



# **COLLEGE OF HORTICULTURE & FORESTRY**

**Narendra Deva University of Agriculture & Technology  
Kumarganj, Faizabad, INDIA, Pin 224 229**

## **Department of Forestry**



**Dr. O.P. Rao  
Professor & Head**

The Department of forestry offers P.G. degree programme on M.Sc. Forestry with specialization in Agroforestry. The research is primarily focused on evaluation of tree species of fuel, fodder fruit and timber value. Nursery management techniques for different agroforestry species would also be developed. The detailed account of various courses offered, research schemes and infrastructural facilities, etc. are given here under:

**Teaching: Teaching / Research Staff:**

S. No.	Name & Designation	Mobile. No.	Specialization	e-mail address/
1.	 <b>Dr. O.P. Rao</b> Prof. & Head	09415959562	Horticulture & Agroforestry	<a href="mailto:opraonduat@yahoo.com">opraonduat@yahoo.com</a>
2.	 Dr. A.K.S. Parihar Professor (Soil Science)	09450372565	Soil Science & Agroforestry	<a href="mailto:arunksp2011@gmail.com">arunksp2011@gmail.com</a>
3.	 <b>Dr. S. K. Verma</b> Asstt.Prof. (Agroforestry)	09454932174	Forestry	<a href="mailto:ver.sanj@gmail.com">ver.sanj@gmail.com</a>

Teachers / Scientists of the Department have been teaching B.Sc. (Ag), M. Sc. and Ph.D. students. There are courses being taught under different discipline (Forestry, Horticulture, and Soil Science). The following is the detail of courses within and out side the department.

Course	Title of the course	Credit
<b>(i) Under Graduate Courses:</b>		
FES-321	Agroforestry & Social Forestry	2(1+1)
Hort. 211	Fundamental of Fruit Production	3(2+1)
Hort. 221	Fruit Production	3(2+1)
Hort. 524	Systematic Pomology	3(2+1)
SS-111	Fundamentals of Soil Science	2(1+1)
SS-211	Principles of Soil Conservation & Management	2(1+1)
SS-421	Soil Fertility & Fertilizers	2(1+1)

SS-417	Chemistry & Technology of Fertilizers	2(2+0)
SS-419	Research Methods in Soil Science	1(0+1)
<b>(ii) Post Graduate Courses</b>		
Hort-512	Propagation of Fruit Crop	2(1+1)
Hort-514	Tropical Fruit	2(1+1)
Hort-623	Fruit Production in Wasteland	3(2+1)

### Course Programme for M. Sc. Forestry (Agroforestry)

#### (A) Major Courses

Course code	(i) Core Courses	12 Credits
FOR 511	Silviculture	2 (1+1)
FOR 512	Forest Mesuration and Inventory Preparation	2 (1+1)
FOR 513	Agroforestry	3 (2+1)
FOR 514	Forest Management	2 (2+0)
FOR 515	Forest Ecology and Biodiversity Conservation	2 (1+1)
FOR 516	Forest Based Industries	1 (1+0)
FOR 521	Tree Breeding	2 (1+1)
FOR522	Forest Regeneration	2 (1+1)
FOR 591	<b>Seminar</b>	<b>1 (0+1)</b>

(ii)	Optional Courses	12 Credits
AF 521	Social Forestry	3 (2+1)
AF 522	Plantation Forestry	2 (2+0)
AF 513	Productivity of Agroforestry Systems	3 (2+1)
AF 514	Agroforestry for Animal Production	2 (2+0)
AF 525	Forest Nursery and Afforestation Techniques	3 (2+1)
AF 526	Forest and Rangeland Management	3 (2+1)
AF 517	Management of Fuel Wood	1 (1+0)
AF 518	Medicinal and Aromatic Plants	2 (1+1)
(B) Supporting courses: to be decided by the Student Advisory Committee. (Variable)		12 credits
FOR 600	Research	15 (12 + 3)

In addition to the above courses, the students also offer courses from the following departments as minor courses with the recommendations of advisory committee.

1. Soil Science
2. Plant Physiology
3. Agronomy

B. Sc. (Agriculture) and B. Sc. Bio. group (except Forestry as one of the subject) students admitted to M. Sc. forestry programme are required to complete the following deficiency courses.

Course Code	Courses	12 Credits
FOR 411	Principle of Silviculture	3 (2+1)
FOR 412	Silvicultural Systems	2 (2+0)
FOR 413	Forest Mensuration	3 (2+1)
FOR 414	Wood Science and Technology	2 (1+1)
FOR 415	Fundamental of Forest Protection	2 (2+0)

FOR 416	Wildlife Management	3 (2+1)
FES 321	Agroforestry & Social forestry	2(1+1)
FES 211	Forest Ecology & Environment	2(1+1)

**Research:** Following projects were guided from time to time since the Department of Forestry came into existence. Some have been concluded & others are in progress. A brief resume is given as following.

**Research Projects running / concluded in the Department**

Title of the Project	Year of start	Funding Agency	
All India Coordinated Research Project on on Agroforestry	1987	ICAR, New Delhi	Continued
Mega Seed Project on Seed production on Agricultural crops and Fisheries-Production of Quality Planting Materials of Forest Species	2006	ICAR, New Delhi	Continued
Development of Agroforestry systems on in saline sodic wastelands.	1994	UPLDC & UPCAR, Lucknow	Concluded
Investigation on Improvement of Yield and Quality of Rose Oil In Eastern Part of U.P.	1990	ICAR, New Delhi	Concluded
Operational Research Project on Agroforestry	1993	Ministry of Rural Development, New Delhi	Concluded
Tree Improvement and Standardization of of Nursery Technology and seedlings standards for Field Plantation of of Babool ( <i>Acacia nilotica</i> )	1997	Indian Council of Forestry Research and Education, Dehradun	Concluded
Multilocation & field trial of promising clones of <i>Populus deltoids</i> .	1997	Indian Council of Forestry Research and Education, Dehradun	Concluded
Technology for the collection Processing and Testing of Forest Tree Seeds.	1997	Indian Council of Forestry Research and Education, Dehradun	Concluded
Standardization of Invigoration (Rejuvenation) Techniques and Cultural Practices in Seedling Seed Orchard of Teak ( <i>Tectona grandis</i> )	1997	Indian Council of Forestry Research and Education, Dehradun	Concluded
CPT Progeny trials and standardization of nursery technology and seedlings standards for field plantation of shisham in eastern U.P.	1997	Indian Council of Forestry Research and Education, Dehradun	Concluded
Development of technology for collection, processing & testing of forest tree seeds.			
Development of Rice Based Agroforestry Systems and Management Practices for Yield Improvement of Field Bunds and Fallow Marginal Lands Using MPTS ( <i>Sesbania glyricidia</i> and others) and Grasses. NATP (RRPS-29)	2000	ICAR, New Delhi	Concluded

**(A) Revolving fund Scheme:** The Department of Forestry started a Revolving Fund Scheme in the year 1997 for raising quality nursery stock.

S.No	Name of plants	Rate (Rs. Per plant)
1.	Sagaon	5.00
2.	Shisham	14.00
3.	Casuarina	4.50
4.	Neem	3.50
5.	Kanji	3.50
6.	<i>Eucalyptus</i>	3.50
7.	Popular	4.00
8.	Mango	25.00
9.	Aonla (NA-6, NA-7, NA-10, Chakaiya)	18.00
10.	Guava	12.00
11.	Karonda	4.00
12.	Duranta (Ornamental)	6.00

❖ **Lab Equipments and Office Accommodation:** Adequate equipments, laboratory and office accommodation are available in the department. A brief list of laboratory equipments is given as following.

1. Seed Germinators
2. B.O.D. Incubator
3. Refrigerators
4. Deep Freezer
5. Computerized and one manual Spectrophotometers
6. Flame Photometer
7. Leaf Area Meters
8. pH Meter
9. Ec Meter
10. Moisture Meter
11. Auto Clave
12. Soil grinder
13. Seed Separator
14. Water bath
15. Five computers including one Lap-top with canopy analyser
16. All equipments related to Forestry (Haga altimeter, Vernier caliper, Girthing tape, Stem bore, Bark gauge, diameter tape, Chain saw, etc.)
17. Glass house
18. Hardening chamber
19. Water analyzer
20. Distillation units

## (B) Infrastructural facilities

### Farm Facilities

❖ Area	(Total area 25 Acre)
M.E.S. unit I	- 8 Acre
M.E.S. unit II	- 17 Acre

Existing Agroforestry Systems at MES (Forestry)

AF System	Distance line to line and plant to plant (m)	Crop Combination	
		Woody Perennial	Agricultural/Fodder crop
Agri-silviculture	10x10	<i>Madhuca latifolia</i>	Wheat-Paddy
Agri-silvi-horticulture	10x2 & 10 x 6	<i>Casuarina equisetifolia</i> & <i>Guaava</i>	Turmeric
Agri-silviculture	4x2	<i>Casuarina equisetifolia</i>	Wheat-Paddy
Agri-silviculture	5x4	<i>Populus deltoides</i>	Wheat-Paddy
Agri-silviculture	6x4	<i>Dalbergia sissoo</i>	Wheat-Paddy
Silvi-pastoral	8x4	<i>Dalbergia sissoo</i>	Napiar+Para+Panicum grass combination
Agri-silvi-horticulture	10x6	<i>Dalbergia sissoo, Emblica officinalis</i>	Paddy+Mustard

Nursery	-	There is a well developed nursery with quality seedling stock
High-Tech Nursery	-	For mass multiplication of true-to type planting stock under controlled environment, glass house /green house and poly house have been developed.

### Salient Research Achievements:

Under agroforestry management, the results of various studies conducted on sodic wasteland are highlighted as below:

- \* The Average annual light intensity in different agroforestry systems varied from 412 (*M. latifolia*) to 795Lux (*P. deltoides* based agri-silvicultural system) during rabi season. During kharif light intensity varied from 496.5 (*M. latifolia*) to 567 Lux (*C. equisetifolia* based agri-silvicultural system). Different systems studied are described as following:
- \* Under agri-silvicultural system five varieties of wheat and three varieties of paddy were cultivated in *P. deltoides* based agri-silvicultural system on sodic land. The crop yield showed a gradual increase from near tree area to the middle of the alleys for all the varieties under observation. In case of grain yield for wheat, the variety NW-1012 followed by NW-1014 reflected higher grain yield than those of other varieties under present study. In case of paddy, of the three varieties, Usar-3 variety had maximum average grain yield (2.65 t ha<sup>-1</sup>) followed by Sarjoo-52 ((2.52 t ha<sup>-1</sup>). Usar-2 variety showed the minimum yield. The maximum crop yield under agri-silviculture

was recorded in the middle of the alley. The average grain yield was about 25-28.5% (Sarju-52 vs Usar-2) less than that of open area (control treatment).

- \* The grain yield showed an increasing order of crop yield from near the base to the middle of the alleys for all the varieties of wheat as well as paddy consistently. The grain yield for agri-silviculture system was 1.22-1 t ha<sup>-1</sup> near the base (0.50m) and 3.28-3.46 t ha<sup>-1</sup> at 3.5 m distance of the alleys. The lowest values in afore-mentioned ranges were recorded for Raj-3765 and highest for NW 1012. A comparison of open condition with the average across distances below tree canopy of agroforestry system indicate that wheat grain yield was nearly 2/3<sup>rd</sup> of the open condition.
- \* Under agri-silvicultural system, on an average across distance from near tree base to the middle of the alleys, the grain yield for different varieties ranged from 2.15 (BPT 5204) to 2.42 t ha<sup>-1</sup> (sarjoo-52). For same varieties, grain yield in open condition ranged from 2.82 to 3.11 t ha<sup>-1</sup>, registering greater yield than that of agri-silvi system. However, among different varieties the yield difference was not sizeable. The average grain yield for wheat ranged from 2.33 to 2.58 t ha<sup>-1</sup> (Raj- 3765 vs NW-1012). In open condition minimum value (2.63 t ha<sup>-1</sup>) was indicated for the grain yield of HD-2643, whereas maximum value (2.79 t ha<sup>-1</sup>) was indicated by for NW-1012 under study. For same varieties, grain yield in open condition ranged from 2.61 to 3.11 t ha<sup>-1</sup>, registering greater yield than that of agri-silvi system. The average grain yield for paddy ranged from 1.97 (N-359) to 2.06 t ha<sup>-1</sup> (Sarju-52). In open condition, the grain yield was indicated between 2.61 and 2.71 t ha<sup>-1</sup>, Sarju-52 being the highest yielder.
- \* Two medicinal annual herbs (Kalmegh and Matricaria) were cultivated under *C. equisetifolia* based agri-silviculture system. Across different treatments of organic fertilizers, FYM application showed greater crop yield (3.13 t ha<sup>-1</sup>) for *Andrographis paniculata* (Kalmegh) than other treatments of the study, although plant height did not show any sizeable change. In *Matricaria chamomilla* no remarkable difference was observed in plant height when compared with Kalmegh.
- \* Effect of different sources of organic fertilizers was also studied in organic fertilizer treatments under *D. sissoo* based agri-silviculture system. For *A. paniculata*, the crop yield was recorded higher in case of FYM treatment (2.98 t ha<sup>-1</sup>) than those of other treatments under study. Flower yield for *M. chamomilla* was also obtained in sole FYM treatment than other treatments of the study. In open condition the yield performance of *M. chamomilla* flowers (0.54 t ha<sup>-1</sup>) was better than other treatments of the study.

