,900 ha^{-1}) and 75% pruning's (Rs. 30,728 ha^{-1}).
- In 13 years old agrihorticulture system (Guava + Mustard), Open condition recorded significantly higher grain yield of mustard (632.73 kg ha^{-1}). pruning (deheading) at 1.0m height recorded significantly higher yield (544.21 kg ha^{-1})
- Under hortimedicinal system (fruit trees

+turmeric) Significantly higher fresh yield of turmeric was recorded under open condition (85.68 qha^{-1}) and was significantly superior to yield recorded with bel (80.87 q ha^{-1}) and Aonla (78.87 q ha^{-1}) Ridge bed method of sowing recorded significantly higher fresh yield of turmeric (83.25 q ha^{-1}) as compared to flate bed (80.31 q ha^{-1}).

- Bel+ Turmeric(Rs. 67,500 ha^{-1}) recorded higher monetary returns than Aonla+ Turmeric (Rs. 54,625 ha^{-1}).
- Ridge bed method of sowing was more profitable and gave higher monetary returns (Rs. 58,426 ha^{-1}) as compared to flate bed method of sowing (Rs. 54,116 ha^{-1}).
- Under Agrisilviculture system (*Dalbergia sissoo+late sown* wheat). Significantly higher grain yield of wheat crop was recorded in open condition (1892 kg ha^{-1})
- Among different pruning intensities, 75% pruning recorded significantly higher grain yield (1700 kg ha^{-1}) as compare to other pruning intensities.
- Wheat variety GW-273 recorded significantly higher grain yield (1778 kg ha^{-1}) closely followed by MP-3020 (1617 kg ha^{-1}) but superior to variety GW-266.
- Agrisilviculture system gave significantly higher monetary returns (Rs. 29003 ha^{-1}) as compared to growing of crop alone (Rs. 15126 ha^{-1}) and tree alone (Rs. 14,531 ha^{-1}).
- Under Agrisilviculture system (*Dalbergia sissoo+normal sown* wheat) Open condition recorded significantly higher grain yield (1949 kg ha^{-1}). Among different pruning intensities, 75% pruning recorded significantly higher grain yield (1751 kg ha^{-1}) at par with 50% pruning but significantly superior to 25% pruning and no pruning).
- Among different Wheat varieties, MP 3173 recorded significantly higher grain yield (1720 kg ha^{-1}).
- Managed Agrisilviculture system wheat + D. sissoo in 25% pruning gave higher monetary return (Rs. 29,175 ha^{-1}) as compared to other pruning treatments but significantly higher to tree alone (Rs. 14531 ha^{-1}) and crop alone (Rs. 15126 ha^{-1}).

FOOD SCIENCE

- For diabetic persons sugar free aonla candy could be developed with 10% aspartame with good acceptability.
- The shelf-life of guava fruits could be enhanced for 10-15 days through coating of fruits with alove vera gel.
- The acceptable flavored tofu could be made with 3 % cumin/ajowan and 4 % lemongrass.
- Fibre rich pizza base could be developed from wheat flour 70gm, sugar 3 gm, fat 5 gm, salt 2 gm, water 25 ml with 30 % fenugreek leaves/carrot shreds.
- The good quality sugar free biscuits could be prepared using sucralose 2.5gm, fat 14gm, and baking powder 0.65gm.
- The low cost supplementary food for children could be developed from roasted wheat flour and roasted soy flour (80:20) along with 10 % skimmed milk powder. The product named as *panjiri which* was good in nutritional as well as sensory qualities.
- The utilization of microbial pigments could be safely used without any adverse effect in fruit jam and tutty fruity.
- The nutritious *atta* could be developed from wheat flour and processed soy flour (90:10) at commercial and/or home scale level. The product has a great potential in solving malnutrition problem of the society.
- Dried *mahua* flower being a excellent source of many nutrient could be utilized in the formulation and development of *mahua* toffee with moderate acceptability.

BIOTECHNOLOGY

Molecular Diversity analysis among *Macrophomina phaseolina* (Tassi) Goid isolates causing Charcoal Rot of Soybean: The genomic DNA of 21 isolates of *M. phaseolina* isolated from fresh mycelium of fungus was grown in Richard's solution and subjected to amplification with RAPD and ISSR markers for diversity analysis. Randomly selected 17 decamer primer amplified 134 RAPD marker loci. Out of these 134 bands, 73 bands (54.47%) were polymorphic. Average number of bands per primer was 7.88±0.47, while average number of polymorphic bands per primer was 4.29± 068.47. Twenty four ISSR primers amplified 187 ISSR markers loci. Out of these 187 loci, 50 loci were found polymorphic (26.73%) across all the *Macrophomina phaseolina* isolates. Percentage polymorphism ranged from 0 to high as 87.5 (primer 888). Average number of total bands per primer was (7.79±0.41), while average number of polymorphic bands per primer was 2.08±0.39. The analysis of molecular variation (AMOVA) revealed apparent differences in partitioning of variation within and among isolates. Both the marker systems showed greater variance within *M. phaseolina* isolates than among regions. RAPD (91%) produced more variation between the isolates as compared to ISSR (75%).

Studies on *in vitro* morphogenesis of chickpea: For the *in vitro* regeneration studies in chickpea from different explants, immature cotyledonary nodes and embryonic axis were cultured on MS medium supplemented with different concentration and combination of auxins and cytokinins. Somatic embryogenesis in chickpea has been studied by culturing explants on MS medium supplemented with BAP (0.1-4.0 $mg.l^{-1}$) in combination with NAA (1.0-10 $mg.l^{-1}$) and 2, 4-D (5-10 $mg.l^{-1}$). After 28 days of culture, the calli were transferred into embryonic callus formation medium. The pH of the entire medium was adjusted to 5.8 prior to autoclaving. All cultures were incubated at 25±2 ^{0}C under PAR light and a 12/12 hrs light dark photoperiod. Based on results obtained from different explants, immature embryonic axis of chickpea were preferred over other explants. Shoot differentiation via callusing takes place when basal medium is without 2,4-D, whereas direct shoot differentiation occurs on basal medium supplemented with different concentration and combination of BAP with NAA. Two factors, which affected the embryogenesis frequency of chickpea, are genotype interaction X culture media and type of explants.

Molecular basis of cytoplasmic male sterility in wheat: Ten SSR markers *viz*. *Xwmc48, Xcfd84, Xwmc89, Xwmc818, Xwmc182, Xwmc285, and Xwmc33, Xwmc617, Xwmcc457, and Xcfd23* were analyzed for confirming that, male sterility is controlled by a single dominant *Ms*2 gene in five wheat hybrids and their five male sterile parental lines. SSR markers were found to be linked with *Ms*2 gene and located on chromosome arm 4DS. The male sterility gene was also linked to *Rht-d*1*c* gene which is responsible for dwarfness in common wheat. Consequently, all the male sterile parental lines used were dwarf. Restorer of fertility (*Rf*) genes in the nucleus function to suppress the CMS phenotype, nuclear restoration allows commercial exploitation of the CMS system for the production of high-yielding and heterotic seeds. Among five maintainer parental lines and their hybrids, DNA templates of only three maintainer namely JWB4, JWB5 and JWB10 and their three hybrids namely JWH4, JWH5 and JWH10 were amplified with five SSR markers viz. *Xbarc273*, *Xgwm153, Xgwm18, Xgwm264 and Xgwm11* to exhibit the *Rf*1 fertility restoration gene. DNA templates of remaining two maintainer parental lines JWB1 and JWB8 and their hybrids JWH1 and JWH8 amplified with all the five applied SSR markers namely Xbarc61, Xgwm268, Xgwm582, Xbarc207 and Xgwm131 corresponding to *Rf*3 gene. *Rf*1 and *Rf*3 genes control fertility in maintainer and hybrid lines and situated on chromosome 1B.

Cloning and sequencing of bacterial phytase gene: Two strains of *Bacillus subtilis* NCDC-070 and NCIM-2712 were chosen for cloning and sequencing of *phy* gene. From overnight cultivation of *Bacillus* strains in nutrient broth medium at 37^{0}C genomic DNA was isolated. The *phy* gene specific Primers were designed with known published sequence Acc. No. AF298179 of *B. subtilis*. On PCR amplification of *phy* gene, 1059 bp size was amplified in both strains. The *phy* gene of *B. subtilis* NCDC-070 and NCIM-2712 was cloned into InsT/A cloning vector and the positive clones were confirmed through colony PCR with gene specific primers and restriction digestion. Cloned *phy* gene of *B. subtilis* strains were further sequenced. The *phy* gene sequences revealed an ORF of 928 bp coding for 309 aa and 826 bp coding for 275 aa for *Bacillus* strains NCIM-2712 and NCDC-070 respectively. The sequences were compared with reference sequence it showed 6 nucleotide and 3 amino acids variations. The *phy* gene of *B. subtilis* NCIM-2712 had 99% similarity with NCDC-070 at nucleotide level as well as at amino acid level.

Production of bioethanol from waste potatoes: The findings indicated that with the application of SSF method, maximum bioethanol yield (13.45 g/100 ml medium) was obtained at incubation temperature of 30° C after 120 hr of incubation period using yeast whereas it was found to be 14.17 g/100 ml of medium at a incubation temperature of 35° C with 120 hr of incubation period using bacteria. With regard to simultaneous saccharification and fermentation (SiSF) method, maximum yield (13.85 g/100 ml medium) of bioethanol using yeast was recorded at a pH of 5.0, incubation temperature of 30° C and incubation period of 120 hr whereas it was recorded the highest (14.36 g/100 ml medium) at a pH of 5.5 with incubation temperature of 35° C and incubation period of 120 hr. The findings also indicated that SiSF method of fermentation was found to be relatively better than that of SSF method for achieving maximum recovery and better quality of bioethanol.

Cloning and sequencing of *phy* gene from *Pseudomonas syringae:* Genomic DNA was isolated from *Pseudomonas* syringae MTCC-2730 strain. Primers were designed from known published sequence of *Pseudomonas syringae* MOK1 (AY156083) to amplify *phy* gene in the strain under investigation. Approximate 470 bp amplicon generated by PCR was successfully cloned in InsTA (pTZ57R/T) cloning vector and sequenced. The sequence of 463 bp *phy* gene fragment was obtained that showed sequence similarity of 29.2% with the *P. syringae* MOK1 (reference sequence). In the obtained sequence, primer regions were found to be conserved among *P. syringae* MTCC-2730 and the reference sequence.

Studies on sonicated assisted *Agrobacterium*-mediated transformation in soybean (*Glycine max* L. Merrill): To obtain sterile plant material, seeds of two cultivars, JS 335 and JS 93-05 of soybean were planted in greenhouse and immature pod were collected as plant material. Pods were surface sterilized and cotyledonary nodes and embryonic axis were excised from immature seeds and used for in vitro regeneration and transformation studies. MS basal medium fortified with 4mg/l each of BAP and NAA (MS4B4N) was found the best medium for callus induction and somatic embryogenesis in soybean genotypes used in the study. Cotyledonary node and embryonic axis explants were transformed with 1:20 dilution cultures of two strains of *Agrobacterium tumefaciens* (EHA105 and GV3101) carrying two different binary vectors, with sonication in a range of duration of 1 to 30s. Thereafter, sonicated explants were co-cultivated on solid co-cultivation medium in dark. After four days of co-cultivation, explants treated with GV3101 were subjected to GUS histochemical assay to test the efficiency of sonication on transformation. It was found that sonication for duration of 2s showed highest transient GUS expression. The co-cultivated explants were further cultured on shoot induction medium and shoot elongation medium containing 25mg l^{-1} hygromycin and

75mg l^{-1} of kanamycin for the selection of putative transformants as per the selectable marker gene present in binary vector for selection. After two weeks of culture, four shoots each were randomly selected as putative transformants and rest of the surviving shoots were transferred to rooting medium for plant regeneration. The putative transformants selected on antibiotic containing medium were analysed at molecular level through PCR analysis with gene specific primers. The PCR products were evidenced with positive with control and also with predicted fragment sizes, through Primer-BLAST (NCBI). The putative transformants selected as hygromycin resistant were molecularly analyzed with gene specific primers for *hpt* gene. All the putative transformants were supported by PCR analysis giving band size of 499bp as in positive control (PCR with single colony of *Agrobacterium tumefaciens* GV3101) and also with predicted product length through Primer-BLAST (NCBI). The PCR analysis with repV and repC primers was validated through colony PCR of A. *Tumefaciens* containing pBinAR-antisense Rep which amplified a 566bp long sequence of viral *rep* gene. The same size band was obtained in positive control and four samples of putative transformants. All the transformants obtained from transformations with both the strains of *Agrobacterium* were also analyzed with primer set of CaMV35S promoter and an amplified fragment of about 195bp was obtained in all the putative transformants along with positive control. All the putative transformants selected as antibiotic resistant were found positive in molecular analysis indicating towards the success of the present investigation.

Polymorphism studies of markers linked for Fusarium wilt resistance in ckickpea germplasm: A total of 15 SSR (microsatellite) markers present on linkage group 2 were chosen on the basis of the linkage to fusarium wilt resistance loci. All the markers used for screening were found polymorphic. Out of 15 SSR primers, 13 had tri-nucleotide, while 2 had di-nucleotide repeat motifs. 15 SSR primers amplified 87 SSR alleles. Maximum number of allele i.e. 8 was scored by primer TA194. Average number of bands per primer was 5.8±0.35. Specific bands were amplified by 10 primer sets which separated specific chickpea cultivars from remaining cultivars. The range of PIC scores of SSRs markers ranged between 0.62537 to 0.832034. Major allele frequency for 61 chickpea genotypes ranged from 0.2459 to 0.5574 with an average of 0.4092. A very low level of heterozygosity (%) was detected in the investigated material i.e. 0.00% to 0.0328%, with an average of 0.68%. There is significant correlation between gene diversity and polymorphic information content (PIC) value. Although, no association was observed for allele size range with PIC value and gene diversity. Similarly, no correlation was observed between number of alleles and PIC value. None of the markers found that discriminate the resistant and susceptible cultivars. A very little genetic variability (26%) was observed for the fusarium wilt loci. Dendrogram were generated for molecular genetic distance using 'UPGMA' subprogram of 'NTSYS-pc'. All the genotypes were clustered in three major groups. All the groups having both susceptible and resistant genotypes.

Polymorphism studies of markers linked for Ascochyta blight resistance in ckickpea germplasm: A total of 19 SSR (microsatellite) markers present on linkage group 4 were chosen on the basis of the published microsatellite primers from chickpea genome linked to Ascochyta blight resistance loci. These primers sets amplified total 69 loci with an average 3.63± 0.82. Out of these 19 markers, 14 markers found polymorphic and 5 were found monomorphic. Maximum numbers of band i.e. 7 were scored by primer set TS 54 and TA 2. Eleven markers amplified specific alleles. The primers STMS 28, STMS 11, GA 24, GAA 47, TA 2, TA 130 ,TA 72 and ICCM 0065a scored 1 unique allele each whereas 3 specific allele is scored by primers GA2 and TR 20, Marker ICCM 0249

amplified 4 unique alleles . The average percentage of the high frequency alleles was 72.19. It ranged from 27.59 (ICCM0065a) to 94.83% (GAA-47). GA2 and GAA-47 produced the maximum number of alleles and they had the minimum frequency of a common allele, with 93.97 and 94.83%, respectively. The average gene diversity was less i.e. 3.59 ±0.076% with a range 0.00 to 0.808. The highest gene diversity was recorded for marker TS-54. There is significant correlation between number of allele per locus and polymorphic information content (PIC) (r=0.894 p > 0.001), gene diversity (r=0.888 p> 0.001), heterozygosity (r=0.535 p>0.01). Similarly PIC value had the significant association with gene diversity (r=0.999 P>0.001), heterozygosity (r=0.457 p > 0.05). But there was no correlation between the heterozygosity and gene diversity(r=0.440). The size range of the alleles had the significant correlation with no of alleles (r= 0.936 p. 0.001), heterozygosity (r=0.640 p > 0.001) and gene diversity (r=0.839 p > 0.001). The genetic dissimilarity SSR markers ranged from 3% to 37%.This indicate a very low to high genome diversity for Ascochyta resistance controlling loci.

Production of microbial pigments using *Monascus ruber:* Among all the carbon and nitrogen sources in the study, the combination of RG : CSOC (Rice grits : Cotton seed oil cake) resulted in the highest total yield of microbial pigments in both SSF and SmF methods. Using the method of solid state fermentation (SSF), highest yield of microbial pigments was obtained at initial moisture level of 60%, temperature of 30ºC, inoculum size of 1.5 x 10^6 (spores/ml) and incubation period of 12 days with the combination of RG : CSOC as substrate in 2:1 ratio. In submerged fermentation (SmF) also, highest total yield of pigments was recorded using carbon and nitrogen sources (RG: CSOC) in 2:1 ratio by maintaining the optimum conditions of fermentation variables such as pH of 6.0, temperature of 30ºC, inoculum size of 1.5 x 10^6 (spores/ml) and incubation period of 7 days. The pattern of thin layer chromatography (TLC) indicated that the extracted pigment contained three major components in the extracts obtained from both the methods of fermentation.

Studies on *Agrobacterium tumifaciens*–mediated genetic transformation in tobacco: The tobacco leaf discs were transformed in two different growth regulator combinations of cocultivation medium for different cocultivation duration. There was no significant difference of cocultivation medium found on transformation frequency but there was effect found on regeneration of cocultivated leaf discs. Cocultivation period of 10 min was sufficient to obtain transformed plants with highest transformation efficiency of approximately 10%. Molecular analysis of putative transformants was carried out through PCR with gene specific primers for CaMV35S promoter, *hpt* gene and viral replication initiation protein (Rep) gene and evidenced with a negative control (nontransformed tobacco DNA) and positive control (a single colony of both strains of *Agrobacterium*). Molecular analysis clearly indicated the integration of the transgenes to the tobacco host genome. Although, the transformation efficiency was less i.e. approximately 10% but this could serve as a sound basis to prove the success of genetic transformation of tobacco in the present investigation.

AGRICULTURAL ENGINEERING

Ground water assessment in alluvial areas of Narmada river basin

- Ground water assessment study was conducted in Upper Narmada Basin, comprises of five revenue districts namely Mandla, Dindori, Jabalpur, Narsinghpur and Hoshangabad.
- Based on the existing method of ground water computation namely water level fluctuation method proposed by GEC 1997 the ground water recharge during monsoon computed to be 56525, 59843,

75431 and 79743 ha-m for Dindori+Mandla, Jabalpur, Narsinghpur and Hoshangabad districts respectively

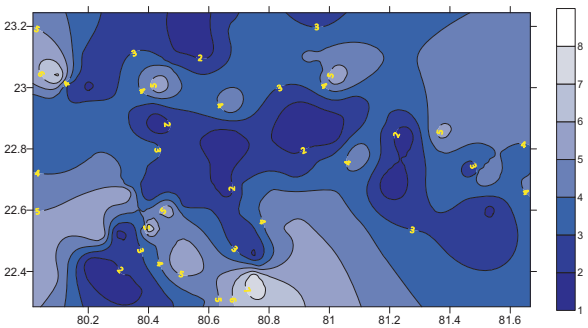
- While going through the entire process of ground water recharge estimation it was observed that firstly, the unit of assessment should be a hydrological unit instead of a block which is presently being taken, secondly, the specific yield value should be derived from a iso-specific yield map as against discrete values being in use presently, thirdly, the frequency of observation wells should be representative of the underground strata i.e. more wells should be there in more heterogeneous area.,
- A GIS based method is used to compute ground water recharge. The values for ground water recharge were computed as 94570, 116405,108163, 130849 ha m for Dindori + Mandla, Jabalpur + Katni, Narsinghpur and Hoshangabad districts respectively.

Management of canal command – a conjunctive use approach

- In order to evaluate the irrigation system physical, financial, maintenance and sustainability parameters were computed for Jhansi, Jamuniya, Pipariya and Dulhakheda minor commands during the year 2009-10. It was found that Jhansi minor command area has very poor performance and therefore the study was concentrated this year on Jhansi minor. An intensive water balance study was carried out on this command.
- Water availability through minor canal into the command area was 41.21 ha-m and from tube well 5.50 ha-m, inflow in the form of rainfall 3.91 ha-m, seepage from minor 36.94 ha-m and irrigation from minor 40 ha-m respectively. The outflow for monsoon and non monsoon period in the form of evapotranspiration from cultivated land was 63.4, 56.22 ha-m and evaporation from uncultivated land 0 ha-m, surface runoff 137.77, 0 ha-m, ground water draft 0.50, 5.50 ha-m, change in soil moisture storage 39.93, 39.93 ha-m and subsurface flow 0 ha-m respectively.
- For the year 2009, monsoon and non-monsoon period inflow in the form of rainfall 293.28 ha-m, 28.16 ha-m, seepage from minor 0 and 38 ha-m and irrigation from minor 0 and 41.21 ha-m respectively. The outflow for monsoon and non-monsoon period in the form of evapotranspiration from cultivated land was 73.98, 58.72 ha-m and evaporation from uncultivated land 0 ha-m, surface runoff 127.57, 0 ha-m, ground water draft 0.50, 5.50 ha-m, change in soil moisture storage 39.93, 39.93 ha-m and subsurface flow 0 ha-m respectively.
- The average ground water recharge due to the rains in the command area computed to be 45.44 and 51 ha-m for the year 2008, 2009 monsoon period and 3.22 ha-m for the year 2009 non-monsoon period and the depletion from ground water reserve was -28.03 ha-m during year 2009 non-monsoon period.

Planning of conjunctive use of surface and ground water in various canal commands

- Three blocks of the district Jabalpur were irrigated by the L.B.C. of RABS project viz. Bargi, Shahapura and Patan. Out of designed potential command area was 51376 ha, the actual irrigated area was 8399 ha. Reasons for the gap were seepage from canals, rising water table poor or almost nil water courses, and no functioning of WUAs. In order to control water logging strategy of implementation



Water Level Fluctuation Contours of Mandla District

of Conjunctive Use of surface and ground water in high water table areas was planned.

Enrichment of ground water bank through Haveli recharge

- Laboratory experiment was conducted for evaluation of a suitable filter with combination of different size of gravel, sand and coir. As water passing rate is most affected by the depth of sand bed, therefore, three different depths were tried. A fixed depth of coir (10cm) was taken between sand and pea gravel.
- In all the water filters with coir pad as part of water filter had lower water passing rate i.e. 15.25 lph than water filters without coir pad which had water passing rate as 16.94 lph .
- The study of water passing rate under various mud concentration(8,10,12,14 and 16 mg/l) levels indicated that all mud concentration levels differ significantly among themselves, the water passing rate decreased as mud concentration level increased.
- In all water filters with coir pad as part of water filter had lower value of turbidity i.e. 22.33 NTU than water filters without coir pad which had turbidity as 32.26 NTU.
- In case of long duration (24 hrs) experiment, water filter with 10 cm sand depth exhibited significantly higher water pass rate (12.35 lph) and water filter with coir pad and 30 cm sand thickness had significantly lower (9.97 lph) water pass rate than rest of the water filters.

Studies on ground water pollution

- A survey was conduced to assess the surface water quality in Narsinghpur and Jabalpur district of Madhya Pradesh. Water sample were collected from Singledeep, Mahjholi, Indrana, mahjoli Road, Pipariya, Singode, Sihoda and Sukha villages of Narsingpur and Jabalpur district during September.
- There is a large variation of pH (8.42 to 10.75), EC (51.0 to 208.0 µs/cm), Iron content (0.11 to 8.10 mg/l), Copper content (0.19 to 2.71 mg/l), Fluoride (0.05 to 7.52 mg/l) and dissolved oxygen (0.1 to 0.9 measured for water samples at different location
- The water samples collected from the villages Majhouli Road , Majhauli, Singod and Sihoda shows pH above permissible limits hence should not be injected directly to the ground water.Rest of the samples are in permissible limits and hence may be used for direct recharge
- For recharge from haveli fields it is proposed that the first runoff should be drained off or stored in the field. After words the stored water after 10 cm depth may be utilized for direct injection to ground water aquifer

Agricultural thematic mapping on GIS platform

- Up gradation of Agricultural attribute maps (24 nos.) of Sindh basin.
- Conversion of land use land cover map of Sindh Basin (2.75 M ha) from raster to vector and finally in shape file format as per desired by PICU.
- Crop classification of crop map as per the ground truth made at different training sites (Katani, Vijayraghogarh and Maihar Block). Training sites cover 74882.84 ha.
- Filtering and cleaning of land use land cover map of Tons basin (1.24 M ha) as the requirement of PICU, which was submitted earlier in January 2010.

Farm Power Machinery Management

Feasibility evaluation of 8-row self-propelled rice transplanter

Machine working width, cm	23.8
Number of hills / m^{-2}	42 and 48
Area covered	8 ha
Maximum Planting speed	
Low	1.3
High	1.8

Farmers opinion

- Nursery raising is some what difficult for common farmer.
- The machine is very costly and beyond the reach of common farmers.
- Leveled and very good field preparation is essential.
- The machine looks very good and easy to operate told by 88% of farmer.
- Work well in light soils.

Feasibility testing of tractor operated Roto Till Drilln

Total area covered, ha	= 56 ha
Effective Field capacity, ha/h	= 0.31- 0.35
Field efficiency,%	= 67-84
Fuel saving %	= 50-60
Time saving	= 60-70

Roto till drills are used for field preparation and sowing in a single operation. Rotor attachment can also be used for puddling purposes

Farmers opinion

- The machine is quite heavy an need 45 to 50 hp tractors where as farmers generally have 35 hp tractors

Feasibility evaluation of CIAE tractor mounted pneumatic planter

Number of rows : Two to six

- Seed metering: Pneumatic disc, suction principle
- Suitability for crop : Mustard, Sorghum, Soybean, Pigeon pea, Sorghum, Maize and Groundnut etc.
- No. of teeth on sprocket of ground wheel : 19, 14
- No. of teeth on sprocket of Drive shaft : 14, 19
- No. of teeth according to sprocket on gang: 29, 26, 22,19,14,13
- No. of teeth on sprocket of Seed metering disc : 19
- Average diameter of ground wheel, cm : 42
- Area covered: 16.4 ha
- Field capacity ha/hr : 0.48 to 0.5
- Field efficiency % : 70 to 72
- Speed of travel km/hr : 2.5 to 2.8
- Depth of sowing: 2.5 to 3.5 cm

Farmers opinion

- The fertilizer application mechanism is not provided in the machine
- Some times proper suction pressure do not develop in the seed metering unit because of leakages therefore seed metering is not proper.

Feasibility evaluation of tractor operated Aero blast Sprayer

Area covered	: 22 ha
Swatch width	: 17 to 20 m
Tank capacity	: 400 lit
Field capacity ha/hr	: 1.5 to 2.6
Speed of operation km/hr	: 1.52 to 1.76
Suitability of machine for	: Tall field crops, fruit trees & forest trees

Farmers opinion

- The farmers are satisfied with the performance of the machine.
- The main breakdown were observed in cross, pulley and belt.
- The cost of machine of high.
- Weight of machine is higher and some time front end of tractor lift.

Prototype feasibility of tractor operated laser guided land leveler

- Laser system, witch includes laser transmitter, laser receiver, laser eye receiver, control box and mast.
- Hydraulic system, consisting of solenoid valve, pressure relief valve, hydraulic cylinder and hose pipes.
- Drag scraper of 0-6 cubic meter capacity.

Operation of laser guided land leveler in the field

Area covered ha	: 22
Field capacity ha/h	: 0.2 – 0.24

Adaptive research trials for field crop and horticultural crops conducted by research stations of MPWSRP

S.No.	Title of Trial	Location	No. of Farmers
1	Productivity improvement on soybean through life saving irrigation	Heerapur, RARS Sagar	10
2	Effect of improved drainage system (ridge and furrow method) on productivity of soybean	Heerapur, RARS Sagar	10
3	Introduction of paddy (SRI) in Heerapur command area	Heerapur, RARS Sagar	10
4	Effect of staking on yield of hybrid variety of tomato in Hirapur command area	Heerapur, RARS Sagar	10
5	Increase the productivity of okra crops through Hybrid variety	Heerapur, RARS Sagar	3
6	Increase the productivity of wheat through irrigation management in Hirapur command area.	Heerapur, RARS Sagar	5
7	Increase the water productivity in wheat through applying recommended dose of nutrient in Hirapur command area	Heerapur, RARS Sagar	5
8	Increase the productivity of Onion through planting method in Hirapur	Heerapur, RARS Sagar	
9	Productivity improvement of soybean through life saving irrigation.	Gurma Tank/Tons Patulkhi	3
10	Effect of improved drainage (Ridge and furrow local made) on the productivity of soybean.	Gurma Tank/Tons Patulkhi	2
11	Introduction of paddy (SRI) in Tons basin command area	Gurma Tank/Tons Patulkhi	5
12	Diversified cropping system under different farming system	Gurma Tank/Tons Patulkhi	6
13	Productivity improvement of Tomato through Hybrid Varieties	Gurma Tank/Tons Patulkhi	9
14	Productivity improvement of Brinjal through Hybrid Varieties	Gurma Tank/Tons Patulkhi	8
15	Productivity improvement of Chillies through Hybrid Varieties	Gurma Tank/Tons Patulkhi	9
16	Productivity improvement of Wheat Under irrigated cropping systems.	Gurma Tank/Tons Patulkhi	5
17	Enhancing water use efficiency of Chickpea through sprinkler irrigation method	Gurma Tank/Tons Patulkhi	5
18	Productivity improvement of soybean through life saving irrigation.	Betwa basin Chauphala	
19	Short duration varietals trial of sesame in tank command area	Chauphala	10

Feasibility test of T.D. Pneumatic Planter

Speed of operation km/hr : 2 to 3
Field efficiency % : 60 to 65

The standard deviation of reduced levels was observed to very from 0.4 – 0.94 cm in the different subplots as compared to a variation of 4.82 – 10.35cm in unleveled plots. The cost of operation was found to vary from Rs. 3000-4000/ha.

Front Line Demonstration

Demonstration of tractor operated vertical conveyor reaper

Area covered ha : 63
No. of Farmers : 44

Farmers ppinion

Machine is good for harvesting of wheat crop.

Demonstrations of flow through paddy thresher

Duration of operation hr. : 60
Quantity of crop threshed qt. : 400
Threshing capacity qt/hr : 6 to 8

Front Line Demonstration of Horticulture tools

A demonstration view of aero blast sprayer

No of Demonstration : 35

Specifications

The pruning secateurs are known by various names depending upon the shape of blades and are available in various sizes. The size refers to overall length of the secateur.

Size (mm) : 150, 175, 200, 225 and 250
Cutting capacity (dia. mm) : Up to 20

Result

Total area covered by horticultural tools in the year 2010 including 0.37 ha at JNKVV Farm and 0.61 ha at farmers field.

Farmers opinion

Contribution of horticultural and floricultural crops to the total agricultural production in the country is quite significant due to highly favourable and varied agro-ecological diversities. Hand tools such as budding and grafting knife, pruning knife and secateurs can be used for plant propagation and pruning.

A view of nursery raising

A view of roto till drill

A view of Flow through paddy thresher

Pruning Secateurs

Post Harvest Technology

Compilation of status and potential of agro processing industries in Madhya Pradesh.

The project was started in June 2010. The potential areas identified for value addition to agricultural crops in M.P. were surveyed and are listed below:

Thrust areas identified for value addition to agricultural crops in MP.

Production Segment	Name of Crop
Cereals & Pulses	Wheat, Rice, Maize, Millets & Pulses
Fruits	Banana, Mango, Orange, Papaya
Vegetables	Potato, Onion, Peas, Tomato, Brinjal
Oilseeds	Soyabean, Groundnut, Mustard
Medicinal Plants	Gooseberry (Aonla), Aegle Marmelos (Bael), Aloe vera
Spices	Garlic, Coriander, Chillies, Ginger, Fenugreek

Renewable sources of energy for agriculture and agro based Industries

Field evaluation of IDBG cook stove

The Field evaluation of IDBG cook stove with 4 different fuels viz wood, coconut shell, Jatropha shell and pigeon pea stalks revealed efficiency of 28% to 33% at burning rate of 0.9 to 1.4 kg/h and fuel saving of 39 to 48% against the conventional cook stove The users and the personals who witnessed the demonstration were highly impressed with the performance of the stove and the stove is in high demand.

Field evaluation of modified durable single and double pot cook stove

The construction and operation of modified durable single and double pot cook stove were conducted at village Hathana, block Panagar. The female beneficiaries liked the

Field evaluation of modified durable single and double pot cook stove

construction technique and smokeless operation of the stoves. The thermal efficiency of the cook stoves ranged between 17 to 21%.

Research papers published

1. Marabi, R.S., Satpute, G.K., Yogranjan and Gupta M.P. 2011. Determination of genetically desirable association through quantitative traits variation in potentially improved seed yielding phenotypes modulating biotic stress response in linseed (*Linum usitatissimum* Linn.). *Journal of Genetics and Breeding (Italy),* 63: 35-42.
2. Ahirwar, R.M. and Gupta, M.P. 2010. Biology of bud fly, *Dasineura sesami* (Grover & Prasad) on sesame. *Journal of Insect Science*, 23 (4): 364-368.
3. Ahirwar, R.M. Gupta, M.P. and Banerjee Smita 2010. Bio-ecology of leaf roller/ capsule borer, *Antigastra catalaunalis Duponchel*. *Advances in Bioresearch,* 1(2): 1-15.
4. Ahirwar, R.M., Gupta, M.P. and Banerjee, S. 2010. Field efficacy of natural and indigenous productson sucking pests of sesame. *Indian Journal of Natural Products and Resources,* 1 (2): 221-226.
5. Gupta M.P., Shrivastava, A.K. and Nayak, M.K. 2010. Development of weather based prediction model for leaf roller population of sesame in Bundelkhand Zone of Madhya Pradesh. *Mausam.* 61 (2): 229-232.
6. Jain Neeta, Jain Namrata and Chourasia S.K. 2010. Impact of moisture conservation technique and thiourea seed priming treatment on sesame (*Sesamum indicum*). *Annals of Agricultural Research*. New Series Vol. 31 (3&4): 123-126.
7. *Yogranjan*, Satpute G.K., and Marabi R.S. 2010. Technological developments in agriculture for sustainable impact on human health. *Electronic Journal of Polish Agricultural Universities (Poland)*. Topic- Agronomy 13 (3):
8. Sawarkar, S.D, Thakur, Risikesh and Khamparia, R.S. (2010). Impact of long term continuous use of inorganic and organic nutrients on micronutrients uptake by soybean in vertisol. *Journal of Soils and Crops* 20 (2): 207 – 210.
9. Thakur, Risikesh, Sawarkar, S.D., Kauraw, D.L. and Singh, Muneshwar (2010). Effect of inorganic and organic sources on nutrients availability in a Vertisol. *Agropedology* 20 (1): 53-59.
10. Thakur Risikesh, Sawarkar S.D., Vaishya U.K. and Singh Muneshwar (2011). Impact of Continuous Use of Inorganic Fertilizers and Organic Manure on Soil Properties and Productivity under Soybean-Wheat Intensive Cropping of a Vertisol. *Journal of the Indian Society of Soil Science* 59 (1) : 74-81
13. Kumar Arvind, Rao S. and Sharma Subrata (2010). "Effect of varying temperature and Media on germination and vigour of Isabgol (*Plantago ovata* Forsk) and muskdana (*Abelmoschus moschatus* Medicus) JNKVV Res. J .42. (2): 173-176.

Database on proven post harvest technologies from R&D institutions as well as those commercial available.

Name of Technology	Type of Technology	Application/ Use	Status
Water chest nut Decorticator	Manual	Decortication of Water Chest Nut.	Commercialized
Multi Fruit Grader.	Manual and Gravity of Fruits.	Sorting and Grading Commercialized	
Pea Shelling Machine	Power Operated	Pea Shelling	Commercialized
Green Bengal Gram Pod Stripping Machine	Power Operated	Shelling of Green Bengal gram Pod	Commercialized

15. Khare D., Shrivastva A.N., Shrivastva M.K. and Bhale M.S. (2010). Pedigree analysis of soybean varieties Indian J. Genet., 70(3): 292-295.

17. Nair P. and Khare D. (2009). Genetics of factors ascertaining transportability of pods of vegetable pea (*Pisum sativum*) Indian J. agric. Sci., 79(11):939-40.

18. Sharma Subrata, Gautam S.P. and Dwivedi S.K. 2010. Effect of nitrogen application on yield attributing parameters and productivity of barley cultivars. JNKVV Res. J .42. (2): 187-189.

21. Khare D., Shrivastava A.N., Shrivastava M.K. and Bhale M.S. (2010). Pedigree analysis of soybean. *Indian J.Genet.* 70 (3):292-295

22. Singh Rahul and R. K. Varma (2010). Variability among two anastomosis groups of *Rhizoctonia solani causing aerial blight of soybean. JNKVV Res J., 44(1): 67-74.*

23. Kale Ashish and Varma R.K. (2010) Screening of pesticides against *Sclerotium rolfsii* causing collar rot of Soybean. JNKVV Res J., 44 (2): 189-194 pp.

24. Parihar P. and Bhadauria U.P.S. (2010) Status of major nutrients in guava. Ind J. Plant and Soil Res. 12 (2), 102-105.

27. Singh A, Thakur R.S., Gautam S. Wasnikar A. and Deshmukh R. (2010) Effect of cold sterilization on quality attributes of mushrooms stored at low temperature. JNKVV, Res J 44 (1)

28. Singh A. and Verma A. (2010). Extra cellular enzyme profile of oyster mushrooms as affected by gamma radiation JNKVV Res. J. 44 (1)

29. Bano S., Singh A. and Nema S. (2010) Seed microflora associated with stored groundnut seeds and its relation with aflatoxin B, production J Basic Applied Mycology 9 (I & II)

36. Upadhyay V.B., Vishwakarma S.K. and Jain, Vikas (2010) Evaluation of site specific nutrient management on productivity and economics of rice-wheat crop sequence. *JNKVV Res. J.* 44 (1):45-48.

39. Parihar, S.K., Dwivedi, B.S., Khan, I.M. and Tiwari, R.K. (2010). Effect of integrated nutrient management on yield and economics of little millet (Panicum sumatrense roth exRoem, and Schult). J. Soils and crops 20 (2):211-215.

40. Singh, Ranjay Kumar, Dwivedi, B.S. and Tiwari, R.K. (2010). Learning and testing the farmers knowledge: conservation of location specific indigenous paddy varieties. Ind. J. Trad. Know. 9 (2): 361-365.

41. Mehta, A.K. Biliaya, S.K and. Rathi, G.S (2010) Genetic divergence in oat (*Avena sativa* L.) accepted in Forage res 34 (4).

42. Agrawal K.K., Jha Amit, Bhadauria U.P.S. and Jain Sanjay 2010. Crop weather relationship studies on chickpea for improving crop adaptation to climate change. *International Journal of Tropical Agriculture* Vol.28

43. Jain Sanjay and Jha A.K. 2010. Allelopathic effect of Neem *(Azadirecta indica)* leaf extract on rice and *E.column. International Journal of Tropical Agriculture* Vol.28

44. Dubey Abhijeet., Jha A.K. and Shrivastava A., 2010. Effect of nitrogen levels on green fodder yield of oat (*Avena sativa*) varieties. *International Journal of Tropical Agriculture* Vol.29

46. Jha A.K. and Kewat M.L. 2010. Weed Management in summer soybean *International Journal of Tropical Agriculture* Vol.29.

47. Aggrawal, S.B. , Singh Sarita and Jha A.K., 2010. Production of vermicompost and culture as influenced by various substreta and additives. *International Journal of Tropical Agriculture* Vol.29.

48. Suryavansi Vijay, Agrawal K.K. and Jha Amit, 2010. Effect of sowing dates on

growth and yield of chickpea varieties under irrigated conditions of Jabalpur. *International Journal of Tropical Agriculture* Vol.29.

49. Jha A.K. and Kewat M.L. 2010. Nutrient uptake influenced by different tillage and sowing management under rice –wheat cropping system, JNKVV Research Journal. Vol
50. Jha Amit Kumar, Kewat M.L., Upadhyay, Vishwakarma, S.K. 2011. Effect of tillage and sowing management on productivity, economics and energetics of rice-wheat cropping system for Kamore Plataue and Satpura hill zone of Madhya Pradesh. *Indian Journal of Agronomy*. Vol 55 (1)
51. Dubey Megha, Singh Smita, Kewat M.L. and Sharma J.K. (2010). Efficacy of imazethapyr against monocot weeds in groundnut.Indian J.Weed Sci.,42 (1&2:27-30)

Presented Research Papers
(Seminars/Conferences/Workshops etc)

1. Gupta, M.P., Naik, M.K. and Mishra, P.K. 2011. Integrated management of linseed bud fly in Bundelkhand zone of Madhya Pradesh. Paper presented in National Symposium on "Integrated farming systems for sustainable agriculture-challenges and opportunities" held at Institute of Agricultural Sciences , Bundelkhand University, Jhansi (U.P.), Feb.,19-21,2011. *Abstract pp.* 124.
2. Naik, M.K, Gupta, M.P., Tomar, D.S. and Mishra, P.K. 2011. Study on the avoidable losses due to leaf roller/ capsule borer in sesame. Paper presented in National Symposium on "Integrated farming systems for sustainable agriculture- challenges and opportunities" held at Institute of Agricultural Sciences ,Bundelkhand University, Jhansi (U.P.), Feb.,19-21,2011. *Abstract pp.* 125.
3. Naik, M.K, Gupta, M.P. and Tomar, D.S. 2010. Testing of IPM module for the management of pod borer, *Helicoverpa armigera* (Hubner) in chickpea. Paper presented in National Symposium on "Perspective and challenges of integrated pest management for sustainable agriculture" held at, Solan (Himachal Pradesh), Nov., 19-21, 2010. *Abstracts pp.* 190-191.
4. Naik, M.K, Gupta, M.P. and Tomar, D.S. 2011. Extent of damage due to leaf roller/ capsule borer, *Antigastra catalaunalis* Dup. in sesame. Paper presented in X Agricultural Science Congress on "Soil, plant and animal health for enhanced and sustained agricultural productivity" held at, NBFGR, Lucknow Feb.,10-12, 2011. *Abstract pp.* 293.
5. Naik, M.K, Gupta, M.P. and Tomar, D.S. 2010. Screening of linseed genotypes against bud blight and bud fly. Paper presented in 32nd Annual conference & I Symposium on "Innovations in plant pathology research and human resource development" held at, Junagadh Agricultural University, Junagadh (Gujarat), Nov., 24-26, 2010. *Abstract pp.* 44.
6. Marabi R.S., Satpute G.K. and Yogranjan 2011. Bee (*Apis mellifera* Linn.) Mediated Foraging Response for Genetic Regulation of Pollination Efficiency in Niger [*Guizotia abyssinica* (L. f.) Cass.]. *In* Proc. 98th Indian Science Congress: Agriculture and Forestry Sciences held at SRM University Chennai India, Jan. 3-7, '11. *Abstract pp.* 16.
7. Yogranjan, Srivastava A.K., Satpute G.K. and Marabi R.S. 2010.Chelate mediated phytoextraction of organic and inorganic contaminants for environmentally safe bio-products. *In* Proc. National Seminar on Agriculture and Global warming: Challenges and Potentials held at Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, M.P., June 5-6, 2010. *Abstract pp.* 29-30.
8. Srivastava A.K., Yogranjan, Satpute G.K.

2010. Simulation of Soybean yield under temperature change scenario in Bundelkhand region *In* Proc. National Seminar on Agriculture and Global Warming: Challenges and Potentials held at Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, M.P., June 5-6., 2010. *Abstract pp.* 33.

9. Jain Neeta, Jain Namrata and Chourasia S.K. 2010. Critical period for crop weed competition in Sesame (*Sesamum indicum*). Presented in National Seminar in "Sustainable Agriculture and Food Security–Challenges and Opportunities". Organized by University of Teachers' Association, Orissa University of Agr. & Technology, Bhubneshwar, Orissa from 29-30 November 2010, Abstract pp.8.
10. Jain Namrata, Chourasia S.K., Jain Neeta and Vinamrata Jain 2010. Performance of Pearlmillet hybrids in Tikamgarh districts of Madhya Pradesh. Presented in National Seminar in "Sustainable Agriculture and Food Security–Challenges and Opportunities". Organized by University of Teachers' Association, Orissa University of Agr. & Technology, Bhubneshwar, Orissa from 29-30 November 2010, Abstract pp. 85-86.
11. Sawarkar, S.D., Sudesh Kumar Bramhne and Risikesh Thakur (2010). Effect of Nutrient Inputs and Bio-Fertilizer Application on Yield and Quality of Chickpea (*Cicer Arietinum* L.) in Vertisol. National Seminar on Land Resource Management: Land Degradation, Climate Change and Land Use Diversification, held at National Bureau of Soil Survey and Land Use Planning, Nagpur (M.H.), 8 to 10 Oct. pp 71 and Abstract No. AO-78.
12. Sawarkar, S.D., Bramhne, Vijay, Kumar and Thakur, Risikesh (2010). Effect of Inorganic, Organic and Biofertilizer on Biomass Partitioning, Growth, Nutrient Uptake and Productivity of Isabgol (*Plantago Ovata* Forsk). National Seminar on Land Resource Management : Land Degradation, Climate Change and Land Use Diversification, held at National Bureau of Soil Survey and Land Use Planning, Nagpur (M.H.), 8 to 10 Oct. pp 09 and Abstract No. AO-11.
13. Thakur, Risikesh, Sawarkar, S.D., Singh, Muneshwer and Khamparia, R.S. (2010). Impact of Long-Term Application of Inorganic Fertilizers and Organic Manure on Soil Properties in a Vertisol. National Seminar on Land Resource Management: Land Degradation, Climate Change and Land Use Diversification, held at National Bureau of Soil Survey and Land Use Planning, Nagpur (M.H.), 08 to 10 Oct. pp 72 and Abstract No. AO-79.
14. Sharma, G.D., Thakur Risikesh and Dwivedi, B.S. (2010). Qualitative effect of organic source with inorganic fertilizers on soybean. All Indian Science Congress, held at New Delhi, 22 – 23 Nov.
15. Thakur Risikesh, Sharma, G.D. and Dwivedi, B.S. (2010). Effect of Long-Term Application of Fertilizer and Organic Manure on Efficiency of Rhizobium bacteria in Soybean. All Indian Science Congress, held at New Delhi, 22 – 23 Nov.
16. Sharma, G.D., Sharma, B.L. and Khamparia, R.S. (2010). Molybdenum Status in Medium Black Soil of Jabalpur district of Madhya Pradesh. National Seminar on Land Resource Management : Land Degradation, Climate Change and Land Use Diversification, to be held at National Bureau of Soil Survey and land Use planning, Nagpur (M.H.), 08 to 10 Oct. pp 81 and Abstract No. AO-91.
17. Sharma, B.L., Sharma, G.D. and Khamparia, R.S. (2010). Molybdenum Status in Medium Black Soil of Chhatarpur district of Madhya Pradesh. National Seminar on Land Resource

Management : Land Degradation, Climate Change and Land Use Diversification, to be held at National Bureau of Soil Survey and land Use planning, Nagpur (M.H.), 08 to 10 Oct. pp 80 and abstract no. AO-90.

18. Mishra P.C., Shukla R.S. and Mishra S.C. (2011) Role of morphophisio-logical traits in wheat under rainfed and restricted irrigated condition. 3rd International group meeting on wheat productivity enhancement under changing climate. February 9-12, 2011held at UAS, Dharwad, Page 235.
19. Mishra D.K. and Shukla R.S. (2011) Genetic studies of drought tolerance in wheat. 3rd International group meeting on wheat productivity enhancement under changing climate. February 9-12, 2011held at UAS, Dharwad, pp 59.
20. Shukla R.S. and Mishra D.K. (2011) Screening wheat genotype for terminal heat tolerance suitable under very late sown condition of Madhya Pradesh. 3rd International group meeting on wheat productivity enhancement under changing climate. February 9-12, 2011held at UAS, Dharwad, page 58.
21. Khare D. and Bhale M.S. (2010). Screening of sesame varieties for seed dormancy National Seed Congress New Delhi January 18-20, 2010.
22. Khare D. and Priya Nair (2010). Effect of Excessive Moisture and Heat on Seedling Establishment of Vegetable Pea. 28th ISTA symposium to be held at Cologne Germany from 16th June to 22 June, 2010.
23. Khare D. and Priya Nair (2010). Excessive moisture and high tempera-ture tolerance at the time of field emergence in vegetable pea. 28th ISTA Symposium to be held at Cologne, Germany from 16-22 June, 2010.
25. Khare D., Sahu P., Saini N., Shrivastva A.N. and Bhale M.S. (2011). Soybean seed Longevity. *Oral Presentation* in National Seed Congress Organized by MPKV, Rahuri and NSRTC, Varanasi at College of Agriculture, Pune from January 29-31, 2011, Souvenir and Abstracts 217-225.
26. Khare D., Rao S. and Bhale M.S. (2010) Establishment of distinctness among sesamè varieties through morphological and phenological traits. 28th ISTA symposium to be held at Cologne Germany from 16th June to 22 June, 2010
29. Sharma Subrata, Patidar Jitendra and Rao Sathrupa, 2011, Effect of Testing Media & Temperature on germination and vigour parameters of ocimum" in "National Seed Congress on Quality Seeds for Prosperity " organized by National Seed Research & Training Centre, Varanasi and MPKV Rahuri at College of Agriculture, Pune from 29th to 31st Jan 2011 :
31. Singh A., Thakur R.S., Gautam S., Deshmukh R. (2010). Quality evaluation of mushrooms as influenced by gamma radiation, Souvenir MPMVS, Jabalpur pp 25.
32. Ramkinker Verma, Rao S., and Dwivedi S.K. (2010). Effect of varying temperature and packaging material on storability of seeds of *Withania somnifera* (Aswagandha) 4th World Ayurveda Congress and Arogya Expo at Bangalore, 9-13 December 2010.
33. Rehana Khan, Rao S. and Dwivedi S.K. (2011). Effect of temperature and testing media on germination and vigour parameters of Ajwain (*Trachyspermum ammi* L) National Seed Congress, 29th - 31st January 2011 organised at College of Agriculture, Pune, MPKVV, Rahuri.
34. Kharadi R., Nayak P.S., Upadhyaya S.D., Upadhyay A. and Khan N.A. (2010). "Differential response of plumbagin content in *plumbago zeylanica* L(Chitrak) under control water stress treatment."4th world Ayurvade congress and Arogya Expo. 9-13 December 2010, Bengaluru, Karnataka.

35. Barfa R.S., Upadhyay A., Khan N.A., Dwivedi S.K. and Gontia A.S. (2010). "Evaluation of different germpasm of Isabgol (*Plantago Ovata* Forsk.) for biochemical parameters, productivity and quality traits." 4th world Ayurvade congress and Arogya Expo. 9-13 Dec 2010, Bengaluru, Karnataka, India.

36. Shaktawat G.S., Khan N.A., Upadhyaya S.D., Upadhyay A. and Nayak P.S. "Biochemical Evaluation of coleus forskolii Brig (Patharchur) under stress and non stress water regime" 4th World Ayurveda Congress and Arogya Expo. 9-13 Dec 2010, Bengaluru, Karnataka, India, PA-819 p 127.

37. Dwivedi S.K., Patidar V., Upadhyay A., Tiwari A.B. and Nayak P.S. (2010). "Physiological and biochemical changes in Ashwaganda (*Withania somnifera* (L). Dunal) as influence by organic chemical and integrated nutrient management." 4th world Ayurvade congress and Arogya Expo. 9-13 Dec 2010, Bengaluru, Karnataka, India, PO-56 p 230-231.

38. Samaiya R.K. and Dwivedi S.K. (2010) "Varietal screening for physiological traits in chickpea genotypes." National conference of Plant Physiology on "Physiological and molecular approaches for crop improvement under changing environment" Nov. 25-27, BHU, Varanasi PP-73

39. Samaiya R.K. "Survey, collection and evaluation of medicinal and aromatic plants of Sagar region of M.P." 4th world Ayurvade congress and Arogya Expo. 9-13 Dec 2010, Bengaluru, Karnataka, India, PO-83 p 284-85.

40. Samaiya R.K. "Constraints for commercial exploitation of medicinal and aromatic plants of Sagar region of M.P." 4th world Ayurvade congress and Arogya Expo. 9-13 Dec 2010, Bengaluru, Karnataka, India, PO-84 p 285.

41. Sasikant Tiwari, Pandey B.R., Dubety Saket, Patel Neha and Panse Raju . Efficacy of different herbicides against weeds of Onion (*Allium cepa* L.). National symposium on "Alliums: current scenario and emerging trends" to be held on 12-14 March 2011 at DOGR Pune.

42. Meshram D.K., Pandey B.R., Saket Dubey, Patel Neha and Panse Raju (2009). Evaluation of different Garlic (Allium sativum L) varieties under Satpura hills of M.P. National Symposium on "Alliums: current scenario and emerging trends" to be held on 12-14 March 2011 at DOGR Pune.

43. Panse Raju, Pandey B.R., Mishra Madhuri and Sharma Anchal (2010). Evaluation of different onion varieties for yield and cost benefit ratio. National Seminar on Restructuring of Irrigated Agriculture Status and Strategies, March 15-17, 2011, JNKVV, Jabalpur.

44. Panse Raju, Pandey B.R., Mishra Madhuri and Sharma Anchal. Post harvest management in Garlic crop. National Seminar on Restructuring of Irrigated Agriculture Status and Strategies, March 15-17, 2011, JNKVV, Jabalpur.

45. Sharma Sharma, Pandey B.R. and Panse Raju. Nutritional and Meditational value of Garlic cloves. National Seminar on Restructuring of Irrigated Agriculture Status and Strategies, March 15-17, 2011, JNKVV, Jabalpur.

46. Pandey B.R., Sharma Anchal and Panse Raju (2010). Evaluation of different Onion genotypes in Rabi season for satpura region of Madhya Pradesh. National Seminar on Restructuring of Irrigated Agriculture Status and Strategies, March 15-17, 2011, JNKVV, Jabalpur.

47. Pandey B.R., Shrivastava R.K., Sharma Anchal, Verma B.K. and Panse Raju. Effect of different levels of organic manures, inorganic fertilizers and biofertilizers on growth, yield and quality

of tomato (*Solanum lycopesicon* (Mill) Wettesd.) cv. H-86. National Seminar on Restructuring of Irrigated Agriculture Status and Strategies, March 15-17, 2011, JNKVV, Jabalpur.

48. Pansey Raju, Sharma Anchal, Pandey B.R. and Mishra Madhuri (2010). Comparative efficacy of different botanicals and bio-pesticides for the management of Onion thrips (*Thrips tabaci* L). National Symposium on Vegetable Biodiversity, April 4-5, 2011, JNKVV, Jabalpur .

49. Pandey B.R., Sharma Anchal, Mishra Madhuri, Panse Raju and Singh Bhatnagar Pulendra. Studies of Genetic Variability of Yield and its Components in Cabbage (*Brassica Oleracea* Var. *capitata* L.). National Symposium on Vegetable Biodiversity, April 4-5, 2011, JNKVV, Jabalpur

54. कोष्टा एल.डी., पाठक एन.एन., सिंह ज्ञानेन्द्र, जैन के.के. एवं बाजपेई आर. (2011) : बॉस आधारित कृषि वानिकी पद्वति। 13वी राष्ट्रीय कृषि विज्ञान संगोष्ठी, बारानी एवं सीमित सिंचाई क्षेत्रों में कृषि, वानिकी तथा पशुपालन–समस्या व समाधान, आयोजन स्थलः बुन्देलखण्ड विश्वविद्यालय एवं राष्ट्रीय कृषि विज्ञान अनुसंधान केन्द्र, झॉसी. 21–23 जनवरी, 2011, पेंज नं. 85–85।

55. कोष्टा एल.डी. , उपाध्याय एस.डी. एवं जैन के. के. , बाजपेई आर. एवं श्रीवास्तव एम.के. (2011) अधिक बायोमास उत्पादन हेतु बहुउददेशीय वृक्षों का चुनाव एवं उनके विभिन्न भागों का योगदान। 13वी राष्ट्रीय कृषि विज्ञान संगोष्ठी, बारानी एवं सीमित सिंचाई क्षेत्रों में कृषि, वानिकी तथा पशुपालन–समस्या व समाधान, आयोजन स्थलः बुन्देलखण्ड विश्वविद्यालय एवं राष्ट्रीय कृषि विज्ञान अनुसंधान केन्द्र, झॉसी. 21–23 जनवरी, 2011, पेंज नं. 106–107।

56. सिंह यशपाल, कोष्टा एल.डी. एवं सिंह आराधना (2011) : केचुआ खाद उत्पादन एवं उपयोग। 13वी राष्ट्रीय कृषि विज्ञान संगोष्ठी, बारानी एवं सीमित सिंचाई क्षेत्रों में कृषि, वानिकी तथा पशुपालन–समस्या व समाधान, आयोजन स्थलः बुन्देलखण्ड विश्वविद्यालय एवं राष्ट्रीय कृषि विज्ञान अनुसंधान केन्द्र, झॉसी. 21–23 जनवरी, 2011, पेंज नं. 62।

57. बाजपेई, आर. कोष्टा एल.डी., जैन के.के. एवं सिंह यशपाल (2011) : बॉस में कीट नियंत्रण। 13वी राष्ट्रीय कृषि विज्ञान संगोष्ठी, बारानी एवं सीमित सिंचाई क्षेत्रों में कृषि, वानिकी तथा पशुपालन–समस्या व समाधान, आयोजन स्थलः बुन्देलखण्ड विश्वविद्यालय एवं राष्ट्रीय कृषि विज्ञान अनुसंधान केन्द्र, झॉसी. 21–23 जनवरी, 2011, पेंज नं.

58. सिंह ज्ञानेन्द्र, बिसेन अभय एवं कोष्टा एल.डी. (2011) : वृद्विनियंत्रक का करंज की मृदु काष्ठ कटिंग पर मूलन वृद्वि एवं उत्तरजीविता पर प्रभाव। 13वी राष्ट्रीय कृषि विज्ञान संगोष्ठी, बारानी एवं सीमित सिंचाई क्षेत्रों में कृषि, वानिकी तथा पशुपालन–समस्या व समाधान, आयोजन स्थलः बुन्देलखण्ड विश्वविद्यालय एवं राष्ट्रीय कृषि विज्ञान अनुसंधान केन्द्र, झॉसी. 21–23 जनवरी, 2011, पेंज नं. 76।

59. सिंह ज्ञानेन्द्र, बिसेन अभय एवं कोष्टा एल.डी. (2011) : नर्सरी में मृदा सूर्यीकरण का महत्व। 13वी राष्ट्रीय कृषि विज्ञान संगोष्ठी, बारानी एवं सीमित सिंचाई क्षेत्रों में कृषि, वानिकी तथा पशुपालन–समस्या व समाधान, आयोजन स्थलः बुन्देलखण्ड विश्वविद्यालय एवं राष्ट्रीय कृषि विज्ञान अनुसंधान केन्द्र, झॉसी. 21–23 जनवरी, 2011,पेंज नं. 13–14।

60. सिंह ज्ञानेन्द्र, बिसेन अभय एवं कोष्टा एल.डी. (2011) : नीम : उपयोगिता एवं जैव फसल सुरक्षा। 13वी राष्ट्रीय कृषि विज्ञान संगोष्ठी, बारानी एवं सीमित सिंचाई क्षेत्रों में कृषि, वानिकी था पशुपालन–समस्या व समाधान, आयोजन स्थलः बुन्देलखण्ड विश्वविद्यालय एवं राष्ट्रीय कृषि विज्ञान अनुसंधान केन्द्र, झॉसी. 21–23 जनवरी, 2011, पेंज नं. 88।

61. नायक हिरन्मयी एवं कोष्टा एल.डी. (2011) : उड़ीसा में बांस की स्थिति, विस्तार एवं उपयोग

–एक अध्ययन। 13वी राष्ट्रीय कृषि विज्ञान संगोष्ठी, बारानी एवं सीमित सिंचाई क्षेत्रों में कृषि, वानिकी तथा पशुपालन–समस्या व समाधान, आयोजन स्थलः बुन्देलखण्ड विश्वविद्यालय एवं राष्ट्रीय कृषि विज्ञान अनुसंधान केन्द्र, झॉसी. 21–23 जनवरी, 2011, पेंज नं. 50–51।

62. जैन के.के., एस.डी. उपाध्याय एवं ए.डी. कोष्टा (2011) : फलदार वृक्षों के साथ हल्दी की खेती : अधिक उपज एवं आय पद्वति। 13वी राष्ट्रीय कृषि विज्ञान संगोष्ठी, बारानी एवं सीमित सिंचाई क्षेत्रों में कृषि, वानिकी तथा पशुपालन–समस्या व समाधान, आयोजन स्थलः बुन्देलखण्ड विश्वविद्यालय एवं राष्ट्रीय कृषि विज्ञान अनुसंधान केन्द्र, झॉसी. 21–23 जनवरी, 2011, पेंज नं. 45–46।

Books and Book Chapter

1. Srivastav A.K., Yogranjan, Satpute G.K. and Marabi R.S (2010). Bright farming to mitigate climate change for improving vulnerable socio-ecosystem: A sustainable approach. Climate Change and Society (In Hindi). *Eds*. Manjula Mehta; Ministry of Earth Science, Govt of India, pp. 11 – 18.

2. Khare D. and Bhale M.S. (2010).Seed Technology. Scientific Publishers, Jodhpur, Rajasthan, India. 260 p. (Second print 2005, First print 2000) (ISBN:81-7233-241-6).

3. Rao S.K., Kalloo G., and Khare D. (2010). Promotion of Public Breed Hybrids of Field Crops. Studium Press (India) Pvt. Ltd. 257p.

Research Bulletins

1. Khamparia, R.S., Singh, M.V., Sharma B.L., Kulhare, P.S. and Sharma G.D. (2010). Four Decades of Research in *Micro, Secondary Nutrient and Pollutant Element in Crops and Soils of Madhya Pradesh*.

2. Mishra D., Khare D., Bhale M.S. and Koutu G.K. (2010). Lecture notes- Seed Certification 146p.

3. Khandalkar V.S., Saxena M., Khare D. and Rao S.K. (2009). Hybrid seed production technology of pigeonpea. Pub., Department of Plant Preeding and Genetics, JNKVV, Jabalpur. Technical Bulletin HDPB 1/2009 12p.

On-going All India Coordinated Research Projects/All India Network Projects

S.No.	Name of Project	Budget	Project Incharge	Associated Scientists
CROP IMPROVEMENT				
1	Maize Improvement, Chhindwara	20.92	Dr. R.K. Reddy	Dr. V.K. Paradkar
2	Rice Improvement, Rewa	34.68	Dr. S.K. Tripathi	Dr. C.M. Mishra Dr. P. Perraju Dr. I.M. Khan
3	Niger, Chhindwara	24.22	Dr. S.K. Thakur	Shri G.K. Rai
4	Linseed, Sagar	18.94	Dr. M.P. Dubey	Dr.(Smt) P. Das
5	Linseed, Powarkheda	2.00	Dr. V.S.N. Rao	-
6	Sesame, Tikamgarh	59.85	Dr. S.K. Chourasia	Dr. G.K. Satpute Dr. M.P. Gupta
7	Sesame, Powarkheda	24.18	Dr. V.S.N. Rao	Dr. G.L. Thakur
8	Soybean, Jabalpur	18.20	Dr.A.N. Shrivastava	Dr. R.K. Verma
9	Chickpea, Jabalpur	46.53	Dr. (Mrs) Om Gupta	Dr.(Smt) Anita Babbar Dr. Suneeta Pandey
10	Millets Improvement, Dindori	29.09	Dr. O.P. Dubey	Dr. S.K. Choubey Dr. Abhinav Sao
11	Millets Improvement, Rewa,	32.23	Dr. A.K. Singh	-
12	Wheat Improvement, Powarkheda	32.25	Dr. P.C. Mishra	Dr. D.N. Shrivas
13	Wheat Improvement, Sagar	51.19	Dr. U.K. Tiwari	Dr. A.R. Washnikar
14	Sugarcane, Powarkheda	32.51	Dr. A. Chatterjee	Dr. A.K. Choudhary
15	Nematode Pests & their control, Jabalpur	27.04	Dr. S.P. Tiwari	Dr. Jayant Bhatt Dr.(Smt) Usha Bhale
16	Barley Improvement, Rewa	23.86	Dr. A.K. Singh	-
17	NSP- Breeder Seed Production, Jabalpur	34.72	Dr. G.K. Koutu	Dr. S.K. Singh
18	NSP -Seed TechnologyResearch, Jabalpur	34.66	Dr. D. Khare	Dr. M.S. Bhale
19	Production of Breeder Seed of Annual Oilseed Crop, Jabalpur			
	- *Soybean*	--	Shri B.D.Ghode	-
	- Groundnut	--	Dr. R.S. Shukla	-
20	Forage Crops	34.52	Dr. A.K. Mehta	Dr. Amit Kumar Jha
21	MULLaRP, Sagar	13.53	Dr. (Smt) P. Das	-

S.No.	Name of Project	Budget	Project Incharge	Associated Scientists
22	Biological Control of Crop, Pests and Weeds, Jabalpur	2.48	Dr. S.B. Das	-
NATURAL RESOURCE MANAGEMENT				
23	Integrated Farming System (i) MAE , Rewa Powarkheda (ii) ECF, Dindori Katni	93.87	Dr. K.R. Naik Dr. B.M. Mourya Dr. R.S. Lidder --- Sh. R.K. Sharma	Dr. B.S. Dwivedi - - - -
24	NWP – Organic Farming	10.65	Dr. K.R. Naik	-
25	Micro & Secondary nutrients and Pollutant Elements in Soils, Jabalpur	29.90	Dr. P.S. Kulhare	-
26	Soil Test Crop Response, Jabalpur	29.94	Dr. B. Sachidanand	Shri S.S. Baghel Dr. Amit Upadhyay
27	Long Term Fertilizer Exp., Jabalpur	13.38	Dr. N.K. Khamparia	Dr. S.K. Sawarkar
28	AINP on Biofertilizer (BNF), Jabalpur	18.60	Dr. A.K. Rawat	
29	Agro-Forestry, Jabalpur	19.33	Dr. L.D. Koshta	-
30	Dryland Agriculture, Rewa	55.51	Dr. D.P. Dubey	Dr. K.K. Agrawal Dr. S.K. Pyasi Shri A.S. Patel
31	Optimization of Ground Water Resources through Wells & Pumps	33.33	Dr. R.K. Nema	Dr. M.K. Awasthi Shri Y.K. Tiwari
32	Agro-meteorology	17.27	Dr. Manish Bhan	-
33	Water Management	40.00	Dr. R.V. Singh	Dr. P.B. Sharma Dr. M.L. Sahu Dr. P.N. Tiwari Dr. S.K. Padihar
HORTICULTURE				
34	Vegetable Improvement	39.00	Dr. A.K. Naidu	Dr. S.K. Sengupta Dr. S.K. Mittra Dr. R.K. Shrivastava
35	Potato Improvement	16.65	Dr. D.N. Nandekar	-
36	Sub Tropical Fruits	17.52	Dr. Jagdish Singh	Dr. T.K. Singh
37	Medicinal, Aromatic Plants and Betelvine	20.78	Dr. U.K. Khare	Dr. Sanjeev Kumar Dr. Swati Barche
38	Spices	0.95	Dr. Sengupta	-
39	Arid Zone Fruits	15.75	Dr. C.S. Pandey	-
40	AINRP on Onion & Garlic	18.47	Dr. A.K. Naidu	-

AGRICULTURAL ENGINEERING

41	Farm Implements & Machinery	24.13	Dr. K.B. Tiwari	-
42	Harvest & Post Harvest Technology	76.13	Dr. Mohan Singh	Dr. Ravi Agrawal Dr. (Smt) Sheela Pandey
43	Renewable Energy Sources	18.01	Dr. B.M. Khandelwal	
	GRAND TOTAL	**1206.77**		

GOI PROJECTS

44	Agro Economics Research Centre, Jabalpur	60.00	Dr. A.M. Mishra	Dr. Hariom Sharma Dr. Ashutosh Shrivastava
45	Cost of Cultivation Scheme, Jabalpur	205.00	Dr. R.M. Sahu	Dr. R.S. Raghuwanshi Dr. S.C. Dwivedi Dr. R.K. Jain Dr. R.N. Pathak
46	Agro Advisory Service, Jabalpur	3.80	Dr. Manish Bhan	-
	Powerkheda	3.02	Dr. Anita Thakur	-
	Tikamgarh	3.40	-	-
	Chhindwara	2.16	Dr. Paradkar	-
	Total	**277.38**		

Ad hoc Research Projects

Govt. of India

- Development of Spices & Aromatic Plants (NHM funded). Outlay: Rs. 20.47 lacs. PI: HoD, Vegetable.
- Establishment of facilitation centre on medicinal and aromatic plants. Outlay: Rs.12.00 lacs. PI: Dr. S.D. Uadhayaya, Professor. Co-PI: Dr. S.B. Nahatkar, Pri. Sci., Dr. A.B Tiwari, Sr. Sci., Dr. Anubha Uadhayay, Asstt. Professor.
- Vegetation carbon pool assessment in India. Outlay: Rs. 2.44 lacs. PI: Dr. S.D. Upadhayaya, Professor Co-PI: Dr. A.K. Khare, PC, Dr. Ashutosh Shrivastva.
- Seed Production in Agricultural Crops (Mega Seed project). Outlay: Rs. 23.00 lacs. PI: Dr. S.K. Rao, Director Farms
- Enhancing BSP and creation of training programme NSFM (Pulses). Outlay: Rs. 7.66 lacs. PI: Dr. S.K. Rao, Director Farms
- Breeding Soybean utilizing radiation induced mutation and elite lines for resistance against YMV and root rot. Outlay: Rs. 6.77 lacs. PI: Dr. A.N. Shrivastava, Principal Scientist (PB), Jabalpur.
- Development of molecular markers in chickpea and breeding for developing superior cultivars with enhanced disease resistance. Outlay: Rs. 11.26 lacs. PI: Dr. Anita Babbar, Professor/Principal Scientist (PB), Jabalpur.
- Equipping and strengthening of designated centre of DUS testing and documentation Outlay: Rs. 2.00 lacs. PI: Dr. Satrupa Rao, HoD, Crop Physiology. Co-PI: Dr. Dhirendra Khare, Dr. M.S. Bhale.
- Studies on self life extension of wild mushroom from tribal areas of Madhya Pradesh by Gamma Radiation. Outlay:

Rs. 4.16 lacs. PI: Dr. Alpana Singh, Asstt. Professor (Food Science), Jabalpur. Co-PI: Dr. A.R. Washnikar.

- Rapid conversion of normal maize inbreeds to quality protein maize and further enhancement of limiting amino acids in elite inbreeds through marker assisted selection. Outlay: Rs. 24.69 lacs. PI: Dr. Sharad Tiwari, Biotechnology Centre, JNKVV, Jabalpur
- Identification of potential vegetation for bio drainage and fitting in evaluation of bio drainage in Tawa Command of Madhya Pradesh, Outlay: Rs. 15.60 lacs. PI: Dr. N. N. Pathak, Principal Scientist, Agroforestry, Jabalpur. Co-PI: Dr. M. K. Shrivastava, TA, Er. P. K. Sharma.
- CSS on National Project on Management of Soil Health and Fertility. Outlay: Rs. 17.41 lacs. PI: Dr. Girish Puri, Principal Scientist, JNKVV, Jabalpur. Co-PI: Dr. Narendra Chauhan.
- Marker assisted breeding of abiotic stress tolerant rice varieties with major QTLs for drought, submergence and salt tolerance at Rewa". Outlay: Rs.10.60 lacs. PI: Dr. P. Perraju, Senior Scientist (PB),Rewa.
- Integrated Agri-biotechnologies of socio-economic upliftment of Baiga and Gond tribes of Madhya Pradesh. Outlay: Rs. 108.48 lacs. PI: Dr. Sharad Tiwari, Principal Scientist (PB), JNKVV. Jabalpur. Co-PI: Dr. L.P.S. Rajput, Dr. A.K. Naidu, Dr. S.B. Das, Dr. G.K. Koutu.
- Collection of elite material and model plantation of Jatropha. Trainees and farmers training for nursery management production and technology and marketing of Jatropha. Outlay: Rs. 2.54 lacs. PI: Prof. V.K. Gour, Senior Scientist (Pl. Breeding), Jabalpur. Co-PI: Dr. V.K. Shukla, Dr. Ajay Khare.
- National Network project on Integrated Dev, of Jatropha /Karanja. Outlay: Rs. 3.61 lacs/Rs. 3.37 lacs. PI: Dr. V. K. Gour (Jatropha)/ Dr. L. D. Kosta (Karanj).
- Rehabilitation of 3 plant tissue culture laboratories/Estt. of 2 leaf/plant tissue culture laboratories. (Jabalpur - Horti. Biotech). Outlay: Rs.19.61 lacs PI: Dr. P. K. Jain/ Dr. Sharad Tiwari. Co-PI: Muilti-location project, concerned station in-charge assist in the programme.

Agricultural Engineering

- Scaling of water productivity in agriculture for livelihood through teaching cum demonstration training of trainers and farmers at Powarkheda. Outlay: Rs. 28.50 lacs. PI: Dr. R. V. Singh, Principal Scientist (Agro) Powarkheda.

MPCOST Projects

- Conservation strategies for enhancing the use of genetic resources of small millets to ensure long term benefit to tribal farmers of Madhya Pradesh" Outlay: Rs. 10.11 lacs. PI: Dr. Abhivnav Sao, Scientist Dindori (PB). Co-PI: Dr. O.P. Dubey, Principal Scientist (Agro.).
- Data generation and evaluation of production technology of medicinal and aromatic plants using IT tools. Outlay: Rs. 1.59 lacs. PI: Dr. A.K. Rai, Assistant Professor, Instrumentation.

Govt. of Madhya Pradesh & its bodies

- Establishment of five Model Nursery of medicinal Plants under JNKVV. Outlay: Rs. 50.00 lacs. PI: Dr. A. B. Tiwari, Sr. Scientist , Jabalpur Co-PI: A. K. Nigam-PKD, S. C. Gautam - Sagar, PC -Mandla, PC of KVK - Dindori
- Rashtriya Krishi Vikas Yojna Development of Hybrid Technology -Tissue Culture Lab/Promotion of Honeybee. (Jabalpur and Powarkhda). Outlay: Rs. 2.27 lacs. PI: Dr. S.K. Rao, Dean Rewa & DF, Dr. Sharad Tiwari, Dr. A.K. Bhowmik, Principal Scientist.
- Exploration, collection and conservation of wild species and land races from eastern Madhya Pradesh. Outlay: Rs. 3.38 lacs. PI: Dr. P. Perraju, Scientist (PB), Rewa.

- Conservation and evaluation of germplasm of mango in Rewa district of Madhya Pradesh. Outlay: Rs. 3.40 lacs. PI: Dr. Rajesh Singh, SMS, (Horti.) Rewa.
- A cell on regular monitoring of Agro-Economics System. Outlay: Rs. 21.88 lacs. PI: Dr. H.O. Sharma, Professor, Jabalpur.
- Estt. of Referral Seed Testing Laboratory in M.P. Outlay: Rs. 85.42 lacs. PI: Dr. M.S. Bhale, Pr. Scientist (Pl. Patho), JNKVV, Jabalpur Co-PI: Dr. Dhirendr Khare,Pr. Scientist (PB), JNKVV, Jabalpur.
- High Temperature Tolerance in Wheat Outlay: Rs. 40.80 lacs. PI: Dr. R. S. Shukla, Pr. Scientist (PB), NKVV, Jabalpur.
- Strengthening and development of Regional research Station, Dindori Madhya Pradesh for improvement of small millets technologies and varieties. Outlay: Rs. 48.00 lacs. PI: Dr. O. P. Dubey, Principal Scientist, Agro), Dindori Co-PI: Dr. Abhinav Sao, Scientist.
- Strengthening of irrigation facilities for Breeder Seed Production and JNKVV Seed Farms/ Strengthening of Soil Testing Laboratories. Outlay: Rs. 250.00 lacs/ Rs. 251.00 lacs. PI: Director Farms, JNKVV, Jabalpur/ HoD, Soil Science, JNKVV, Jabalpur.Co-PI: Executive Engineer/ Assistant Engineers of concerned farms.

ICAR sponsored

- Niche area of excellence " Strengthening & Development of Medicinal and aromatic plants. Outlay: Rs. 30.00 lacs. PI: Dr. S.K. Dwivedi, Principal Scientist, Crop Physiology.
- Conservation, cultivation, processing & evaluation of Medicinal and aromatic plants under Plan Scheme Niche Area of Excellence. Outlay: Rs. 20.00 lacs. PI: Dr. S.K. Dwivedi, Principal Scientist.
- Development of extra large chickpea varieties for crop diversification under ISOPM, ICAR (IIPR). Outlay: Rs. 6.00 lacs. PI: Smt. A. Babbar, Sr. Scientist (PB).
- Modernization of Agricultural University Farms. Outlay: Rs. 35.00 lacs. PI: Dr. S. K. Rao, Director Farms.
- Integrated farming systems to ensure sustainable livelihood security for the peasants of disadvantaged districts of MP (NAIP). Outlay: Rs. 63.83 lacs. PI: Dr. Nalin Khare, Prof. & Head, Agril. Extension.
- Network project on harvest, processing and value addition of Natural resin and gums. Outlay: Rs. 6.00 lacs. PI: Dr. Moni Thomas, Sr. Scientist (Ento.) Jabalpur.
- Biotic Stress (Rusts) of wheat, Powarkheda Outlay: Rs. 0.95 lacs. PI: Dr. P.C. Mishra, Powarkheda.
- Business Planning and Development (BPD) Project Outlay: Rs. 204.67 lacs. PI: Dr. S.K. Rao, Dean, Rewa. Co-PI: Dr. S. D. Upadhayaya, Dr. S.B. Nahatkar, Dr. A. K. Dwivedi, Professor, Dr. N.G. Mitra, Dr. Dukhi Shyamkar.
- Increasing chickpea and pigeon pea production through intensive application of Integrated Pest Management. Outlay: Rs. 12.63 lacs. PI: Dr. A. K. Bhowmick, Principal Scientist, JNKVV, Jabalpur.
- Development of new plant type varieties with higher yield and in built resistance to major pest and disease. Outlay: Rs. 2.93 lacs. PI: Dr. G.K. Koutu, Professor (PB) Jabalpur.
- Network project on hybrid rice research. Outlay: Rs. 6.23 lacs. PI: Dr. G. K. Koutu, professor (PB), Jabalpur.
- Technology Mission on Cotton (TMC on cotton). Outlay: Rs. 284.00 lacs. PI: Dr. S. R. Dharpure, Principal Scientist (Ento) Chhindwara. Co-PI: Bhupendra Thakre, TA, Jyoti Tiwari, Ajay Singh, TA, Surya Prakash Malani, SMS.
- National Initiative on Climate Resilient Agriculture (NICRA) Balaghat, Chhatarpur Tikamgarh (3 KVKs) Outlay: Rs. 30.00 lacs.(10.00 lakh to each KVK) PI: PC KVK Balaghat, PC KVK Chhatarpur, PC KVK Tikamgarh.,

- Network Centre on National initiative on climate change resilient agriculture-AICRPDA-NICRA (ICAR). Outlay: Rs. 22.50 lacs. PI: Dr. D. D. Dubey, Principal Scientist OIC Dryland Agriculture, Rewa
- Weather based agro advisories and assessment of vulnerable areas of major food crops production zone. AICRPAM-NICRA (ICAR).Outlay: Rs. 11.80 lacs. PI: Dr. Manish Bhan Scientist, JNKVV. Jabalpur

Sponsored by other agencies

- Community managed bio-industrial watersheds for sustainable use of natural resources and enhanced livelihood. Outlay: Rs. 11.33 lacs. PI: Dr. B. Sachhidanand, Principal Scientist, Soil Science, Jabalpur.

International funded projects

- Enhancing chickpea Production in Rainfall Fall Land (PRFL) of Madhya Pradesh and Chhattisgarh. Outlay: Rs. 39.66 lacs. PI: Dr. S.K. Rao, Director Farms, JNKVV, Jabalpur.
- Improving heat tolerance in chickpea for enhancing its productivity in warm growing conditions and mitigating impact of climate change. Outlay: Rs. 8.33 lacs. PI: Dr. Anita Babbar, Professor/Principal Scientist (PB), Jabalpur.

CONSULTANCY PROCESSING CELL
Product Testing 2010-11

Name of Company	Product	Fee (Rs.)	Crop
BASF INDIA LTD., MUMBAI	Bavestine Fungicide	1,10,300	Soybean
	Insignia Fungicide	1,10,300	Soybean
	Persuit–herbicide	1,10,300	Soybean
	Stamina-	1,10,300	Soybean
	Topramizone	1,10,300	Maize
	Persuit+70%Wg herbicide	1,10,300	Soybean
	Basagran 40.3% AS herbicide	1,10,300	Soybean
	Verismo 22% SC Insecticide	1,10,300	Soybean
	Metaflumizone (Verismo) 22% FS insectcide-	1,10,300	Gram
	Pyrachlostrobin 20% FS (Insignia / Insure) Fungi -	1,10,300	gram
	Chlorphenapyr 10% SL (Intrepid 10% SC) Insecticide -	1,10,300	Cabbage
BAYER INDIA LTD., MUMBAI.	Paddy Hybrids at Jabalpur and Rewa	2,20,600	Paddy
	Soloman300OD Insctd	1,10,300	Soybean
	Imidacloprid 600 FS	1,10,300	Soybean
EXCELL INDUST LTD MUMBAI	Emidachloprid 0.3%	1,10,300	Soybean
	Tabuconazole 25%	1,10,300	Soybean
	Azoxystronin 23.5%	1,10,300	Paddy
	Difenoconazole 25%	1,10,300	Paddy
	Difenoconazole 25%	1,10,300	Paddy
	Kresoxim Methyl 44.3%	1,10,300	Soybean
	Amm. Salt Glyphosate :	1,10,300	Soybean
	Amm. Salt Glyphosate: Herbi	1,10,300	Soybean
	Bispyribac Sodium 10% for Nursary/ Transplant / Direct	1,10,300	Paddy
	Paclobutrazole-II season	1,10,300	Paddy
	Succeeding crop studies on		

Name of Company	Product	Fee (Rs.)	Crop
	Pacobutrazol	1,10,300	Wheat
	Succeeding crop studies		
	Bispyricbac	1,10,300	Wheat
Syngenta, Pune	seed testing	1,10,300	Paddy/ Maize
	Cruser 35 FS in Soybean(II nd season)	1,10,300	Soybean
	Emamectin Benzoate in Soybean/	1,10,300	Soybean
			Bengal gram
	Alka 247ZC in soybean (I st season)	1,10,300	Soybean
	Virtako40WG in soybean(I st season)	1,10,300	Soybean
	Cruser 35 /Maize	1,10,300	Maize
	Emomectin Benzoate,	1,10,300	Gram
MONSONTO INDIA LTD. MUMBAI	Maize Hybrids	1,10,300	Maize
Ralis	Ergon II nd season	1,10,300	Wheat
	RIL 071/F1 in wheat	1,10,300	Wheat
Crystal-p	Herbicide AMC	1,10,300	wheat
Amway, Noida	Spray Adjuant ASPA -80		
	in wheat with Herbicide	1,10,300	Wheat
	wheat with Fungicide	1,10,300	Wheat
Nagarjuna Fertl. Hyderabad	Testing/ performance of Soil testing kit	1,10,300	Soil testing kit
MAHYCO MUMBAI	Veg. Hybrd	1,10,300	Tomato
Parijat Agro Chem NewDelhi	Herbcd Imathpr	1,10,300	Soybean/ Wheat
Hindustan Pulverizing Mills, New Delhi	Fungcd SuperXL, in Chilli and Rice	2,20,600	Chilli and Rice
Biocare, Nagpur	Organic soil conditioner Paddy	1,10,300	Paddy
	Organic soil conditioner Wheat	1,10,300	Wheat
Modicare, New delhi	Avctiv -80 in paddy	1,10,300	Paddy
PNP Associates	Growth Regulator Dormax	1,10,300	Sugarcane
Indofil	Emamectrin Benzoate in	1,10,300	Brinjal/ Red Gram/
Vidharva Mrtwra Agro bio tec asso	HaNPV in chickpea	1,10,300	chickpea
Parijat Agro chem.. N Delhi	Imazethepyr 10SL succeeding crop study in Wheat	1,10,300	Wheat
Sharda World Wide	Imazethabyr IOSL and Oriezalafop-P ethyl 5% herbicide Soybean	2,20,600	Soybean
Sharda World Wide	Imazethabyr IOSL and Oriezalafop-P ethyl 5% herbicide Wheat	2,20,600	Wheat

EXTENSION

Jawaharlal Nehru Krishi Vishwa Vidyalaya has well established extension based centers which are situated at each college campaii, Zonal Research Stations, Regional Research Stations and Krishi Vigyan Kendras. At present, the State has two Agricultural Universities. The Directorate of Extension Services, located at Jabalpur monitors all the extension based programmes of the University. The publication aspect is being looked after by the Communication Centre located at Jabalpur. Twenty KVKs located at district level are controlled by this University. These establishments have following lead functions:

Lead function of extension centers

Directorate of Extension

Directorate of Extension is committed to serve farmers through well - organized network covering six agro climatic zones of the State. The channels for the transfer of agricultural and allied technologies are the direct approach to the farmers and indirectly by training of the master trainers of the extension agencies who own the responsibilities of transferring them to the ultimate users. The technologies are being transferred to the farmers through demonstrations, training programmes, field days, Kisan Melas, print and electronic media, maintaining a close linkage with Department of Farmers Welfare & Agriculture Development and other agencies for technological backstopping, covering 25 districts of the State. The motto of the university extension services is to "reach the unreached" through extension system in Madhya Pradesh. The main objectives of the Directorate are given below:

- Transfer of technologies, assessment, application, refinement and feedback for the researchers.
- Up gradation of knowledge and skill of extension functionaries as well as farming community.
- Development and dissemination of technologies through print and electronic media for mass communication.
- Catering needs of farming communities through single window system.
- Linkage with line departments.
- Reviewing the activities of KVKs and technological backstopping of KVK scientists and help in formulating action plan.

Communication Centre

- Publication of literature, bulletins, manuals, books and folders.
- Recording of radio programmes for broadcasting through All India Radio, Jabalpur

Agricultural Technology Information Centre (ATIC)

Agricultural Technology Information Centre has been established at Jabalpur to cater the needs of farming community in terms of technological informations, products offered for sale and services rendered by the university through "Single Window System" .A separate infrastructure under ATIC has been created with the following objectives:

- Strengthening the sale of Jawahar products like seeds, culture, planting material, vegetable seeds, medicinal and aromatic plants, farm implements, , poultry and dairy products
- Plant and animal clinic services
- Soil and water testing facilities
- Testing of new pesticide products
- Weather forecast based agro-advisory services
- Dissemination of technology through electronic and print media
- Agriculture Help Line on phone
- Kisan Call Centre

Krishi Vigyan Kendra

- Conducting "On Farm Testing" for identifying technology in terms of location specific sustainable land use systems.
- Organize training programmes to update the extension personnel with emerging advances in the agricultural research on regular basis.
- Organize short and long - term training courses in agriculture and allied vocations for the farmers and rural youths with emphasis on "learning by doing for higher production on farm and generating self-employment.
- Organize Front Line Demonstrations on various crops to generate production data and feed back information.

Location of KVKs

The KVKs are located in twenty districts under the administrative and technical control of this Vishwa Vidyalaya and establishment of KVKs are as fallows: Chhindwara (1982), Balaghat (1992), Seoni (1994), Shahdol (1994), Sidhi (1994), Tikamgarh (1994), Betul (2002), Panna (2002), Dindori (2003), Damoh (2004), Harda (2004), Hoshangabad (2004), Jabalpur (2004), Narsinghpur (2004) Rewa (2004), Sagar (2004), Chhattarpur (2005), Katni (2005), Mandla (2006) and Umaria (2006).

Transferable Technology accessed

New technique/technology may not necessarily be superior in farmers' conditions, even though their average performance over a wider region is superior. Conducting performance test on farmers' fields help in getting the feedback for required modification in the technology. Therefore, the objective of On Farm Testing (OFT) is to test and evaluate the research findings of the Research Stations at the farmers' fields and to refine and modify the technologies, if required for better adoption by farmers. It is confirmation of proven research results under real farming situations. Economically viable, operationally feasibly technologies matching with farmers' needs are identified to solve the problems faced by them.

The Krishi Vigyan Kendras under JNKVV assessed the technology of crop production and animal husbandry. The total of 251 OFTs were conducted under different thematic areas. Thematic area wise number of OFTs and area under them are depicted below:

It can be observed that maximum number of On Farm Trials were for crop production techniques followed by plant protection. The emphasis was also given for drudgery reduction for farm women under home sciences/ women empowerment and farm mechanization under agricultural engineering.

Some of the important technologies assessed by KVKs after diagnosing the problems of the area with major results are also given

1. Varietal Assessment

Problem- Low yield of soybean due to use of old varieties.

Technology Assessed- Improved variety of soybean JS 95-60.

KVK Jabalpur, Tikamgarh, Harda and Dindori conducted OFTs on evaluation of short duration soybean variety JS 95-60. On an average 31 percent increase in yield was recorded at farmer's fields.

Problem- Low yield of paddy due to use of old varieties.

Technology Assessed: Hybrid rice JRH 8.

KVK Mandla and Shahdol conducted OFT on evaluation of JRH 8 rice variety under rainfed conditions. The hybrid rice performed better in tribal areas too. On an average 48 per cent increase in yield was recorded at farmers' fields.

Drudgery reduction in farm women

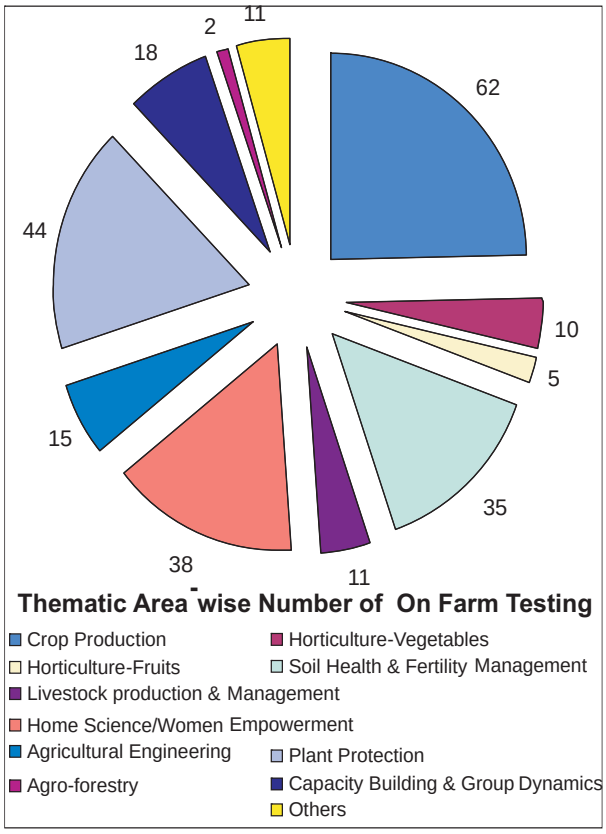
Problem: High drudgery and low efficiency of farm women involved in cleaning and grading of grains

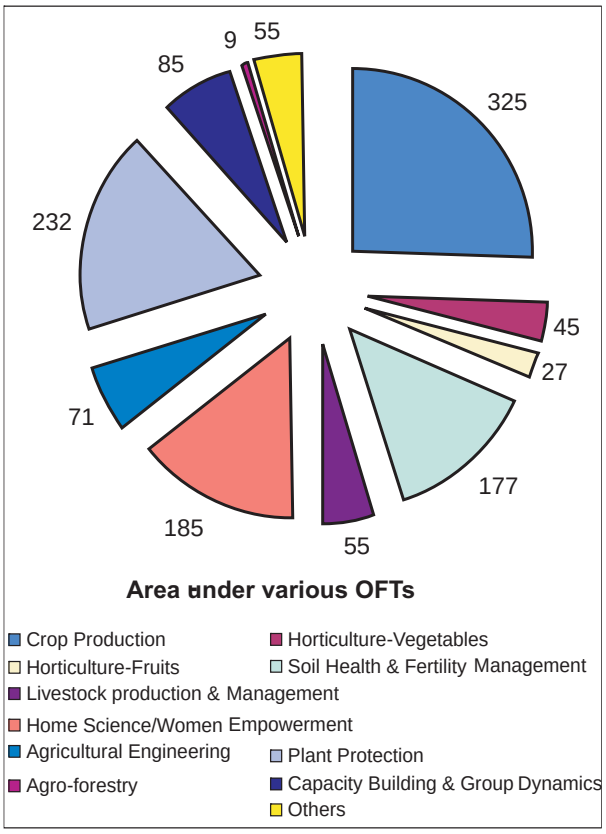
Technology assessed: Hanging sieve for drudgery reduction and efficiency enhancement of farm women during cleaning and grading of grains

Cleaning and grading of grains by hanging sieve was assessed by KVK Chhindwara, Mandla, Narsinghpur, Rewa and Sagar by conducting 29 trials. Manual cleaning of grains takes too much time as well sitting and

Table : Performance of Soybean variety JS 95-60

Technology Option	Number of trials	Seed Yield (q/ha)	B:C Ratio
Farmer's Practice			
Use of local seed of soybean	21	13.33	1.7
Assessment of improved variety of soybean JS 95-60		17.47	2.3





Soybean variety JS 95-60

bending posture causes muscular disorders. Hanging sieve is hanged by rope, thus load of sieve and grain is partially born by woman.

Resource Conservation Technology

Problem: No income from aonla plantation before fruiting and improper utilization of available land**.**

Technology assessed: Performance assessment of sesame under aonla plantation

KVK Jabalpur conducted 4 trials on farmer's plantation of aonla. TKG-8 variety of Sesame was taken. Yield of sesame was 5.35 q/ha with benefit cost ratio of 1.84.

Problem- Low yield of paddy due to non adoption of System of Rice Intensification

Technology Assessed - System of Rice Intensification (SRI)

Two KVK namely Narsinghpur and Rewa assessed System of Rice Intensification under semi-irrigated condition. A total of 15 trials

Technology Option	No. of trials	Yield (q/ha)	B:C Ratio
Farmers' practice			
Use of local seed of rice	8	25.95	1.58
Assessment of hybrid rice variety JRH 8	8	38.35	2.28

Table: Performance of hanging sieve for cleaning and grading of grains

Technology Option	No. of trials	Output (kg/hr)	Drudgery Reduction (%)	Increase in efficiency (%)	Labour cost Rs./day
Farmers' practice					
Manual cleaning	29	12	0	0	450
Use of Hanging sieve for grading and cleaning	40	8	70	150	

Hybrid Rice JRH 8

Sesame TKG-8 under Aonla plantation

System of Rice Intensification

were conducted. It was observed that yield of paddy in SRI has increased by 48 per cent over traditional practice; whereas increase in net return was 60 per cent.

Water Management

Problem- Low yield due to uneven application of water through flooding method

Technology assessed - Assessment of border strip method of irrigation in wheat

Katni KVK conducted 45 trials on border ship method irrigation. Borders were made at spacing of 2.5 m on fields 0.15 per cent slope. Increase in yield and net return was 18 and 25 per cent respectively, due to even application water by borders.

Integrated Pest Management

Problem- Yield reduction due to heavy aphid infestation in mustard

Technology Assessed- Integrated pest management by removal of infested twings and application of Imidacloroprid @ 1.250 ml ha^{-1}.

KVK, Tikamgarh conducted 5 trials on integrated pest management under irrigated mustard crop. On an average 20 per cent increase in yield was recorded.

Transferable Technology transferred

To demonstrate the latest location specific proven technologies of agriculture and allied entreprises among the farmers community, activities have been carried out under Front Line Demonstrations (FLDs). Total 219 demonstrations were conducted to cover 1154 farmers' fields directly and many more farmers exposed with field days and sangoshtis.

Impact of Technology transferred

The impact of technology transferred by the KVK is depicted as increase in yield/value of crops or enterprises over the existing practices. More than 50 per cent increase has been recorded in case of value addition and integrated crop management practices.

New Innovation- Sugarcane Bud Chipper

Shri Rosanlal Vishwakarma, Village Mekh,

Table: Performace of sesame under aonla plantation

Technology Option	No. of trials	Seed Yield (q/ha)	Net return (Rs./ha)
Farmers' practice			
No crop under aonla	4	-	-
Sesame crop under aonla plantation	-	5.35	10400

Table: Assessment of SRI

Technology Option	No. of trials	Seed Yield (q/ha)	Net return (Rs./ha)
Farmers' practice	15	47.05	32725
SRI	-	69.90	52325

Borders for irrigating wheat

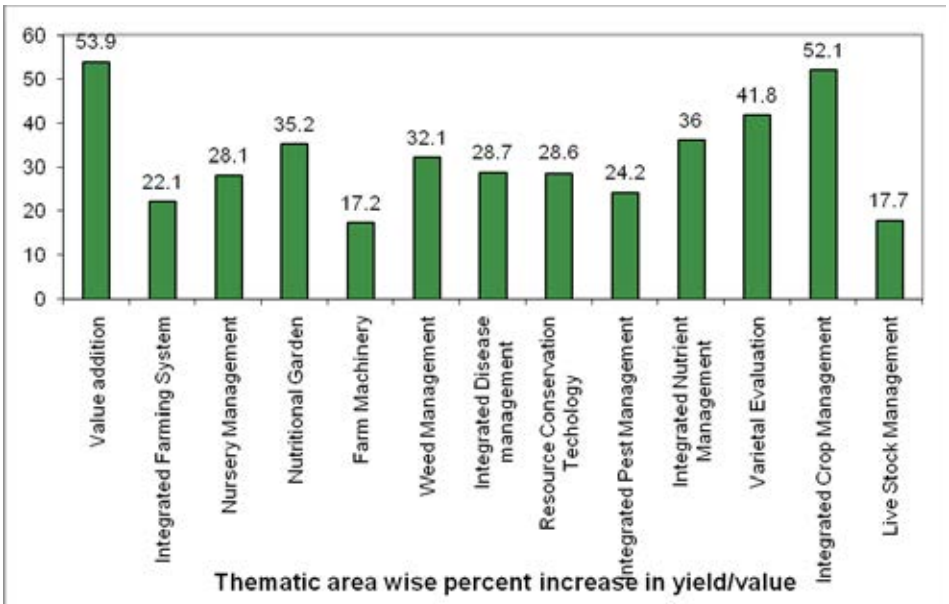
IPM in Mustard

Table- Assessment of Border irrigation on wheat crop

Technology Option	No. of trials	Seed Yield (q/ha)	Net return, Rs./ha
Farmers' practice			
Flood irrigation	5	38.3	32745
Border Irrigation		45.3	40795

Table- Assessment of IPM of aphid in mustard

Technology Option	No. of trials	Seed Yield (q/ha)	Net return, Rs./ha
Farmers' practice	5	13.50	30515
Removal of infested twings and application of Imidacloroprid @ 0.33 ppm		16.25	35900



Demonstration for use of local jute in handicrafts

FLD on IPM-Gram

FLD on Wheat Variety HI-1544

FLD on nursery management in cabbage

Guava Pruning

System of Rice Intensification

Kharif Onion

Dual purpose breed of poultry bird

Demonstration of Rotavator

IPM in Soybean

Tissue Culture Banana

FLD on gram under NFSM programme

Sugarcane Bud Chipper

Block- Gotegaon Distt-Narsinghpur (MP) developed sugarcane bud chipper which have a half moon shape sharp knife fitted in iron handle with spring system, which is manually operated. Pressing of handle, separated sugarcane bud by chipper and can be adjustable as per width of sugarcane. Innovative sugarcane bud chipper is simple to operate and portable. This bud chipper could be able to separate300-500 buds/hour. It require 90% less seed material 13 q weight of buds for sowing in place of 125 q as in traditional practice of sowing sugarcane sets. Raw material of seed (112 q, cost Rs. 33600/- per ha.) after separating the buds can be utilized for making gur and sugar. Germination per cent of sugarcane bud is 40% higher as compared to traditional system of planting (30%). Many sugarcane growers attracted for this and lot of demand developed for this device. Farmers could able to sold 1500 such devices at a price Rs. 1000/-

Output: Bud chipper could be able to separate 300-500 bud/hour

Outcome: Germination percent of sugarcane bud is 40% higher as compared to traditional system of planting (30%).

Impact : Higher output in less time, easy to operate, higher germination of sugarcane bud.

Trainings Organized

Training is considered a key component for updating the knowledge and imparting the new skills to the participants. KVK is organizing regular training programmes for farmers as well as farm women and extension workers of line departments. In all, 1891 training courses were organized for 54473 participants of various categories.

Training on value adition

Training on seed production

Field visit

Field visit

Crop Cafeteria

To demonstrate the performance of different varieties of various crops in one place, crop cafeteria has been established in all the KVKs. Various promising varieties of important crops of the area are sown and demonstrated to farmers and other visitors in both the crop season.

Technology Generated at College of Agriculture, Rewa

Varietal release, development of potential cropping systems, natural resource management, nucleus, breeder and Jawahar seed production of all major crops, conservation of plant diversity, integrated management of plant nutrients, weeds, insect pest and diseases etc. have been generated. Important technologies of this college are:

- The main technologies generated by the college have been popularized among farmers of the region namely, SRI, ridge furrow system, varietal replacements etc.
- Technology for Soybean - Pigeonpea, Kodo, Kutki intercropping developed to maximize the returns.
- Chemical weedicides (Persuit and Terga Super) identified for weed management in standing crop of soybean.
- Soybean-chickpea sequence has been found more remunerative.
- Lentil crop was found to be most remunerative after rice in light soil. Technology for water management (watershed) for rain fed crops and dryland farming.
- Technology for water management (watershed) for rain fed crops and dryland farming.
- In rainfed agriculture for efficient use at water 10% area of total field will be utilized for water harvesting tank.
- Nitrogenous fertilizer reduces the incidence of Striga sp. in Kodo millet Seed treatment with Carbendazim and carboxin are effective to control head smut in kodo and grain smut in little millet
- Double hedge row system of planting technology developed for more production in mango cv. Amrapali.
- Sowing of soybean cv. JS93-05, Rice cv PS 3, MR219, WGL 32100, Dhansweri, Wheat cv. HD 2864, Shimla Mirch cv. California Wonder, Garlic cv. G 323 are more remunerative under irrigated condition.
- Rice hybrids Pro-Agro 6444, KRH-2, JRH-4, JRH-5, PAC-801 and PRH-10 were found most promising rice for obtaining higher grain yield (80-90 q/ha) under irrigated ecosystem.
- Newly evolved fungicides Sivic 75WP, Tilt, Tricyclazole, Contaf, Result 25 EC @ 1 ml/lit. were found highly effective for controlling the leaf blast of rice.
- Bio-pesticides, Wanis, Neem gold, Biotos @ 5 ml/l were highly effective for the management of leaf blast of rice.
- Chlorothalonil (Kavach) 75 WP, Kocide 77 WP were found highly effective fungicide for the control of false smut of rice.
- Granular insecticide Carbofurom @ 1000g ai/ha, Monocrotophos 2ml/l were found highly effective insecticide for the management of rice pest effectively.
- Compatibilty of insecticide and fungicide studied. Coragen was found compatible with fungicide contaf and Bann.
- Blue green Algae and Azolla were introduced at Rewa and popularized as bio-fertilizer among the farmers.

Transferable technology Impact assessment

Technologies developed by the research projects were successfully demonstrated in the region through FLD's under All India Coordinated Research Project, State Plan Adhoc Research Project and KVK's.

Extension Activities at College of Agriculture, Tikamgarh

Assessment of Soybean variety JS 95-60
Problem: Yield reduction(15%) due to moisture stress at flowering and grain formation stages and early withdrawal of rainfall (affected area 2000 ha)

Assessment of Paddy variety JR - 201
Problem: Low yield (575 Kg/ha) due to traditional variety under upland condition (affected area 3000 ha)

Assessment of Integrated Pest Management (IPM) in Soybean
Problem: Yield reduction (20%) due to infestation of girdle bettle, semi-loopers, and stem fly (affected area 65%)

Assessment of SRI method of transplanting in paddy
Problem: Low yield (20 q/ha) due to conventional transplanting method of paddy (affected area 600 ha)

Assessment of Papaya variety- Pusa delicious
Problem: Low yield (4.5 t/ha) due to local long duration variety (affected area 25 ha)

Assessment of integrated wilt management in gram
Problem: Low yield (12.0%) in yield due to heavy incidence of wilt under rainfed condition

Assessment of wheat variety JW-3173 under limited irrigation condition
Problem: Low yield (22%) of old variety HD 1553 due to availability of limited irrigation (affected 45%)

Assessment of planting geometry (15 x 10 cm) in onion
Problem: Low market value due to high planting density resulting small size of bulb (affected area 85%)

Assessment of integrated management of aphid in mustard
Problem: Yield reduction (16% due to heavy aphid infestation in mustard (affected area 75%)

Assessment of growth regulator NAA in bottle guard
Problem: Low yield (25%) due to less numbers of female flowers (affected area 60%)

Assessment of cauliflower variety Snow white (Hy.)
Problem: Low income of farm women due to cultivation indigenous variety of cauliflower (affected area 35%)

Assessment of value addition in Ber fruit (Zizuphus spp.) for income generation among farm women
Problem: Low income of farm women due to no value addition in Ber fruit (Zizuphus spp.)

Assessment of balance feeding in pregnant buffaloes
Problem: Low milk yield (700 lit./lactation) due to non-adoption of green fodder and balanced ration

Assessment of tubular maize Sheller for drudgery reduction and increased efficiency of farm women involved in maize shelling
Problem: High drudgery and low efficiency of farm women involved in maize shelling manually

Demonstration on production technology of Black gram
Problem: Low yield due to adoption of local variety(T-9) , non adoption of weed control practices and use of imbalance fertilizer dose (4:11:0 NPK Kg/ha)

Demonstration on production technology of Gram
Problem: Low yield due to local variety (khazoa), use of imbalance dose of fertilizer and heavy infestation of insect pest and incidence of wilt.

Demonstration on production technology of Soybean
Problem: Low yield due to broadcasting method of sowing, old variety JS 335, use of imbalance fertilizer (9:23:0 NPK Kg/ha) and indiscriminate use of insecticides.

Demonstration on production technology of Mustard
Problem: Low yield due to use of imbalance dose of fertilizer (40:20:0 NPK Kg/ha) , indiscriminate use of insecticides.

Varietal replacement of Maize variety JM-216
Problem: Low yield (416 kg/ha) of maize due to adoption of long duration of long duration degenerated maize varieties (affected area 1200 ha)

Demonstration of Ridge and furrow method
Problem: Yield reduction (21%) due to broadcasting method of sowing and erratic rainfall pattern in medium black soils (affected area 20,000 ha)

Demonstration of Kharif Onion
Problem: Low benefit (Rs/ha) due to excess production of Rabi season onion

Demonstration of serrated sickle for harvesting of Soybean
Problem: Low efficiency 7 high drudgery of farm women in harvesting of Soybean

Variety replacement in chilli-Super Disha (Hy.)
Problem: Low yield (50q/ha) of chilli due to local variety (affected area 300 ha)

Variety replacement in wheat-GW-322
Problem: Low yield (22%) due to old variety (HD-1553) (affected area 35%)

Variety replacement in Tomato-Narendra -6
Problem: Low yield (35%) due to local variety (affected area 69%)

Variety replacement in Brinjal- Pant Rituraj
Problem: Low yield (26%) due to local variety (affected area 65%)

Variety replacement in Marigold- Pusa Narangi
Problem: Low income of farm women due to use of local marigold variety Tarru (affected area 95%)

There was very good impact 20-30% in the region particularly replacement of seeds, adoption of hybrid rice and plant protection measures.

Radio Talks

The following radio talks recorded during the 2010 at Communication Centre studio and spools were given to AIR Jabalpur for broadcasting in programme "Krishi Vishwa Vidyalaya Se Kheton Tak" on every Monday between 7.20 to 8.00 pm (Prime Time).

January

- Spray of nitrogen and phosphorus fertilizers in standing crops - Dr. V.B.Upadhyaya
- Identification of major insects of gram and their control - Dr. Abhishek Shukla
- Major diseases of oilseeds and pulses of rabi and their contro - Dr. U.K.Khare
- Feed management in milk animals - Dr.A.K.Gour

February

- Cultivation of summer black gram and green gram - Dr. K.R.Naik
- Cultivation of summer cucurbits - Dr. P.K.Jain
- Improved package of practices of water melon and musk melon -Dr.A.K.Naidu
- Production technology for summer fodder -Dr. S.K.Bilaiya

March

- Production technology for oyster mushroom - Dr. Sushma Nema
- Diseases of summer black gram and their control -Dr. Smt. I. Badera
- Insects of summer black gram and their control - Dr. S.B.Das
- Earn profit by pig husbandry -Dr.J.P.Lakhani

April

- Improved storage of onion and garlic - Dr.V.K.Verma
- Crop insurance scheme – boon to farmers-Dr. P.K.Jain
- Safe storage of grains - Dr. Smt. S.Rao

May

- Mouth and foot dresses of cattle, reasons, treatment and prevention-Dr. L.L.B.Rao
- How to protect stored grains from insects - Dr. A.S.Thakur
- Prepare soya milk, cheese and topo at home-Dr. Smt. A. Pandey
- Soil testing method-Dr. A.K.Dwivedi
- Benefit and procedure of seed treatment of kharif crops-Dr. A.R.Vasnikar

June

- Improved cultivation of soybean crops - Dr.A.N.Shrivastava
- Improved production technology of hybrid rice-Dr.G.K.Koutu
- Improved production technology of Sesame and Niger crops -Dr.M.R.Deshmukh

July

- Methods of preparation of budded plants of fruits -Dr. S.K.Pandey
- Improved production technology for asgandha - Dr.A.B.Tiwari
- Earn more profit by fish seed production - Dr.A.K.Mandloi
- How to control weeds in major kharif crops - Dr. M.L.Kewat

August

- Major insects of soybean and control measures-Dr. A.K.Bhowmik
- Major insects of sesame and niger, identification and control -Dr.Rajesh Pachouri
- Major diseases of paddy, identification and control -Dr. S.P.Tiwari
- Major insects of paddy, identification and control-Dr. O.P.Veda
- Distillation and preservation of oils of aromatic plants-Dr. Mrs. A. Upadhyaya

September

- How to prepare vermin compost -Dr. S.B.Agrawal
- Improved production technology of chandrasur-Dr. S.K.Dwivedi
- Improved production technology of pea-

Dr. A.K. Naidu

- Methods and advantages of seed treatment of rabi crops-Dr. A.K. Vasnikar

October

- High yielding varieties of wheat at low investment- Dr. R.S.Shukla
- Improved production technology of linseed- Dr. S.K.Vishwakarama
- Improved production technology of Gram-Dr. Smt. A.Babbar
- Improved production technology of Wheat -Dr. D.K.Pahalwan

November

- Berseem cultivation for green fodder and seed production-Dr. B.B.Ghode
- Improved methods of irrigation-Dr. M.K.Hardaha
- Production techniques of Marigold - Dr. B.R. Pandey
- Production techniques for late sown wheat -Dr. V.K.Shukla
- Honeybee husbandry – a profitable business - Dr. A.K. Bhowmik

December

- Fruit and vegetable preservation at rural level-Dr. Smt. S. Gour
- Improved production technology of mentha -Dr. Naveen Patle
- Major insects of rabi pulses and control measures -Dr. A.K.Bhowmik
- Major insects of rabi pulses and control measures -Dr. S.B.Das
- Major diseases of rabi pulses and control measures-Dr. Smt. Om Gupta

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Radio programme- College of Agriculture, Tikamgarh

Title of Radio Talk broadcasted from Akashvani Chhatarpur

• **रबी सब्जियों के सामयिक कार्य** 09.11.2010	Dr. Smt. Swati Barche, Asstt. Prof.(Hort.)
• मृदा परीक्षण विधियां एवं मृदा जल प्रबंधन । 14.05.2010	Dr. B.K. Dixit, Asstt. Prof. (Soil Science
• सोयाबीन की फसल में सामयिक सलाह, आकाशवाणी • केन्द्र, छतरपुर, 23.08.2010 • अधिक दुग्ध उत्पादन के लिये वर्ष भर चारे की • उपलब्धता, आकाशवाणी केन्द्र, छतरपुर, 12.03.2011	Dr. Namrata Jain, Asstt. Prof.(Agronomy)
• **मूंगफली की खेती वैज्ञानिक ढंग से** on • 2.6.2010 at All India Radio, Chhatarpur (M.P.).	Dr. V.K. Singh, Asstt. Professor (Horticulture)
• **फलों का फटना व गिरना कारण व बचाव** on • 8.10.2010 at All India Radio, Chhatarpur (M.P.).	Dr. V.K. Singh, Asstt. Professor (Horticulture)
• किसान भाई स्वयं बीजोत्पदन हेतु बीज • ग्प्रमयोजना का लाभ केसे प्रोप्त करें • on 2.6.2010 at All India Radio, Chhatarpur (M.P.).	Dr. S.P. Singh, Asstt. Prof. (Extn. Edu.)
• Insect and diseases in Sorghum and Bajra • under Gram Sabha, 16.8.2010,Graha Vatika me • Samyak karya, Gharni programme, 110.2.2011	Sh.B.L.Sahu, SMS (Hom.Sci.)
• Cultivation of Kodon,Kanun and Sawan on l • on rainfall condition, 29.06.2010	Dr. R.K.Prajapati , SMS (Plant Prot.)
• Cultivation of Sanai (*Crotolaria juncea*) for Seed • and Fibre, 04.06.2010, 07.06.202010	Dr. Rupendra Kumar, SMS (Agil.Ext.)

TV telecast (Bhopal Doordarshan, (Krishi Darshan) 6.21 pm)

Period	Title	
June 2010	Value addition in Ber – preparation of Ber surbat	Sh.B.L.Sahu, SMS (Hom.Sc.),
Feb. 2011	Nutritional garden – to control mal nutrition of farm women	
16/04/2010	Benefits of organic farming	Dr.R.K.Prajapati, SMS (Plant Prot.)
23/04/2010	Cultivation of fruit crops	
04/05/2010	Seed Producation of wheat	
04/06/2010	System of rice intensification	
27/07/2010	Cultivation of soybean	
03/08/2010	Cultivation of vigana spp.	
19/10/2010	Cultivation of wheat	
09/11/2010	Cultivation of mustard	
14/12/2010	Cultivation of cauliflower groups vegetables	

Radio programme:- Radio talk delivered by the following scientist of College of Agriculture, Rewa

1. 11 May, 2010–Dr. M.A. Alam (Professor Entomology) "Pest of summer vegetables".
2. 18 August, 2010 – Dr. M.A. Alam (Professor Entomology) "Tamater aur Baigan men Krishi Raksha Karya".
3. 23 October, 2010 – Dr. M.R. Dhingra (Scientist Entomology) "Tamarter aur Baigan ke phasal men keet aur rog niyantran".
4. 31 December, 2010 – Dr. S.K. Tripathi (Professor Pathology) "Management of Rabi diseases.
5. 4 January, 2011–Dr. M.A. Alam (Professor Entomology) "Chana, Matar aur massor phasal men keet niyantran,
6. 7 February, 2011–Dr. M.R. Dhingra (Scientist Entomology) "Telhani phasalo men Krishi karya".

Kisan Mobile Advisory

This innovative programme was started through seventeen selected KVKs with the objective to enhance the process of dissemination of need based recommendations based on the weather conditions and need of the farmers. In all 1217 messages were sent to 13,962 farmers.

Other Extension Activites

Various extension activities carried out have been summarised in following table given below:

Activity	No.	Participants
• Field Days	125	5504
• Kisan Mela	36	42345
• Kisan Gosthi/Farmers Meeting	133	8206
• Ex- trainees Meet	30	1153
• Diagnostic Visit to farmers Fields	692	4577
• Farmers Visits at KVK	2632	17818
• Exhibitions	34	25730
• Workshop	4	96
• Radio Show	171	Mass
• TV Show	108	Mass
• Film Show	336	8352
• Special Day Celebration	3	124
• CD Show	3	124
• Lecture delivered by the KVK Scientists	1144	23932

Publications

Krishi Vigyan Kendra wise list of extension literature and other publications

KVKBalaghat:
Popular Articles

- Improved seeds- Today Need
- Disease caused by the low intake of vital nutrients in the diet

- Dhan beej ke samanya sindhant evam vidhiyan
- Balaghat ke kisanon ne swyam ke khet men banaya sankar dhan ka beej
- Breeding and care of ornamental fishes
- Improved variety of Pig
- Poultry production and their management

Extension Publication

- Tikau Kheti –Jaiwik Kheti Genhu ki unnat saghanikaran vidhi
- Dhan ke unnatsheel prajatiyan
- Ornamental Fish Culture
- CD Developed
- Organic Farming
- Ornamental Fish
- SRI Method for paddy

KVK: Betul

Extension Publication

- Pramukh Sabziyo ki Utpadan Taknik-Booklet

KVK: Chhatarpur

Extension Publication

- Biofertiliser and its application
- Bio-control of Insect and diseases
- Water conservation
- Seed production of Soybean
- RAWE activities
- Popular articles
- Betelvine cultivation and disease control –Kheti (ICAR)–Sept 10-Ashish Kumar Tripathi

KVK: Chhindwara

Extension Publication

- Chhindwara Zile ki kharif phasalen (unnat krishi takneek)
- Dhania
- Trikodarma dwara pyaj evam lashun ke pramukh mitti janit rogon ka prabandhan
- Pyaj utpadan ki unnat vidhi
- Pyaj evam lahsun ke poshak tatwa evam aushadhiya gun
- Makka phasal
- Soybean phasak ki unnat utpadan takneek
- Chana ki unnat kheti
- Gehun ki unnat kheti

KVK: Damoh

Extension Publication

- Mushroom : kheti evam vyanjan vidhiyan
- Jaivik kheti margdarsika
- Jaivik Kheti ke liye kenchua khad utpadan taqnique
- Adhiktam krushi utpadan ke liye gouvansh adharit panchamrut sanskar
- Pyaj ki kheti
- Tamatar ki unnat kheti
- Jaivik kheti mein upyogi NADEP khad
- Ausdhiy poudhon ki krushi taqnique
- Samanvit keet prabandhan
- Chana utpadan taqunique
- Kharif faslon mein nida niyantran
- Jaivik kheti mein upyogi jeevamrut
- Jaivik hari khad
- Drip irrigation system

KVK: Dindori

Popular articles

- Narvai Jalane Se Kheto ko ho raha nuksan.Dainik Bhaskar ,06 April 2010, Page No. 10
- Insect Pest Management in Mango, Krishak Doot, 13 to 19 April 2010, Page No. 5
- Canopy Management in Fruit Plants , Krishak Doot 20 to 26 April 2010, Page No. 11
- Narvai Na Jalaye Kisan , Krishak Doot20 to 26 April 2010, Page No. 2
- Production Technology of Ramtil, Krishak Doot,3 to 9 August, 2010, Page No. 6 &13,
- Phasalo ko Deemak se Bachaye, Krishak Chetana,Sept-Oct.2010,Page No.35
- Phasalo ko Deemak se Bachaye, Krishak Doot, Dec.2010,Page No.10
- Traditional Treatment of Animal Diseases, Krishak Doot 11 to 17 Jan, 2011, Page No. 6
- Phasal kei Shatru Chuhe,Krishak Chetana,Jan-Feb.2011,Page.No.13 &26

Extension Publication

- Aamle kei Vividh Vyanjan
- Anajo , Khadyano va beejo ka surakshit bhandaran
- Baigan Ki Unnat Kheti
- Beej Upchar kyo Awashyak hai
- Bhumi Samtal Karne Ka Yantra
- Chuho ka Safal Niyantran
- Control of Soil and Seed Born diseases
- Improved Cultivation of Chilli.
- Insect Pest Management in Arhar
- Insect Pest Management in Gram
- Insect Pest Management in Paddy
- Insect-pest Management in Okra.
- Integratd Disease Management in Cucurbitaceae crops.
- Integratd Disease Management in Paddy
- Jal Nikasi

- Jal Sangrahan Jalashay
- Jal Shudhikaran Avam Jal Sansadhan Swachata
- Kaise Bachayen Sinchai Jal
- Khet Taiyari ke Yantra
- Lahsun Ki Unnat Kheti
- Mrida Apardan
- Mrida evam Jal Sanrakshan Taknik
- Mrida parikshan hetu mitti ke namune akatra karne ka tarika va suchna patrak
- Mushroom Utpadan Taqnik Avam Prachar Prasar
- Pani Uthane Ke Upkaran
- Phalo kei Parirakshit Patarth
- Plant propagation through stem cutting and gooti method.
- Soyben se banne wale vyanjan
- Tomatar Ki Unnat Kheti
- Unnat Krishi Yantra
- Varsha Jal Sangrahan
- Wilt Management in gram

KVK: Harda
Popular Articles

- Tamatar ke pramukh keet, rog evam unka samuchit prabandhan- Bhumi Nirman- 15th Oct 2010
- Tamatar ke pramukh keet, rog evam unka samuchit prabandhan- Krishak doot; 14-20 September,2010
- Phool evam patta gobhi men I.P.M., 7-13 September,2010
- Kharif dalhani evam tilhani phasalon men zinc ka matatva- Krishak doot; 31 August- 6 September 2101
- Moongphali men akikrit NashiJeev prabandhan- Bhumi Nirman- 16th Sep 2010
- B T Kapas men akikrit padap poshak tatwa prabandhan- Bhumi Nirman- 16th Sep 2010
- Dalhani phaslon men gandhak ki upyogita- Krihsak Doot; 7-13 Sep, 2010

Extension Publication

- Ganna utpadan takneek
- Usar bhoomi men phalon ki kheti
- Dhan utpadan hetu Medgaskar paddhati
- Sabjiyon ke bharpoor utapdan hetu unnatshil prajatiyan
- Chane ki phasal men akikrit NashiJeev prabandhan
- Sabjiyon men akikrit nashi jeev prabandhan
- Phaslotpadan badane evam pride swasthaya hetu jaiv urvarkon ki upyogita
- B T kapas utpadan takneek
- Mitti parikshan evam uske labh
- Guno se barpoor soubean
- Make ke poustik vyanjan
- Soybean beej utpadan takneek
- Gehun beej utpadan takneek
- Jaivik kheti

KVK: Hoshangabad
Popular Article

- Phoolgobhi me dehik kriyatmak vicar evam unka samadhan
- Mirch ki unnat kheti
- Medhnali padhati se soybean ki kheti Kharif visheshank
- Poshan udhyan me ugai jane vali mahatvapurna vriksh our unka poshniya evam aushadhiya mahatva
- Bordo mishran, sasta sulabh avem prabhavi fafundnashak.
- Swasthya sishu ahar – stanpan
- Til Utpadan ki unnat Krishi takneek va mahatva
- Medhnali padhati se soybean ki kheti Kharif visheshank
- Balika Kuposhan ki samapti me parivar ki chunotipurna Bhoomika
- Hari pattedar sabjiyan : sukshm poshaktatva janit kuposhan ka samadhan
- Ankurit bhojya padarth sasta saral evem poushtik bhojan
- Ageti mater ki unnat kheti labh adhik deti
- Zero tillage our ferb technology
- Gehun ki fasal ke pramukh rog our keet
- Vagyani vidhi se mirch ki kheti se adhik labh kamayen
- Baingan ki unnat Krishi takneek
- Ageti mater ki unnat kheti labh adhik deti
- Krishi ayogya bhomi me aushdheeya faslon ki kheti ek atirikta amdani ka shrot
- Swasth shareer ke dushman char namak, tel, shakker avem mansahar
- Til ka oushdiya avem poshniya mahatva

Extension Publications

- Madhya Narmada Ghanti me Gehu Utpadan ki naveentam krishi takneek
- Pasal suraksha evam utpadan vridhi ki kam lagat takneek

- Paudh prasaran takneek
- Jaivik Kheti

KVK: Jabalpur

Popular Articles

- Kam lagat wali kheti
- Clonal ukeliptis ropan takneek
- Jal graham kshetron ke vikas ke liye upyukt poudh prajatiyan evam ropan takneek
- Akunran parikshan uprant kare boni
- Amrood Kaise hoon Khub.Farm
- Kam Samay Me Jyada Munafe Ke Liye Papita Ki Kheti
- Amrood Ke Paude Taiyar karne Ki Unnat Taknique
- Nai Phalo-Udyan Ki Stapna Evam Uski Dekhbhal
- Ageti sabji Matar Ki Kheti
- Kharif Piyaz Ki Kam lagat Taknique
- Papite Ki Safal Bagwani Ke liye-Unnat Kisme
- Baigan ki adhunik kheti
- Muli ki kheti labh dheti
- Amrood ki phasal ko kidon se bachayen

KVK: Katni

- Popular articles
- Environmental imbalance due to imbalance use of agro chemicals and human health
- Effect of agro chemicals on soil and soil microbial processes
- Resource management for soil health and sustainable agriculture
- Soil and environmental pollution: Causes and remedies
- Ideal soil sample collection and storage
- Technique of goat farming
- Feed management of livestock in summer season

Extension Publications

- Production technology of Gram

KVK: Mandla

Popular articless

- Poustikta se bharpoor – Aloo , Krihsak Doot Bhopal, 10-16 Aug 2010
- Sabjiyon ka badshah – Aloo, Krishak Samaj Vikas February 2011
- Amritphal aanwle ke swasthyavardhak gun evam parirakshan, 9-15 Nov 2010
- Tamatar ki unnat kheti, Krishak Samaj Vikas December 2010
- Jal ki Mahtta evam pradooshit jal se hone wali bimariyan, Jeevan, R.D.G. C 2010-11

Extension publications

- Moong avam Urid ki unnat krishi karyamala
- Kadduvargiya phaslo ki utpadan takniki
- Ganne se gur banane ki unnat takniki
- Murgipalan hetu prabhandhan takniki
- Tamatar ki unnat kheti

KVK: Narsinghpur

- Popular articles
- Soybean mein kharapat,keet evm rog niyantran
- Parval ki vaigyanik kheti
- Keetnashak ke dushparinam
- Ganna keet evm unka niyantran
- Tamatar ki kheti

Extension Publications

- Moong ki vaigyanik kheti evm samanvit rog evm rog keet niyantran
- Soybean utpadan takniki
- Urd ki vaigyanik kheti , samanvit rog evm rog keet niyantran
- Arhar unnat utpadan takniki evm podh saranhshan
- Kenchuo dwara nirmit khad-kheti ke liye vardaan
- Jaiv urvarko ki upyogita evm prayog
- Ganna utpadan taknik
- Masoor ki unnat krishi taknik
- Chane mein lagne wale keet evm unka niyantran
- Gehoon ki unnat kheti
- Oyester mushroom utpadan taknik
- Miit parikshan ki upyogita
- Rabi 2010-11 hetu takniki sujhav

KVK: Rewa

- Popular articles
- Bhojan Pakane ki Unnat Vidhi Dwara Paushtik Ahar
- Saghan Dhan Paddhti (Shri Paddhati) Me Mahila Krshak Ki Bhumika
- Mahila krisahk Dwara Soyabean Me Buwai Purva Beej Prabandhan
- Extension publications
- Mrida evam jal sarankshan ki vidhiyan
- Paryavaran sarankshan hetu padti bhoomi men vriksh lagayen

- Jaiv urvarak ka mahatva
- Mahila krishakon dwara soybean buwai men beej prabandhan
- Vrikshon ka manushya jeevan men mahtawa
- Gaajarghas nivaran
- Urad ki labhkari evam vaigyanik kheti
- Lemangrass ek mahtwapoorn oushadhiiya phasal
- Dhritkumari ka krishikaran evam upyod
- Rabi ki Bonee Hetu Mahilao Dwara Krishi Karya
- Dhaan kee Kheti (Shri Vidhi) Me Mahila Krishako Ki Bhumika
- Bhookh ke Viruddh Ekjutata
  Gajar Ghas Unmoolan Ki Vidhi Evam Mahatva

Blogs

- Paishtik Ahar
- Pey Jal Shuddhikaran ki Vidhi Evam Mahatva
- Jaivik Grih Vatika Lagaaye, Bina Rasayan ki paustik Sabziya Bharpur KHaye
- Jawahar Gramya (kvkrewa.blogspot.com)

KVK: Seoni

Extension publications

- Aap bhi apnaye fasal suraksha ke mahatvapurna 15 sutra
- Gehu ki Unnat Kheti
- Kit ke nirichan avam niyantran hetu apnaye Prapanch
- Jaivik kheti me neem ka upyog
- Swayam banaye kechua khad
- Duudeshiya alsi ki unnat utpadan taknik
- Pyaz avam lehsun ke poushak tatva avam aushadiya gund
- Chane ki elli ka ekikrit niyantran
- Khadya,poushak avam swasthya suraksha me mote annajo ka mahatva
- Talab ki sadi meeti
- Tilahani faslo ke rog ,lakshan avam niyantran
- Ekekrit keet prabandhan

KVK: Shahdol

Poplar articles

- Varsha Ritu mein Khadya Pradarthaon ki suraksha ki avshakta - kyun aur kaise in Krishak Doot
- Varsha Ritu Mein Khadya Pradarthaon kai chunav mein barti jani wali savdhaniyan in Krishak Doot
- Swachalit Nidai Yantra
- Soyabean Mein Kharpatwar Ki Roktham in Krishak Jagat
- Jal Grahan Kshetra Prabandhan Avam Grameen Sahbhagita in Krishak Vandana
- Gobhi vargiya phaselon me poshak tatvon ki upyogita
- Sabji utpadan me padap vridhi niyamak ka upyog
- Sabji utpadan ki vishit samasya
- Danik bhojan me poshak tatvon ki upyogita
- Gharalu estar par pramukh sabjiyon ko sukhane ki vishit vidhiyan
- Krishak mahila dwara atrikt aya ka sadhan palash ke vrikshon par lac ke kheti
- Pashuon ka garmi na aana- anoestrous
- Pashu Aahar Se sambandhit saman niyam
- Pashuon mein garbadhan ki samsya se nijat

Extension Publications

- Mustard
- Alsi ki vaigyanik kheti
- Soil testing method
- Javik vidhi se kharif pyaj utpadan
- Kritam evam milavati dhoodh ki janch
- Pashu palan prabhandh ka varshik calendar
- Preserved products of tomato
- SHG formation and management
- Importance and use of NKG
- Organic Production of Kharif Onion
- Vermi compost Production Bio fertilizers - Mycorrhiza
- Bio fertilizers
- Mycorrhiza
- Documentary: DVD on Kharif Onion

KVK- Sidhi

Popular Articles

- Rabi Dalahan Utpadan ki Unnat Taknik, *Khad Patrika* , New Delhi pp.49-53.
- Dalhan Bachanye Dhan Kamanye- Dalhani Phaslo Me Akikrit Rog Prabandhan. Krisak Chetna, Jabalpur pp. 14-15
- Greeshm Kal me Milky Mushroom Utpadan takniki, Krisak Chetna, Jabalpur, pp. 29-30.

•Extension Publications

- Dhan me Samannavit keet Prabandhan
- alhani Phaslo me Phali Chhedak Keet

Prabandhan

KVK, Tikamgarh

Popular articles

- Pramukh Masala Fasalein-Dhaniya (*Major spice crop-Coriander*), *Madhya-Krishak Bharati,* 5(3): 31-32.
- Varsa Ashrit Kaali Mittiyon Ki Upukat Fasal-Kusum (Safflower-Suitable cro for black soil on the rainfall based pattern). *Bhumi Nirman 14* (10):6
- Masoor Utpadan Ki Taknik (*Production Technology for lentil production*) Krishak Jagat 11 (16): 07

Publication

Population articles

- Pramukh Masala Fasalein-Dhaniya (*Major spice crop-Coriander*), *Madhya-Krishak Bharati,* 5(3): 31-32.
- Varsa Ashrit Kaali Mittiyon Ki Upukat Fasal-Kusum (Safflower-Suitable cro for black soil on the rainfall based pattern). *Bhumi Nirman* 14 (10):6
- Masoor Utpadan Ki Taknik (*Production Technology for lentil production*) *Krishak Jagat* 11 (16): 07

Extension publications

Literature Developed/Published by Krishi Vigyan Kendra, Tikamgarh

- Haldi: Masala avam Aushadhi Fasal(*Turmeric: A spice and medicinal crop)*
- Dhaniya Ki Kheti Kar Baniye Dhanvan (*Do the coriander cultivation to get higher return*)
- Masala avam Sugandhit Fasalon Ka Prasansakaran avam Mulya Swardhan(*Processing and value addition of spices and fragrerant crops*)
- Tikamgarh Mein Varsh Bhar Upaladh Sabazi Arabi (Ghueya)(*Round the year availability of vegetable for Tikamgarh district-colocasia*)
- Methi:Chhote Daane-Bade Labh (*Fenugreek: Small seed but highly profitable crop*)
- Fal avam Sabazi Ka Parirakshad(*Preservation of fruits and vegetables*)
- Tamatar Se Ketchup Taiyar Karane Ki Vidhi (*Preparation method of Ketchup from tomato*)
- Aam avam Nimboo Ka Prasanshkaran avam mull savaradhan (*Processing and vaule addition in mango and citrus)*
- Kam Pani Mein adhik dhan utpadan SRI(*Low water requirement production technique of paddy System of rice intensification*)
- Adhik dugadh utpadan Ke Liye Postik Hare Chaare (*Nutritive green fodder for higher milk production*)
- Ugayen Safed Sona-Lahasun(*Grow more garlic-white gold*)
- Bahu udesheey adark ka vyavsayik utpadan(*Production of Multipurpose commercial crop-ginger)*
- Bakariyon Mein Bimari Prabandhan (*Diseases management of goat*)
- Urd –Utapadan Takanik(*Production technology of black gram*)

Literature Developed/Published by KVK

- Tikamgarh Zile Ke Liye Bakari Paalan-Ek Mahatpurn Vyvasay.(*Goat farming-An important business for Tikamgarh district*).KVK/TKG/2009-10/01(in Hindi)
- Varsh Bhar Pyaz Ki Kheti ? (*How to grow onion round the year*).KVK/TKG/2009-10/02(in Hindi)
- Papita Duganaa Labh Ki Kheti(Double income generation through papaya cultivation). KVK/TKG/2009-10/03(in Hindi)
- Mirch Ki Vaigyanik Kheti(*Scientific cultivation of chilli*).KVK/TKG/2009-10/04(in Hindi)
- Safan Tamator Utapadan Takanik(*Successful technique for tomato production*). KVK/TKG/2009-10/05(in Hindi)
- Mahila Swa-Sahita Samuh Samudayk Vikash Ka Aadhar (*Women self-help*

group for community development). KVK/ TKG/ 2009-10/ 06 (in Hindi)

- Varsh Bhar Hare Chare Ki Upalabadhata (Availability of green fodder round the year). KVK/TKG/2009-10/07 (in Hindi)
- Grishmkalin Til Utapadan Takanik(*Summer sesame production technology*).KVK/ TKG/2009-10/08(in Hindi)
- Vermi-compost Kaise Banayein(*How to prepared vermi-compost*). KVK/TKG/ 2009-10/09(in Hindi)
- Khar Ke Pichhawade Murgi Palan (*Backyard poultry*) KVK/TKG/2009-10/10(in Hindi)
- Varsh Bhar Sabjeon Ki Upalabadhata Grahvatika Se Kaise Karein (Availability of vegetables round the year). KVK/TKG /2009-10/11(in Hindi)
- Krashak Mahilavon Ki Shram Sakati Unnat Krashi Yantron/Upkarono Ke Prayog Se Kam KaranaVarsh(*Drudgery reduction in women through iproved agricultural tools*) Bhar Sabjeon Ki Upalabadhata Grahvatika Se Kaise Karein (Availability of vegetables round the year). KVK/ TKG/ 2009-10/12(in Hindi)
- Khetihar Mahilono Ki Aay Adhik Kaise Badayein?(*How to generate income for farm women?*) KVK/TKG/2009-10/11(in Hindi)

Extension Publications

- Haldi: Masala avam Aushadhi Fasal(*Turmeric: A spice and medicinal crop)*
- Dhaniya Ki Kheti Kar Baniye Dhanvan (*Do the coriander cultivation to get higher return*)
- Masala avam Sugandhit Fasalon Ka Prasansakaran avam Mulya Swardhan(*Processing and value addition of spices and fragrerant crops*)
- Tikamgarh Mein Varsh Bhar Upaladh Sabazi Arabi (Ghueya)(*Round the year availability of vegetable for Tikamgarh district-colocasia*)
- Methi:Chhote Daane-Bade Labh (*Fenugreek: Small seed but highly profitable crop*)
- Fal avam Sabazi Ka Parirakshad (*Preservation of fruits and vegetables*)
- Tamatar Se Ketchup Taiyar Karane Ki Vidhi (*Preparation method of Ketchup from tomato*)
- Aam avam Nimboo Ka Prasanshkaran avam mull savaradhan (*Processing and vaule addition in mango and citrus)*
- Kam Pani Mein adhik dhan utpadan SRI(*Low water requirement production technique of paddy System of rice intensification*)
- Adhik dugadh utpadan Ke Liye Postik Hare Chaare (*Nutritive green fodder for higher milk production*)
- Ugayen Safed Sona-Lahasun(*Grow more garlic-white gold*)
- Bahu udesheey adark ka vyavsayik utpadan(*Production of Multipurpose commercial crop-ginger)*
- Bakariyon Mein Bimari Pabandhan (*Diseases management of goat*)
- Urd –Utapadan Takanik(*Production technology of black gram*)

KVK: Umaria

Extension Publications

- Unnat krshi taknik pustika- Rabi mosam ki prmukh fasle.
- Jevik kheti bhartiy krishi ke tikaupan ki or badhte kadam
- Beej utpadan takniki avm til ka safal beejoutpadan
- Kharif pyaz ki unnat takneek

- Wheat production techniques
- Sesame production techniques
- Minimize the cost of productivity by applying biofertilizers.
- Gram production techniques
- Mustard production techniques
- Linseed production techniques

Agriculture Information Technology Centre

The following activities were organised by the Centre:

Farmer's visit

Purpose of visit	No. of farmers visited
Technology Information	1886
Technology Products	320
Diagnostic Services	80

Details on technology information
Kisan Call Centre/ other phone calls from farmers : 619
Training to farmers/ technocrats/students : 102

Publications
Books
Number sold/Distributed free : 17960
Revenue generated : Rs. 449911/-
Number of farmers benefitted: 17960

Technology Products provided
Seeds
Quantity : 158.7 q
Number of farmers benefitted : 68
Revenue generated : Rs. 309265/-

Technology services provided
Number of farmers benefitted
Plant diagnostics : 80

FARMS

The significance of sustainable agriculture is hidden in the use of quality seed. It is the most crucial and vital input for enhancing productivity. The importance of seed has been recognized since time, human practices crop husbandry. Procuring quality seed for sowing has been a major concern for farmer ever since crop husbandry was initiated. The crop varieties are being grown under diverse environmental conditions. In an organized seed production programme, it is essential to maintain genetic purity of seed stock in large-scale multiplications and to ensure conformity to the original stock. The maintenance of population in an organized and systematic way has been a big task, as it has to retain the relationship of nucleus seed with that originally developed by a plant breeder and the certified seed, marketed. Genotype x environment interaction also affects the expression of the variety. Natural selection and management practices may affect the genetic purity of the variety grown in the environment for which it has not been developed and recommended. Changing growing environment also has major effect on population behaviour and have important consequences on quality including varietal maintenance. Realizing the significance and impact of quality seeds, the JNKVV, launched a scheme for production of Breeder seed alongwith maintenance of varieties in early 1980s at Jabalpur even before launch of the National Seed Project by ICAR. Seed is one of the basic and vital input of any plant production activity. The importance of seed as the carrier of critical characteristics of crop production has been recognised from the early days of agriculture. Hence, it is always necessary to launch a special drive to orient and strengthen the on going seed developmenl programmes to enhance the availability of quality seed of improved varieties.

Mission

To produce adequate quantity of quality seed for enhancing productivity and profitability of crops in a sustainable eco-friendly manner for the livelihood security.

Mandate

- To maintain the genetic purity of crop varieties;
- To make available the sufficient quantity of breeder seed
- To produce, market and distribute Jawahar seed and planting material.

Genesis

Dr. Laxman Singh is the founder of quality seed production in JNKVV, Jabalpur and established Breeder Seed Production Unit at JNKVV during 1975 in the Department of Plant Breeding & Genetics to fulfil the seed requirement of improved varieties of pulses in the State of Madhya Pradesh. The maintenance breeding

work was also initiated for the improved varieties of other crops. Considering the necessity and importance of large quantities of quality seed, JNKVV established Directorate of Farms in the year 1987 at Jabalpur. Director utilizes the on-farm resources to produce quality planting material of improved varieties developed at JNKVV as well as of the recommended National varieties suitable for Madhya Pradesh. Directorate shoulder the responsibility of farm planning, production, marketing and quality assurance of seeds/ saplings through effective coordination of State/National Seed Developmental Agencies and by developing organizational-operational frame work with dedicated team of plant breeders, seed technologists, seed production experts, seed agronomists, Administrative Officer (Farms) and other associated staff. The programmes are well organised to meet the expectations of seed industry in the country through a well knit action oriented network and infrastructure.

Growth

Jawaharlal Nehru Krishi Vishwa Vidyalaya (JNKVV) is the premier institution for seed production and distribution in the country. It caters around one third of breeder seed requirement of the nation. The clientle include National and State Seed Corporations, State Farms Corporation of India, State Departments of Agriculture, Horticulture & Farm Forestry and Animal Husbandry, State Agriculture Cooperatives, KRIBHCO, Ministry of Agriculture, Govt. of India, National Dairy Development Board, Bharat Krishak Samaj, National and multinational seed companies, progressive farmers, Oil Federations and several other organizations directly/indirectly involved in seed production activities. The University has developed an expertise in production, processing and management of seeds of cereals, pulses, oil seed crops, fodder crops, vegetables, spices, sugarcane, medicinal &aromatic plants within the well conceived and unique framework` of single window system of operation. The important features of the seed production programme are: Maintenance breeding based production; Effective internal monitoring system and I In house strong quality assurance mechanisms. Diversification of nucleus/breeder seed production programme with a view to meet the growing demand of quality seed of vegetables, spices, sugarcane, medicinal & aromatic plants have added new dimensions. The seed production programme is reviewed every year at University level during kharif & rabi seasons.

The University has also initiated need-based training programmes for seed professionals from State Agricultural Universities (SAU), State Department of Agriculture, State Seed Corporations, State Seed Certification Agencies, National and Multi-national Seed Companies to up date knowledge on seed technology, seed certification standards and covering all important and relevant aspects of seed production, processing and storage. The University has also shared its experience by organizing ICAR sponsored winter school of 21 day on Recent trends in seed production management at Jabalpur. Capacity building programmes were organized for seed growers to strengthen the seed production programmes through Seed Village programmes, Megaseed Project, Rice fallow Chickpea etc. The seed production programmes of pulses was strengthenend through national food security mission.

Functioning of single window system

The execution of system envisages planning, production, monitoring, processing, marketing and supply of seeds to the indenters from a single window. It is being operated through Director Farms of the University. The system has been effective for the successful implementation of seed production programme. The Nodal Centre for the programme is under operation at Jabalpur with five satellite centres viz., Sehore, Rewa,

Indore, Tikamgarh and Powarkheda located at Zonal Agricultural Research Stations.

Financial returns through JNKVV Farms

(Rs. in lakh)

Year	Gross Receipt	Gross Expenditure	Net Receipt
1981-82	49.36	46.25	3.11
1990-91	112.24	96.27	15.97
1991-92	149.92	126.27	23.55
2001-02	447.08	304.18	142.90
2004-05	650.79	377.91	272.88
2005-06	691.97	429.22	262.75
2006-07	756.81	487.66	269.15
2007-08	967.58	571.69	395.89
2008-09	618.93	383.52	235.41
2009-10	564.19	423.37	141.22

Financial resources

Financial assistance has been made available from ICAR under National Seed Project since the year 1983. The project has also been strengthened in terms of infrastructure and manpower in the year 1993. The project has developed the large operational system that utilizes the internal scientific/technical resources of the University to produce quality breeder seed. The system is strongly supported by maintenance breeding programme : Field crops-ICAR · Mega Seed Project ICAR; Soybean & Groundnut ICAR-GOI · Seed Legume Project ICAR-GOI; Vegetables ICAR · Seed Village Project- GOI; Spices- Govt. of MP & GOI · Water Management Project (World Bank) and Medicinal & Aromatics-GOI, Seed Village programmes, National Food Security Mission etc.

Seed production planning

Seed production programmes of all the crops are being planned based on indents of national and state seed corporation through ICAR, private seed sector, seed market intelligence reports and based on previous year sales and demands. The total indent of all the sectors put together is being planned on the basis of suitability of the selected varieties to different agro-climatic zones of MP. The entire production programme is being developed with the consent of officer-in-charge of farms and controlling officer at zonal level every year. The change in programme is permissible subject to the approval of Director Farms.

Review of production programme

The University issue NSP I and BSP-I proforma for the entire seed programme implemented separately for field crops, vegetables, spices fruit plants and saplings. After issue of programme to the concerned, the follow up action being submitted to Director Farms. The implemented programme is being reviewed through zonal wise meeting during the Kharif season. The annual review meetings are being organized in the month of April/May.

Seed production system

Crop improvement: A dynamic seed sector has been developed at JNKVV with continuous release of improved varieties and hybrids from crop research programmes. To ensure the crop research programmes, strong support is provided from the State. Several crop varieties have been developed and released in wheat, linseed, etc through crop improvement programme etc.

Maintenance breeding centres: The maintenance breeding is one of the important activities of seed production programme of the University. The programme involves a dedicated team of crop scientists located at various research stations to maintain the varieties. Crop varieties are being maintained by Single Plant Selection (SPS) grown in progeny rows. The SPS bulk seed is multiplied to produce breeder seed depending up on the indents.

Status of breeder seed production

JNKVV produces more than 24% part of Breeder Seed produced by NARS for field crops as well as substantial quantities of

Breeder, Foundation and truthfully labeled seeds of vegetables spices and medicinal & aromatic crops. Similarly, a large number of saplings of Amla, Mango and Beer are being produced and supplied. The University has been a major player in the multiplication of seeds and saplings of medicinal & aromatic plants by virtue of developing several improved varieties.

Size of seed production programme

Crops	Number	Varieties
Field crops	32	250
Vegetable crops	13	23
Spices	11	26
Fruit plants	05	15
Medicinal & aromatics	20	35
Flowering plants	20	40
Total	101	389

Monitoring systems

The financial and physical targets are fixed on annual basis and reviewed in the JNKVV planning meeting in the month of April every year. The corrective measures are planned for the improvement in the implemented programmes. The mid-term corrective measures are also being taken up in the farm seed production activities as per the advice of local farm advisory committee. The monitoring of seed production programme is being done at five levels

Breeder seed production of field crops in quintals

Year	India	JNKVV	Contribution (%)
1990-91	23783	2845	12.20
1995-96	34341	4589	13.40
2001-02	40754	9439	23.16
2002-03	44229	9708	21.95
2003-04	54142	15203	28.08
2004-05	60793	16828	27.68
2005-06	69507	16250	23.38
2006-07	77663	22144	28.51
2007-08	92059	20863	22.66
2008-09	91883	22329	24.30
2009-10	90000*	20012	22.23*

Public-private partnerships

JNKVV has implemented the benefit sharing of the public sector breeds with the private sector. There seems to be a tremendous potential to develop the seed links programmes of public/ private sector. This

Maintenance breeding

helps in developing/ strengthening research resources and adequate resource income to University. An MOU has been developed for the purpose. This MOU is as per the guidelines of IPR Management for Agriculture Research Technologies of NARS and approved by Board of Management of University. Seed companies i.e., Vikki Agro Tech, Vibha Seeds J.K. Agric Genetics, Dhanuka Seeds, Agri. Co. Seed etc. and with a dozen of seed companies showed interest for commercialization of early maturing Rice hybrids on non exclusive basis. Similarly in medicinal and aromatic plants partnerships are being developed through three-party agreement i.e., JNKVV, farmers and Industry on mutually agreeable terms and conditions. An IPR Management cell of the University has taken care of transferable technologies for commercialization of rice hybrid JRH 5

Seed quality assurance mechanism

An in house seed quality assurance system has been developed to regulate the quality of seed and planting material produced at the University. This is being done through field monitoring systems. Later on the seed samples are being drawn from the processed seed of each variety and are being tested at Govt. Seed Testing Lab as well as JNKVV Seed Testing Laboratory of STR. The seed samples are supplied to STR lab for verification of genetic purity of the seed supplied to various agencies through Grow Out test as Post Control Plot. Observation related to genetic impurity in Post Control Plot are being communicated to seed production centre of the University as well as the persons lifted the same seed lots so that corrective measures may be taken up timely to maintain the seed quality.

Marketing strategy and information systems

Seed is being made available to the indenters as per demand/indents. Quantity of seed available of all the crops, varieties and categories for sale is placed in the University Web site alongwith name of center where seed is available, price list, contact phone numbers etc. This information is made available to all the concerned. The seed purchaser may demand through FAX or e mail which is confirmed immediately along with the name of centre and total amount to be paid at the lifting centre and cut of date for lifting etc. The information about cut off date, quantity of seed available is being also made available at Agricultural Technological Information Center, JNKVV, Jabalpur (ATIC) as well as Directorate Farms. The upto date seed availability is being upgraded in the JNKVV web site from time to time to benefit the seed producing agencies.

Innovative seed Systems: Several seed systems i.e., seed village programme, model seed sytems at Vidisha and Sagar, Rice fallow chickpea quality seed production in livelihood seed system paid dividends to the farmers and brought self reliance in quality seed availability

Benefits and beneficiaries

The seed cost has come down as it has been produced where it was needed most by eliminating transport costs and role of middlemen. The integrity and quality of the seed would be assured, as it is produced under the supervision of competent person. Adoption of improved varieties led to increase productivity by 20-30%. Promotion of local seed enterprises has also generated employment at the village level. The major beneficiaries are small holder farming families who may gain access quality seed of improved varieties.

Livelihood security through quality seed production

Quality seed of various crops is being distributed in the tribal areas to provide an advantage of increased availability of quality seed. This programme had tremendous positive impact on upliftment of socioeconomic status of the targeted tribal farmers. These programmes are being implemented through KVK of the V.V.

Special focus on horticulture crops

Seed production programme of spices and fruit-plant saplings was initiated on a large-scale. This resulted in availability of sufficient quantity of seed and planting materials of horticulture crops in the state. Fruits plant nurseries were established at all the centres of V.V.

Brand Management of Jawahar Seeds

Brand Jawahar seed has been established with a logo to popularize the seed and planting materials. Now Jawahar seed is an emerging brand as the quality seed planting materials. Research programme wrer included for the development as well as promotion of hybrid technologies of maize, rice, castor, pigeonpea. Identification of seed production areas as well as seed production practices were standerdised for rice, maize and pigeonpea

New areas of seed production

Several new areas have been identified for strengthening of commercial activities.

Medicinal and aromatic plants

The area has been strengthened by providing 25.0ha additional land for maintenance of improved varieties and their Nucleus and Breeder seed production.

Micro propagation

(a) Sugar cane varieties
(b) Banana
(c) Microtuber production of potato

ISOPOM Project

"Development and Popularization of 'Model' Seed System(s) for Quality Seed Production of Major Legumes to Ensure Seed-Sufficiency at the Village Level"

Good quality seed is essential for desirable production in any agricultural production system. However, resource poor farmers face serious constraints when sourcing healthy, high quality seed. The health of seed is important, not only with regard to the direct yield losses caused by seed-borne diseases, but also for perpetuation of epidemics, spread of diseases, food and feed safety (absence of toxins) and storability. Further benefits of using good seed include, lower pesticide requirements, no need for poisonous seed

Seed village programme during Rabi 2010-11

Centre	No. of Farmers	Crop	Variety	Total requirements of Foundation Seed (q)	Seed rate per acre (kg)	Total Area (acre)	Total Produce seeds (q)	Trained Farmers
Budgaon	150	Gram	JG 11	41.05	30	150	1000	150
Sagar	138	Wheat	C 306	55.2	40	138	1158	138
Rewa	222	Gram/Wheat	JG 130/JW17	56.1/14	30/40	222	1312/490	222
Sidhi	150	Wheat	JW 17/273	60.0	40	150	699	150
Panna	150	Gram	JG 335	45.0	30	150	840	150
Shahdol	150	Mustard	P. Agni/Tarak	1.5	1	75	363	150
Jabalpur	72	Pea	PSM 3	7.2	10	15	123	72
Umaria	150	Wheat	JW17	60.0	40	150	716	150
Tikamgarh	150	Wheat	GW 322	60.0	40	150	1506	150
Chhindwara	111	Gram	JG 130	33.30	30	111	640	111
Seoni	150	Gram	JG 218	45.0	30	150	658	150
Powarkheda	150	Wheat	GW 322	60.0	40	150	2570	150
Betul	144	Wheat	JW 3173	57.60	40	144	1728	144
Garhakota	133	Gram	JG 322	39.9	30	133	5078	133
Harda	150	Wheat	GW 366	60.0	40	150	2600	150
Narsinghpur	144	Wheat	JW 3173	57.60	40	144	1728	144
Ganjbasoda	138	Wheat	GW 273	55.20	40	138	2400	138
Total	2452			808.65	591	2350	25609	2452

Season	No of trained farmers	Quantity of seed produced (q)	Coverage of area (in acre) 2009-10
Kharif	-	-	-
Rabi	2452	25609	2350
Total	2452	25609	2350

dressings, usability for organic cropping, no rejection of expensive multiplication seed, improved seed export potentials, better quality of food and feed, better quality for industrial purposes, reduced seed rates, faster emergence and more vigorous growth and reduction of farmers risks. Production and trade of healthy seed thus constitutes a large and readily accessible, yet largely unexploited, potential for pro poor development. Demand of quality seed at village level cannot be fulfilled without the participation of farmers. Only formal seed sector can not fulfill the requirement. Introduction of high yielding varieties suitable for the area and organization of training for seed production technology will certainly play significant role in achieving the goal. In Rabi 2009-2010 environment was more favorable for quality seed production at farmer's field in both the districts. Fortunately Incidence of dry root rot and Pod borer was not reported in both the districts at stake holder's field

To ensure availability of quality seed of chickpea, 500 new farmers from 10 villages of two blocks were selected in each districts for Rabi season 2009-10. Seed of farmers preferred varieties were distributed to the stake holder farmers between 15-20 October 2009. Training programmes were organised regarding seed production practices at different stages of crop during crop season. During 2008-09 project activities were conducted in two blocks of each district, for this purpose 10 villages of Vidisha and 10 villages of Sagar were selected.

Seed Village Programme

Year	:	Rabi 2010-2011
Crop and variety	:	As per list
No. of farmers	:	2452
Area (acre)	:	2320.00
Seed quantity	:	808.65 quintals
Type of seed	:	Foundation
Total quantity of produced seed	:	18971.76 quintals
Inputs and training	:	Rs. 12,66,593.00

Beneficiaries: Total 2,452 farmers are benefitted through this Programme. Twenty five thousand six hundred nine quintals of quantity of seed has been produced.

Rice fallow chickpea

District Jabalpur

The area under cultivation of crops in Jabalpur district is 2, 72,700 ha out of which 1,49,171 ha area is rainfed, only 1,23,529 ha area is irrigated which are being cultivated during rabi and Kharif both. The soil of the Jabalpur district is medium black to red yellow gravel. The Jabalpur district covers seven blocks out of which Patan, Sahpura and Panager block comes under the deep to medium black soil where as Sihora, Majholi and Kundum block posses the sandy to loam and red gravel soils, respectively. The total average rainfall of the Jabalpur district is 1350 mm which receives during four months of mid june to mid October. Paddy is the major cereals crop grown during the kharif. However, the pea is growing intensively in the four blocks i.e., Patan, Sahpura, Sihora and Panagar block in fallow-pea-wheat cropping sequence under the assured irrigation. Moreover, in the rainfed areas paddy followed by lentil /gram or paddy fallow cropping sequence are under practice.

Rice-chickpea is the predominant system next to Rice-Wheat cropping system which covers more than 65.0 and 68.0 thousand ha. area during their respective season under rainfed-rice irrigated chickpea, respectively. Moreover, 16,865 ha area comes under the

current fallow due to unavailability of irrigation facilities during Rabi season. Rice and wheat are two most important cereal crops grown in the state which contribute to a major share in food grain production. Rice cultivation is traditionally spread in the Kymore plateau and Satpura hills that covers nearly 50% of the total geographical area.

Medium to long duration Rice (120-130 days) - wheat with high yielding dwarf cultivars gave the assured returns under irrigated condition. However, in rainfed areas farmers either leave the second crop or grow the traditional local varieties of chickpea after rice (long duration) in the stored soil moisture, which yield is very low, hence, it discourage the chickpea production. Unfortunately the farmers of the Jabalpur (Kymore platue and Satpura hills) are least aware with the newly developed short duration rice varieties/hybrids as well as the new cultivars of the chickpea and their improved management practices under rainfed areas. The major constant in the production of chickpea is the losses of soil moisture due to delay in sowing owing to late harvest of paddy crop and infestation of *Fusarium wilt* and *coller rot*. Though, the number of varieties of chickpea have been developed by the University which are high yielding, short duration, pest and drought tolerant and can be followed under improved pulse production and protection technology. The aforesaid interventions under the rice fallow cropping sequence not only increase the overall productivity of the system but also improve the physical. Chemical and biological properties of the soil and helps to make the production system more economical and sustainable. This will also helps to improve the nutritional livelihood status of the isolated poor farmers.

Salient findings on project activities

Two hundred six field demonstrations on improved variety of gram were conducted at farmer's fields during rabi2009-10. The selected farmers / site belongs to the block of Panager (Saliya, Padora, Kevlari,Urdwa and Podi) Sehora (Gidorha, Ghorakoni) Kundam (Imlai) Paten (Chedi and Bilkherwa). Varieties JG 16 and JG 74 were demonstrated on one or half Acre area hence, each demonstration covered the one or half acre land. Crop was sown from Oct. 2009 to Nov. 2009 by using the seed rate of 30 kg /acre (75 kg/ha). Out of 206 demonstrations 85 were consisted of variety JG 16 while remaining (121) comprised of variety JG 74. Treated seed with fungicide was used for sowing and before sowing it was inoculated with Rhizobium Culture and PSB. Simultaneously, PSB was applied @ 4 kg/ha along with 100 Kg of well decomposed FYM) as soil application just before the sowing. The crop received winter rains ranging from 11.6 mm of water in different locations during the month of January 2010. The crop was fertilized by farmer as per their own sources. The integrated pest management approach was followed by using pheromantrap and birdperchers, along with the need based application of insecticide Imabectrin benzoate (misile), trizophose and Indoxacrob (awant) as a single spray. However, most of the farmers left the crop without use of insecticide. Data were recorded with respect to yield and other observation like infestation of disease and insect pest are presented in the Table.

The crop variety showed resistance with respect to disease score (under range 1-10%) at all most all the places. Moreover, the scored plants were found to be infested with Sclerotium (collar rot disease) during the early stage of crop. The rare plants were found to damage with *Fusarium wilt*. Similarly, the incidence of pod borer was also observed in the crop. However, the percent incidence was very low as compared to the crop sown by the farmers in the adjoining area. The demonstrated plots showed the variation at different locations with respect to incidence of heliothis ranging from 15 to 20 per cent observed at podding stage.

Farmers centric Scientist laid in trials for seed multiplication

The performance of demonstrations conducted at various agro ecological

situations on chickpea. The whole district divided into 4 Agro Ecological Situations (AES) on the basis of agro ecological conditions like Soil type, Topography, Rainfall and Cropping system etc. Detail characteristics are given below:

AES-I : In AES-I selected two villages i.e., podi and Imlai. Soil type of the villages are red mixed gravel soil, light to medium, rainfed, av. rainfall 1355 mm, undulated topography, cropping system rice-fallow, rice-wheat, fallow-lentil are under practice.

AES-II : In AES-II belonging to two villages Chedi and Bilkharwa. Soil type deep black soil, Irrigated, av. rainfall 1150 mm, low lying fields, cropping system, fallow-pea/ lentil-black gram, rice-chickpea, rice-wheat are under practice.

AES-III : In AES-III covers five villages Saliya, Padora, Ghorakoni, Urdwa and Kevlari. Deep black soil, fields are low laying, irrigated, av. rainfall1200mm, rice-wheat, rice-chickpea and fallow-lentil cropping system are in practice

AES-IV : In AES-IV belonging to one village Gidorha. Red light soil, low water holding capacity, sloppy, rainfed, av. rainfall 1300 mm, undulated topography, rice-fallow, rice-wheat cropping system are in practice

AES-I : The AES-I consisted the undulated topography and light red soil belonging to two villages Podi and Imlai. Variety JG 74 was demonstrated to show the performance and compared with the farmers practice used locally available seeds of JG 315. Data of 47 demonstrations revealed that the improved variety JG 74 recorded the max. yield of 16.3 q/ha as compared to 14.8 recorded under farmers practice while the min. yield of 12.6 and 10.9 q/ha was recorded under farmers practice respectively. The improved practice gave 58% higher yield with net return (Rs.16,680/ ha) and B:C ratio of 1.79 as compared to net return of Rs. 8,850 and 1.17 respectively.

Further it was also noted that variety JG 74 seems to be a moderately resistant with the infestation of pod borer (>10%) while the disease infestation was between the 5-10%. The improved varieties stand first with respect to nodulation rating as compare to farmers practice.

AES-II : belongs to villages Chedi and Bilkharwa. Two gram varieties JG 16 and JG 74 were demonstrated at 11 and 14 farmer's field respectively. The av. yield data revealed that variety JG 16 and JG 74 recorded 42.3% and 40.5% respectively higher yield over farmer's practice and fetched net return of Rs. 31,700 and Rs. 28,080 per ha with B:C ratio of 3.40 and 3.01 respectively. The introduce varieties gave Rs. 10,450 and Rs. 9,030 an additional net

Table 1 (A) Yield performance of gram variety JG 74 at farmer's field (AES-I)

Variety	Yield under (q/ha)						% increase
	Demonstration			Farmer's Practice			
	Max	Min	Av	Max	Min	Av	
JG- 74	16.3	12.6	12.99	14.8	10.9	8.2	58.4

Table 1 (B) Net return over Farmer's Practice

Variety	Gross Return	Cost of Cultivation	Net Return	B:C Ratio
Improved Practice (JG 74)	25980	9300	16680	1.79
Farmers Practice	16400	7550	8850	1.17

Table 1 (C) Disease and Pest Score

	Av. Plant Stand	Av. Disease Score	Av. Pod borer Score	Av. Nodulation
Improved variety	2.52	2.32	1.0	1.7
Farmer's Practice	2.8	2.8	1.8	1.2

Table 2(A)Yield performance of gram varieties JG 74 and JG 16 at farmer's field (AES-II)

Varieties	Yield (q/ha)						% increase
	Demonstration			Farme'rs Practice			
	Max.	Min.	Av.	Max.	Min.	Av.	
JG 74	22.3	16.3	18.69	15.2	14.0	13.3	40.5
JG 16	24.2	17.2	20.5	16.0	13.8	14.4	42.3

Table 2 (B) Net returns over farmer's practice

Varieties	Gross Return	Cost of Cultivation	Net Return	B:C Ratio
Improved variety (JG 74)	37380	9300	28080	3.01
Farmer's Practice	26600	7550	19050	2.52
Improved variety (JG 16)	41000	9300	31700	3.04
Farmer's Practice	28800	7550	21250	2.8

Table 2 (C) Disease and Pest Score

	Av. Plant Stand	Av. Disease Score	Av. Pod borer Score	Av. Nodulation
Improved variety (JG 74)	2.07	2.21	1.14	3
Farmer's Practice	2.6	2.8	1.8	1.6
Improved variety (JG 16)	2.27	2.18	1.18	3
Farmer's Practice	2.6	2.7	1.7	1.6

return /ha. The plant stand and nodulation were found to be medium to moderate and disease infestation was between the ranges of 5-10%.

AES-III: Comprises five villages namely Saliya, Padora, Ghorakoni, Urdwa and Kevlari and a total of 74 demonstrations were conducted at farmers' field with the use of JG 16 where as JG 74 were demonstration at 22 farmers field both these varieties gave 75 and 57.2% higher yield over farmers practice, respectively. Moreover, the use of variety JG 16 and JG 74 fetched Rs. 37,100 and R.s 27,580 per ha as compared to net profit of Rs.18,850 and Rs.15,850 under farmer's practice. Data of the trails reveal that variety JG 16 and JG 74 seems to be the resistant for plant disease and moderately resistant for pod borer in JG 16 and JG 74 respectively.

AES-IV : 40 demonstrations on JG 74 along

Table 3 (A) Yield performance of gram variety JG 74 at farmer's field (AES-III)

Variety	Yield (q/ha)						% increase
	Demonstration			Farmer's Practice			
	Max.	Min.	Av.	Max.	Min.	Av.	
JG 74	21.6	14.6	18.44	12.6	9.8	11.7	57.2
JG 16	30.2	16.03	23.2	14.8	12.8	13.2	75

Table 3 (B) Net returns over Farmer's practice

Variety	Gross Return	Cost of Cultivation	Net Return	B:C Ratio
Improved variety (JG 74)	36880	9300	27580	2.96
Farmer's Practice	23400	7550	15850	2.09
Improved variety (JG 16)	46400	9300	37100	3.98
Farmer's Practice	26400	7550	18850	2.49

Table 3(C) Disease and Pest Score

	Av. Plant Stand	Av. Disease Score	Av. Pod borer Score	Av. Nodulation
Improved variety (JG 74)	2.09	2.29	1.06	2.69
Farmer's Practice	2.6	2.8	1.8	1.8
Improved variety (JG 16)	2.1	2.07	1.17	2.82
Farmer's Practice	2.6	2.8	1.8	1.8

with integrated pest management practice were fallowed. The yield data recorded 50.4% higher yield over local practice and gave 5.5 quintal /ha additional yield and Rs. 8,400 additional income with B:C ratio of 2.52 against the 2.0 computed for farmers practice. The other parameters related to the insect & disease, shows that there was a infestation of wilt/ Sclerotium disease between the 5-10% ,while the infestation of pod borer was between the 10-20%, as regard to the development of root & nodules, were recorded medium to moderate (2.45) nodules an root of the variety JG 74.

Table 4 (A) Yield performance of gram variety JG 74 at farmer's field (AES-IV)

Variety	Demonstration			Farmers Practice			% increase
	Max. (q/ha)	Min. (q/ha)	Av. (q/ha)	Max. (q/ha)	Min. (q/ha)	Av. (q/ha)	
JG 74	19.9	12.0	16.4	11.4	9.6	10.9	50.4

Table 4 (B) Net return over Farmer's practice

Variety	Gross Return	Cost of Cultivation	Net Return	B:C Ratio
Improved Practice (JG 74)	32800	9300	23500	2.52
Farmer's Practice	21800	7550	15100	2.0

Table 4 (C) Disease and Pest Score

Variety	Av. Plant Stand	Av. Disease Score	Av. Pod borer Score	Av. Nodul.
Improved variety	2.45	2.1	1.05	2.45
Farmers Practice	2.8	3.0	1.8	1.2

Varieties	Av. No. of Branches/ plant	Av. No. of Pods / plant	Av. No. of grains per Pod	Pest Score Disease	Pest Score Pod Borer	Seed Yield (q/ha)
JG 11	07	58	1.5	2	2	28.33
JG 16	08	65	1.8	2	1	31.3
JG 14	07	43	1.5	2	2	26.6
JG 74	08	57	2	2	1	28.0
JG 130	08	51	1.0	2	2	31.3
JAKI 9218	07	56	1.4	2	2	26.6
JG 63	08	58	1.0	2	2	30.0
JGK 2	07	49	1.2	2	3	16.0

Farmers Participatory Varietals trials

In order to assess the performance of different gram varieties and demonstrated to the farmers at different locations was conducted during Rabi 2009-10. A trail consisted of eight

varieties namely JG 11, JG 16, JG 130, JG 14, JG 63, JG 74, JGK 2 JAKI 9218 were laid out at two locations (Urdwa and Saliya) in Panager block.

Out of these two locations a trail conducted at urdwa did not perform well due to the heavy infestation of weed and excess moisture, another location i.e., Saliya perform well. Data in relation to seed yield showed that the variety JG 16 and JG 130 top the list closely fallowed by JG 63 and gave 31.3, 31.3 and 30.0 q/ha as these varieties JG 16 JG 130 and JG 63 possessed higher no of branches per plant (8 / plant) and bears the pod 65,51 and 58 per plant respectively, as compared to others. All varieties showed resistance to wards the incidence of disease and scored 2 no (less than 5% motility) where as, The variety JGK 2 seems to be a more susceptible to pod borer as it score 3 scale (more than 20% damage) where as JG 16 and JG 74 score 1 rating scale (less than 10% damage).

Assessment of Gram varieties at farmer's fields for yield and other traits

Development of village level seed system

The variety was demonstrated at two locations for 2.5 ha area namely Saliya and Umaria choubey for seed production at farmers field. In order to develop the village level seed production system both the farmers were registered in the MP seed certification agency for quality seed production (Foundation Seed). The variety recorded seed yield 29.5 and 24.5 q/ha and farmers possessed 61.5 and 51.0 q seed for further use as a seed, though Vivak Patel of Umaria has sold 12.0q seed to the farmers of near by villages Veeranlal Patel, Yagdutt Choubey, Omprakash Khare, Janarden Choubey.

Farmers' perception and expectation

Most of the farmers desired early maturing variety of paddy so that subsequent gram crop may be grown successfully. The timely availability of quality seed must be ensure, for proper utilization to Zero tilled seed drill need to be provided under rain fed situations in order to sown the crop under stored moisture with out loss. Farmers desired to sale the produce as seed gram in the mandi as they have registered their crop for certification (Breeder to Foundation) in the MP seed certification agency.

Constraints

The chickpea is grown under rainfed situation and followed the minimum tillage practices which provide opportunity to grow and florists the weeds. These weeds cause the reduction in yield. The unavailability of safer and effective post emergence herbicides for controlling the weed population in chickpea.

The farmers are using high seed rate as compared to recommended, which provide a environment for the occurrence of coller rot disease at seedling stage.

The farmers are least interested to invest money on protection of crop as they are economically poor. Most of the farmers used to grow gram on marginal lands.

Conclusions

- On basis above findings it could be concluded that variety JG 16 proved better over existing variety (local)
- The quality seed of improved variety gave more yield than locally used grain as seed and proved remunerative
- Both the improved variety JG 16 and JG 74 found to be resistant to wilt and pod borer under field conditions

The spread of variety and coverage area

A total of 5640 kg seed of improved varieties JG 16 and JG 74 were provided to the 206 farmers of the district and variety JG 16 and JG 74 covered the area 35.0 and 40.0 ha in the district, respectively. Presently farmers having the quality seed of about 300 and 600 quintals of variety JG-16 and JG-74 respectively for further use and it is sufficient to cover the area of 1200 ha.

Mega Seed Programme

Planning of Seed Production Programme

The seed production programmes of all crops

Data Record Sheet No. 4.2- Final observation at harvest (yield): VLSS trails

S. No.	Farmers Name	District	Village	Variety	Area (ha)	Quantity (kg)	Disease Score	Pest Score	Yield (q/ha)	Seed (q/ha)
1	Brijendra Patel	Jabalpur	Saliya	JG- 16	2.5	150kg	2	11.7	29.52	61.5
2	Vivak Patel	Jabalpur	Umariya Choubey	JG-16	2.5	150kg	2	9.5	24.48	51.0

are being planned on the basis of national and state indents, indents from private seed sector, seed market intelligence reports and also based on previous year sales and demands. The total indent of all sectors put together is being planned on the basis of suitability of a particular variety to different agro-climatic zones. The entire production programme is being developed with the consent of officer-in-charge of farms and controlling officer at zonal level, every year. The change in the approved programme is permissible subject to the approval of Director Farms.

Status of Breeder Seed Production

Breeder seed production of field crops is being systematically organized since 1980 at VV level. Prior to this VV has established a nucleus seed production unit with it own resources to meet the seed demands of improved varieties. Total quantity of breeder seed produced during 2008 is given below. JNKVV has been a best performing seed production centre in the country since 1980. Now the seed production programme is well diversified in terms of field crops, vegetables, spices, medicinal & aromatics and fruit plants and saplings with a strong maintenance-breeding programme coupled with a single window system of operation.

Technical programme for achieving targets in respect of seeds/planting materials. (in q)

Crop	Nucleus Seed		Breeder Seed		Foundation Seed		Truthfully labeled Seed	
	Target	Production	Target	Production	Target	Production	Target	Production
Cereals								
Paddy		38.00	227.50	1956.57	-	1179	-	40.40
Kodo		3.00	-	5.20	-	-	-	-
Kutki		1.00	-	2.50	-	-	-	-
Maize		0.50	-	71.70	-	-	-	-
Sorghum		6.00	3.85	13.80	-	-	-	-
Bajra		0.50	-	34.20	-	-	-	-
Total		49.00	-	2083.97	-	1179	-	40.40
Pulse crops								
Pigeonpea		1.00	29.34	342.00	-	150	100	175
Mung		5.00	24.00	34.00	-	-	-	-
Urad		5.00	0.0	34.00	-	25	-	-
Total		11.0	53.34	410	-	175	-	-
Oilseed crops								
Soybean		1926	6850.00	6333.15	-	-	-	-
Niger		0.0	5.40	6.70	-	-	-	-
Groundnut		20.00	43.40	33.25	-	-	-	-
Sesame		2.00	6.35	8.10	-	120	-	-
Total		1948	6905.15	6381.2	-	-	-	-
Fiber crops								
Cotton		0.20	-	12.43	-	-	-	-
Total		0.20		12.43	-	-	-	-
Forage crops								
Berseem		5.00	20.00	58.60	-	-	-	-
Oat		14.80	20.00	57.00	-	-	-	-
Total		19.80	40.00	115.6	-	-	-	-
Rabi 2008								
Wheat		886.20	-	7527.0	-	1179	600	800
Barley		0.00	-	15.00			-	-
Maize		0.00	-	55.00	-	-	120	200
Oat		14.00	-	30.00	-	-		
Total		900.2	-	7627	-	1179.00	720	1000
Pulses								
Chickpea		534.0	-	3584	-	-	-	-
Pea		26.5	-	378	-	-	-	-
Lentill		25.0	-	60	-	-	-	-
Groundnut		0.0	-	0.0	-	-	-	-
Total		585.5	-	4022	-	-	-	-
Oilseeds								
Mustard		9.45	-	301	-	-	-	-
Toria		0.20	-	0.34	-	-	-	-
Niger		0.0	-	0.0	-	-	-	-
Linseed		5.85	-	60.5	-	-	-	-
Safflower		3.00	-	3.79	-	-	-	-
Total		18.5	-	365.63	-	-	-	-
Others								
Sugarcane				1300.00	-	-	-	-
Total				1300.00	-	-	-	-
Fodder crops								
Berseam		5.00	-	46.00	-	-	-	-
Total		5.00	-	46.00	-	-	-	-

BREEDER SEED PRODUCTION PROGRAMME, KHARIF-2011- BSP-I [Field Crops]

Kharif 2010-Breeder Seed Production Programme of all farms

S.No.	CROP	No. of Varieties	Area (ha)	Indent (q)	Targeted Production (q)
1	Soybean	4	402.23	5000.00	8120.00
2	Arhar	5	32.65	0.00	658.00
3	Paddy	18	153.00	278.00	6820.00
4	Niger	3	4.60	12.80	34.00
5	G. Nut	2	0.80	0.00	12.00
6	Kodo	7	2.90	4.00	29.00
7	Kutki	2	1.30	0.00	15.00
8	Maize	3	5.80	0.00	120.00
9	Maize (F)	1	2.00	0.00	40.00
10	Sesame	9	12.30	10.67	88.50
11	Sorghum (F)	1	1.00	3.00	20.00
12	Mung	5	5.70	0.00	58.00
13	Urad	3	18.00	0.00	185.00
	TOTAL	**63**	**642.28**	**5308.47**	**16199.50**

NUCLEUS SEED PRODUCTION PROGRAMME, KHARIF-2011- NSP-I [Field Crops]

Kharif 2010-Nucleus Seed Production Programme

S.No	Crop	Area [ha]	Indent [q]	Target Production [q]	
				SPS	Nucleus
1	Soybean	51.40		49.00	1124.00
2	Tuar	1.60	-	20.00	0.00
3	Groundnut	0.20	-	3.00	0.00
4	Paddy	1.15	-	33.50	0.00
5	Kodo	0.30	-	3.00	0.00
6	Kutki	0.10	-	1.00	0.00
7	Til	0.80	-	0.80	4.00
8	Niger	0.60	-	0.40	0.00
	Total	**56.15**	**-**	**110.70**	**1128.00**

Farm Wise Breeder Seed Production Programme Kharif- 2011:

All the Farms producing Breeder seed Production Farms were allotted separate production programme. Model Seed Production programme of two farms given as below and all the Farms provided seed production programme in such manner

Crop	Variety	Area (ha)	Grade of seed	Targeted Production			Source Seed		
				Productivity q. / ha.	Total Prodn. (q)	Value Rs.Lakh	Grade of seed	Quantity (q)	Place
Breeder Seed Production (Soy.)Unit, Agril. College Farm, Jabalpur									
Paddy	JRH-5	4.00	F1	10	40	1.36	N		BSP (FC)
	Kranti	5.00	B	50	250	8.50	N	2.0	BSP (FC)
	MR-219	5.00	B	50	250	8.50	N	2.0	Self/BSP(FC)
	Mahamaya	5.00	B	50	250	8.50	N	2.0	Self/BSP(FC)
	PS-4	10.00	B	40	600	22.80	N	2.0	BSP(FC)/ BSP GN
	P- 1460	5.00	B	50	250	9.50	N	2.0	Self/BSP(FC)
Soybean	JS 95-60	10.00	B	20	400	24.00	N	20.00	BSP(FC)
Pigeonpea	TJT 501 ICPL 87	3.00 2.00	B B	20 20	60 40	5.40 3.60	N N	0.60 0.40	Sagar Self
Niger	JNC-6	1.00	B	5	5.0	0.33	N	0.09	Self
TOTAL		**50.00**				**92.49**			
Breeder Seed Production (G. Nut) Unit, Agril. College Farm, Jabalpur									
Paddy	IR-36	3.00	B	40	120	4.32	N	0.75	Self/BSP(FC)
	IR-64	4.00	B	40	160	5.76	N	1.00	Self/BSP(FC)
	JRH-5	3.80	Hy.	10	38	5.70	N	0.20	BSP(FC)
	MR 219	5.80	B	40	240	8.64	N	1.50	BSP(FC)
	Kranti	16.40	B	40	680	23.12	N	6.80	BSP(FC)
	PS 5	0.50	B	40	20	1.00	N	0.10	BSP(FC)
	WGL 32100	7.00	B	40	280	10.08	N	1.40	BSP(FC)
	MTU 1010	2.00	B	40	80	2.88	N	0.50	BSP(FC)
Soybean	JS 95-60	23.60	B	20	480	28.80	N	17.20	BSP(FC)
Pigeonpea	ICPL 88039	4.00	B	20	80	7.20	N	1.00	Self
	TJT 401	2.00	B	20	80	7.20	N	0.80	self
Niger	JNC 1	1.00		5	5	0.33	N	0.05	Self
TOTAL		**73.1**				**105.03**			

BREEDER SEED PRODUCED DURING KHARIF-2011

S.No.	CROP	Area (ha)	Indent (q)	Production (q)
1	Soybean	402.23	5000.00	4281.78
2	Arhar	32.65	0.00	315.00
3	Paddy	153.00	278.00	5182.20
4	Niger	4.60	12.80	17.60
5	G. Nut	0.80	0.00	5.00
6	Kodo	2.90	4.00	12.75
7	Kutki	1.30	0.00	3.95
8	Maize	5.80	0.00	76.00
9	Sesame	12.30	10.67	24.12
10	Mung	5.70	0.00	27.25
11	Urad	18.00	0.00	101.82
	TOTAL	**639.28**	**5305.47**	**10047.47**

BREEDER SEED PRODUCTION PROGRAMME DURING RABI 2010-11- BSP-I of all farms

S. No	Crop	Varieties	Indent (q)	Targeted Production (q)	Area (Ha)
1.	Wheat	21	3733.00	12660.00	289.20
2.	Barley	2	16	46	1.20
3.	Chickpea	10	2032	4695	235.40
4.	Mustard	3	00	398	19.90
5.	Niger	3	00	15	3.00
6.	Linseed	4	8.04	185	12.00
7.	Lentil	1	00	710	35.50
8.	Berseem	2	00	71	15.20
9.	Oats	2	00	80	4.00
10.	Groundnut	2	00	120	6.00
11.	Pea	7	00	1326	66.30
12.	Maize	3	00	352.00	7.40
13.	Sugarcane	8	00	2200	5.50
	TOTAL	**68**	**5789.04**	**22858.00**	**700.60**

Nucleus Seed Production Programme during Rabi 2010-11- NSP-I [Field Crops]

S.No.	CROP	PRODUCTION (q)	
		SPS	NUCLEUS
1.	Wheat	82.00	515.00
2.	Gram	28.00	386.00
3.	Peas	9.30	1.70
4.	Linseed	8.00	0.00
5.	Lentil	5.00	10.00
6.	Mustard	0.50	0.00
7.	Toria	0.05	0.00
8.	Oat	1.25	8.00
9.	Berseem	0.80	4.00
10.	Barley	1.20	0.00
	TOTAL	**136.10**	**924.70**

Farm Wise Seed Production Programme Rabi 2010-11

All the Farms producing Breeder seed Production Farms were allotted separate production programme. Model Seed Production programme of two farms given as below and all the Farms provided seed production programme in such manner

Breeder Seed Production (Field Crop) Unit, Jabalpur

Crop/ Variety	Area (ha)	Grade of Seed	Targeted Production			Source of Seed		
			Productivity q/ha	Total Production (q)	Value (Rs in Lac)	Grade of Seed	Quantity (q)	Place
WHEAT								
GW-322	3.60	B	50	180	9	N	3.60	Self
Sujata (Desi)	1.0	B	40	40	2	N	1.00	Self
Lok-1	2.60	B	50	130	6.5	N	2.60	Self
GW-273	2.00	B	50	100	5	N	2.00	Self
MP 3173	1.50	B	40	60	3	N	1.50	Self
JW-3288	1.50	B	50	75	3.75	N	1.50	self
HD-2864	3.60	B	50	180	9	N	3.60	Self
GW-366	1.50	B	50	75	3.75	N	1.50	Self
JW-3020	1.40	B	30	42	2.1	N	1.40	Self
JW-17	0.20	B	40	8	0.4	N	0.20	Self
JW-3269	1.40	B	50	70	3.5	N	1.40	Self
MP 3211	2.00	B	50	100	5	N	2.00	Self
JW 2932	1.50	B	50	75	3.75	N	1.50	self
GRAM								
JG-11	5.85	B	20	117	8.19	N	4.5	Self
JG-63	2.40	B	20	48	3.36	N	1.80	Self
JAKI-9218	2.00	B	20	40	2.8	N	1.50	Self
JG-74	2.00	B	20	40	2.8	N	1.50	Self
JG-322	2.50	B	20	50	3.5	N	1.87	Self
JG-130	2.00	B	20	40	2.8	N	1.50	Self
JG-315	5.40	B	20	108	7.56	N	4.05	Self
JG-14	2.00	B	20	40	2.8	N	1.50	Self
JG-16	0.50	B	20	10	0.7	N	0.37	Self
JG-12	0.40	B	20	8	0.56	N	0.30	Self
LINSEED								
JLS-27	0.70	B	20	14	0.588	N	1.4	Self
LENTIL								
JL-3	2.00	B	20	40	2.84	N	0.80	Self
MUSTARD								
Pusa Tarak	0.40	B	25	10	0.68	N	0.02	Self
BERSEEM								
JB-1	0.20	B	5	1	0.24	N	0.04	Self
JB-5	0.30	B	5	1.5	0.36	N	0.06	Self
OAT								
Kent	0.40	B	30	12	0.48	N	0.20	Self
PEA								
Arkel	1.00	B	20	20	3	N	0.75	Self
IPF 99-25	0.30	B	20	6	0.9	N	0.22	
PSM 3	0.40	B	20	8	1.2	N	0.30	
JP-885	0.30	B	25	7.5	0.375	N	0.22	Self
					102.483		0	

Breeder Seed Produced suring Rabi 2010-11

S. No	Crop	Varieties	Indent (q)	Production (q)
1.	Wheat	21	3733	9797.38
2.	Barley	2	16	43.00
3.	Chickpea	11	2032	1564.30
4.	Mustard	3	00	274.57
5.	Niger	3	00	6.80
6.	Linseed	4	8.04	47.29
7.	Lentil	1	00	34.66
8.	Berseem	2	00	29.45
9.	Oats	2	00	50.80
10.	Groundnut	2	00	4.20
11.	Pea	7	00	850.57
12.	Maize	3	00	120.85
13.	Sugarcane	9	00	1355.00
	TOTAL	**68**	**5789.04**	**14178.87**

Summary of Seed Production at University/Institute Farms 2010-11

Sl. No	Centre	Breeder Seed	
		Target	Production
1	PAU, Ludhiana	5555.65	6485.82
2	GBPAU & T. Pantnagar	2902.60	6554.70
3	RAU, Bikaner	5804.27	9693.10
4	JNKVV, Jabalpur	11094.51	22871.34
5	UAS, Bangalore	2028.40	6074.90
6	UAS, Dharwad	7671.10	6305.47
7	ANGRAU, Hyderabad	39892.06	17669.54
8	IARI, New Delhi	499.40	675.96
	Grand Total	**104963.97**	**120492.55**

Receipts 2010-11 and Anticipated Net Receipts (2011-12) Rs. in Lakhs

	Name of the	2010-11			2011-12		
	Farms	Farm Receipts (2010-11)	Expenditure(2010-11)	Net Receipts (2010-11)	Anticipated Farm Receipts (2011-12)	Expenditure(2010-11)	Anticipated Net Receipts (2011-12)
1.	Chhindwara	13.45	6.88	6.57	12.24	4.60	7.64
2.	Dindori	13.55	10.20544	3.34456	18.3144	10.20544	8.10896
3.	Ganjbasoda	7.61034	8.88221	- 1.27187	20.61760	8.88221	11.73539
4.	Garhakota	1.8866	4.98307	- 3.09647	8.9424	4.98307	3.95933
5.	Kuthulia	71.23649	31.29809	39.9384	80.88797	31.29809	49.58988
6.	Mohgaon	2.81	3.83	- 1.02	2.32	3.42	-1.10
7.	Powarkheda	78.70609	50.88648	27.81961	124.1399	50.88648	73.25342
8.	Rewa	35.82144	25.13754	10.6839	62.90716	25.13754	37.76962
9.	Sagar	63.59633	23.98744	39.60889	55.56950	23.98744	31.58206
10.	Tendani	6.65	4.36	2.29	6.31	4.36	1.95
11.	Tikamgarh	42.22752	30.09803	12.12949	46.13973	30.09803	16.0417
12.	Waraseoni	7.17	5.20	1.97	9.09	5.20	3.89
	Total	**344.71481**	**205.7483**	**138.96651**	**447.47866**	**203.0583**	**244.42036**

S.No.	Name of the Farms	2010-11			2011-12		
		Farm Receipts (2010-11)	Expenditure (2010-11)	Net Receipts (2010-11)	Anticipated Farm Receipts (2011-12)	Expenditure(2010-11)	Anticipated Net Receipts (2011-12)
1	Badgaon						
2	Betul	15.30484	11.49444	3.8104	48.22472	11.49444	36.73028
3	Damoh	8.46275	4.54398	3.91877	5.93	4.54398	1.38602
4	Harda	18.75945	7.19970	11.55975	25.00	7.1997	17.8003
5	Katni	7.83055	15.89033	- 8.05978	6.50	15.89033	- 9.39033
6	Mandla	0.81947	1.19960	- 0.38013	0.83781	1.19960	- 0.36179
7	Narsinghpur	21.15909	8.99181	12.16728	1.60	8.99181	- 7.39181
8	Navgaon	6.13060	5.73929	0.39131	9.051	5.73929	3.31171
9	Panna	13.39606	11.53194	1.86412	25.12696	11.53194	13.59502
10	Seoni	10.89205	5.99858	4.89347	14.00	5.99858	8.00142
11	Shahdol	00	00	00	00	00	00
12	Sidhi	3.88284	3.01540	0.86744	5.60435	3.01540	2.58895
13	Umaria	0.71510	1.65945	- 0.94435	1.7422	1.65945	0.08275
	Total	**107.3528**	**77.26452**	**30.08828**	**143.61704**	**77.26452**	**66.35252**
	Rewa Diary	7.05656	3.36700	3.68956			
	Tikamgarh Diary	3.84908	6.54592	- 2.69684			
		10.90564	**9.91292**	**0.99272**			
Grand Total							
	Farms	**344.71481**	**205.7483**	**138.96651**	**447.47866**	**203.0583**	**244.42036**
	KVK	**107.3528**	**77.26452**	**30.08828**	**143.61704**	**77.26452**	**66.35252**
	Diary	**10.90564**	**9.91292**	**0.99272**	**591.09**	**280.32**	**310.77**
		462.97325	**292.92574**	**170.04751**	**591.0957**	**280.32282**	**310.77288**

SEED VILLAGE SYSTEM

Looking into the strength of seed systems at JNKVV, seed village programme has been implemented. Foundation seed of improved variety is being provided to the 150 farmers in a cluster of villages in each district for seed multiplication programme in all the districts of Madhya Pradesh. Capacity building programmes were organized for providing knowledge of varieties and their diagnostic characters for certification, seed technologies such as requirement of field standards, isolation requirement, objectionable diseases and related post harvest processes, storage, etc. The seed produced has been utilized to increase the area in those cluster of villages and will further increase area under those varieties through local seed diffusion mechanism. This mechanism of knowledge management has played an important role in dissemination of seed production technologies as well as crop production technologies at a much faster rate resulted in releasing the potential benefits of improved technologies. The details of quality seed produced is given below.

Rice Fallow Chickpea Seed System

In this system early maturing drought tolerant rice hybrids developed by JNKVV have been provided in the Rice fallow chickpea rainfed farming system of Rewa, Satna, Jabalpur, Damoh, fallowed by cultivation of chickpea under rainfed condition with improved technologies. In this model early maturing Rice hybrids JRH-4, JRH-5 transplanted through System of Rice Intensification fallowed by planting of suitable varieties i.e. JG 130(Rewa/Satna), JG 16(Damoh/Jabalpur) with the package of

Quality seed production under Seed Village System

Year	2006-07	2007-08	2008-09	2009-10	2010-11
	Quality seed produced (Qtls)				
2006-07	14590	218850	3282750	-	-
2007-08	-	21679.14	325187.1	4877806.5	-
2008-09	-	-	52226.14	783392.1	11750881.5
Total	14590	240529.14	3660163.24	5661198.6	11750881.5

technologies to ensure the legume nutritional security as well as enhanced farmers income as compared to keeping fallow land after rice. In this system, technology transfer has been managed through knowledge management system and more than 2500 farmers perceived the technologies and spread across the farming community. Now these technologies showed impact through expanding the area of chickpea horizontally as well as increased the production vertically. This has been one of the success stories of knowledge management through seed system to improve the economic returns of the rice fallow chickpea farmers as well as nutritional security compared to the growing rice alone leaving rabi fallows. Certified seed is being produced in the farms of selected farmers fields of the project areas and village seed system were established resulted in increased productivity of chickpea. More than two thousand five hundred farmers were trained for quality seed production resulted in the high production and high seed replacement rates with enhanced chickpea production in Rewa, Satna, Jabalpur and Damoh.

Modernization of AU Farms

Farm and its Location	Purpose for which used	Area (ha)
College Farm, Jabalpur		334.40
RARS, Dindori	Students, Instructional farm research maintenance breeding nucleus and breeder seed production	21.50
ZARS, Chhindwara		21.50
RARS, Mohgaon		10.00
RARS, Tendani		14.00
RARS, Waraseoni		15.63
College Farm, Rewa		27.30
ZARS, Kuthulia		74.60
ZARS, FRS, Kuthulia		35.00
ZARS,, Sagar		45.00
DHRT Garhakota		2.00
College Farm, Tikamgarh		127.60
ZARS, Powarkheda		139.00
College Farm, Ganjbasoda		50.00

Budget: (in lakh)

Head	Approved for 3 years	2008 -09		2009-10		2010 - 11
		Released	Utilized	Released	Utilized	Demand
A. Works	6	200	200	250	250	150
B. Equipments/ Implements	1	-		25	25	75
Total	7	200	200	275	275	225

Details of budget utilization (Total in 2 years)

Items	Amount (Rs. in lakh)
Boundary wall	11,73,190.00
Seed store	10,42,716.00
Seed Store Conditioned	10,41,817.00
Seed Testing Lab.	10,14,970.00
Seed Godown - Indore, Powerkheda and Sehore	17,27,307.00
Mega Seed Godown	30,00,000.00
Conditioned Store	15,00,000.00
Processing Shed	15,00,000.00
S.T.R. Building	35,00,000.00
Boundary wall gate implement shed at BSP Unit	7,00,000.00
Threshing Floor	8,00,000.00
Digging of tube well at Shahdol and purchase of HDPE pipes, sprinkler etc.	3,00,000.00
Farm Development land leveling and land shaping at College of Agril. Rewa/ Jabalpur	10,00,000.00
Land leveling and land shaping of JNKVV farms and fields I/c excavation of pond for irrigation	17,00,000.00
Total	2,00,000,00

Details of budget requirement

S.No	Items	Amount (Rs. in lakh)	Justification
A.	Civil Works		
1.	Renovation of Research Farm Building		
	Jabalpur	20.0	All the field research laboratories located in this building were in bad shape, hence renovation is essential for better facilities
	Powarkheda	20.0	All the field research laboratories located in this building were in bad shape, hence renovation is essential for better facilities
	Rewa	20.0	All the field research laboratories located in this building were in bad shape, hence renovation is essential for better facilities
2.	Irrigation Systems including pipe line/ sprinkler tube wells.	-	
	College Farm Jabalpur	20.0	College farm require irrigation pipe lines alongwith sprinkler/drip systems of irrigation
	ZARS Powarkheda Farm	20.0	Farm require irrigation pipe lines alongwith sprinkler/drip systems of irrigation
	Chhindwara Farm	5.0	Farm require irrigation pipe lines alongwith sprinkler/drip systems of irrigation
3.	Electrification		
	Jabalpur Farm	20.0	Needs establish of transformer and electrification works for better power supply to the farms
	ZARS Powarkheda Farm	25.0	Needs establish of transformer and electrification works for better power supply to the farms
	Combine harvester @ 15.0 lakh	15.0	It is essential for harvesting of the seed plot due to increased cost of labourers and also reduce the cost of harvesting time and reduce the losses due to climatic adversities.
	Tractors 55 HP along with implements, trolley etc.-5 @ 6.0 lakh	30.0	It is essential for field operations as well as planting of crops using ridge planter that can mitigate climatic adversities.
	Ridge planters-5	4.0	Ridge planter for planting plots for better water use efficiency
	Laser levelers-2	12.0	It is essential leveling the fields that can save 30 % water requirement as well as increase the productivity.
	Thresher-5 @ 90,000=00	4.5	It is essential for threshing of the seed plots without any mechanical mixture and timely threshing of the seed plots.
	Levelers, cultivators, disc, plough, post hole digger etc.	9.5	These implements are essential for the field operations.
	Total	225.0	

Impact/benefits of grant utilization on education, research and extension activities (during last two years):

Physical

- Increase the quality of experimentation units for practical of graduate and post graduate students
- Better facilities were created for conducting project research work
- Better extension support systems were developed for transfer of technology
- Created better infrastructural facilities for scientists working in research farms

Production, productivity, etc.

- Increase the seed production of field crops upto 22,000 qtls
- Enhance productivity of various crops in seed production plots
- Enhanced quality seed production as well as research experimentation

Financial

- Increased profitability of seed production programme
- More returns on investments in the seed programme

Participatory seed production (in q)

S.No.	Crop	Production
1	Paddy	416272
2	Wheat	326462
3	Chickpea	365676
4	Lentil	9267

STUDENTS' WELFARE

Inter Collegiate Games, Sports and Cultural Meets

- **Youth Festival -** 11th Inter Collegiate Cultural Competition was organized at College of Agriculture Jabalpur from 29-30 January, 2010. The function was inaugurated by Prof. Gautam Kalloo Vice Chancellor as Chief Guest. About 150 students from 5 colleges of Vishwa Vidyalaya participated with great zeal and enthusiasm in literary, fine arts, theatre, music and folk dance competitions.
- **Inter Collegiate Sports Meet -** Volley ball, Kabbaddi and Kho-kho inter collegiate competitions were organised at College of Agriculture, Rewa from February 2-5; 2010, in which 112 students from 5 colleges of JNKVV participated.
- **Inter Collegiate Athletic Meet -** Badminton, T.T. and Athletics inter collegiate competitions were organised at College of Agriculture, Jabalpur from February 15-17, 2010, in which 78 students from 5 colleges of JNKVV participated.
- **Inter Collegiate Sports Meet -** Carrom and chess inter collegiate competitions were organised at College of Agricultural Engineering, Jabalpur from February 15-17, 2010, in which 58 students from 5 colleges of JNKVV participated .

Inter University Competition

- **Excellent performance of JNKVV at 11th AGRIUNIFEST 2010:** The 11th All India Inter State Agricultural University Cultural Competition was organized by Sam Higginbotham Agricultural Technology and Science Institute, Allahabad during February 8-12, 2010, sponsored by ICAR, New Delhi. Students of JNKVV belonging to Jabalpur, Rewa and Tikamgarh campii participated in various events and bagged silver medal in extempore/debate competition.
- **11th AGRIUNISPORTS -** The 11th All India Inter Agricultural University Sports & Games meet was organized at Rahuri (M.S.) from February 20-25, 2010. Students from JNKVV participated in athletics, volley ball, table tennis and badminton competitions and won Bronze medals in javelin throw and high jump.

Republic Day Function

- NCC activities are carried out at JNKVV Jabalpur, consisting of two infantry troops of Army wing under 1MP Battalion at College of Agriculture, Jabalpur and 3 M.P. Battalion at College of Agriculture, Rewa. In addition to above mentioned Units 2MP Girls Battalion has also been introduced at College of Agriculture, Jabalpur during 2007.
- Cadet Vijendra Raj of Agriculture College Jabalpur got second prize in firing competition held during the National Integration Camp, Khamariya, Jabalpur from December 10-21, 2010. Cadets of NCC girls wing, College of Agriculture, Jabalpur organized pulse polio programme in nearby villages during January 10, 2010. 102 cadets of both the wings attended various camps. Cadets of girls wing got six awards in NCC NIC camp held at Khamariya. Cadet Ashita Rathore passed C certificate with A grade during the session. 41 cadets in B and 9 in C of NCC Boys unit and 40 cadets in B and 13 in C of girls unit were declared successful in NCC certificate examinations.
- NCC cadets of JNKVV presented the "Guard of Honour" to Hon'ble V.C. JNKVV, Jabalpur on 26th January 2010.
- Under the banner of NCC, cadets were provided elementary military training with emphasis on subjects viz. foot drill, weapon training with rifle, LMG, CMG, SLR etc., self defence, first aid besides participation in adventure activities viz. gliding, parasailing, para jumping and other social activities viz., tree plantation, blood donation, traffic control, election duty, rallies on social awareness and help to people during natural calamities.

Ten days combined NCC camp

2 M.P. Girls Battalion organized a ten days combined NCC training camp from 19th to 28th October, 2010 at Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur under the able guidance of Commanding Officer Lt. Col. Ajit Chavan and Dr. P.K. Bisen, Dean, Student Welfare, JNKVV, Jabalpur. In this camp 630

Placement Cell - selected candidates

Interview in progress

11th AGRIUNIFEST march past

Plantation programme under NSS

Winners being awarded by Hon. Vice Chancellor

Youth Festival 2010

cadets (350 girls and 280 boys) from Jabalpur, Chhindwara, Balaghat, Shahdol, Narsinghpur and Mandla participated. The objectives of the camp were to provide experience of community living to the cadets, to built leadership quality, team sprit, personality development, competitiveness among them and to train them for Republic Day parade. The best part of the camp was to make cadets aware about agriculture, research activities related to agriculture etc. The other activities of the camp included weapon training, drill, firing, field craft and battle craft, health and hygiene, personality development and career counseling. During this camp, group competitions were also organized.

During the Camp Dr. P.K. Bisen, Dean, Student Welfare, JNKVV, Jabalpur delivered a lecture on opportunities of self employment in agriculture which included aspects like Agricultural Education, Agricultural Products, Agricultural Technologies and Agricultural Research. Dr. Bisen also organized a visit to university so that cadets received valuable information about hi-tech horticulture, medicinal plants, seed production, bee keeping, fishery and dairy etc.

The cadets were educated about the competitive exams pertaining to military services and visited some food products factories so as to create interest among cadets towards self employment. In social service activities, they visited places like Nari Niketan and blind school. A rally was organized to create awareness about health and hygiene, education, humanity, discipline and harmony among the residents of nearby village Suhagi. During this camp, competitions like volley ball, throw ball, tug of war, best drill, poster, slogan, group dance, and group song etc were also organized.

In the last phase of the camp, a cultural programme was presented by the cadets. Hon'ble Vice Chancellor, Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur was the Chief Guest, Other dignitaries of JNKVV also participated in this function. Hon'ble Vice

National Service Scheme

Blood donation camp

Chancellor Dr. Gautam Kalloo distributed the prizes, cadet from JNKVV girls battalion grabbed trophies in best slogan, elocution, best poster, best firing and throw ball competition.

National Service Scheme (NSS)

- Activities under NSS encompass regular activities and 10 days special camps in each campus are arranged in nearby villages. Girl students also participated in educating village women in relation to child health and active participation of women in transfer of technology in the adopted villages. During their stay in the villages, students got involved in village activities by organizing rallies for awareness towards AIDS, literacy, anti-dowry and other related activities.

Regular activities

- On December 31, 2009, Red Ribbon Rally was held in which slogans concerning prevention of AIDS were chanted by the students of V.V. In this rally, 62 NSS students participated.
- The National Youth week was celebrated from 12-19 January, 2010 at JNKVV, Jabalpur.
- A special camp was organized during 17-23 February, 2008 at village Gurgavan and the public awareness movement was conducted. Plantation of bamboo trees was also done.
- NSS volunteers participated in training camp on January 12, 2010 and Sadbhavana Rally was organized by Rani Durgavati Vishwa Vidyalaya, Jabalpur.
- Plantation porgamme was organised at village Urdua on August 20, 2010 by the volunteers of College of Agriculture, Jabalpur.

Fellowships/Scholarships

Scholarships awarded to the V.V. students during academic session 2009-10.

National Talent Scholarship	51
Junior Research Fellowship	06
Merit-cum-means Scholarship	04
Merit Scholarship	122
Total	183

Placement Cell

The university has a full fledged Placement cell under the Dean Students Welfare to arrange for campus interviews for placement of graduate and post graduate students. The placement cell has been successfully organizing campus interviews and more than 178 students have been absorbed in various reputed companies during April 2009 to March 2010. The cell also counsels students on the availability of scholarships and avenues for higher studies. A step forward is the development of software which would keep track of the student profiles in a database and help to manage and sort out more than 800 students registered at the Placement Cell,

thus simplifying the access to the student profiles.

Tutorial Cell

As per guidelines of ICAR, a tutorial cell is functional in office of the Dean Student Welfare. The following reference materials including question banks are available in the tutorial cell

1. Objective Horticulture
2. Interview Redefined
3. Model Questions for Competitive Examinations
4. Bio Pesticides for Sustainable Agriculture: Prospects and Constraints
5. Group Discussions for Admissions and Jobs
6. ICAR Telephone Directory
7. Books Catalogue 2010
8. India 2010: A Reference Manual
9. Agricultural Statistics at a Glance 2009
10. Crop Nutrition: Principles and Practices
11. Agriculture Refresher
12. Agriculture Terminology
13. Agricultural Research DATA BOOK 2009
14. Economic Survey 2009-10
15. Introduction to Agriculture
16. Objective Agronomy
17. Multiple choice questions for Agricultural Extension
18. Agriculture Year Book 2009
19. Kurushetra Food Security
20. Kurushetra :Climate Change and Sustainable Agriculture
21. Quest for Pest Management
22. Agriculture Question Bank with Answers 2010
23. Technology of Horticulture
24. Ready Reckoner for Plant Breeding
25. State of Indian Agriculture 2009
26. General Agriculture for ICAR Examinations 2010
27. General Agriculture
28. A Hand Book of Jobs and Carrer
29. Indian Agriculture Since independence
30. Objective Horticulture
31. Advanced Techniques of Agriculture
32. Objective Soil Science
33. Agriculture Entrance Examinations 2010
34. Genera Studies
35. Objective Genetics
36. Agriculture General Knowledge
37. Agriculture Made Easy
38. Objective Plant Breeding
39. Plant Sciences at a Glance
40. Plant Breeding Simplified
41. Objective Agriculture for All Competitive Examinations
42. Objective Agriculture

Employment generation through Placement Cell

Organization/NGO's/Companies/ Banks visited V.V. campus - 10

No. of V.V. students got employment - 178 (April 2009 to March 2010)

List of candidates selected in various organizations (April 2008 to March 2009)

1.	BAIF for SPESD Bhopal	April, 2009	12	M.Sc. (Ag.)/ M.Tech.
2.	Union Bank of India	June, 2009	27	M.Sc. (Ag.)/B.Tech./B.V.Sc./MBA
3.	Union Bank of India	Nov., 2009	10	M.Sc. (Ag.)/B.Tech./B.V.Sc./MBA
4.	Hindustan Petroleum	Nov., 2009	02	M.Sc. (Ag.)/MBA
5.	Dhanuka Agritech Ltd.	Dec., 2009	04	M.Sc. (Ag.)
6.	Bank of India	Jan., 2010	12	B.Sc. (Ag.)
7.	BASIX	Feb., 2010	25	
8.	DPIP, Bhopal	July 12, 2010	40	M.Sc. (Ag.)/MBA
9.	IWMP, Bhopal	Aug. 10, 2010	14	M.Sc. (Ag.)/M.Tech.
10.	Shriram Seeds	Aug. 17-18, 2010	32	M.Sc. (Ag.)/MBA
	Total		178	

Report of New Construction / Infrastructure Development Work 2010-2011

S. No.	Work
1.	Supply of transformers and errection of H.T. extension line for 10 KV NDL connection at college of Agri. Ganj Basoda.

Works under RKVY (Research & Development of infrastructure facility)

1. Construction of boundary wall around Botanical Garden at JNKVV, Jabalpur
2. Renovation of U.G. Girls Hostel & Tribal Hostel at JNKVV, Jabalpur
3. Construction of boundary wall behind New Hostel at JNKVV, Jabalpur
4. Construction of boundary wall in front of College building at JNKVV, Jabalpur
5. Construction of boundary wall around New Teacher Hostel at JNKVV, Jabalpur
6. Construction of boundary wall Bangladesh Qtrs to B.Tech. Hostel at JNKVV, Jabalpur
7. Roof Treatment of Farmers Hostel, Farm office at College of Agriculture, Tikamgarh

Works under K.V.K.

1. Construction of Farmers' Hostel at KVK, Mandla i/c water supply, sanitary & Electricity
2. Electricity work of Adm. Building at KVK Tikamgarh
3. Construction of Farmers hostel under KVK at Krishi Vigyan Kendra Sagar i/c water supply, sanitary & Electricity
4. Construction of Staff Qtrs. under KVK at Krishi Vigyan Kendra, Sagar i/c water supply, sanitary & Electricity
5. Construction of Farmers hostel under KVK at Krishi Vigyan Kendra, Powarkheda i/c water supply, sanitary & Electricity
6. Construction of Adm. Build. under KVK at Krishi Vigyan Kendra, Powarkheda i/c water supply, sanitary & Electricity

Works under Mandi project

1. Construction of potting mixture shed at V.E.I. Rangua (Garhakota) Distt. Sagar i/c water supply, sanitary & Electricity
2. Construction of Threshing floor at V.E.I. Rangua (Garhakota) Distt. Sagar
3. Construction of POP Ceiling at Adm. Building (Seminar Hall) DHRTC Garhakota i/c Electricity
4. Construction of Seed processing & testing lab at V.E.I. Rangua (Garhakota) Distt. Sagar i/c water supply, sanitary & Electricity

Works under ICAR project and Govt. of India projects

1. Wall painting work with exterior & wall care putty on out side of wall at VIP G.H. No.1 at JNKVV, Jabalpur
2. Repairing of panting of old iron cots of U.G. Hostel at College of Agriculture, Jabalpur
3. Construction of Girls Hostel at College of Agriculture, Tikamgarh i/c water supply, sanitary & Electricity
4. Renovation of V.V. Administrative Office building at JNKVV, jabalpur
5. Renovation of Dean Students Welfare Office at JNKVV, Jabalpur

S. No.	Work
6.	Renovation of Electrification work of various buildings at JNKVV, Jabalpur
7.	Alluminium window in corridor of Guest House No.2 at JNKVV, Jabalpur
8.	Development with paver block & kerb stone at Guest house No.1 at JNKVV, Jabalpur
9.	Renovation of VC Chamber library build. at JNKVV, Jabalpur
10.	Construction of International Hostel at K.N. JNKVV, Jabalpur i/c water supply, sanitary & Electricity
11.	Construction of Girls Hostel at K.N. JNKVV, Jabalpur i/c water supply, sanitary & Electricity
12.	Development work in front of Kaushal Bhawan with paver block kerb stone JNKVV, JBP.
13.	Construction of Museum build. at JNKVV, Jabalpur i/c water supply, sanitary & Electricity
14.	Renovation of Director Instruction Office at JNKVV, Jabalpur
15.	Renovation of VIP Guest House Block No.II at JNKVV, Jabalpur
16.	Digging of open well (4 Nos.) at College of Agriculture, Tikamgarh
17.	Renovation of old IGMRI building at JNKVV, jabalpur
18.	Hiring of JCB Machine for excavation work for drain & leveling of excavated material at ground JNKVV, Jabalpur
19.	Transformers connection fram 11 KV Rural (Connection) feeder to 11 KV tow feeder at Murjhar RARS Waraseoni
20.	Renovation of Farm office Seed Godown Field lab at College of Agriculture, Tikamgarh i/c Electricity
21.	आंचलिक कृषि अनुसंधान केन्द्र पवारखेडा होशंगाबाद में व्हीट भवन का शेष नवीनीकरण एवं फार्म आफिस का नवीनीकरण कार्य
22.	Supply of fabrication of paver block at JNKVV, Jabalpur
23.	बी.एस.पी. यूनिट, ज.ने.कृ.वि.वि., जबलपुर में फील्ड रिसर्च/बीज लेब का नवीनीकरण कार्य मय जल प्रदाय एवं विद्युतीकरण कार्य सहित। (द्वितीय आमंत्रण)
24.	Construction of Examination Hall at JNKVV, Jabalpur
25.	बी.एस.पी. यूनिट ज.ने.कृ.वि.वि. में पुरानी फील्ड रिसर्च/सीड लेब में वाटर प्रूफिंग कार्य।
26.	Preparation of C.C. bed for fixing of paver block at JNKVV, Jabalpur
27.	ज.ने.कृ.वि.वि., जबलपुर में इंटीग्रेटेड फार्मिंग सिस्टम अनुसंधान के अंतर्गत डेरी यूनिट शेड का निर्माण कार्य मय जल प्रदाय एवं विद्युतीकरण कार्य सहित।
28.	बी.एस.पी. यूनिट, ज.ने.कृ.वि.वि. में चहारदीवारी लोहे का गेट एवं पुराने शेड का फर्श कार्य
29.	बी.एस.पी. यूनिट, ज.ने.कृ.वि.वि. में कंडीशनंड स्येर भवन की छत एवं शेष कार्य मय जल एवं विद्युतीकरण कार्य सहित
30.	ज.ने.कृ.वि.वि., जबलपुर के अतिथी गृह क्रमांक 2 के पीछे बीही (अमरूद) के बगीचे से लगी हुई चहारदीवारी का निर्माण कार्य, लोहे का गेट तथा कौशल भवन की चहारदीवारी के बाहरी प्लास्टर एवं रंगाई पुताई का कार्य। (द्वितीय आमंत्रण)
31.	Construction of Sports Complex at JNKVV, Jabalpur i/c water supply sanitary work
32.	महाराजपुर प्रक्षेत्र ज.ने.कृ.वि.वि, जबलपुर में फील्ड इन्सट्रक्शन भवन का निर्माण मय जल प्रदाय एवं विद्युतीकरण कार्य सहित।
33.	Tarring of Road at Krishi Nagar to V.V. at JNKVV, Jabalpur

Newly Constructed & Renovated Infrastructure

Kaushal Bhawan
(Multi-purpose Community Hall)

Guest House No. 2

Girl's Hostel

Krishi Vigyan Kendra, Jabalpur

Seed Technology Centre

Narmada International
Guest House

Online Journals access in Library

Library Reference Section

Jawahar Stadium

VIP Guest House No. 1

A renovated lab

College of Agriculture, Jabalpur