DEPARTMENT OF AGRONOMY
AT A GLANCE : 2014-15




OUR PROFESSION FEEDS THE WORLD

DR. N.B.SINGH
Head of Department, Department Of Agronomy
Narendra Dev University of Agriculture and Technology
Kumarganj, Faizabad -224229

LIST OF HEAD
DEPARTMENT OF AGRONOMY

S. NO.	NAME	PERIOD
1	DR. RAGHUBIR SAHAI DIXIT	10.10.1975 – 22.04.1982
2.	DR. ABDUL SHAKUR WARSI	23.04.1982 – 15.07.1987
3.	DR. RGHUBIR SAHAI DIXIT	16.07.1987 – 07.02.2001
4.	DR. D.S. YADAV	08.02.2001 – 04.02.2007
5.	DR. H.P.TRIPATHI	05.02.2005 – 31.07.2011
6.	DR. BHAGWAN SINGH	11.08.2011 – 25.12.2013
7.	DR. N.B. SINGH	26.12.2013 - Continued

LIST OF FACULTY MEMBERS
DEPARTMENT OF AGRONOMY

Name	Prof.	Assoc. Prof.	Asstt. Prof.	Project
1. Dr. N.B.Singh	Prof. & Head			IFS
2. Dr. G.R.Singh	Professor			WM
3. Dr. T.P.S.Katiyar	Professor			WM
4. Dr. Ghanshyam Singh	Professor			
5. Dr. O.P.Rai	Professor			DLP
6. Dr. Jai Deo Sharma	Professor			WC
7. Dr. S.S. Singh		Assoc.Prof.		WC
8. Dr. R.C. Tiwari		Assoc. Prof.		WM
9. Dr. H.C. Singh		Assoc. Prof.		DLP
10. Dr. Alok Kumar		Assoc. Prof.		IFS
11. Dr. R.S. Singh			Asstt. Prof.	WC
12. Dr. Neeraj Kumar			Asstt. Prof.	DLP
13. Dr. R.K.Pathak			Asstt. Prof.	WC
14. Dr. B.N.Singh			Asstt. Prof.	WM
15. Dr. R.A. Yadav			Asstt. Prof.	IFS
16. Dr. Ram Pratap Singh			Asstt. Prof.	
TOTAL	**6**	**4**	**6**	

LIST OF RESEARCH STAFF
DEPARTMENT OF AGRONOMY

Dr. R.P.Dwivedi	Proj. Asstt.				IFS
Sri R.A.Pandey		R.A.			IFS
Sri A.K.Singh			JRA		DLP
Sri Arun Pratap Singh		R.A.			IFS
Sri Ishwar Nath Singh		R.A.			IFS
Sri Ram Saran				T.A.	Attached from D.R.
Sri Tilak Ram		R.A.			IFS(ECF)
Sri P.C. Tripathi		R.A.			IFS(ECF)
Sri A.N.Pandey		R.A.			IFS (ECF)
Sri V.B. Singh		R.A.			IFS(ECF)
Sri Sangram Maurya				Field Asstt.	WM
Sri Devi Prasad				Field Asstt.	WC
Sri Kunwar Vishal Singh				Field Asstt.	WM

LIST OF OFFICE STAFF
DEPARTMENT OF AGRONOMY

S.N.	Name	IIIrd Group	Driver	IVth Group	Project
1	Sri A.N.Rizvi	Sr. Steno			Collage
2	Sri S.A.R. Zaidi	Sr. Asstt.			IFS
3	Sri. A.K.Srivastava	Steno			WM
4	Sri S.B.Singh	Lab Asstt.			Collage
5	Sri R.S. Gupta	Lab Asstt.			WC
6	Sri O.P.Singh	Lab Asstt.			Collage
7	Sri Ram Ujere Yadav	Jr. Clerk			DLP
8	Sri Ram Lal	Jr. Steno/ Computer Asstt.			IFS
9	Sri Om Prakash	Accounts Clerk			Collage
10	Sri Fakir Pal Singh	Mechanic			DLP
11	Sri R. Ratan Maurya	Jr. Clerk			Collage
12	Sri V. K.Upadhyay		Driver		WM
13	Sri Jai Prakash Yadav		Driver		IFS
14	Sri Ram Ujagir Mishra			Peon	Collage
15	Sri Jag Jeevan Singh			Peon	IFS
16	Sri Shiv Prasad			Peon	DLP
17	Sri Ram Autar			Peon	WC
18	Sri Suresh Pratap Singh			Peon	IFS

DEPARTMENT OF AGRONOMY
COURSES FOR Ph.D. DEGREE PROGRAMME

A- Major Courses		**Credit hours**
AGRON 611	Mineral nutrition of field crops	3(3+1)
AGRON 612	Advances in agronomy	1(1+0)
AGRON 613	Farming system	2(1+1)
AGRON 621	Soil fertility management	3(2+1)
AGRON 622	Dryland agriculture	2(2+0)
AGRON 624	Management of saline and alkali soil	2(1+1)
AGRON 691	Ph.D. Seminar	(0+2)
AGRON-700	Ph.D Research	45(40+5)

COURSES FOR M.SC.(AG.)

A- Major Courses **12**

A_1 Core Courses:

AGRON 511	Modern concepts of crop production	(3+0)
AGRON 512	Principles and practices of weed management	(2+1)
AGRON 521	Principles and practices of water management	(2+1)
AGRON 522	Soil fertility management and fertilizer use	(2+1)
AGRON 513	Agronomy of major field crops (*Kharif*)	(3+0)
AGRON 523	Agronomy of major field crops (*Rabi*)	(3+0)
AGRON 591	M.Sc. (Ag.) Seminar	(0+1)

A_2 Optional Courses: **8 Credits**

AGRON 514	Crop ecology & geography	(2+0)
AGRON 515	Soil conservation & watershed management	(2+1)
AGRON 516	Fodder & gorage crops	(2+1)
AGRON 517	Agro-forestry	(2+1)
AGRON 518	Tillage in crop production	(1+1)
AGRON 519	Agronomic field experimentation	(1+1)
AGRON 524	Dryland farming	(2+1)
AGRON 525	Management of problem soils	(2+1)
AGRON 526	Medicinal and aromatic crops	(2+1)
AGRON 527	Seed production agronomy	(2+1)
AGRON 528	Organic farming	(2+1)
AGRON 600	M.Sc. (Ag) Thesis	(12+3)

B- Supporting Courses:

14 credits o be decided by Major Advisor and Advisory Committee from Soil Science, Physiology, Statistics and Library. (14 +0)

DEPARTMENT OF AGRONOMY
B.Sc.(Ag.)
SEMESTER-WISE DISTRIBUTION OF COURSES

	I Semester	
AGRON 111(N)	Principles of Agronomy	2(1+1)
AGRON 112(N)	Introductory Agriculture (Ancient, Heritage, Agriculture, Scenario and gender equity in Agriculture)	1(1+0)
	II Semester	
AGRON 121(N)	Water management including micro irrigation	3(2+1)
	III Semester	
AGRON 211(N)	Practical crop production I (Cereals, Pulses and Fodder crops)	1 (0+1)
AGRON 212(N)	Organic Farming	3(2+1)
	IV Semester	
AGRON 221(N)	Practical crop production II (oil seeds & commercial crops)	1(0+1)
	V Semester	
AGRON 311(N)	Farming Systems and Sustainable Agriculture	2(1+1)
AGRON 312(N)	Field crops I (kharif)	3(2+1)
	VI Semester	
AGRON 321(N)	Field crops II (Rabi)	3(2+1)
AGRON 322(N)	Weed Management	2(1+1)
	VII Semester	
RAWE 111(N)	Crop Production	5
	VIII Semester	
	Courses for Experiential Learning	20

DEPARTMENT OF AGRONOMY

List of Advisor and Students – [M.Sc.(Ag.) & (Ph.D.)] - 2013-14

S.No	Name of Advisor.	Name of students with I.D.No. (M.Sc.(Ag.)		Name of students with I.D.No (Ph.D.)	
1.	Dr. Bhagwan Singh	3.Harish Kumar	A-7513/13	3.PradeepKumar	A-5483/10/12
				4.Narendra Singh	A- 7024/12
2.	Dr. N.B. Singh	3.Sankalp Srivastava	A-720/13	1.PankajKumarSingh	A-5483/10/12
				2.Pawan Jaiswal	A-7682/13`
		4. Rajnesh Tomar	A-7616/13	1.Kamlesh Kumar	A-4579/08
3.	Dr. Ghanshyam Singh	2.Shrimannaryan Dubey	A-7522/13	2.Sandeep Kumar Yadav	A-7025/12
		3. Sher Bahadur	A-7521/13		
4.	Dr. G.R. Singh	1. Akshansh Kumar Gupta	A-7508/13	1. Dileep Kumar Maurya	A-3260/09/11
		2.Rambharosh Rajbhar	A-7519/13	2.Rajeev Kumar	A-3590/06/10/12
5.	Dr. Jai Dev Sharma	2. Mayank Jaiswal	A-7514/13	1.Ravindra Nath	A-5030/09
				2.Shatrughan Kumar Singh	A-4953/09
				3.Brijesh Kumar Verma	A-7680/13
6.	Dr. Akhtar Ali	3. Yaswant Kumar	A-7526/13	1.Upendra Kumar Srivastava	A-5031/09
				2.Hemant Gangwar	A-7681/13
7.	Dr. O.P. Rai	3. Akhilesh Chandra Yadav	A-7507/13	1.Shishir Kant Singh	A-5621/10
				2. Anil Kumar	A-7023/12
8.	Dr. R.A. Singh	3. Vivek Singh	A-7525/13	1. Naresh Mani Pandey	A-3920/17/11/13
		4. Vimilesh Singh	A-7523/13		
9.	Dr. Ravi Shankar Singh	4. Vipul Singh	A-7524/13	NIL	
10.	Dr. Anil Kumar Singh	3. Ajit Kumar Verma	A- 7506/13	NIL	
		4. Ram Rajya	A- 7581/13		
11.	Dr. B.N.	3. Devesh Kumar	A-7511/13	1.Raj Kishor Kamal	A-

	Singh	4. Gagan Singh	A-7512/13		1245/94/99/13
12.	Dr. Ram Achal Yadav	3. Avanish Kumar Singh	A-7509/13	1.Ravi Pratap Yadav	A-6187/11/13
		4. Ram Nath Maurya	A-7517/13		

M.Sc.(Ag.) Final Year Students
Batch 2013-14

S.No.	Name of Students	ID No.
1.	Ajeet Kumar Verma	A-7506/13
2.	Akhilesh Chandra Yadav	A-7507/13
3.	Akshansh Kumar Gupta	A-7508/13
4.	Avanish Kumar Singh	A-7509/13
5.	Devesh Kumar	A- 7511/13
6.	Gagan Singh	A-7512/13
7.	Harish Kumar	A-7513/13
8.	Mayank Jayswal	A 7514/13
9.	Rajesh Kumar	A- 7515/13
10.	Rajnesh Tomar	A- 7616/13
11.	Ram Nath Maurya	A-7517/13
12.	Rambharosh Rajbhar	A-7519/13
13.	Ram Rajya	A-7518/13
14.	Sankalp Srivastava	A-7520/13
15.	Sher Bahadur	A- 7521/13
16.	Shrimannarayan Dubey	A- 7522/13
17.	Vimilesh Kumar	A-7523/13
18.	Vipul Singh	A-7524/13
19.	Vivek Singh	A-7525/13
20.	Yashwant Kumar	A-7526/13

M.Sc.(Ag.) Previous YearStudents
Batch 2013-14

S. No.	Name of students	I.D. Number
1	Aditya Prakash Dwivedi	A-8131/14
2	Alekh Kumar Sharma	A-8132/14
3	Amit Kumar	A-8133/14
4	Anil Kumar	A-5193/10/14
5	Ankit Kumar Verma	A-5188/10/14
6	Avinash Patel	A-8134/14
7	Durgesh Pandey	A-5201/10/14
8	Dushesh Kumar	A-8135/14
9	Harish Kumar Jaiswal	A-8136/14
10	Kamal Nayan Upadhyay	A-8137/14
11	Mahendra Pratap Singh	A-8138/14
12	Nitin Kushwah	A-8139/14
13	Rohullah Fazli	A-8140/14

14	Sandeep Kumar Yadav	A-8141/14
15	Shashank Shekher Singh	A-8142/14
16	Shiv Bahadur	A-5251/10/14
17	Shiv Vendra Singh	A-8143/14
18	Upendra Kumar	A-8144/14
19	Vibhanshnu Maurya	A-8145/14
20	Vikas Singh	A-8146/14
21	Vikash Kumar Singh	A-8147/14
22	Yogesh	A-8148/14

List of Ph.D. Students (OLD)

S.N.	**Name of students**	**I.D.No**
1	Anil Kumar	A-7023/12
2	Brijesh Kumar Verma	A-7680/13
3	Dileep Kumar Maurya	A-3260/05/09/11
4	Hemant Gangwar	A-7681/13
5	Kamlesh Kumar	A-4579/08
6	Narendra Singh	A- 7024/12
7	Naresh Mani Pandey	A-3920/17/11/13
8	Pankaj Kumar Singh	A-5483/10/12
9	Pradeep Kumar	A-5483/10/12
10	Pawan Jaiswal	A-7682/13
11	Ravindra Nath	A-5030/09
12	Rajeev Kumar	A-3590/06/10/12
13	Raj Kishor Kamal	A-1245/94/99/13
14	Ravi Pratap Yadav	A-6187/11/13
15	Shiv Das	A-5622/10
16	Shatrughan Kumar Singh*	A-4953/09
17	Shishir Kant Singh	A-5621/10
18	Sandeep Kumar Yadav	A-7025/12
19	Upendra Kumar Srivastava	A-5031/09

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List of Ph.D. Students (2014-15)

S.N.	**Name of students**	**I.D.No**	**Advisor**
1	Sri Yaswant Kumar Yadav,	A-4285/08/12/14	Dr. Bhagwan Singh
2	Sri Tarun Gopal,	A-8367/14	Dr. N.B. Singh
3	Sri Rajneesh Singh,	A- 6838/12/14	Dr. Ghanshyam Singh
4	Sri Harikesh,	A-6182/11/14	Dr. Akhtar Ali
5	Sri Ankit Tiwari,	A-6828/12/14	Dr. O.P. Rai
6	Sri Ajit Kumar,	A-6826/12/14	Dr. Anil Kumar Singh
7	Sri Sanjay Kumar,	A-8366/14	Dr. Ashok Kumar Singh

LIST OF NET QUALIFIED STUDENTS

1	Shree Naresh Mani Pandey	A-3920/07/11/13	April-2014	Ph.D.
2	Shree Brijesh Verma	A-7680/13	April-2014	Ph.D.
3	Shree Ankit Tiwari	A-6828/12/14	Nove.-2014	M.Sc. Ag.
4	Shree Abhishekh Tiwari	A-6824/12/14	Nove.-2014	M.Sc. Ag.
5	Shree Rajneesh Singh	A-6828/12/14	Nove.-2014	M.Sc. Ag.

Courses Allotted During I Semester

Sl. No.	Name of Instructor	Other Instructor	No. of students
1	Dr. Bhagwan Singh	**AGRON 591/691** BS/OPR/GS/JD **AGRON 513** NBS/BS/OPR/RAS	30
2	Dr. N.B.Singh	**AGRON 513** NBS/BS/OPR/RAS **AGRON 611** NBS/AK/RKP	
3	Dr. G.R.Singh	**AGRON 518** GRS/GS/TPS **AGRON 519** GRS/JD/AKS	Nil 35
4	Dr. GhanShyam Singh	**RAWE 411(N)** GS/RPS Dean Office) **AGRON 511** GS/JD/RSS **AGRON 612** GS/JD **AGRON 591/691** BS/OPR/GS/JD`	90 29 08 30
5	Dr. T.P.S. Katiyar	AGRON 518 GRS/GS/TPS	Nil
6	Dr. Jai Dev Sharma	**AGRON 512** JD/RKP/SSS **AGRON 519** GRS/JD/AKS **AGRON 591/691**	 30 08

		BS/OPR/GS/JD` AGRON 612 GS/JD	
7	Dr. Akhtar Ali	**AGRON 211(N)** A Ali/RRS/KPT	127
8	Dr. O.P.Rai	**AGRON 311(N)** OPR/RAY **AGRON 513** NBS/BS/OPR/RAS **AGRON 516** OPR/BNS **AGRON 613** OPR/AK/RAY **AGRON 591/691** BS/OPR/GS/JD	123 42 22 6 30
9	Dr. R.A.Singh	**AGRON 111(N)** RAS/RSS **AGRON 312(N)** RAS/RAY/KPT	123 123
10	Dr. Alok Kumar	**AGRON 611** NBS/AK/RKP AGRON 613 OPR/AK/RAY	 06
11	Dr. R.S. Singh	**AGRON 111(N)** RAS/RSS **AGRON 112(N)** RSS/BNS/KPT **AGRON 212 (N)** RSS/AK/NKY **AGRON 511** GS/JD/RSS **AGRON 311 (H)N** AKS/RSS/NKY	123 123 94 35 62
12	Dr. B.N.Singh	**AGRON 112(N)** RSS/BNS/KPT **AGRON 516** OPR/BNS	123 22
13	Dr. R.A. Yadav	**AGRON 311(N)** OPR/RAY **AGRON 312** RAS/RAY/KPT **AGRON 613** OPR/AK/RAY	123 123 06
14	Dr. Anil Kumar Singh	AGRON 212 RSS/AK/NKY AGRON 311 (H)N	129 63

		AKS/RSS/NKY AGRON 519 GRS/JD/AKS	40
15	Dr. R.K. Pathak	**AGRON 512** JD/RKP/SSS **AGRON 611** NBS/AK/RKP	
16	Dr. S.S.Singh	**AGRON 512** JD/RKP/SSS	
17	Sri Kalika Prasad Tripathi	**AGRON 112(N)** RSS/BNS/KPT **AGRON 211(N)** A Ali/RRS/KPT	123 127
18	Sri Ram Ratan Singh	**AGRON 211(N)** A Ali/RRS/KPT	127
19	Dr. Neeraj kumar Yadav	**AGRON 212 (N)** RSS/AK/NKY **AGRON 311 (H)N** AKS/RSS/NKY	94 63
20	Dr. R.C. Tiwari	**AENG 111(N)** RCT/HCS **AENG 211(N)** RCT/HCS **AENG 211(H)** RCT/HCS	126 123 53
21	Er. H.C. Singh	**AENG 111(N)** RCT/HCS **AENG 211(N)** RCT/HCS **AENG 211(H)** RCT/HCS	126 123 53

Courses Allotted During II Semester

Sl. No.	Name of Instructor	Other Instructor	No. of students
1.	Dr. Bhagwan Singh	**AGRON 524** BS/HCS/NKY **AGRON 622** BS/HCS/NKY	01 Ph.D.
2	Dr. N.B.Singh	**AGRON 523** NBS/BS/OPR/RAS **AGRON 522** NBS/RSS/RKP **AGRON 591/691** NBS/OPR/GS/JD	

3	Dr. G.R.Singh	**AGRON 521** GRS/TPS/AKS **AGRON 624** GRS/TPS/NKY **CEL-421(N)1-4** GRS/BNS	20 06 27
4	Dr. T.P.S. Katiyar	**AGRON 521** GRS/TPS/AKS **AGRON 624** GRS/TPS/NKY	
5	Dr. Ghanshyam Singh	**AGRON 528** GS/JD/BNS **AGRON 621** GS/AK/RKP **AGRON 591/691** NBS/OPR/GS/JD	35 12 07
6	Dr. Jai Dev Sharma	**AGRON 625** JD/SSS **AGRON 322(N)B** JDS/SSS/AKS(Extn.) **AGRON 591/691** NBS/OPR/GS/JD	Nil 120
7	Dr. O.P.Rai	**AGRON 523** NBS/BS/OPR/RAS **AGRON 421(N)1-3** OPR/RAY **AGRON 591/691** NBS/OPR/GS/JD	 36 (B.Sc. Ag IV year)
8	Dr. Akhar Ali	**AGRON 221(N)** A Ali/KPT/RRS	129
9	Dr. Ravi Shanker Singh	**AGRON 522** NBS/RSS/RKP **AGRON 321(N)B** RAS/RSS/KPT	
10	Dr. H.C.Singh	**AGRON 121(N)** HCS/RCT/BNS **AGRON 121(H)** HCS/RCT/BNS **AGRON 622** BS/HCS/NKY **AGRON 524** BS/HCS/NKY	126 62
11	Dr. R.C. Tiwari	**AGRON 121(N)** HCS/RCT/BNS	

		AGRON 121(H) HCS/RCT/BNS	
12	Dr. S.S. Singh	**AGRON 322(N)** JDS/SSS/AKS **AGRON 625** JDS/SSS	
13	Dr. Alok Kumar	**AGRON 621** GS/AK/RKP	
14	Dr. B.N.Singh	**AGRON 121(N)** HCS/RCT/BNS **AGRON 121(H)** HCS/RCT/BNS	
15	Dr. R.K.Pathak	AGRON 522 NBS/RSS/RKP **AGRON 621** GS/AK/RKP	
16	Dr. Ram Achal Yadav	**CEL 421(N)1-3** OPR/RAY	
17	Dr. Neeraj Kumar Yadav	**AGRON 524** BS/HCS/NKY **AGRON 622** BS/HCS/NKY **AGRON 624** GRS/TPS/NKY	
18	Sri Kalika Prasad Tripathi	**AGRON 321(N)** RAS/RRS/KPT **AGRON 221(N)** A Ali/KPT/RRS	
19	Dr. R.A.Singh	**AGRN 523** NBS/BS/OPR/RAS **AGRON 321(N)** RAS/RSS/KPT	123
20	Dr. Anil Kumar Singh	**AGRON 521** GRS/TPS/AKS	
21	Dr. Ashik Kumar Singh (DE Office)	**AGRON 322(N)** JDS/SSS/AKS (Extn.)	
22	Sri Ram Ratan Singh	**AGRON 321(N)** RAS/RRS/KPT **AGRON 221(N)** A Ali/KPT/RRS	

DETAILS AREA OF AGRONOMY RESEARCH FARM

- Cropped area - 26 Acre
- Farm Building and - 02 Acre
- Total farm area - 30 Acre

Project-wise cropped area :

i) AICRP ON IFS - 4.50 Acre
ii) AICRP on WM - 4.50 Acre
iii) AICRP on Dryland - 4.0 Acre
iv) AICRP on WC - 3.50 Acre
v) Adhoc Project - 1.50 Acre
vi) College of VS & AH - 1.50 Acre
vii) Research Students - 8.50 Acre

Farm implements available:

i) Tractor - One No.
ii) Harrow - One No.
iii) Cultivator - One No.
iv) Plough - One No.
v) Seed Drill/Zero drill) - One No.
vi) Leveler - One No.
vii) Rotvator - One No.

Cropped area (Kharif)

Sl.No.	Crop Name	Area (Acre)	Production	Remarks
1.	Rice	12.25	88 Q.	-
2.	Arhar	1.25	-	-
3.	Haldi	0.25	-	-
4.	Sugarcane	1.50	-	-

Cropped area (Rabi)

Sl.No.	Crop Name	Area (Acre)	Production (Qtl)	Remarks
1.	Mustard	1.75	.	-
2.	Gram	0.50	-	-
3.	Lentil	1.75	-	-
4.	Wheat	14.25	-	-
5.	Potato	0.75	-	-
6.	Brocoli	0.25	1.46	-

No. of Farm Labourers - 20

Work distribution of Farm Labourers-

i) Watchman - Five
ii) IFS at farm- Three (For cows, orchard & fish component)
iii) Office –Three (Dost Mohammad –WM, Umadutt – IFS, Kamlesh – Dry land)
iv) Tractor Driver – One
v) Remaining – 8 are employed at farm in research projects/research scholars as per availability of labourers.

RESEARCH PROJECTS

ALL INDIA COORDINATED RESEARCH PROJECT ON

INTEGRATED FARMING SYSTEM

INTRODUCTION:

The main centre of farming system research (formerly cropping system) under the jurisdiction of Narendra Deva University of Agriculture and Technology, Kumarganj, Faizabad started functioning since 1977-78.

MANDATES:

Following mandates were undertaken to overcome the problems of the crop production in the area:

1- To develop resource efficient, economically viable and sustainable crop production technology for different farming situations
2- To undertake nutrient management research for efficient resource utilization and yield maximization and evaluate their long-term sustainability.
3- To undertake on-farm testing, verification and refinement of system based crop production technology

To achieve the above mandates the following areas of research were identified:

1- Development of need-based efficient and profitable cropping systems.
2- Optimum crop combinations and planting geometry for intercropping systems.
3- Tillage requirements and crop establishment practices under different cropping systems.
4- Effect of long term INM and chemical fertilizer use on crop yields and soil fertility.
5- Organic farming.
6- On-farm evaluation and refinement of cropping systems technologies.

Objectives:

On-Station Research:

1. To find out suitable and profitable rice based cropping systems for Eastern Uttar Pradesh.
2. To develop suitable integrated nutrient management system for major cropping system (rice-wheat) with emphasis on locally available resources.
3. To study long range effect of graded fertilizer levels on yield stability and soil fertility under rice-wheat crop sequence.
4. To develop organic nutrient management package for high value crops viz. basmati rice-mustard-green gram
5. To develop resource efficient, economically viable and sustainable integrated farming system models for small and marginal farmers of Eastern Uttar Pradesh for their livelihood security.

On-Farm Research:

1. To undertake socio-economic and agronomic surveys for identification of production constraints.

2. To assess the responses of rice and wheat to N, P and K fertilizers under farmers' field conditions.
3. To assess the on farm performance of alternative cropping systems for increasing yield potential and net returns.
4. To enhance productivity and profitability of small and marginal farmers through integration of various farm enterprises for their livelihood security.

Technology Developed:

1. Rice (hybrid)-potato-green gram cropping system proved to be most remunerative with the net profit of Rs. 122374/ha followed by rice (hybrid)-mustard – black gram with Rs. 94137/ha. Adoption of hybrid rice (PHB 71) or basmati rice (Pusa basmati) was found more profitable than imbred rice (Sarjoo 52).
2. The substitution of 25 – 50% recommended nitrogen through farm yard manure or through green manure of *Sesbania aculeata* (dhaincha) with 75-50% recommended NPK doses through fertilizers to rice crop and 100% NPK through fertilizer to wheat may be adopted without any adverse effect on the yield.
3. Three decades results revealed that in absence of phosphatic and/or Potassic fertilizers, nitrogen alone failed to produce any positive effect on grain yield of both the crops in rice –wheat system.
4. In NARP Zone 7 and 8, under irrigated conditions, rice-lentil system was found more remunerative than traditional rice-wheat system.

Recommendations:

1. As per different indices of efficiency the rice (hybrid)-potato-green gram cropping system was found most efficient and remunerative system followed by rice (hybrid)-mustard-blackgram. Adoption of hybrid rice (PHB 71) or basmati rice (Pusa basmati) was found more profitable than inbred rice (Sarjoo 52).
2. On the basis of 28 years results it is concluded that substitution of 50% recommended nitrogen through farm yard manure or through green manure of *Sesbania aculeata* (dhaincha) alongwith 50% recommended NPK through chemical fertilizers to rice and 100% RDF through fertilizers in wheat was found more productive as compared to 100% NPK fertilizers alone, in rice-wheat cropping system.
3. In long term experiment to study the effect of NPK fertilizers for 35 years, it was concluded that in the absence of phosphatic and/or potassic fertilizers, nitrogen alone failed to produce any effect on grain yield of both the crops in rice-wheat system advocating need of balanced fertilization of major nutrients to sustain productivity and soil fertility in long run.
4. Under irrigated conditions rice-lentil and rice-mustard system were found more remunerative than traditional rice-wheat system.

Major Achievements:

- Application of farm yard Manure (12 t/ha) or *Sesbania* green manure (18 t/ha) holds great promise for 50% substitution of nitrogen fertilizer (60 kg N/ha) for rice in rice-wheat system. The use of organic manures along with chemical fertilizers sustained the yield through increased nutrients availability and nutrient use efficiency besides improving the physical conditions of soil more effectively than continuous application of chemical fertilizer alone. Substitution of 50 per cent N through FYM and *Sesbania* green manuring to rice resulted equal or more yields as compared to 100 per cent NPK fertilizers alone.

Among the different organic N sources, green manuring of *Sesbania* and FYM proved significantly superior to wheat cut straw (WCS). A positive residual response to FYM was observed continuously on wheat yield.

- The studies revealed the need of balanced fertilization (NPK) in rice-wheat system for long term sustainability in yield and soil fertility. Yields of rice and wheat declined steeply by omitting P fertilizers showing more decline in wheat than rice. Rice and wheat, both crops responded significantly to application of K and positively interacted with higher doses of N and P if the system continues for longer period. The application of 120 kg N/ha alone decreased wheat yields by 187 kg/ha/year and rice yields by 108 kg/ha/year. In contrast, when the crops received 120 kg N along with 80 kg P_2O_5/ha, the rate of decline was reduced to 105 for wheat and 51 kg/ha/year for rice. Application of 40 kg K_2O with 120 kg N/ha without P did not help in minimizing yield reduction. However, the reduction in yield was further minimized to 91 for wheat and 39 kg/ha/year for rice by balanced fertilization i.e.120 kg N, 80 kg P_2O_5 and 40 kg K_2O/ha .
- The response of nutrients (NPK) was found higher in rice than wheat. Amongst the nutrients, the response of phosphorus was maximum (13-18 kg grain/kg P_2O_5), followed by that of potassium (10-14 kg grain/kg) K_2O, whereas that of nitrogen was minimum (9-12 kg grain/kg N) in both the crops (rice & wheat) in eastern part of Uttar Pradesh.
- Organic manuring with FYM + vermicompost + neemcake (each 1/3 of recommended N of the crops) proved its superiority in terms of productivity and profitability over chemical fertilizers in maize-potato-onion cropping system.
- Under irrigated conditions rice-mustard and rice-lentil systems were found more remunerative than traditional rice-wheat system in NARP Zone 7 and 8.
- A sustainable model of integrated farming system for marginal and small farmers is being developed. The crops, livestock and horticulture component have been established. Further, progress in making fish pond pertaining to fish component has been initiated .

On cultivators' fields in both the NARP Zone No. 7 & 8, it was found that the balanced NPK Zn fertilization is essential for obtaining higher grain yields of rice and wheat

Impact:

1. The recommended intensified /diversified cropping systems as well as improved crop management practices are being adopted as per need and feasibility by the resource full farmers of eastern Uttar Pradesh.
2. The nutrient consumption (NPK) in eastern U.P. has been almost doubled. The importance of balance fertilization has been realized by the farmers which is proved by the narrowing of NPK consumption ratio from 39 : 6.1 : 1.0 (1993-94) to 21 : 6.9 : 1.0 (2000-01) and further narrowed to 6.8 : 2.8 : 1.0 (2008-09) showing improvement in productivity and soil health vis-à-vis livelihood security of the farmers.
3. The awareness regarding integrated nutrient management especially in rice-wheat system has been increased which restricted the degradation of natural resources especially soil. The use of farm yard manure, vermin-compost, crop residues and green manuring increased which sustained the crop productivity as well as soil health.

Future Strategies:

1. Characterization and evaluation of the existing farming systems of various agro-climatic zones of Eastern Uttar Pradesh for constraint analysis and suggestive interventions.

2. Development of sustainable model of integrated farming systems for small and marginal farmers of Eastern Uttar Pradesh for their livelihood security and testing of developed model on farmers fields with farmers participatory approach.
3. Development of organic farming packages of high value crops for sustainable crop productivity and soil health.

ALL INDIA COORDINATED RESEARCH PROJECT
ON FARMING SYSTEM (Staff Position)

S. N.	Post Sanctioned/ Pay Scale	Name of Incumbent	Mobile No.
1.	Sr. Agronomist	Dr. N.B. Singh	9415720277
2.	Jr. Chemist	Dr. Alok Kumar	9451204165
3.	Jr. Agronomist	Dr. Ram Achal Yadav	9450502117
4.	Research Assoc.	Sri Ram Asray Pandey	9450286241
5.	Research Assoc	Sri I. N. Singh	9415720942
6.	Research Assoc	Sri A Pratap Singh	9453237796
7.	TA/JRA	Dr. R.P. Dwivedi	-
8.	Sr. Asstt.	Sri S.A.R. Zaidi	9450763860
9.	Attendant	Sri Jagjeevan Singh	-

ALL INDIA COORDINATED RESEARCH PROJECT
ECF (Staff Position)

S. N.	Post Sanctioned/ Pay Scale	Name of Incumbent	Mobile No.
1.	Agronomist	Vacant	-
2.	Research Assoc.	Sri Phool Chandra Tripathi	8601497935
3.	Research Assoc.	Sri Akhilanan Pandey	9475651621
4.	Research Assoc.	Sri Vijai Bahadur Singh	9919615213
5.	Jr. Research Asstt.	Sri Tilak Ram	9452323328
6.	Research Assoc.	Vacant	
7.	Research Assoc.	Vacant	
8.	Jr. Steno	Sri Ram Lal	9839802752
9.	Jeep Driver	Sri Jai Prakash Yadav	9451996466
10.	Attendant	Sri Suresh Pratap Singh	9956312811

ALL INDIA COORDINATED RESEARCH PROJECT FOR DRYLAND AGRICULTURE

INTRODUCTION:

- One of the sub-centers of All India Coordinated Research Project for Dryland Agriculture was started at N. D. University of Agriculture and Technology, Kumarganj, Faizabad in 1987.
- This centre is engaged in developing the economically feasible, easily adoptable and socially acceptable technologies for dryland/ rainfed areas of Eastern Uttar Pradesh.

MANDATE:

- To optimize the use of natural resources i.e. rainfall, land and water and to minimize soil and water loss and degradation of environment.
- To evolve simple technology to substantially increase crop productivity and viability.
- To increase stability of crop production over year by providing improvement in natural resource management and crop management systems and alternate crop production technologies matching weather aberrations.
- To evaluate and study transferability of improved dryland technology to farmers fields.

OBJECTIVES:

- To find out the soil and climatic limiting factors associated with the productivity of rainfed crops and classify the growing environments.
- To evolve suitable package of practices for different crops grown under dryland conditions.
- To select suitable drought resistant, short duration, fertilizer responsive crops and their varieties for dryland agriculture.
- To study the effect of moisture and nutrients on different crops grown under dryland conditions.
- To manage the water resources available under dryland conditions.

TECHNOLOGY:

- The compartmental bunding of 10 m x 10 m to 15 m x 15 m sizes with a bund height of 30 cm is suitable for in situ moisture conservation during monsoon period. An increase of 12% yield of pigeonpea (Narendra Arhar-2) was recorded when crop was sown in lines with compartmental bunding.
- The sub soiling at 2m interval with cross pass upto 35 cm depth facilitate more retention of soil moisture in the soil profile resulting in good yield of paddy and lentil.
- Pigeonpea based intercropping system viz. pigeonpea + okra (1:1) pigeonpea + sponge guard (1:1), Pigeonpea + Turmeric (1:1), pigeonpea + kalmegh (1:1) are more profitable. This system is efficient is making the use of rainfall and length of growing season effectively and provide insurance against crop failure due to aberrant weather conditions.
- Inter cropping of fodder maize + cowpea as an early crop during kharif season, followed by a chickpea during the rabi can be sown well in time on sufficient residual moisture. This system was found profitable under rainfed conditions of eastern Uttar Pradesh.

- The application of 30 kg Sulphur/ha and 5 kg zinc/ha was found suitable to improve the seed yield and oil quality as well as oil production of mustard under rainfed salt affected soils of domain area. These nutrients may be applied as basal at the time of sowing alongwith recommended dose of N, P and K.

IMPACT:

- This practice is being adopted approximately on 500 ha in Faizabad, Ambedkarnagar, Sultanpur and Barabanki districts of eastern Uttar Pradesh.
- This technology is being adopted by the reasonable number of progressive farmers of the domain area.
- These systems are being adopted approximately to the tune of 15% farmers of this region.
- This technology is being adopted approximately in 20% of domain area.
- Progressive farmers of the domain (15-30%) are adopting this technology.
- Due to unavailability of biofertilizers in the market, farmers are not able to adopt the technology. Only progressive farmers are using this practice so the extent.

- Use of PSB and rhizobium culture alongwith 45 kg P_2O_5 per ha is optimum for chickpea to increase its productivity and to improve the protein content. The use of biofertilizers increased the seed yield of chickpea by 31.4%.

Future Strategies:

The diverse challenges and constraints in dry land farming viz. natural resource degradation, climate change, increasing food, feed and fodder demand and slow growth in farmers income are most important so, there is need for modifying and introducing new technologies for increasing and sustaining yield in dry land areas**.**

S. N.	Designation of Sanctioned post	ICAR Pay Scale	Identical post at the centre	Name of incumbent
1.	Agronomist	37400-67000	Prof. Agronomy	Dr. O. P. Rai
2.	Jr. Scientist (Soil Physicist)	15600-39100	Assoc. Prof. Soil Science	Dr. Neeraj Kumar
3.	Jr. Scientist (Agril. Engg.)	15600-39100	Assoc. Prof. Agril. Engg	Dr. H. C. Singh
4.	S.T.A.	9300 - 34800	S.T.A. (Agronomy)	Sri A.K.Singh
5.	S.T.A.	9300 – 34800	S.T.A. (Soil Sc.)	Vacant
6.	S.T.A.	9300 – 34800	S.T.A. (Agl. Engg)	Vacant
7.	Fieldman	5200 - 20200	J.R.A.	Vacant
8.	Fieldman	5200 - 20200	J.R.A.	Vacant
9.	Mechanic	5200-	Mechanic	Sri F. P. Singh

ALL INDIA COORDINATED RESEARCH PROJECT ON WEED CONTROL

INTRODUCTION

The AICRP-WC under jurisdiction of Narendra Deva university of Agriculture & technology was started since 1982 at main campus Kumarganj, Faizabad.

STAFF POSITION (As on 31.01.2014)

S. No.	Name of incumbent	Designation	Mobile No.
1.	Dr. Jaidev Sharma	Professor of Agronomy/PI	9456241425
2.	Dr. S.S. Singh	Residue chemist	9450763891
3.	Dr. R.S. Singh	Jr. Agronomist	9415188017
4.	Dr. R.K. Pathak	Jr. Microbiologist	9453956534
5.	Mr. R.S. Gupta	Lab Assistant	9450929919
6.	Mr. Devi Prasad	Field Assistant	7376998514
7.	Vacant	Steno	-
8.	Mr. Ram Avtar	Lab attendant	-
9.	Mr. B.P. Maurya	Mail messenger	9807945108

MANDATES:

- Weed survey and surveillance of the weed flora in eastern U.P.
- Weed biology and physiology of important weeds like weedy rice.
- Weed management in crops and cropping systems like rice and rice-wheat cropping system.
- Management of problematic/ invasive/ parasitic/ aquatic weeds. To study the problematic/ aquatic weeds.
- Herbicide residues and environmental quality: Herbicides residue studies in soil.
- Transfer and technology: OFT and FLD will be conducted on farmers field.

OBJECTIVES:

- Ecological survey of weed flora in different agro-climatic zones of eastern Uttar Pradesh with main focus on weed surveillance.
- To evolve effective, easy, economical and safe weed control methods in major crops and cropping systems.
- To know the long range effect of herbicides, on the soil micro-flora, soil fertility, crop growth and yield and herbicide residue build up in soil/water/ plant in crops and cropping systems.
- To conduct on farm trials to popularize the weed control technologies on farmers' fields and to test the proven results on farmers fields.

MAJOR ACHIEVEMENTS :

- Dominancy of broad leaved weeds increased in both the crops of rice and wheat due to repeated application of grassy weed killers in EPZ. Dominancy of *Caesulia auxillaris, Ludvigia parviflora* and *Alternenthra spp* in rice and *Chenopodium album, Anagallis arvensis and Fumaria parviflora* in wheat was increasing, despite the natural presence of *Echinochloa spp* in rice and *P. minor* in wheat.
- Bispyribac –Na at 25 g ha^{-1} applied at 25-30 DAT of rice controlled almost all type of weeds very effectively.
- An effective control of complex weed flora in direct seeded rice (wet) was achieved by using pendimethalin 1000g ha^{-1} at 5-6 DAS followed bispyribac Na 25 g ha^{-1} applied at 25-30 DAS.
- Infestation of *Phalaris minor* and other weeds was less under zero till than conventional till. Grain yield, net profit and BCR recorded higher in conventional rice zero till tillage wheat than other tillage treatments.
- Isoproturon 1.0 kg +2,4-D 0.5 kg ha^{-1} being at par with manual weeding twice controlled weeds effectively and recorded higher yield and economics than other treatments.
- *Orobanche cernua* was controlled effectively by using the 20 g urea/plant on the beheaded orobanche shoots at 80 DAP stage (farmers practice). The infestation further it controlled of orobanche and recorded higher level of tobacco leaf yield.
- OFT revealed that clodinafop + metsulfuron methyl (160+4g ha^{-1}) as tank mixed controlled the grassy and broad leaved weeds very effectively and recorded higher grain yield and economics.
- Front line demonstrations conducted on rice during kharif-2013 revealed that either oxadiarzyl 100g as PE followed 2,4-D 500 g ha^{-1} as PoE or bispyribac-Na 25g ha^{-1} as PoE controlled grassy, broad leaved weeds and sedges very effectively.

IMPACT:

- Two important weeds were found in rice-wheat cropping system of eastern Uttar Pradesh as in rice. *E. crusgalli, Alternanthra casulia* and in wheat*. Polypogon monosplensis, Poa annua and Rumex.*
- Application of butachlor @1.5 kg ha^{-1} at pre emergence in rice and Isoproturon @ 1.0 kg + 2,4-D Na salt @ 0.5 kg ha^{-1} as post emergence in wheat to control the weeds in rice and wheat in eastern U.P.
- Herbicides like butachlor, isoproturon and 2,4-D Na salt at recommended doses did not leave any residue in soil of rice and wheat.
- Microbial population did not influenced by butachlor, isoproturon and 2,4-D Na salt at recommended doses beyond 45 DAS.
- Bispyribac Na at 250 g ha^{-1} was found effective to control narrow And BLWs in rice and found very popular and the formers.

FUTURE STRATEGIES :

- To evolve effective, easy, economical and safe weed control methods in major crops and cropping systems.
- To know the long range effect of herbicides, on the soil microflora, soil fertility, crop growth and yield and herbicide residue build up in soil/water/ plant in crops and cropping systems.
- To improve the weed management practices for control of problematic weeds in different situations through studies on physiology and biology of specific weeds.
- To popularize the weed control technologies and to test the proven results on farmers fields.
- To impart training to the extension agencies on weed control technology.

ALL INDIA COORDINATED RESEARCH PROJECT ON WATER MANAGEMENT

Mandate :

- Development of improved & sustainable water management technology for higher production potential with other production factors for promising crop/varieties and cropping systems under varying water water availability situations.

Objectives:

Station Research:

- To find out the suitable water management technology for different cropping system crops/varieties under varying other inputs.
- To study the different crop establishment methods and moisture regime in wheat under rice-wheat cropping system.
- To evaluate the efficacy of irrigation under drip and surface irrigation along with fertilization in field, vegetable and fruit crops.

Operational Research:

- To study the demand and supply of water in selected canal command
- To demonstrate the developed water management technology on farmers field in selected distributory.
- To demonstrate the suitable and more remunerative crops/cropping systems for head, middle and tail end minors under varying water available situations.
- To study and demonstrate the conjunctive use of water through canal and ground water for higher productivity.
- To study and demonstration the multi use of water for higher productivity and profitability.
- To demonstrate the suitable cropping systems for varying water availability situations.
- Studies on drainage in high water table areas in different type of soils and also to carry out work on problems of water logging in irrigated areas.

Achievements:

Station Research:

- Improved water management practice (7cm water in checks of 100 m^2 at 1-3 days after disappearance of ponded water) gave higher grain yield of rice (16-30%) and saved about 25-40% water as compared to farmers practice (field to field irrigation with 10-12cm water in each irrigation).
- In case of wheat crop, improved water management practice (6cm irrigation in checks of 100 m^2 at critical stages at CRI, late jointing and milking) gave higher yield (15-30%) and saved water about 40% as compared to farmers own practices of field to field irrigation with 8-10cm water.
- For seepage control in irrigation channel bitumen coating on different type of lined materials was found most effective.
- Irrigation level of 7cm at 1-day after disappearance of ponded to be best schedule for transplanted rice with respect to grain yield and WEE as well.
- Irrigation schedule of 7cm 1 DADPW with 150 kg N + 30kg N through FYM was found best with respect to yield of hybrid rice and WEE (84 kg/ha-cm)
- In case of onion, bed planting with 1.4 IW/CPE irrigation schedule was found significantly better than other schedules with respect to bulb yield.
- Inter cropping of rice with paired rows of pigeonpea on raised bed (5:2) was found most remunerative even under rainfed condition or 7cm irrigation 7-11 DADPW.

- In case of wheat, irrigation schedule of 1.0 IW/CPE upto late jointing and 1.2 IW/CPE upto dough stage gave the highest yield of wheat.
- Irrigation level of 0.9 IW/CPE with 125% RDF gave the highest yield of tomato with maximum WEE.
- Highest yield of Rajmash was recorded under 0.90 IW/CPE with 5cm irrigation water applied with 100 kg N and 10 tonne FYM per hectare.
- In case of scented rice, significantly higher yield and WEE were recorded under 7cm irrigation at 1 DADPW.
- Pigeonpea grown on raised bed in paired rows at 50cm spacing and intercropped with 3-rows of urd on raised bed was found to be most remunerative system under rainfed situation.
- Maximum grain yield of wheat was obtained where crop was planted on beds (3 rows) and fertilizer with 125% RDF under the irrigation schedule of 1.0 IW/CPE with 4-cm depth of irrigation.
- In rice-rai-okra cropping system, okra was planted on beds and irrigated at 7 days interval with 5cm water gave the highest okra yield.
- Application of 75% RDF + 25% N through bio-compost was found suitable with five irrigations at critical stages in case of wheat crop.
- Maximum fruit yield of banana and Aonla was found under drip irrigation at 80% wetted surface with 100% N.
- In case of Mungbean, irrigation scheduling of 1.0 IW/CPE was found best where planted on raised beds.
- For Rajmash, ridge sowing and irrigated at 1.0 IW/CPE (5cm water depth) was found best where fertilized with 75% RDF + 25% N through bio-compost. Maximum water use efficiency was recorded with 0.8 IW/CPE.
- In case of broccli, irrigation schedule of 0.8 IW/CPE was found most suitable. Application of 75% RDF + 25% N through bio-compost was found suitable for this crop.

Operational Research:

- The ratio of supply and demand during kharif and rabi in command of Ram Nagar distributory system was computed to be 0.05 and 0.75 respectively. The water availability in Tulsipur minor (being at head) was more as compared to demand. The deficit in water was observed more in rabi season as compared to kharif.
- Improved water management practice 7cm water 1-3 days after disappearance of ponded in checks of $100m^2$ increased grain yield to the tune of 28, 29 & 41 per cent at head, middle and tail minors of Ramnagar distributory and saved water about 25-40%. WEE was also higher as compared to farmers practice (field to field irrigation of 10-12cm water.
- Improved water management practice was demonstrated on farmers fields and it was observed that improved practice (3 irrigations at CRI, late jointing and milking stages with 6cm irrigation in checks of $100m^2$) increased wheat yield by 23, 25 and 28 per cent as compared to farmers practice (field to field irrigation of 8-10cm). WEE was also higher under improved irrigation. It also save 40% of water.
- Under poor availability of canal water particularly at tail end minors or outlets, gram + mustard (4:1) intercropping was found to be most remunerative over other intercropping or pure stands. Maximum net return (Rs. 32590/ha) was calculated under this system at farmers fields.

- Growing of pigeonpea on raised beds in paired at 50cm intercropped with 5-rows of rice (short duration) in furrow (100cm) was found more productive and remunerative under poor availability of canal water at tail end minors.
- Growing of pigeonpea on raised beds in paired rows at 50cm intercropped with 3 rows of urd on raised bed was found most productive and remunerative system under poor availability of canal water at tail end of minors.
- Rice-potato-okra and rice-rai-okra cropped system were found more remunerative systems for head and tail end of minors.
- The integrated farming system, pisiculture and dicker in pond and nearby cropping system of rice-lentil+rai was found more productive and remunerative (net return Rs. 83038/ha/yr) as compared to conventional cropping system of rice-wheat+rai (Rs. 68312/ha/yr).

Impact:

Water management practices have been proved to be most beneficial project for farmers. Farmers adopted the improved water management practice for different crop which increased their production, income and also saved water. Cropping system demonstration in different water availability condition also increased the income of farmers. Multiuse of water in farming systems also enhance the income of farmers in which pisiculture, duckeries and crop were taken together.

Future Strategies:

- Studies on vegetable, horticulture, medicinal and aromatic crops in relation to proper irrigation schedules.
- Multiple use of water at farmers field/ponds with economic technologies.
- Studies on drainage in different situation at farmers fields.
- Studies on drip irrigation system for judicious use and save the water.
- Evolve the water management technologies for different crops under low availability of water and low rainfall condition.

Team of the Scientists:

1. Dr. G.R. Singh,
2. Dr. T.P.S. Katiyar, Soil Physicist
3. Er. R.C. Tiwari, Chief Scientist
4. Dr. B.N. Singh, Junior Agronomist

SYLLABUS

AGRON 600 : M.SC. (AG.) THESIS (12+3)

AGRON 611: MINERAL NUTRITION OF FIELD CROPS 3(2+1)

Scope of mineral nutrition and historical background, soil as a source of nutrients. Recapitulation of essential and beneficial elements, mechanism of ion uptake by roots and foliage, translocation of nutrients in plant, critical concentration of nutrients, nutrient uptake and growth relationship, ecological and genotypic variation in plant nutriention. Role of essential elements in plant metabolism, diagnosis and correction of their deficiencies (i) major nutrients – N, P, K, Ca, Mg and S (ii) micro and beneficial elements.

PRACTICAL

Studies on the dry matter and ash content in different crop plants, assessment of nutritional status of crop plants by rapid tissue test and foliar diagnosis, development of deficiency symptoms of major and minor nutrients in water culture, pot study on varietal differences in nutrient requirement, time course studies in ion uptake, determination of critical concentration of nutrients in important field crops, studies on mineral interactions.

AGRON 612: ADVANCES IN AGRONOMY 1(1+0)

Recent agronomic trends and problems in different countries and their impact on crop production.

AGRON 613: FARMING SYSTEM 2(1+1)

Definition principles, scope, limitations, objectives and various components of farming system. Approaches, objectives, issues, priorities and methodologies of farming system research. Farming system research in India and abroad. Farming system research for different agro-climatic zones of India. Farming system research for degraded lands, waste land and pasture lands. Integrated farming system with crops-fish/vegetables/livestock/poultry/piggery/seri-culture/horticulture. Integrated farming system models for wet land and dryland.

PRACTICAL

Survey of prevailing systems in the nearby area of the university. To work out the variability of structure of holding of farmers and scope of supporting livestock, poultry and other subsidiary small enterprises. Development of integrated farming system model for specific situations with their economics.

AGRON 621:SOIL FERTILITY MANAGEMENT 2(1+1)

The concept of soil fertility, history of soil productivity and fertility, its place in nature and the dynamics of soil formation. Basic soil plant relationship, phenomenon of ion exchange, involvement of soil and plant systems, nutrient absorption and ionic balance in plants. Relationship between environmental factors and plant nutrient. Concept of permanent fertility experiments and their effect on soil and crop yield. Soil reaction in relation to nutrient availability and plant growth. Soil organic matter and its maintenance under different conditions. Soil nitrogen, its sources, losses and management. Phosphorus, its sources, management and agronomic significance. Potassium, its dynamic equilibrium in soil agronomic significance, secondary elements and their agronomic significance. Trace elements their sources, location and criteria. Soil liming and its significance with reference to Indian soils. Assessment of soil fertility, bio-fertilizers, their significance in crop production. Maintenance of soil fertility in problem areas viz. salt affected, water logged, and dry areas etc.

PRACTICAL

Procedures of plant and soil sampling. Determination of organic matter content of soils, soil pH and cation exchange capacity. Estimation of total nitrogen, phosphorus and potassium in

plant material. Estimation of available nitrogen, phosphorus and potassium in soil. Determination of calcium and magnesium in plant materials. Rapid plant tissue test.

AGRON 622 : ADVANCES IN DRY LAND FARMING 2 (2+0)

Characteristics of dry land farming, extent of dry land farming in the state and country and economic significance there of. Special problem of dry land agriculture like susceptibility of soil to accelerated water and wind erosion, poor content of organic matter, greater incidence of insect, pests, diseases and weeds, greater susceptibility for salinization, greater evapotranspiration by weeds and intense solar radiation. Identification of the problems and assessment of potential and actual hazards to crop production, mitigating the diversities and meeting the challenges. Problems of conservation of soil and water with particular reference to that from run off, splash erosion and high evapotranspiration. Crop planning and management of such areas for sustained production. Quality of crops in dry land, problems and practices in the use of irrigation and soil water for efficiency in crop production through use of fertilizers, proper tillage operations, weed control and mulches. Improvement of dry land on watershed basis. Resource management to improve the overall productivity of area under watershed. Development of model watershed based on the recent technology.

AGRON 623: CROP ADAPTATION AND DISTRIBUTION 2(2+0)

Scope, climatic and soil factors determining the crop distribution. Classification of climate, bio-climatic zones and physiological limits. Ecological classification of cultivated plants, plant succession, migration, ecological optimum, adaptation. Photo and thermo periodism, geographic distribution of crop plants. Growth and development, relationship of developmental physiology with growth manipulation of crops.

AGRON 624: MANAGEMENT OF SALINE AND ALKALI SOILS 2(1+1)

Formation of saline and sodic soils, source and accumulation of soluble salts. Classification of salty soils, basic terminology used for different soluble salts. Harmful effect of salts, crop responses to soil reaction, extent of damage to the crops, salt tolerance of crop varieties. Steps essential to reclamation, use of various kinds of soil amendments, leaching requirements, selection of crops and cropping pattern in salty soils. Role of agronomic practices in reclamation and management of salty soils. Standardization of agronomic and other techniques for crop production with special reference to the salty soils under the service area of this university. Management and use of different kinds of water in crop production.

PRACTICAL

Determination of pH, electrical conductivity, ESP, SAR and other values of soils. Germination studies, crop response to levels of salinity and sodicity. Familiarization of different agro-techniques in reclamation of soils.

AGRON 625: HERBICIDES-CHEMISTRY AND PHYSIOLOGY 3(2+1)

Histroy and classification of herbicides, morphogenetic, physiological and biochemical response of plants to herbicides, uptake, translocation, metabolism and mode of action of important herbicides. Fate of herbicides in soil movement, adsorption, desorption, degradation, persistence etc. Factors affecting herbicide toxicity in plants. Selectivity in relation to formulation. Methods, rate and time of application. Uptake, movement and metabolism of herbicides. Herbicide crop variety interaction, development of herbicide resistance in weeds, sub-toxic effects on plants, toxic and safe use of herbicides. Use of radioisotopes in weed research, tracer radiation from radioactive nuclei, half life, dose calculation, measurement of radioactivity, auto-radiography, scanning echniques, study of fate of applied herbicides in plant, soil and water by tracer techniques.

PRACTICAL

Acquaintance with the various formulations of herbicides, estimation of residue analysis by bioassay, colorimetric. TLC, GLC and radiometric methods, use of labeled herbicides for the

study of uptake, translocation and metabolism. Herbicides use under field conditions for studying their effects on plants.

AGRIB 626: ENVIRONMENT IN RELATION TO CROP PRODUCTIVITY 2(2+0)

Eco-environment of plant, natural and artificial environments, macro and micro-environments, structures of the atmosphere, hydrostatic stability of the atmosphere. Radiation energy flow in environment; Solar spectrum, radiation, and terminology. Environmental temperature; Temperature vs heat, true air vs test body temperature, temperature stratification. Air temperature near the ground, time and space variation, temperature lapse rate, unstable sub layer inversion, day and night temperature of the air and soil. Heat energy exchange between atmosphere plants and soil system. Environmental moisture, vapour pressure, measurements of atmospheric moisture, relative humidity, movement of water vapours in soil plant atmosphere continue, water balance of the crop. Evapo-transpiration in relation to environmental parameters; Gas exchange in plant communities; Environment in green house and growth chamber. Energy budget of green house, climatic control of green house, phytotron and their uses, extrapolation of results from artificial growth chamber to field condition. Crop productivity; Actual potential and maximum crop productivity and their limiting factors. Radiation in relation to light, photosynthesis in relation to temperatures, water stress in relation to crop productivity. Photosynthetic characteristics of C_3 and C_4 plants, CAM type plants etc.

AGRON 511: MODERN CONCEPTS IN CROP PRODUCTION (3+0)

Crop growth in relation to environment, agro ecological zones of India; concept of potential yield and its realization; modern concepts in tillage; zero or minimum, conservation tillage etc; optimization of plant opulation and planting geometry in relation to soil fertility, solar radiation and available moisture regimes; Mitscherlich, Baule and Inverse-yield-nitrogen laws, biotic and abiotic stresses; concept of ideal plant type; crop modeling for maximizing crop yeidl; crop response production functions; cropping and farming systems for sustainable agriculture; organic farming crop, residue recycling and management; crop production under protective agriculture, precision agriculture; crop and growth analysis.

AGRON 512: PRINCIPLES AND PRACTICES OF WEED MANAGEMENT (2+1)

Classification and characteristics of weeds; special weed problems including aquatic and parasitic weeds, ecology and physiology of major weeds; eco-physiology of crop weed competition including allelopathy; weed indices; principles and methods of weed control, concept of integrated weed management; weed control through bio-herbicides, mycoherbicides and allelochemicals; herbicides history, development and their classification; mode and mechanism of action of herbicides; herbicide selectivity, herbicide mixtures, adjuvant and softeners; degradation of herbicides in soil and plants; effect of herbicide in relation to environment; herbicide resistance in weeds and crops; weed management in major crops and cropping systems; weed shifts in cropping systems; control of weeds in non-cropped situations.

PRACTICAL

Identification of important weeds of different crops; preparation of a weed herbarium; weed survey in crops and cropping systems; crop-weed competition studies, preparation of spray solutions of herbicides for high and low-volume sprayers; use of various types of spray pumps and nozzles and calculation of swath width; economics of weed control; herbicide resistance analysis in plant and soil; Bioassay of herbicide resistance.

AGRON 521: PRINCIPLES AND PRACTICES OF WATER MANAGEMENT (2+1)

Water and its role in plants; water resources of India; major irrigation projects and extent of area and crops irrigated in India and different states; soil water movement and water availability, uptake, transport and transpiration in plants; soil-water-plant relationship; plant response to water stress; scheduling, depth and methods of irrigation; micro irrigation system;

fertigation; management of water in controlled environments and polyhouses; water use efficiency; water management of crops and cropping systems; soil, plant and meteorological factors determining water needs of crops; crop plant adaptation to moisture stress condition; quality of irrigation water; effect of saline water and soil salinity on plant-water relation and management of crops; excess soil water and plan growth; water management in problem soils, drainage requirements of crops and methods of field drainage, their layout and spacing irrigability of lands.

PRACTICAL

Measurement of soil moisture using tensiometer, pressure plate and membrane; making of soil moisture characteristics curves; water flow measurement using different devices, determining soil profile moisture deficit and irrigation requirements; computation of water requirement of crops using modified Penman formula; measurement of water flux under saturated and unsaturated conditions; determination of infiltration rates and hydraulic conductivity.

AGRON 522: SOIL FERTILITY MANAGEMENT AND FERTILIZER USE (2+1)

Soil fertility and productivity; soil composition in relation to crop production organic and inorganic constituents; essential plant nutrients; deficiency and toxicity symptoms of major and micronutrients and remedial measures; transformation and dynamics of major plant nutrients; kinds of fertilizers straight, complex and bulk blended; methods of fertilizer application; crop response to nutrients; fertilizer use efficiency, agronomic chemical and physiological; methods of increasing fertilizer use efficiency; nutrient interactions; fertilizer application in cropping systems-direct, residual and cumulative effects; integrated plant nutrient supply, systems-organic manures, compost, green manures, vermin-compost, bio-fertilizers, crop residue and inorganic fertilizers; sustainable agriculture and soil fertility; fertilizers and environment; fertilizer use in problem soils; soil moisture nutrients interactions.

PRACTICAL

Determination of soil pH, organic C, total N, available N, P, K & S in soils; total N, P, K & S in plants; interpretation of interaction effect and computation of economic and yield optima.

AGRON 591 M.SC.(AG.) SEMINAR (0+1)

A2. OPTIONAL COURSES

AGRON 513: AGRONOMY OF MAJOR FIELD CROPS (KHARIF) (3+0)

Origin, history, distribution, adaptation, classification, morphology, phenology, physiology, varietal improvement and production technology of Rice, Maize, Sorghum, Pearl-millet, Smaller-millet, Pigeonpea, Mung bean, Urd bean, Cowpea, Moth bean, Groundnut, sunflower, Sesame, Niger, Caster, Soya bean, Cotton, Jute, Mesta & Sugarcane, quality components and industrial uses of the main and by-products and their post-harvest handling for marketing.

AGRON-514: CROP ECOLOGY AND GEOGRAPHY (2+0)

Historical evolution, basic concepts and princi0les in rop ecology; response of crop plants to environment; factors (physical and social) determining crop distribution; classification of climate, bioclimatic zones; physiological limits of crop yield and variability in relation to the ecological optimum; photo and thermoperiodism; crop adaptation-geographic distribution of crop plants; adverse climatic effects and crop productivity; manipulation and development physiology of crops; crop phonology in relation to ecogeographical conditions; agro-climatic zones and agro-ecological regions of India; effects of global climate change on crop production.

AGRON 515: SOIL CONSERVATION AND WATERSHED MANAGEMENT (2+1)

Soil erosion-definition, nature and extent of erosion; types of erosion, factors affecting erosion; soil conservation-definition, methods of soil conservation-agronomic measures, contour cultivation, strip cropping, cover crops, vegetative barrier; improved dry farming practices; mechanical measures bunding, gully control, bench terracing; role of grasses and pastures in soil conservations; wind breaks and shelter belts; watershed management definition, objectives, concepts, approach, components, steps in implementation of watershed; development of cropping system for watershed areas; alternate land use systems; agro forestry, ley farming; *Jhum* management-basic concepts, socio-ethnic aspects, its layout, drainage considerations and agronomic management; rehabilitation of abandoned *jhum* lands and measures to prevent soil erosion.

PRACTICAL

Study of different types of erosion; field studies of different soil conservation measures; runoff and soil loss measurement; laying out runoff plot and deciding treatments; identification of different grasses and trees for soil conservation; visit to a soil conservation research centre, demonstration and training centre.

AGRON 516: FODDER AND FORAGE CROPS (2+1)

Adaptation, distribution, varietal improvement, Agro techniques and quality aspects including anti-quality factors of important fodder crops like teosinte, maie, bajra, guar, cowpea, oats, barley, berseem, senjit, lucern and clovers; year round fodder production and management, preservation and utilization of forage and pasture crops; principles and methods of hay and silage making; chemical and biochemical changes, nutrient losses and factors affecting quality of hay and silage; use of physical and chemical enrichments and biological methods for improving nutrition value of poor quality fodder, Economics of forage cultivation.

Grasslands of India and their importance, principles of grassland ecology, economic aspect of grasslands, their problems and management; improvement of grasslands; pasture grasses and legumes for improving soil fertility; importance, classification and advantage of pastures; establishment of pastures, their improvement and renovation; ley farming. Agro technology for pasture grasses and forage legumes for different agro-ecological situations, Grazing management. Nutrient Management.

PRACTICAL

Exercises on farm operations in raising fodder crops; exercises on canopy measurement, yield and quality estimation, viz. crude protein, NDF, ADF, lignin, silica cellulose etc. of various fodder and forage crops and ant quality components like HCN in sorghum and such factors in other crops; hay and silage making and economics of their preparation.

AGRON 517 : AGRO-FORESTRY (2+1)

Definition, concept, scope; historical perspective, agro forestry systems; agri-silviculture, silvipasture, agri-silvipasture, agri-horticulture, aqua-silviculture; alley cropping and energy plantation; agro forestry systems for forage and fuel wood production, resource conservation; improvement of degraded lands; biological diversity and sustainable agriculture and environmental protection; associative influence in relation to above ground and underground interferences; allelopathy in various agro forestry systems direct and indirect effect; efficient agro forestry designs/models for different agro climatic conditions; tree-crop-animal relationship; food-fodder-fuel systems; productivity and sustainability; alternate land use systems through agro forestry; social acceptability and economic viability; agro forestry interventions with multipurpose tree species; Nutritive value of tree leaf, economics of AF systems.

PRACTICAL

Identification of various tree species, planting methodology and techniques, study of litter fall and biomass deposits, organic matter and nutrient conservation; poloroding and defoliation, coppicing; light and temperature measurement; visit to a institute related to agro forestry.

AGRON 518: SYSTEMS RESEARCH AND CROP MODELING (2+1)

Systems-classification, flow charts, input-output relationships; methods-types and phased of development; modeling techniques-states, rates and driving variables, feedbacks, relational diagrams, methods of integration; crop modeling-methods for crop-weather interaction, water and nitrogen stress effects, insects pests interactions, data requirement & limitations.

PRACTICAL

Related to theory on a simulation language; modeling techniques; hands on with crop models for assessment of growth and yield of crops; water and nutrient management and climate change and variability components (to be offered in collaboration with related department(s).

AGRON 519. AGRONOMIC FIELD EXPERIMENTATION (2+1)

1. Principles and objectives of field experimentation
2. Study of the field experimental design viz. CRD, RBD, LSD, SPD and Strip plot with their merits and demerits.
3. Selection of treatments and designs, laying out of experiments
4. Conduct of trials-precautions during field experiments to reduce the experimental errors.
5. Principles of sampling, recording of bio metrical observations, compilation, transformations, presentation and interpretation of data.
6. Confounding and missing plot techniques, correlation and regression and fitting response equation-linear and quadratic.
7. Uniform fertility trials, crop cutting and yield estimations
8. Permanent experiment/multi-location experiments

PRACTICAL:

Selection of treatments and design, laying out of field experiments, recording, compilation, presentation and interpretation of data, missing plot technique, analyze of variance, computation of correlation and regression, fitting of linear and quadratic equations.

AGRON 521: TILLAGE IN CROP PRODUCTION 2(1+1)

Soil properties in relation to crop growth. Agronomic practices affecting soil properties, principles of different tillage practices, soil tilth, tillage requirement of crops under different type of soils, concept of minimum tillage, puddling, soil sickness, soil toxicity and soil compaction and their control measures. Role of different types of tillage implements, tillage in relation to weed control, decomposition of organic matter, soil and moisture conservation.

PRACTICES

Use of different type of tillage implements, measurement of bulk density, infilteration rate, porosity and root distribution pattern.

AGRON 523: AGRONOMY OF MAJOR FIELD CROPS (RABI) (3+0)

Origin, history, distribution, adaptation, classification, morphology, phenology, physiology, varietal improvement and production technology of wheat, barley, chickpea, peas, lentil, rajmash, rapeseed and mustard, linseed, safflower, taramira, potato, tobacco and sugar beet quality components and industrial uses of the main and by-products and their post-harvest handling for marketing.

AGRON 524: DRYLAND FARMING (2+1)

Definition, concept, characteristics of dryland and rainfed farming; significance and dimension of dryland farming in Indian agriculture; constraints limiting crop production in dryland areas; characterization of environment for water availability; types of droughts; adaptation of crop plants to droughts; drought management strategies; preparation of

appropriate crop plans for dryland areas; mid-season corrections for aberrant weather conditions; water-harvesting concepts, techniques and practices; use of mulches, kinds, effectiveness and economics; antitranspirants; soil and crop management techniques, tillage, seeding, fertilizer sue, crop and varietal choice, concept of watershed management and its application in India.

PRACTICAL

Rainfall probability analysis for crop planning; measurement of soil and water losses; in situ soil moisture conservation practices; mulches, including live mulches for minimizing evaporation losses; measures to manage prolonged drought during crop season; dry-seeding practices due to delayed monsoon rains; visit to a dryland research centre; study of on going watershed management programmes and agroforestry systems.

AGRON 525: MANAGEMENT OF PROBLEM SOILS (2+1)

Origin, nature, properties and distribution of saline, sodic, calcareous, acid and waterlogged soils; plant response to soil reaction; nutrient imbalance in problem soils; extent of damage to crops; crop tolerance to salinity, sodicity, acidity and water logging; reclamation of problem soils; role of soil amendments and soil drainage; agronomic practices in relation to problem soils; cropping pattern for problem soils.

PRACTICAL

Determination of soil pH, electrical conductivity, CEC, different anions and cations present in soil; lime requirement; visit to problematic areas to acquaint with production constraints.

AGRON 529: MEDICINAL AND AROMATIC CROPS (2+1)

Importance of medicinal and aromatic plants in human health, national economy and related industries; classification of medicinal and aromatic plants according to botanical, characteristics and used; climate and soil requirements cultural practices; yield and important constituents of medicinal and aromatic plants (Isabgol, citronella, palmarosa, Rauwolfia, poppy. Asaphoetida, Nux vomica, rosadle, menthe, basil, geranium etc).

PRACTICAL

Identification of crops based on morphological and seed characteristics; raising of herbarium of M & A plants; quality characters in medicinal and aromatic plants; methods of analysis of some essential oils and other chemical of importance in M & A plants.

AGRON 527: SEED PRODUCTION AGRONOMY (2+1)

Seed production techniques and agronomical practices for important crops-cereals, pulses, oilseeds, fibre crops and fodder crops; seed industry in the country and role of various agencies seed morphology seed multiplication chain, seed purity seed health, Dormancy, seed vigour; Hybrid seed production, seed treatments, seed viability, seed quality; physiology of seed germination; seed testing for germination and seedling evaluation; seed certification, processing, grading and storage; distribution and marketing, store grain pests.

PRACTICAL

Seed quality on the basis of purity and germination; rouging; detasseling and familiarization with seed processing equipments; materials and precautions for seed storage; comparison of farmers saved seed with certified seed.

AGRON 528: ORGANIC FARMING (2+1)

Organic farming concept and definition, its relevance to India and global agriculture and future prospects; Land and Water Management, land use, minimum tillage, shelter zones, hedges, pasture management, agro-forestry, water use efficiency; soil fertility-nutrient recycling, organic residues, organic manures, composting, soil biota and decomposition of organic residues, earthworms and vermin-compost, green manures, bio-fertilizers, Farming systems crop rotations multiple and relay cropping systems, intercropping in relation to maintenance of soil productivity, control of weeds, diseases and insect pests; Animal Husbandry, dairy farming, sheep and goat and piggery etc. Integrated pest management-

biological agents and pheromones, bio-pesticides; Socio-economic impacts; Marketing and export potential inspection, certification, labeling and accreditation procedures, Organic farming and national economy.

PRACTICAL

Aerobic and anaerobic methods of making compost, making of vermin compost; Identification and nursery raising of important agro-forestry trees and trees for shelter belts, Efficient use of bio-fertilizers technique of treating legume seeds with Rhizobium cultures, use of Azotobacter, Azospirullum and PSB cultures in field; Visit to a organic farm; Quality standard, inspection, certification and labeling and accreditation procedures for farm produce from organic farms.

AGRON 529: CROP AND SEED PHYSIOLOGY (2+1)

Physiology of seed development; dormancy-causes and measures to break dormancy; viability and germination of seed; changes in seed during storage; Yield concepts and measurements; yield contributing components of crop-plant type, its morphological and physiological parameters; yield, photosynthesis and respiration in relation to dry matter production in crop community; distribution and translocation of photosynthesis in relation to yield; productivity maximization and factors limiting the realization of potential, yield, chemical regulators of growth; stress physiology and resistance to drought and salinity; crop quality.

PRACTICAL

Dormancy of crop seeds; tests of dormancy; determining photosynthesis and respiration, test of deciding physical and physiological parameters of plant types; plant growth regulators and their use.

AGRON 111(N): Principles of Agronomy 2(1+1)

Meaning and scope of Agronomy: National and International Agricultural Research Institutes in India. Agro-climatic zones of India and Rajasthan. Tillage, crops stand establishment. Planting geometry and its effect on growth and yield cropping systems. Harvesting.

Practical:

Study of tillage implements; practice of ploughng; practice of puddling; Study of seeding equipments and introduction of remote sensing. Different methods of sowing; study intercultivation implements and practice; practice of methods of fertilizer applications; participation in ongoing field operations.

AGRON 112(N): Introductory Agriculture (Ancient Heritage, Agricultural Scenario and Gender Equity in Agriculture 1(1+0)

Science and business of crop production, Basic elements of crop production; Factors effecting crop production; History of Agricultural Development; Ancient India Agriculture in Civilization Era. Chronological Agricultural Technology development in India. Indian Agriculture, balance sheet liabilities; Assets and Contrasting trends DAT). Agrl. Growth, contrasting food chains, Diversity in physiography. Soil groups arsine, livestock and water; Liabilities; Soil factors weather factors, Economic ecology, and irrigation agriculture, Farming Systems approach, value addition, requirements technology; Women in Agriculture; multifaceted roles and tasks, work stress factors nutritional and rural life standards, role in house hold design making, drudgery reduction farm women, women friendly agricultural technology; Empowerment of women; coup dynamics for farm women, rural women.

AGRON 121(N): Water Management including Micro Irrigation 3(2+1)

Irrigation: definition and objectives, water resources and irrigation development in India and U.P. Soil plant water relationships; methods of soil moisture estimation evapotranspiration and crop water requirement; effective rainfall m scheduling of irrigation; Methods of irrigation surface, sprinkler and drip irrigation: Irrigation efficiency and water use efficiency, conjunctive use of water, irrigation water quality and its management. Water management of different crops (rice, wheat, maize, sugarcane); Agricultural drainage.

Practical:

Determination of bulk density by field method; Determination of soil moisture content by gravimetric method, tensiometer, electrical resistance block and neutron moisture meter; Determination of field capacity by field method; Determination of permanent wilting point; Measurement of irrigation water through flumes and weirs; Calculation of irrigation water requirement (Problems); Determination of infiltration rate; Demonstration of furrow method of irrigation; Demonstration of check basin and basin method of irrigation; Visit to farmers field and cost estimation of drip irrigation system; Demonstration of filter cleaning, fertigation, injection and flushing of laterals; Erection and operation of sprinkler irrigation system; Measurement of emitter discharge rate, wetted diameter and calculation of emitter discharge variability; determination of EC, pH, Ca^{++} and Mg^{++} in irrigation water (quality parameters).

AGRON 211(N): Practical crop production I (Cereals, Pulses and Fodder crops) 1(0+1)

Crop planning, raising field crops in multiple cropping systems; Field preparation, seed treatment, nursery raising, sowing, nutrient management, water management, weed management and management of insect pests and diseases of crops harvesting, threshing, drying, winnowing, storage and maketing of produce. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of a group of students.

AGRON 212(N):Organic Farming 2(2+1)

Introduction, concept, relevance in present context; Organic production requirements; Biological intensive nutrient management-organic manures, vermicomposting, green manuring, recycling of organic residues, biofertilizers; Soil improvement and amendments; Integrated diseases and pest management-use of biocontrol agents, biopesticides pheromones, trap crops, bird perches; Weed management; Quality considerations, certification, labeling and accreditation processors, marketing exports.

Practical

Raising of vegetable crops organically through nutrient, diseases and pest management; vermicomposting; vegetable and ornamental nursery raising; macro quality analysis, grading, packaging, post harvest management.

AGRON 221 (N):Practical crop production II (oil seeds & commercial crops) 1(0+1)

Crop planning, raising field crops in multiple cropping systems; Field preparation, seed treatment, nursery raising, sowing, nutrient management, water management, weed management and management of insect-pests and diseases of crops harvesting, threshing, drying, winnowing, storage and marketing of produce. Preparation of balance sheet including cost of cultivation, net returns per student and well as per team of a group of students.

AGRON 311(N): Farming systems and sustainable agriculture 2(1+1)

Sustainable agriculture:

Introduction, definition, goal and current concepts, factors affecting ecological balance and ameliorative measures; Land degradation and conservators of natural resources, LEIA & HEIA; Irrigation problems, waste lands and their development; Dry land farming; definition, principles and components; Farming systems; definition, principles and components. IFS models for wetland, irrigated dry land and dry land situations.

Practical

Preparation of cropping scheme for irrigated situations; Preparation of cropping scheme for dry land situations; Study of existing farming systems in nearby villages; Preparation of integrated farming system model for wetlands and dry lands. Preparation of enriched Farm Yard Manure; Preparation of Vermicompost; Visit to urban waste recycling unit; Study of profitable utilization of agricultural wastes; Visit to poultry and dairy units to study resource allocation, utilization and economics; Visit to an organic farm to study various components and utilization; Study of degraded lands.

AGRON 312(N): Field Crops- I (Kharif) 3(2+1)

Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield of kharif crops, Cereals-rice, maize, sorghum, pearl millet and minor millets; Pulses; pigeonpea, mungbean and urdbean; Oilseeds, groundnut, sesame and soybean; Fibre crops; cotton, jute and sunhemp and Forage crops; sorghum, maize, cowpea, Bajra and napier.

Practical

Rice nursery preparation and transplanting/seed bed preparation and sowing of kharif crops; Calculations on seed rate; Sowing of soybean, pigeonpea, mungbean, maize groundnut and cotton. Effect of seed size on germination and seedling vigour of soybean/groundnut. Effect of sowing depth on germination of soyabean; Identification of weeds in rice maize and soybnean fields and study of weed control experiments in these crops; Top dressing of nitrogen in maie and rice and study of fertilizer experiments on rice, maize, sorghum and millets; Study of yield contributing characters, yield calculations, harvesting and yield estimation of above crops; Study of crop varieties and important agronomic experiments.

AGRON-321(N):Field Crops-II (Rabi) 3(2+1)

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Rabi crops; Cereals; wheat, barley; Pulses chickpea, lentil, peas. French bean; Oilseeds; rapeseed and mustard, sunflower, safflower and linseed; Sugar crops; sugarcane, Commercial crops; menthe, potato and tobacco. Forage crops: berseem, Lucerne and oat.

Practical

Seed bed preparation and sowing of wheat and sugarcane; Calculations on seed rate; Top dressing of nitrogen in wheat and study of fertilizer experiments on wheat and mustard; Identification of weeds in wheat and grain legumes, application of herbicide and study of weed control experiments. Morphological characteristics of wheat, sugarcane, chickpea and mustard; Yield contributing characters of wheat; Yield and quality analysis of sugarcane; Crop distribution in the state and the region; Important agronomic experiments of rabi crops and visit to research stations related to rabi crops.

AGRON 322(N) Weed Management 2(1+1)

Weeds

Introduction, harmful and beneficial effects, classification, characteristics propagation and dissemination; Weed biology and ecology, crop weed association, crop weed competition and allelopathy Concepts of weed prevention, control and eradication; Methods of weed control; physical, cultural, chemical and biological methods. Integrated weed management; Herbicides; advantages and limitation of herbicide usage in India. Herbicide classification, formulations, methods of application; Introduction to Adjuvant and their use in herbicides; Introduction to selectivity of herbicides; Compatibility of herbicides with other agro chemicals; Weed management in major field and horticultural crops, shift of weed flora in cropping systems, aquatic and problematic weeds and their control.

Practical

Identification of weeds; Survey of weeds in crop fields and other habitats; Preparation of herbarium of weeds; Calculations on weed control efficiency and weed index; Herbicide label information; Computation of herbicide doses; Study of herbicide application equipment and calibration; Demonstration of methods of herbicide application; Preparation of list of commonly available herbicides; Study of Phytotodicity symptoms of herbicides in different crops; Biology of nut sedge, parthenium and celosia. Phalaris minor. Echinochloa spp. And Canda thistle. Economics of weed control practices; Tours and visits of problem areas.