

TAMIL NADU AGRICULTURAL UNIVERSITY

PROCEEDINGS

**31st SCIENTISTS' MEET ON FORESTRY AND 12th SERICULTURE
SCIENTISTS' MEET
(May 5, 2021)**

Lead Centre

**Forest College and Research Institute
Tamil Nadu Agricultural University
Mettupalayam - 641 301**

**Directorate of Research
TAMIL NADU AGRICULTURAL UNIVERSITY
COIMBATORE - 641 003**

2021

PROCEEDINGS

31th Forestry & 12th Sericulture Scientists Meet

The 31st Forestry & 12th Sericulture Scientists Meet was held during May 6-7, 2021 at the Tamil Nadu Agricultural University, Coimbatore, through on-line connecting all scientists across the University College Campuses, Research Stations and KVKs besides main campus. **Dr. K.S. Subramanian**, Director of Research welcomed the gathering and flagged off issues relating to forestry and sericulture. He indicated that the forestry cover in the country (21.67% of the geographical area in the country) is encouraging while the state forest area should further improve through strategic planning and implementation. He highlighted the need for criteria for release of tree varieties, notification of released tree species, cataloguing of tree genetic resources using QR coding, supply of tree samplings to SHFs, monitoring and utilization of one lakh tree species assembled, development of therapeutic forest encompassing oxygenating plants, medicinal herbs and trees, establishment of Miyawaki forest in urban areas, multi-functional agro-forestry, burlapping (tree transplanting), strategies to overcome man-animal conflicts besides promotion of tree mulberry. The action taken reports on the 30th Forestry & 12th Sericulture Scientists Meets were presented by **Dr. K.T. Parthiban**, Dean, FC & RI, Mettupalayam. During the pre-review, the Dean and technical directors had reviewed the on-going university research projects (9), action plan projects (14), core projects (9), AICRPs (5) besides externally funded projects (24).

The outcome of the review process was presented by **Dr. K. Kumaran**, Prof. & Head, Forest Biology & Tree Improvement, **Dr. A. Balasubramanian** Prof. & Head, Silviculture & NRM, **Dr. P. Rajendran**, Assoc. Prof. & Head (i), Agro-Forestry, **Dr. M.P. Divya**, Prof. & Head, Forest Products & Wildlife and **Dr. K. Chozhan**, Prof. & Head, Sericulture. In the closing remarks, the Director of Research said that forestry scientists initiate research on therapeutic forests to meet the challenges to overcome pandemic and propose Center of Excellence on "Natural Dye" to get financial support from State / Central Government agencies. Forestry scientists should ensure individual project review and outcomes may be reflected their presentations during the crop scientists meets. **Dr. K.T. Parthiban**, Dean, FC & RI, Mettupalayam, proposed a formal vote of thanks.

The proceedings of 31st Forestry and 12th Sericulture Scientists' Meet were furnished under the following headings department wise: for the following department's viz.i) Forest Biology and Tree Improvement, ii) Silviculture and Natural Resource Management, iii) Agroforestry, iv) Forest Products and Wildlife and v) Sericulture.

- A. On Farm Trial
- B. Technology for Adoption / Information
- C. Remarks on the ongoing University Research projects / Core Projects / AICRP / Externally funded projects
- D. General Remarks
- E. Action Plan 2021-2022
- F. Remarks on Forestry Projects in Other Campuses
- G. Remarks and Way Forward by the Director of Research
- H. List of Participants

1. Department of Forest Biology and Tree Improvement

A. ON FARM TRIAL

1. Annatto (*Bixa orellana*) – TNBi 23, TNBi 24 and TNBi 30

(Scientists-in-charge : Dr.K.Kumaran and Dr.S.Vennila)

Sl. No.	Genotype	Parentage	Seed Yield (tonnes /acre)	Bixin Content (%)	Duration	% Increase over Population Mean (t/acre)	Special features
1	TNBi 23	Selection	0.90	2.98	Perennial	140.62	High yield
2	TNBi 24	Selection	0.93	3.06	Perennial	145.31	High Bixin
3	TNBi 30	Selection	0.90	3.02	Perennial	140.62	Wide adoption

Centers: Farmer's fields

Experimental Details

Spacing : 3 x 3m

Area : 0.5 acre

Observations to be recorded

- Plant Height (m)
- Basal diameter (cm)
- No. of branches
- Fruit weight (kg)
- Individual plant yield (g)

2. Seed dormancy breaking and germination enhancing technology for *Tectona grandis*

Scientist-in-charge: Dr. M. Umarani, Professor (SST)

Steps involved are as follows.

Step 1: Scarification in Mechanical scarifier for teak drupes for 6 min

Step 2: Alternate soaking & drying in water 7 days

Step 3: Seed coating with TNAU seed coating formulation (8 g/ kg)

Step 4: Soaking in 250 ppm GA₃ for 24 h + humid priming (3 days)

Step 5: Shade drying and sun drying

3. Seed Testing Standards for Neem and Bixa

(Scientists in-charge : Dr.M.Umarani and Dr.K.Kumaran)

Parameters	Bixa	Neem
	Minimum Seed Standards	
Pure seed (minimum)	99 %	99 %
Inert matter (maximum)	1.0 %	1.0 %
Seed Moisture (minimum)	9-10 %	10-11 %
Seed Germination Testing		
Days for first count	14 days after sowing	14 days after sowing
Days for final count	21 days after sowing	21 days after sowing
Germination (minimum)	65 % (including hard seeds)	

B. TECHNOLOGY FOR ADOPTION / INFORMATION

For Adoption

1. Seed Cube Technology for trees

Step 1: Seed coating with TNAU formulation

Step 2: Humid priming of coated seeds and drying back of seeds to original moisture content.

To accomplish this, the seeds are soaked for respective duration as provided hereunder. Later the moist seeds are secured tightly in a wet cloth and kept in a container over a dunnage to allow draining of free water. The container should be closed tightly to provide humid environment for the respective duration. Subsequently, the seeds should be dried back to original moisture content.

Step 3: Enclosing of coated and primed seeds in seed cube media of standardized composition, viz. 1 kg of seed cube media consists of soil (700 g), saw dust (130 g), bone meal (80 g), vermicompost (40 g) and VAM (50 g). Seed cubes can be made using seed cube making wooden frames to make cubes of 3.5 cm (l) x 3.5 cm (b) x 3.0 cm (h) size. Seed cubes should be pushed out of the frame by gentle tapping and allowed to dry well under sun for 2-3 days.

Details of seed coating and humid priming techniques for each tree species

Tree Species	Seed coating (TNAU formulation (g/kg))	Humid priming
<i>Azadirachta indica</i>	4	12 h soaking + 3 days humid incubation
<i>Pongamia pinnata</i>	2	24 h soaking + 36 hours humid incubation
<i>Tamarindus indica</i>	4	12 h soaking + 3 days humid incubation
<i>Thespesia populnea</i>	4	24 h soaking + 3 days humid incubation
<i>Albizia lebbek</i>	3	24 h soaking + 3 days humid incubation

For Information

1. Standardized Dye Extraction Protocol for Indian Madder (*Rubia cordifolia*)(roots), Safflower (*Carthamus tinctorius*)(flowers) and *Clitoria ternatea* (flowers)
2. Four endangered species and six vulnerable species were assembled in the Arboretum as a part of *ex situ* conservation

C. REMARKS ON THE ONGOING UNIVERSITY RESEARCH SUBPROJECTS/AICRP/EXTERNALLY FUNDED PROJECTS

Department	Externally Funded Project(s)	AICRP Project(s)	University Research Project(s)	Core Project(s)	Total
Forest Biology and Tree Improvement	1	1	1	4	7

S. No.	Project No. and Title	Project Leader	Duration	Remarks
University Research Projects				
1.	FCRI/MTP/FOR/2015/002 Establishment of an Arboretum of rare and characteristic species of Western Ghats	Dr.S.Vennila Asst. Prof. (For.)	June 2015 to June 2020	This project may be closed and the completion report to be submitted on or before 30.06.2021. New research project on developing mass multiplication techniques for endangered and vulnerable species may be proposed.

Core Projects				
Sl. No.	Project No. and Title	Project Leader	Duration	Remarks
1.	FCRI/MTP/FOR/2018/CP101 Development of Seed Cube Technology for mass propagation of teak (<i>Tectona grandis</i>)	Dr.R.Umarani Professor (SST)	Oct. 2018 to Sep. 2020	The completion report has been submitted. OFT has to be conducted in one research station, Forest department and farmer field
2.	CPBG/MTP/PBG/2018/CP166 Screening of genetic resources of <i>Caesalpinia sappan</i> for wood dye	Dr.P.S.Devanand Asst. Prof. (PBG)	Dec. 2018 to Sep. 2020	The completion report has been submitted. As it is a promising species, additional genetic resources should be assembled for further studies.
3.	FCRI/MTP/FOR/2018/CP171 Extraction, quantification and chemical characterization of leaf dye of Axle wood (<i>Anogeissus latifolia</i> (Roxb.ex DC)	Dr.M.Kiruba Asst. Prof. (For.)	Dec. 2018 to Sept. 2020	Completion report has been submitted for approval.
4.	FCRI/MTP/FOR/2018/CP018 Genetic improvement and clonal propagation studies in <i>Santalum album</i>	Dr.S.Vennila Asst. Prof. (For.)	Sept. 2018 to Sept. 2020	Completion report has been submitted

Externally Funded/ICAR Project				
1.	EID/FCRI/MTP/DTB/2017/R005 Screening neem genetic resources for higher azadirachtin, establishment of field gene bank and industrial plantations	PI: Dr.K.Kumaran Prof. & Head CoPI: Dr.P.S.Devanand Asst. Prof. (PBG)	Apr. 2017 to Mar. 2022	Assemblage of neem germplasm to be continued and the same may be used for further research

2.	AICRP/FOR/MTP/FOR/002 AICRP on Potential Crops	Dr.P.S.Devanand Asst. Prof. (PBG)	Since 1982	Grain amaranthus seeds should be given to the Dept. of Vegetable Crops, HC&RI, Coimbatore for evaluation. Pillipesara seeds should be supplied to KVKs for conducting trials.
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D. GENERAL REMARKS

- Steps may be taken to enable QR (Quick Response) code for the forest genetic resources preserved at FC & RI, Mettupalayam.
- Stability of the natural dye in fabric needs to be tested.
- Storage protocol for increasing the shelf life of neem seeds to be developed.
- Seed testing standards developed for Neem and Annatto to be sent for approval by the University

E. ACTION PLAN (2021- 2022)

THEME 1: GENETIC IMPROVEMENT OF PRIORITIZED TREE SPECIES

Theme leader: Dr.K.Kumaran, Professor and Head				
Sl. No.	Action Plan/ Activity	Scientist(s) in - charge and Centre	Works to be carried out	Deliverable/ Expected Outcome
1.	Collection, assemblage, evaluation and varietal development of natural dye yielding species	Dr. K. Kumaran Professor and Head Dr. P.S. Devanand Asst. Prof. (PBG) Dr .S. Vennila Asst. Prof. (For.) Dr. P. Radha Asst. Prof. (Biochem.) Centre: FC&RI, Mettupalayam	Germplasm collection, assemblage and evaluation of <i>Bixa orellana</i> and <i>Biancaea sappan</i>	Superior genotypes with high dye content
2.	Collection, assemblage, evaluation and varietal development of Neem	Dr.K.Kumaran Professor and Head Dr.P.S.Devanand Asst. Prof. (PBG) Centre:FC&RI, Mettupalayam	Germplasm collection and assemblage of <i>Azadirachta indica</i>	Superior genotypes with high oil and aza contents
3.	Collection, assemblage and evaluation of <i>Simarouba glauca</i>	Dr.P.S.Devanand Asst. Prof. (PBG) Dr.S.Vennila Asst. Prof. (For.) Centre: FC&RI, Mettupalayam	Germplasm collection, assemblage and evaluation of <i>Simarouba glauca</i>	Screening of superior genotype with high oil content

4.	Collection, assemblage and evaluation of high value species	Dr.S.Umesh Kanna Assoc. Prof. (For.) Centre: FC&RI, Mettupalayam	Germplasm collection, assemblage and evaluation of <i>Toona ciliata</i> , <i>Pterocarpus santalinus</i> , <i>Tectona grandis</i>	Superior genotypes in high value species would be obtained
5.	Collection, evaluation and varietal development of <i>Pillipesera (Vigna trilobata)</i>	Dr.P.S.Devanand Asst. Prof. (PBG) Dr.S.Vennila Asst. Prof. (For) Centre: FC&RI, Mettupalayam	Germplasm collection, assemblage and evaluation of <i>Vigna trilobata</i>	High yielding varieties in <i>Vigna trilobata</i>

THEME 2: TREE SEED MANAGEMENT

Theme leader: Dr.K.Kumaran, Professor and Head

S. No.	Action Plan / Activity	Scientist(s) in-charge and centre	Works to be carried out	Deliverable/ Expected Outcome
1	Developing Storage Protocol for extending shelf life of Neem seeds	Dr.R.Umarani, Professor (SS&T) Dr.K.Kumaran, Professor and Head Centre: FC&RI, Mettupalayam	Conducting seed storage studies to extend shelf life of Neem seeds	Extended shelf life of Neem seeds

2. DEPARTMENT OF SILVICULTURE AND NATURAL RESOURCE MANAGEMENT

A. ON FARM TRIAL

1. Early Induction of Flowering in Grafted Tamarind

Scientists in charge: Dr. A. Balasubramanian, Dr. Boominathan and Dr. G.Asokan

Experimental Details

Spacing	3m x 3m
Treatments	T ₁ - Foliar application of Etherel @ 200 ppm T ₂ - Foliar application of Etherel @ 500 ppm T ₃ - Foliar application of Paclobutrazol @ 500 ppm T ₄ - Foliar application of Paclobutrazol @ 1000 ppm T ₅ - Naphthelin acetic acid (NAA) @ 50 ppm T ₆ - Naphthelin acetic acid (NAA) @ 100 ppm T ₇ - Foliar application of Mepiquatchloride @ 200 ppm T ₈ - Foliar application of Mepiquatchloride @ 500 ppm T ₉ - Untreated control
Replications	3 (Three)
Experimental design	Randomized Block Design (RBD)
Observations to be recorded	Height (m) Basal Diameter (mm) Chlorophyll Biochemical Profiling

Floral Initiation
Flower Maturity
Pod Formation and Maturity

Locations

- **FC&RI, Mettupalayam**
- **Farmers' field at Erode District**
- **Farmers' field at Tirupur District**

3. Multi-locational testing of Teak Genetic Resources

(Scientists in charge: Dr.A.Balasubramanian, Dr.G.Asokan, Dr.C.Ushamalini)

Experimental Details

Spacing	3m x 3m
Treatments (Teak Sources)	T ₁ - Topslip (Tamil Nadu) T ₂ - Nilambur (Kerala) T ₃ - Shivamoga (Karnataka) T ₄ - Visakapattinam (Andhra Pradesh) T ₅ - Baroda(Gujarat) T ₆ - Lanka (Assam) T ₇ - Bhavanipatna (Odisha) T ₈ - Hakimpada (Odisha) T ₉ - Baripada (Odisha)
Replications	3
Experimental Design	Randomized Block Design (RBD)
Observations to be recorded	➤ Height (m) ➤ Basal Diameter (mm) ➤ DBH (m)
Locations	
➤ Western Zone	: FC&RI, Mettupalayam and Farmer's Field at Dharapuram
➤ Southern Zone	: Farmer Filed at Madurai or Virudhunagar district.
➤ North Eastern Zone	: Farmer's Field at Villupuram or Cuddalore district.
➤ North Western Zone	: Farmer's Field at Krishnagiri or Dharmapuri district.
➤ Cauvery Delta Zone	: Farmer's Field at Trichy or Pudukottai or Tanjore district

3. Clone Testing and Precision Silviculture Techniques for *Enterolobium cyclocarpum*

Scientists incharge : Dr.M.Sivaprakash, Dr.A.Balasubramanian & Dr.Sivakumar

Best Clones	: MTP EC 2, MTP EC 3 & MTP EC 4
Experimental details	
Treatments (Spacing)	: T ₁ - 1m x 1m, : T ₂ - 1.5m x 1.5m : T ₃ - 2m x 2m : T ₄ - 3m x 3m
Replications	: 4 (Four)
Experimental design	: Randomized Block Design (RBD)
Observations to be recorded:	
Biometric observations: Height (m), Basal diameter (mm) & Volume index (VI)	
Ecophysiological attributes: Photosynthetic rate, Stomatal Conductance &	

Transpiration Rate will be Documented using Portable Photosynthesis System.

Testing Pulp Wood Quality and Fodder Value:

- i) Estimation of important Physical parameters viz., Bulk density, Basic density and moisture content, Moisture content of wood chips and Chips classification.
- ii) Estimation of important Chemical Parameters viz., Ash content, Hot water soluble, One per cent NaOH solubility, AB Extractive, Acid insoluble lignin, Pentosans (ash corrected) and Hollo cellulose (ash corrected).
- iii) Estimation of strength properties viz., Kraft Pulping, Determination of kappa number, Black liquor analysis, Strength properties of bleached pulp (Viscosity of the pulp, Pulp brightness), Paper sheets preparation, Paper strength measurement, Tensile strength, Tearing strength and Bursting strength.
- iv) Estimation of Fodder value viz., Crude protein, fibre and other nutritive value

Locations
 Western zone : FC&RI, Mettupalayam
 Southern Zone : Farmers field, Tirunelveli or Madurai district.
 North-eastern Zone : Farmers field / AC&RI, Thiruvanamalai.

B. TECHNOLOGY FOR ADOPTION / INFORMATION

For Adoption

1) Precision Teak Farming Techniques For Promotion of Early Growth

Based on the experiment conducted for teak in the past three years, the technology on precision teak farming is developed. This technology is being transferred to the farmer's field for 69 acres in different agroclimatic regions of Tamil Nadu. The component of the technology is furnished below. The technology can be recommended for technology release by TNAU.

Components of Technology	Particulars
1. Quality Planting Material	Seedlings from identified genetic resources
2. Land Preparation Techniques	Land cleaning followed by disc ploughing and fine tilth ploughing
3. Spacing	10 ft. x 10 ft.
4. Pitting	1.5 ft x 1.5 ft x 1.5ft
5. Basal dose of FYM and Biofertilizers	FYM 3 kg/pit and Biofertilizer mix 250 g/pit
6. Planting Technique	Mixing of FYM and Biofertilizer mix with top soil of the pit. This soil and manure mix will be placed near the root zone of the seedlings followed by the soil from the bottom layer of the pit.
7. Irrigation	Drip irrigation 5 to 8 liters/day/plant upto one year 15 to 20 liters/day/plant after two years (upto 8 years) (Irrigation recommended only during lean season)
8. Fertilizer application	Recommended Doze of Fertilizer RDF - 150:100:100 kg/ha (Up to two years in three split applications) RDF - 300:200:200 kg/ha (After two years upto eight years in three split applications)
9. Singling	Multiple stems can be removed by leaving dominant single leading stem having superior apical dominance.
10. Weeding	Mechanical weeding with inter ploughing by tractor or rotavator.

11. Bud pruning	Pruning of young side branches at the stage of one bud with two leaves. Bud pruning can be done upto 10 feet.
12. Leaf management during young stage	Leaves are allowed to grow upto natural fall (Senescence). Live leaves are not recommended for pruning
13. Pruning	<ul style="list-style-type: none"> ➤ Pruning of branches with tree pruner when the plant reached the height above two feet. The branches at the growth stage of pencil thickness should be pruned. ➤ Pruning of branches should be carried out upto 20 -25 feet from the base of the main bole in order to ensure knot free clean bole growth.
14. Thinning	Selective thinning can be carried out based on canopy closer stage. Suppressed trees will be culled and the superior dominant trees will be allowed. Selective thinning is recommended from third after planting. However it may vary depends on site productivity.
12. Pest and diseases	<p>Pests: Root grub, Defoliator, Skeletonizer, Mealy bug, stem borer</p> <p>Diseases: Collarrot, Root rot and Powdery mildew.</p>
15. Stressing	Irrigation and fertilizer application is recommended upto 130 to 150 cm GBH. Then, the trees should be allowed for stressing by gradually reducing the fertigation.
16. Yield	Farmers realized yield is 1 to 1.5 CFT per year based on site quality. Thus in 15 years rotation the expected yield is 15 to 20 CFT per tree. Tree population at final harvest is 200 per acre.

2. Improved Sandal Cultivation Techniques

Sandal being a hemi parasite and requires different types of silvicultural management techniques in order to ensure good survival and establishment. Sandal host association, host management, pruning, etc. were studied both at the research trials in FC&RI, MTP and also trials in farmers' field. Based on the field evaluation improved sandal cultivation techniques are proposed as technology released by TNAU. The salient features of the technology is furnished below:

Components of technology	Particulars
1. Quality planting material	Seedlings from identified genetic resources
2. Land preparation techniques	Land cleaning followed by disc ploughing and fine tilth ploughing
3. Spacing	10ft. x 10ft.
4. Pitting	1.5ft.x 1.5ft. x 1.5ft.
5. Basal doze of FYM & Biofertilizers	FYM 3 kg/pit and Biofertilizer mix 250 g/pit
6. Planting technique	Mixing of FYM and Biofertilizer mix with top soil of the pit. This soil and manure mix will be placed near the root zone of the seedlings followed by the soil from the bottom layer of the

	pit.
7. Relay host	Nursery host - <i>Alternanthera sessilis</i> Transits host in field - <i>Sesbania grandiflora</i> + <i>Gajanus gajan</i> Permanent host - <i>Casuarina equisetifolia</i>
8. Bush Keeping	Sandal seedlings will be planted at the center of the pit along with primary host <i>Alternanthera sessilis</i> . Transit host East west direction - <i>Sesbania grandiflora</i> South North - <i>Gajanus gajan</i> Permanent host - <i>Casuarina equisetifolia</i> should be planted with in one foot from sandal.
9. Host Pruning Management	Initial growth upto breast height the host plants have to be grown. The all host plants should be topped at breast height.
10. Irrigation	Drip irrigation (Irrigation recommended on need)
11. Weeding	Weeding is not recommended as sandal has the capacity to parasite with the weeds also. However at any point of time the height of the weed should not dominate the sandal seedlings.
12. Progressive Pruning	Sandal is highly sensitive to any kind of injury; hence, pruning should be done very minimally from the base. Hence, progressive pruning is recommended.
13. Pest and Diseases	Pests: Stem borer Diseases: Root rot
14. Stressing	Irrigation is recommended upto five years. Then the trees should be allowed for stressing by gradually reducing the irrigation.

For Information

1. Tree Species with High Air Pollution Tolerance Index (APTI)

The listed indigenous tree species have shown high Air Pollution Tolerance Index (APTI). These tree species can be planted in high air pollution zone to reduce the gaseous emissions.

Sl. No.	Tree species	Air Pollution Tolerance Index (APTI)
1.	Sacred fig (<i>Ficus religiosa</i>)	49.16
2.	False Asoka tree (<i>Polyalthia longifolia</i>)	46.53
3.	Manila Tamarind (<i>Pithecellobium dulce</i>)	19.17
4.	Rain tree (<i>Samanea saman</i>)	18.36
5.	Portia tree (<i>Thespesia populnea</i>)	17.15

2. DUS Testing of Neem and Pungam

Forest College and Research Institute, Mettupalayam is identified as National DUS test centre for Neem and Pungam by Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA), New Delhi. This centre invites and facilitates application for registration of Neem and Pungam varieties and also conducts DUS tests. The following reference collections are maintained for Neem and Pungam.

Species	No. of Reference Collection
Neem	32
Pungam	33

3. Insect Parasitization in Farm Grown Trees

The following natural parasites of insects were identified in teak and pungam. Based on the preliminary observation they found to be effective in pest management.

S. No.	Host	Pest	No. of pest insect collected	No. of pest parasitized	Level of infestation
1	Teak	Skeletonizer <i>Eutectona machaeralis</i>	56	41	70% parasitization – <i>Sturmia bella</i> : Tachinidae, Diptera
2		Defoliator <i>Hyblaea puera</i>	26	14	50% parasitization – <i>Sturmia bella</i> : Tachinidae, Diptera
3	Pungam	Webber <i>Crocidolomia binotalis</i>	75	24	30% parasitization – <i>Sturmia bella</i> : Tachinidae, Diptera
On zero pesticide application					

4. Potential Cultures of Farm Grown Trees

The following pre-released cultures of trees viz., Tamarind, Enterolobium and Teak is maintained for field testing.

Trees	Sources
<i>Tamarindus indica</i>	a) Mullampadi b) Hasanur 06 c) Hasanur 09 d) Sweet Tamarind e) Urigam f) Jamunamathur g) Javathu Hills h) Amirthi 1 i) Amirthi 2 j) Salem 132 k) Pernampet
<i>Enterolobium cyclocarpum</i>	a) MTP EC 1 b) MTP EC 2 c) MTP EC 3 d) MTP EC 4 e) MTP EC 5 f) MTP EC 6

<i>Tectona grandis</i>	a) Topslip (Tamil Nadu) b) Nilambur (Kerala) c) Shivamoga (Karnataka) d) Visakapattinam (AP) e) Baroda (Gujarat) f) Lanka (Assam) g) Bhavanipatna (Odisha) h) Hakimpada (Odisha) i) Baripada (Odisha)
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5. Manmade Climate Forest

The concept of manmade climate forest is conceived using appropriate silviculture tools and techniques. A model climate forest was established during October 2020 in farmer's field. The details are furnished.

Name of the Farmer	Location	Area
Mrs. Sukilarajan Cooperative colony Mettupalayam - 641 301	Near National Model School, Mettupalayam	0.75 acres

Tree Species
<i>Alstonia scholaris, Azadirachta indica, Bixa orellana, Cassia siamea, Dalbergia latifolia, Dalbergia paniculata, Dalbergia sissoo, Tectona grandis, Delonix regia, Ficus religiosa, Gmelina arborea, Lagerstroemia lanceolata, Macaranga peltata, Melia dubia, Mitragyna parvifolia, Peltophorum pterocarpum, Pongamia pinnata, Populus tremula, Samanea saman, Sapindus emarginatus, Simarouba glauca, Sterculia foetida, Syzygium cumini, Terminalia arjuna, Vitex negundo, Adenantha pavonina.</i>

C. REMARKS ON THE ONGOING UNIVERSITY RESEARCH PROJECTS / CORE PROJECT / EXTERNALLY FUNDED PROJECTS.

Department	External Funded Project(s)	University Research Project(s)	Core Project(s)	Total
Silviculture and Natural Resource Management	4	6	2	12

Sl. No.	Project Number and Title	Project leader	Duration	Remarks
University Research Projects				
1.	CPPS/MTP/ENT/2019/01 Bio-ecology, taxonomy and management of wood boring bostrychid beetles and its associated natural enemies in wood stored in depot	Dr.G.Asokan, Professor (Agrl. Ento.)	Aug. 2019 to Mar. 2022	Work is in progress. Project may be continued.

2.	CPPS/MTP/ENT/2020/01 Documentation of bee flora and foraging behaviour of <i>Apis cerana indica</i> f. and <i>Apis mellifera</i> (Hym: Apidae) in Mettupalayam area	Dr.G.Asokan, Professor (Agrl. Ento.)	Aug. 2019 to Mar. 2022	Project may be continued.
3.	CPPS/MTP/ENT/2020/02 Biodiversity studies on Oribatid mites (Cryptostigmatids) in districts of Tamil Nadu, utilization for decomposition of farm waste and bio agent tool	Dr.G.Asokan, Professor (Agrl. Ento.)	Apr. 2020 to Mar. 2023	Project may be continued.
4.	NRM/MTP/ENS/2020/002 Assessing the air pollution tolerance of various tree species for urban forestry and improved air quality	Dr.M.Prasanthrajan Assoc. Prof. (Env. Sci.)	Oct. 2020 to Sep.2023	Work is in progress. Project may be continued.
5.	FCRI/MTP/FOR/2021/002 Biodiversity studies of massive tree planting forest area in scrub jungle vegetation	Dr. K.R.Ramesh Asst. Prof. (Forestry)	Feb.2021 to Dec. 2023	Work has been initiated. Project may be continued.
6.	CPPS/MTP/PAT/2020/002 Development of management practices for the nursery diseases of forest trees (teak and sandal)	Dr.C.Ushamalini Assoc. Prof. (Pl. Patho.)	Oct. 2020 to Sep.2022	The project may be continued

Core Projects

1.	FCRI/MTP/FOR/2018/CP039 Developing modern Silvicultural practices for early establishment of Sandal (<i>Santalum album</i>)	Dr.S.Radhakrishnan Assoc. Prof. (Forestry)	Sep. 2018 to Sep. 2020	Completion report has been submitted
2.	FCRI/MTP/FOR/2018/CP099 Standardizing precision silvicultural techniques for <i>Enterolobium cyclocarpum</i> and <i>Neolamarckia cadamba</i> clones for pulpwood utility.	Dr.M.Sivaprakash Asst. Prof. (Forestry)	Nov. 2018 to Sep. 2020	Completion report has been submitted.

External Funded Schemes

1.	IINRG/FCRI/MTP/DOS/2014/R002 Network project on "Harvesting, processing and value addition of natural resins and gums" - Tamarind seed gum (C31QQ)	Dr.A.Balasubramanian Prof. and Head	Aug. 2014 to Mar. 2022	Work is in progress. The project shall be continued.
2.	PPV/FOR/MTP/SIL/2009/R001 Distinctiveness, Uniformity and Stability (DUS) test centre for Neem, Karanj and Jatropha under PPV & FR Authority at FC&RI, TNAU, Mettupalayam	PI: Dr.A.Balasubramanian Co-PI: Dr.S.Radhakrishnan Dr.M.Sivaprakash Dr. M. Umadevi	Apr. 2018 to Mar. 2022	Project may be continued.

3.	ICFRE/FCRI/MTP/DOS/2020/R001 Silvicultural interventions for productivity enhancement and carbon sequestration in plantations of important tree species	PI: Dr.A.Balasubramanian Co-PI: Dr.S.Radhakrishnan Dr.K.Kumaran Dr.S.Thiyageswari Dr.M.Sivaprakash Dr.K.Ramah	Mar. 2020 to Dec. 2025	Project may be continued.
4.	ICFRE/FCRI/MTP/DOS/2020/R002 Tamarind domestication, conservation and deployment of genetic resources for sustenance and livelihood amelioration"	PI: Dr.A.Balasubramanian Co-PI: Dr.S.Radhakrishnan Dr.M.Sivaprakash Dr.M.Suganthy	Mar. 2020 to Dec. 2025	Project may be continued.

D. GENERAL REMARKS:

- Research should be taken up to quantify the Oxygen released from various tree species.
- Pest and disease monitoring of major farm grown trees should be conducted regularly.
- 15 acre tamarind plantation in AC & RI, Kudumiyanmalai to be visited and appropriate recommendations need to be provided for proper maintenance.
- Genetic fidelity studies / performance to be done
- Technical inputs and coordination is to be offered for the management of tree plantations at DARS, Chettinad
- Successful technologies are required to be demonstrated in TNAU centres for the benefit of farmers

E. ACTION PLAN (2021 - 2022)

THEME 1: PRODUCTION SILVICULTURE				
Theme leader: Dr. A.Balasubramanian, Professor & Head				
S. No.	Action Plan/ Activity	Name of the Scientist(s)	Observations to be recorded	Deliverable/ Expected Outcome
1.	Developing precision silvicultural techniques for farm grown tree species	Dr.A.Balasubramanian Dr.M.Sivaprakash Centre: FC&RI, MTP	Scheduling of water and nutrient. Assessment of growth by recording biometric values	Precision silvicultural techniques will be developed for farm grown trees
2.	Standardising precision silvicultural techniques for <i>Enterolobium cyclocarpum</i> clones	Dr.M.Sivaprakash Dr.A.Balasubramanian Centre: FC&RI , MTP Dr.B.Sivakumar Centre: AC&RI, Vazhavachanur	Field testing of clones in different locations. Water and nutrient scheduling. Assessment of growth by recording biometric values.	Location specific precision silvicultural techniques for <i>Enterolobium cyclocarpum</i> clones will be evolved

3.	Exploitation of lesser known tree gums	Dr.A.Balasubramanian Dr.S.Radhakrishnan Dr.M.Sivaprakash Centre: FC&RI, MTP	Establishing tree gum garden. Growth assessment of trees. Standardization of gum tapping techniques.	Lesser known gum yielding trees of regional importance will be exploited
4.	Developing intensive silvicultural management for Tamarind under high density planting	Dr.A.Balasubramanian Dr.S.Radhakrishnan Dr.M.Sivaprakash Dr.G.Asokan Centre: FC&RI, MTP	Imposing Florigen application for flower induction. Biochemical profiling for floral induction. Pollination behavioural studies.	Precision Silvicultural techniques for tamarind under high density planting technique will be standardized
5.	Monitoring and management of pest and disease of major farm grown trees	Dr.G.Asokan Dr.C.Ushamalini Centre: FC&RI, MTP	Recording different pest and disease incidences. Assessment of Natural enemies' population. Diagnosis of tree pathogens. Developing suitable pest and disease management strategies.	Pest and diseases of tree crops will be identified and suitable management strategies will be evolved
6.	Technology transfer and multi locational testing of precision technologies	Dr.A.Balasubramanian Dr.M.Sivaprakash Dr.S.Radhakrishnan Dr.K.R.Ramesh	Transfer of precision tree farming techniques. Testing of technologies / clones through MLTs / OFTs in farmers field. Conducting trainings and demonstrations.	Precision silvicultural techniques developed will be transferred to farmers through training and demonstration.

THEME 2: CONSERVATION SILVICULTURE

Theme leader: Dr. S. Radhakrishnan, Associate Professor (Forestry)

S. No.	Action Plan / Activity	Name of the Scientist(s)	Observations to be recorded	Deliverable/ Expected Outcome
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1.	Restoration of degraded forest	Dr.S.Radhakrishnan Dr.K.R.Ramesh Centre: FC&RI, MTP	Floral enrichment through Massive Tree planting Biodiversity monitoring and assessment.	Degraded forest will be restored through massive tree planting
2.	Protection of tree varieties in Neem and Pungam through PPV & FRA regulations	Dr. A.Balasubramanian Centre: FC&RI, MTP	Recording DUS descriptors for the varieties filed by PPV & FRA. Conducting DUS test for the mandatory crops.	DUS testing will be done based on PPVFRA regulation for the mandatory crops

THEME 3: RESILIENT SILVICULTURE

Theme leader: Dr.M.Prasanthrajan, Associate Professor (Env. Science)

S. No.	Action Plan / Activity	Name of the Scientist(s)	Observations to be recorded	Deliverable/ Expected Outcome
1.	Designing tree species for air pollution abatement	Dr.M.Prasanthrajan Centre: FC&RI, MTP	Air Pollution Tolerance Index of indigenous tree species will be recorded. Biometric and biochemical observation of trees grown in polluted environment will be assessed.	Pollutant specific tolerant trees will be identified and recommended for urban planting.
2.	Strategies for evolving climate forest	Dr.A.Balasubramanian Centre: FC&RI, MTP	Indigenous climate resilient tree species will be identified. Evolving silviculture tools for creating artificial forest to address climate change influences.	Climate resilient forest will be created artificially to address climate modulations
3.	Climate Influence on pest and disease incidence	Dr.G.Asokan Dr.C.Ushamalini Centre: FC&RI, MTP	Assessment of seasonal incidences of pest and diseases.	Climate induced responses of pest and disease will be documented.

3. DEPARTMENT OF AGROFORESTRY

A. ON FARM TRIAL

1. HYSR clone In Shisam (*Dalbergia sissoo*)

Salient Features:

Parentage	:	Clonal selection
HYSR Clone	:	MTPDS18
Yield (3 years)	:	100-111 tons per hectare
Yield (6 years)	:	200-225 tons per hectare
Basic density	:	610 kg/m ³

Pulp yield : 49.4 %
Kappa number : 20.2
OFT Location : 2 Farmers field (Coimbatore and Erode Dts.)
Data to be recorded : All biometric attributes

2. High value tress - Red sander (*Pterocarpus santalinus*)

Salient Features:

Potential progeny : TNRS01
Volume : 0.3976 m³
Density : 900-975 kg/m³
OFT Location : Farmers field Coimbatore and Erode Dts.)
Data to be recorded : All biometric attributes

3. Kapok - High Pod Yielder (*Ceiba pentandra*)

Potential progeny : MTPCP 18
Pod yield : 400-500 pods/ tree
Floss yield : 4560 kg ha⁻¹
OFT Location : 2 Farmers field (Theni and Coimbatore Dts.)
Data to be recorded : All biometric attributes

4. Acacia Hybrid Clone for Pulp & Plywood

Clone : AM 19
OFT Location : 2Farmers field/ industry field (Coimbatore Dt.)
Data to be recorded : All biometric attributes

5. New and Alternate Species for Core Veneer and Splints

Species : *Sterculia alata*
Veneer recovery : 64 %
Splints recovery : 17,000 splints/kg of wood
OFT Location : 3 Farmers field/industry field (Thirupur,Coimbatore and Erode dts TNPL and SPB industrial research)
Data to be recorded : All biometric attributes

6. New eucalyptus clone with low bark content

Eucalyptus hybrid : EHLBT - 01
Bark thickness : 4.25 mm (check > 6 mm)
Basic Density : 542 kg/m³
OFT Location : 3 Farmers / industry field(Thirupur,Coimbatore, TNPL and SPB industrial research)
Data to be recorded : All biometric attributes

7. New Eucalyptus clones for face veneer

Salient Features:

Species : *Eucalyptus urograndis*
Potential progeny : EG 01, EG 02, EG 03
Density : 749 kg/m³
Face veneer yield : 13.00 %
Veneer recovery : 75 – 85 %
Veneer output : 240 – 360 cft
OFT Location : Farmers field (Coimbatore and Erode Dts.)
Data to be recorded : All morphometric attributes

8. Improved Genetic Resources in Jatropha

Parentage	:	<i>Jatropha curcas</i> X <i>Jatropha integerima</i>
No. of hybrid clones	:	58
No. of elite clones identified	:	05
Promising Clones	:	CJH 13
OFT Locations	:	3 Fields

9. Multifunctional Agroforestry Models

OFT Location	:	TNAU Colleges/Research Stations/KVK and Farmer's field
Data to be recorded	:	All biometric attributes and yield attributes of intercrops

B. TECHNOLOGY FOR ADOPTION / INFORMATION

For Adoption

1. Malai Vembu MTP 3 - An Exclusive Clonal Variety for face Veneer Production

Salient Features	:	<ul style="list-style-type: none">➤ Fast growing, Straight and clean cylindrical stem➤ Uniform branching pattern
Parentage	:	Melia MDCW 14
Spacing	:	10m x 10m
Density	:	100 plants/ha.
Rotation	:	8 - 10 years
Average wood yield	:	2500-3000 cft/ha.
Wood quality Characters	:	Density - 586 kg/m ³ Face veneer yield - 12.0 % Average veneer recovery - 60 % Face veneer quality- Fine texture, Flowery grain Suitable for wide utility

2. Mini Clonal Technology for Red Sander

Propagation material	:	Apical shoot
Rooting media	:	Coir pith /Perilite
Rooting hormone	:	IBA @3000 ppm
Rooting percentage	:	60.00 %

3. Profitable Silvopastoral Model

CO(BN)5 grass + Hedge Lucerne in 3:1 ratio is the efficient shade tolerant fodder crops under four years old *Melia dubia* (MTP1) plantation with a espacement of 3 m x 3m. The yield of fodder crops was 88.60 tonnes/ha./year. An additional income of Rs.1.50 lakhs/year could be obtained from fodder crops alone.

4. Value Addition Technology

Raw material	:	Match splints residues
Technology	:	Piston press briquetting technology
Conversion	:	1.5 tonnes/hr.
Calorific value	:	3800-3950 k.cal/kg

For Information

1. Assemblage and management of industrial wood genetic resources

Utility	Tree species	No. of genetic resources tested	Promising genetic resource identified
Timber	Teak – I	32 progenies	MTPTK 07
	Teak – II	30 progenies	Ongoing trial

	Red sanders – I	24 progenies	TNRS 01
	Red sanders – II	32 progenies	New trial
	<i>Swietenia macrophylla</i> – I	24 progenies	FCRISM 20
	<i>Swietenia macrophylla</i> – II	18 progenies	New trial
	<i>Terminalia bellirica</i>	18 progenies	New trial
Plywood	Melia – I	20 progenies	MTP 1
	Melia – II	21 clones	MTP 2
	Eucalyptus	12 clones	EHLBT - 01
	<i>Toona ciliata</i>	16 progenies	TC 02
	<i>Sterculia foetida</i>	21 progenies	On going trial
	Silver oak	18 progenies	New trial
	Kadam	25 clones	MTP 1
	<i>Acrocarpus fraxinifolius</i>	30 progenies	FCRIAF 28
Pulpwood	Casuarina – I	15 clones	CJ 01
	Casuarina – II	10 clones	
	Casuarina – III	17 clones	
	Eucalyptus	32 clones	EUUG 01, EUUG 02 & EUUG 03
	<i>Albizia lebbek</i>	30 progenies	-
	<i>Dalbergia sissoo</i>	24 clones	DS 18
	Acacia hybrid	9 clones	AH 35
	Subabul	15 progenies	FCRILL 15
Biofuels	Jatropha	56 hybrid clones	CJH 13
	Pungam	11 progenies	-
	<i>Callophyllum inophyllum</i>	11 progenies	MTPCI 03

2. High Value Forests

Species identified	:	Teak, Mahogany, Red sanders, Toona, Sandal Terminalia, Melia
Area	:	6 ha.

3. Mini Clonal Technology in TBOs (Neem, Punnai and Mahua)

Propagation material	:	Apical shoot
Rooting media	:	Coir pith / Perlite
Rooting hormone	:	IBA @ 3000 ppm
Rooting percentage	:	40.00 %

4. Suitable pulse crop for Red sanders based Agroforestry system.

Tree species	:	Red Sanders
Spacing	:	4 m x 4 m
Intercrop	:	Cowpea (COCP7)
Yield	:	1358 kg/ha.

C. REMARKS ON THE ONGOING UNIVERSITY RESEARCH SUBPROJECTS /AICRP/EXTERNALLY FUNDED PROJECTS

Department	Centre	URP	Core Project	AICRP	External Funded Project	Total
Agroforestry	FC&RI	6	2	1	4	13

Sl. No.	Project No. and Title	Project leader	Duration	Remarks
University Research Project				
1.	FCRI/KDM/FOR/2016/001 Progeny Evaluation for Higher Productivity in <i>Albizia lebbbeck</i> L. (Benth.) for Dry Land Agroforestry System	Dr.P.Rajendran Assoc. Prof. (Forestry)	July 2016 to July 2021	May be closed in July 2021 and new URP shall be proposed to continue the work. The project should be transferred to FC&RI, Mettupalayam as the project leader is working in this Institute
2.	NRM/MTP/AGM/2020/001 Development of Microbial consortia for efficient Growth of Sandal and Red sanders	Dr.M.Tilak Asst. Prof. (Ag. Micro.)	Dec. 2019 to Mar. 2022	May be continued
3.	DCM/MTP/CRP/2021/001 Studies on light use efficiency and associated physiological traits under different agroforestry systems	Dr.P.Boominathan Assoc. Prof. (CRP) Dr.K.Ramah, Asst. Prof. (Agron.)	Feb. 2021 to Oct. 2022	May be continued
4.	CARDS/MTP/AEX/2020/001 A study on the role of Non-Wood Forest Products (NWFPs) on Tribal livelihood development.	Dr.C.Cinthia Fernandaz Asst. Prof. (Agrl. Extn.)	Dec. 2020 to June 2022	One objective on Certification of NWFPs may be included and the same may be continued
5.	AICRP/DCM/MTP/ AGR/2021/001 Evaluation of tree fodders through feed pelletization for improving livestock productivity	Dr.K.Ramah Asst. Prof. (Agron.)	Jan 2021 to Dec 2022	May be continued
6.	HCRI/MTP/HOR/VEG/2019/001 Evaluation of Vegetable Cluster bean genotypes under <i>Melia dubia</i> based ecosystems	Dr.P.Hemalatha Asst. Prof. (Hort.)	Oct. 2019 to Sep. 2022	May be continued

Core Project				
1	CARDS/ MTP /AEX 2018/CP 167 Identification and documentation of ITKs among the tribes of The Nilgiris.	Dr.C.Cinthia Fernandaz Asst. Prof. (Agrl. Extn.)	Feb. 2019 to Sep. 2020	Completion report has been submitted. Viable ITK technology to be validated and licensed for commercialization.
2.	FCRI/MTP/FOR/2018/CP 041 Design and Development of Multifunctional Agroforestry Model for Drylands	Dr.R.Jude Sudhagar Assoc. Prof. (Forestry)	June 2018 to Mar. 2021	Completion report has been submitted A new project on dry land agroforestry models model with inclusion of fruit trees to be proposed for external funding under Sub-mission on Agroforestry
Externally Funded / ICAR Project				
1	CPL/FCRI/MTP/AGF/2017/R005 Improvement, Characterization and Utilization of tree species amenable for Composite Wood Technology (CWT)	Dr.K.T.Parthiban Professor (Forestry) and Dean	Apr. 2017 to Mar.2022	May be continued
2.	DBT-JAT/FCRI/MTP/AGF/2009/R009 Breeding and Management of Jatropha Hybrid Genetic resources	Dr.K.T.Parthiban Professor (Forestry) and Dean	Apr. 2017 to Mar.2022	May be continued
3.	CIAF/FCRI/MTP/AGF/2016/R004 Consortium of Industrial Agroforestry (CIAF)	Dr.K.T.Parthiban Professor (Forestry) and Dean	Apr. 2016 and Continuing	May be continued
4.	TNPL/FCRI/MTP/AGF/2020/R003 Improvement, Wood Quality Characterization and Utilization of pulpwood genetic resources amenable for Agroforestry	Dr.K.T.Parthiban Professor (Forestry) and Dean	Jan. 2021 to Dec. 2025	May be continued
5.	AICRP/FOR/MTP/FOR/001 All India Coordinated Research Project on Agroforestry	Dr.P.Rajendran Assoc. Prof. (Forestry) Dr.K.Ramah Asst. Prof.(Agron.)	Since 1983 and Continuing	May be continued

D. GENERAL REMARKS

- Suitability of silver oak cultivation in plains to be studied

E. ACTION PLAN (2021-2022)

THEME 1: DEVELOPMENT OF HIGH YIELDING SHORT ROTATION (HYSR) CLONES AMENABLE FOR MULTIFUNCTIONAL AGROFORESTRY SYSTEMS

Theme Leader: Dr.K.T.Parthiban, Dean (Forestry)

S. No.	Action Plan / Activity	Name of the Scientist and centre	Works to be carried out	Deliverable/ expected outcome
1.	Inventory of New species based on wood quality	Dr.I.Sekar Dr.P.Rajendran Centre: FC&I, MTP	Continuation of inventory of FGR Improvement, Characterization and Utilization of tree species amenable for Composite Wood Technology (CWT) Improvement, Wood Quality Characterization and Utilization of pulpwood genetic resources	Tree species amenable for CWT will be inventorised Alternate pulpwood genetic resources will be identified
2.	Development of HYSR clones	Dr.M.Murugesh Dr.P.Rajendran Dr.R.Jude Sudhagar Centre: FC&I, MTP HC&RI, PKM	Progeny evaluation in Kapok Progeny Evaluation in <i>Albizia lebbbeck</i> . Breeding and Management of Jatropha Hybrid Genetic resources	HYSR Clones will be identified in Kapok, <i>Albizia lebbbeck</i> and Jatropha
3.	Mini clonal technology for HYSR clones	Dr.P.Rajendran Dr.R.Jude Sudhagar Dr. P.Hemalatha Centre: FC&I, MTP	Standardization of mini clonal technology for <i>Sterculia alata</i> and TBOs	Mini clonal technology for <i>Sterculia alata</i> and TBOs will be developed

THEME 2: DESIGN AND DEVELOPMENT OF AGROFORESTRY MODELS

Theme leader: Dr.I.Sekar, Professor and Head				
1.	Development of Multifunctional Agroforestry model	Dr.P.Rajendran Dr.R.Jude Sudhagar Dr.K.Ramah Dr P.Hemalatha	Establishment of Multifunctional Agroforestry model in TNAU Colleges, KVKs and Research stations Multifunctional Agroforestry model for Drylands	Profitable Multifunctional Agroforestry model will be developed.
2.	Evaluation of Agroforestry systems under varied crop combinations.	Dr.P.Hemalatha Dr.M.Kiruba Dr.P.Kumar Centre: FC&RI HRS, Yercaud AC&RI, KKM	Identification of suitable pulse crop for Red Sanders based agroforestry system Introduction and evaluation of alternate industrial wood species for coffee based agroforestry system Evaluation of Vegetable Cluster bean genotypes	Suitable pulse crop will be screened for Red Sanders based agroforestry system Alternate industrial wood species for coffee based agroforestry system will be evaluated.

			under <i>Melia dubia</i> based agroforestry system	Suitable Vegetable Cluster bean genotypes under <i>Melia dubia</i> based agroforestry system will be screened.
3.	Development of Climate resilient Agroforestry models	Dr.P.Boominathan Dr.K.Ramah Centre: FC&RI, MTP	Studies on light use efficiency and associated physiological traits under different agroforestry systems	Light use efficiency of different agroforestry system will be calibrated.
4.	Development of microbial consortia for high value timber species	Dr.M.Tilak Centre: FC&I, MTP	Development of microbial consortia for high value timber species such as Sandal and Red sanders	Microbial consortia for Sandal and Red sanders will be developed

THEME 3: TREE FODDER STUDIES AND DEVELOPMENT OF CONCENTRATE FEED

Theme leader: Dr.I.Sekar, Professor and Head

1.	Identification and assemblage of potential fodder trees	Dr.P.Rajendran Dr.K.Ramah	Evaluation of tree fodder based on productivity and quality	Potential fodder trees will be identified and included in the tree protein bank.
2.	Evaluation of tree fodders through feed pelletization for improving livestock productivity	Dr.K.Ramah	Development of tree fodder based feed concentrate	Suitable tree fodder concentrate will be developed.

THEME 4: SOCIO ECONOMIC STUDIES IN AGROFORESTRY AND DEVELOPMENT OF MULTIPARTITE LINKAGES

Theme Leader: Dr.K.T.Parthiban

S. No.	Action Plan/Activity	Name of the Scientist and centre	Works to be carried out	Deliverable/ expected outcome
1.	Linkage for sustaining Agroforestry	Dr.I.Sekar Dr.Jude Suthagar Dr.S.Umesh Kanna Dr.C.Cinthia Fernandaz Centre: FC&RI, MTP	Strengthening linkages through CIAF Continuation and maintenance of database	Establishment of linkages for promotion of consortia based Agroforestry
2.	Agroforestry based impact and livelihood studies	Dr.C.Cinthia Fernandaz Centre: FC&RI, MTP	Impact and monetization study of various Agroforestry systems Study on the role of Non-Wood Forest Products (NWFPs) on	Impact of Consortium on Agroforestry development will be studied. Livelihood development through NWFPs will be analysed

			Tribal livelihood development	
3.	Business enterprises in Agroforestry	Dr.I.Sekar Dr.C.Cinthia Fernandaz, Dr.Jude Suthagar Dr.S.Umesh Kanna	Development of business enterprises and its impact through MAFBIF	Various business models will be developed for creating entrepreneurship opportunity.

4. DEPARTMENT OF FOREST PRODUCTS AND WILDLIFE

A. DECISIONS MADE ON OFT

1. Studies on Bio-efficacy of Herboliv against Wild Boar in Farm Settings

(Scientist in-charge: Dr.K.Baranidharan, Assistant Professor (Forestry))

Location: Farmer's Field

- ❖ Therampalayam in Coimbatore District
- ❖ Bhavani Sagar in Erode district

Crops: Maize and Paddy

Treatments:

- T₁ - 1:9 ratio of herboliv @ spraying interval of 7 days
- T₂ - 1:9 ratio of herboliv @ spraying interval of 15 days
- T₃ - 2:8 ratio of herboliv @ spraying interval of 7 days
- T₄ - 2:8 ratio of herboliv @ spraying interval of 15 days

No. of replications: 3

Observations to be recorded

- Wild boar intrusion
- % of crop damage
- Nutrient and toxic parameters analysis in plants and soil properties

B. TECHNOLOGY FOR ADOPTION / INFORMATION

For Adoption

1. Subabul (*Leucaena leucocephala*) wood is an alternative species for core veneer in low grade plywood production

Subabul of 8 and 10 years old trees are found to be suitable for plywood production considering its veneer recovery (65%), veneer shrinkage (3.3%), water absorption (11.7 %), plywood density (643 kg m⁻³), modulus of elasticity (3743.36 N mm⁻²), modulus of rupture (50.74 N mm⁻²) and static bending strength (52.21 kg cm⁻²) which has shown nearer physical and mechanical properties to the IS 1708 standard. Hence, it is recommended as an alternate species for core veneer in plywood production.

2. Dhaman (*Grewia tiliaefolia*) is an alternate species for plywood, pulpwood and match splint production

Eight year old tree of *Grewia tiliaefolia* is a good source of raw material for core veneer in plywood production. This wood recorded 64.5% veneer recovery, 8% veneer shrinkage, 9% water absorption, 520 kg m⁻³ plywood density, 3118 N mm⁻² modulus of elasticity and 20 N mm⁻² modulus of rupture which are having nearer physical and mechanical properties to IS 1708 standard. Hence, an eight year old *Grewia tiliaefolia* wood is recommended for core veneer in plywood production.

Grewia tiliaefolia wood at an age of 4 year onwards is a good source of raw material for pulpwood utility considering its pulp quality parameters viz., holo ellulose (53%), kappa number (22.00), fibre length (1268.48 μm) and pulp recovery (50%).

Grewia tiliaefolia of six year old trees are found to be suitable for the production of medium grade match splint in terms of colour (creamy white), density (450.20 kg m^{-3}), specific gravity (0.51), number of splints (15670 kg^{-1}) and splints recovery (75.23 %).

For information

1. Identification of phytochemicals in medicinal trees for pharmaceutical applications

The FTIR test evidenced the presence of various phytochemicals in the targeted tree species which indicates its utility for pharmaceutical applications.

Tree Species	Phytochemicals
<i>Terminalia chebula</i>	Amine, sulfonates, phenols, alkane, thiocyanate and aldehydes
<i>Terminalia bellerica</i>	Halo compounds, tertiary alcohol, aldehyde and alkane
<i>Eucalyptus ficifolia</i>	Halo compounds, sulfoxide, amine and alkaline

2. Value added food products using *Prosopis juliflora* pods

i) Preparation of cookies using Prosopis pod pulp

Adding 50 g of Prosopis pulp powder in 950 g of maida



Adding 300 g sugar + 600 g margarine + 0.5 g baking powder



Mixing well and baking at Oven (180°C for 15 minutes)

ii) Preparation of cake using Prosopis pod pulp

Adding 100 g of Prosopis pulp powder in 900 g of maida



Adding sugar (1000 g) + margarine (1000 g) + 4 eggs



Adding baking powder @ 1.5 g + vanilla essence @10 ml



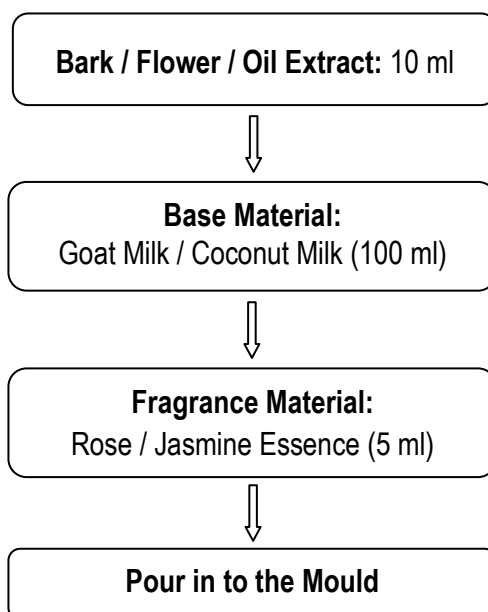
Mixing well and pour into the greased tins



Baking at Oven (180°C for about 40 minutes)

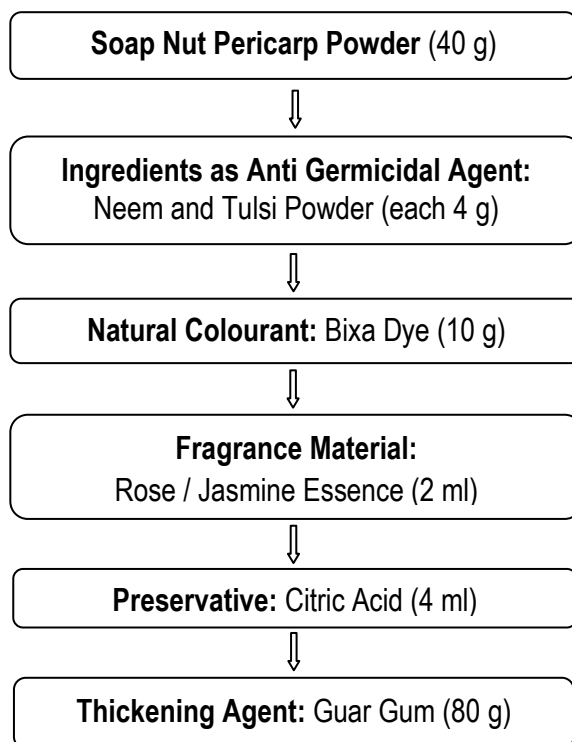
3. Herbal soap using *Acacia pennata* bark, *Senna auriculata* flower and *Madhuca latifolia* seed kernel oil

Herbal soaps were prepared by using *Acacia pennata* bark, *Senna auriculata* flowers and *Madhuca latifolia* seed kernel oil. The soap making process is given below as flow chart.

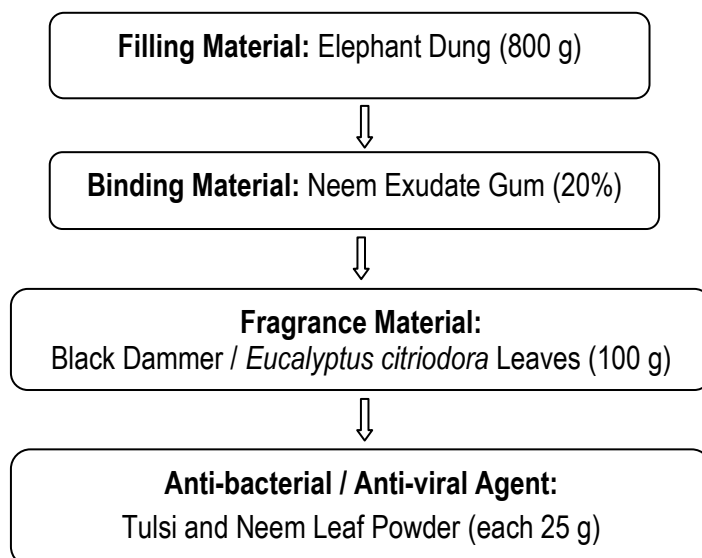


The Total Fatty Matter (TFM) of the soaps prepared by using the following species viz., *Acacia pennata* bark, *Senna auriculata* flowers and *Madhuca latifolia* seed kernel oil were 80.20 %, 66.80 % and 76.60 % respectively.

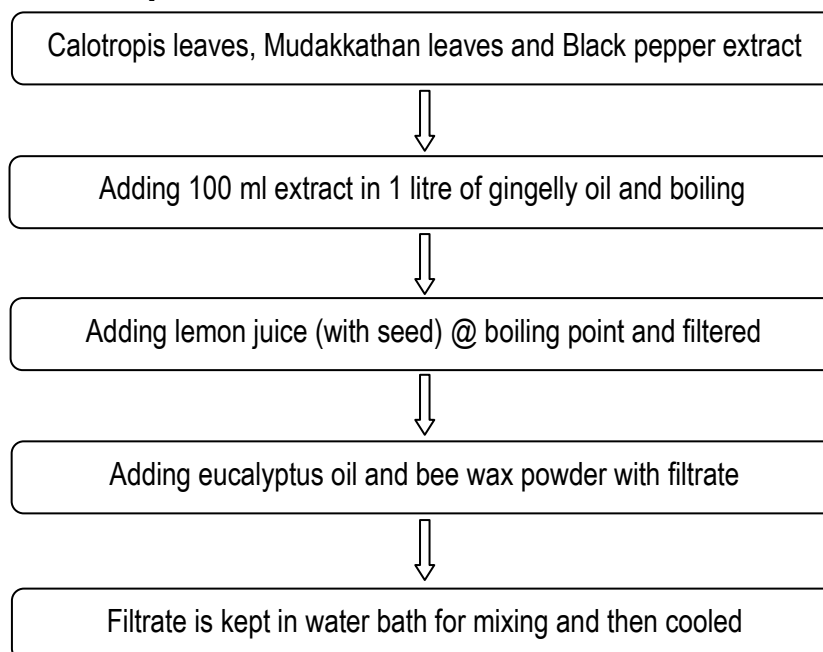
4. Herbal hand wash using soap nut



5. Eco-friendly sambrani using elephant dung



6. Bee Wax based Therapeutic Oil



This therapeutic oil was tested with human who has rheumatism for its efficacy and it was found that it is effective against joint pains, knee pains and rheumatic arthritis on regular use. It is also protective against sun stroke which enhances skin shining and reduce inflammation.

6. Improvement of floral and faunal diversity through eradication of *Prosopis juliflora*

The eradication of invasive *Prosopis juliflora* in forest area has significant positive impact on regeneration of native herbs, shrubs and trees and also improvement in wildlife habitat. This finding serves as a baseline data base for the management of alien invasive species viz., *Prosopis juliflora*.

7. Human-Elephant Conflict management

Forest College and Research Institute has designed two stage control measures like Elephant Prof Trench (EPT - 2 m top x 1.6 m bottom x 2 m height) coupled with three line battery operated fence line along with hanging fence to prevent the entry of elephants. The major causes for Human-Elephant Conflicts (HEC) are habitat fragmentation, cropping program in buffer zones, corridor damage, animal ethnology, easy food and water.

8. Human-wild boar conflict management

The biological method (human hair) followed by physical method (stray wire) were found to be effective with 65-70% to prevent wild boar entry. The bio-efficacy of herbolic against wild boar damage to rice, maize and agroforestry showed that the herbolic @ 1:9 dosage at 7 days interval was found to be 85-90% effective.

9. Human-monkey conflict management

A study revealed that the monkeys usually distribute as troop and one troop would not mingle with other troop and its feeding behaviour is also wider. The best way of driving monkey is that engaging monkey driver and also capturing and relocation of monkeys.

10. Human-Peacock management

Herbolic @ 2:8 dosage level at 7 days interval was found to be 90 % effective against crop damage by peacock.

11. Avian Diversity

The avian diversity studies at TNAU main campus showed that there are 70 species of birds belongs to 32 families wherein the dominant species are Common myna, Great egret and Rose ringed parakeet during October 2020 and Cattle egret and Ashy wood swallow during Jan 2021. The following birds viz., Coucal, Flycatcher, Buzzards and Common myna are acting as scavenger (bio control Agent) and the rare visitors are Purple Moorhen, Painted Stork, Common Buzzard, Black headed Ibis and Spot billed Duck.

C. REMARKS ON THE ONGOING UNIVERSITY RESEARCH PROJECTS CORE PROJECTS AND EXTERNALLY FUNDED PROJECTS

Department	University Research Projects	Core Projects	Externally Funded Projects	Total
Forest Products and Wildlife	4	3	3	10

S. No.	Project Number and Title	Project leader	Duration	Remarks
University Research Projects				
1.	FC&RI/MTP/FOR/2020/001 Study on Documentation and Seasonal variation of Avifaunal diversity in TNAU Campus, Coimbatore	Dr.K.Baranidharan Asst. Prof. (Forestry)	Sept. 2020 to Aug. 2021	The work is in progress. Hence, it may be continued.

2.	FCRI/MTP/FOR/2021/001 Isolation and Characterization of Exudate gum of important native gum yielding trees.	Dr.R.Ravi Asst. Prof. (Forestry)	Jan. 2021 to Dec 2022	Work has been initiated. Project may be continued.
3.	CARDS/MTP/ARM/2021/001 Performance analysis of Packing Case Industries in Coimbatore District, Tamil Nadu	Dr.S.Selvanayaki Asst. Prof.(ARM)	Jan. 2021 to Dec. 2022	Project may be continued.
4.	FCRI/MTP/FOR/TREE/2021/001 Studies on ethno-medicinal knowledge and phytochemistry of important medicinal trees in Nilgiris	Dr.S.Manivasakan, Asst. Prof. (Forestry)	Apr. 2021 to Feb. 2023	Project may be continued.

Core Projects

1.	FCRI/MTP/FOR/2018/CP100 Studies on suitability of <i>Ailanthus excelsa</i> and <i>Sterculia foetida</i> for plywood production	Dr.M.P.Divya Professor & Head	Nov. 2018 to Sep. 2020	Completion report has been submitted for approval
2.	FCRI/MTP/FOR/2018/CP040 Value added products of gum from trees grown in farm lands under different agroclimatic zones of Tamil Nadu	Dr.R.Ravi Asst. Prof. (Forestry)	Sept. 2018 to Sept. 2020	Completion report has been submitted for approval
3.	FCRI/TRY/FOR/2018/CP097 Studies on the influence of precision silvicultural techniques on <i>Neolamarckia cadamba</i> (Roxb.) clones in Trichy	Dr.S.Manivasakan, Asst. Prof. (Forestry)	Nov. 2018 to Sept. 2020	Completion report has been submitted for approval

Externally funded schemes

1.	TNFD/FCRI/MTP/TREE/2021/R001 Documentation, Assessment of Nutritive Value and Standardization of Mass Multiplication Technology for Native Fodder Grasses and Fodder Trees in Coimbatore Elephant Reserve	PI: Dr.M.P.Divya Prof. and Head Dr.K.Baranidharan Asst. Prof. (For.)	Apr. 2021 to June 2022	Work is initiated Project may be continued.
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2.	PA/MPP/FCRI/MTP/FOR2020/001 Bio-efficacy of Wild animal Repellent (Herboliv) to Mitigate Human Animal Conflicts in different Landscapes of Tamil Nadu Agricultural University Colleges/Stations	PI: Dr.K.Baranidharan Co-PIs: Dr.M.P.Divya Dr.R.Ravi Dr.M.Vijayabhama	Nov. 2020 to Oct. 2021	The work is in progress. It may be continued.
3.	DFO/FCRI/MTP/DFV/2016/ R003 Monitoring biodiversity and impact in critical habitats after removal and maintenance of invasive alien species and efficacy of maintenance works in Sathyamangalam Tiger Reserve	PI: Dr.K.Baranidharan Co-PI: Dr.R.Revathi Dr.M.Vijayabhama	Apr. 2016 to Mar. 2021	Project has been completed. Final report has to be sent to the sponsor and the completion report to be submitted on or before 30.06.2021

D. GENETAL REMARKS

- Research on developing nano products shall be continued.
- Value added animal feed shall be developed
- Plant based animal repellents may be developed

E. ACTION PLAN (2021-2022)

THEME 1: POST HARVEST TECHNOLOGY FOR FARM GROWN TREES

Theme Leader: Dr.M.P.DIVYA, Professor and Head				
S. No.	Action plan / Activity	Scientist(s) in-charge and centre	Work to be carried out	Deliverables / Expected outcome
1.	Standardizing the seasoning schedule for Malabar Neem (<i>Melia dubia</i>) and Kadam (<i>Neolamarckia cadamba</i>)	Dr.M.P.Divya Prof. & Head Dr.R.Ravi Asst. Prof. (For.) Centre: FC&RI	Fixing the appropriate seasoning schedule for targeted lesser known timber species.	Seasoning schedule for the selected species will be standardized.
2.	Standardizing suitable preservative chemical treatment for Malabar Neem (<i>Melia dubia</i>) and Kadam (<i>Neolamarckia cadamba</i>)	Dr.M.P.Divya Prof. & Head Dr.R.Ravi Asst. Prof. (For.) Centre: FC&RI	Standardizing suitable wood preservative chemical treatment for targeted lesser known timber species.	Suitable preservative chemical treatment will be identified.

3.	Developing management strategies for wood boring beetles	Dr.G.Asokan Prof. (Agrl. Ento.) Centre: FC&RI	Developing lure trap Identifying suitable chemical management methods	Proper management strategies for wood boring beetles will be evolved
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THEME 2: VALUE ADDED PRODUCTS FROM NON-TIMBER FOREST PRODUCTS

Theme Leader: Dr.M.P.DIVYA , Professor and Head				
S. No.	Action plan/ Activity	Scientist(s) incharge and centre	Work to be carried out	Deliverables/ Expected outcome
1.	Development of value added products from exudate gum of <i>Azadirachta indica</i> , <i>Ceiba pentandra</i> and <i>Acacia nilotica</i>	Dr.R.Ravi Asst. Prof. (For.) Centre: FC&RI	Developing value added products using the identified biochemical constituents of the targeted species	Value added products will be developed for industrial utility.
2.	Characterization of chemical constituents in exudate gum of <i>Albizia lebbeck</i> , <i>Albizia saman</i> , <i>Moringa oleifera</i> and <i>Lannea coromandelica</i>	Dr.R.Ravi Asst. Prof. (For.) Centre: FC&RI	Analyzing the gum properties of targeted tree species	Chemical constituents present in the exudate gum of targeted species will be identified.
3.	Documentation of ethno-medicinal knowledge of tribals in Nilgiris and developing value added products from medicinal trees viz., <i>Feronia elephantum</i> , <i>Terminalia chebula</i> and <i>Terminalia bellerica</i> for pharmaceutical applications	Dr.S.Manivasakan Asst. Prof. (For.) Centre: FC&RI	Documenting ethno-medicinal knowledge of tribal community in Nilgiris through questionnaire & personal interview Developing value added products using the active principles from the targeted trees	Ethno-medicinal knowledge of tribal community in Nilgiris will be documented. Value added products will be developed for pharmaceutical utility
4.	Developing eco-friendly Agarbathi, Sambrani and Mosquito repellent using elephant dung	Dr.M.P.Divya Prof. & Head Dr.S.Manivasakan Asst. Prof. (For.) Dr.R.Ravi Asst. Prof. (For.) Centre: FC&RI	Determining the burning quality, binding properties and fragrant quality parameters of raw materials used in eco friendly products	Eco - friendly Agarbathi, Sambrani and Mosquito repellent will be developed using elephant dung

5.	Documentation of ITKs adopted by indigenous people for wild boar control and development of plant-based animal repellent for wild boar control	Dr.K.Baranidharan Asst. Prof. (For.) Dr.S.Manivasakan Asst. Prof. (For.) Centre: FC&RI	Isolation of alkaloids from native plants and development of wild boar repellent	Indigenous traditional knowledge for wild boar control will be documented. Plant based animal repellent for preventing crop damage by wild boar will be developed
6.	Validation of value added food products viz., cake and cookies and development of value added animal feed viz., Multi Nutrient Bar and Feed Pellets using <i>Prosopis juliflora</i> pods	Dr.M.P.Divya Prof. & Head Dr.S.Manivasakan Asst. Prof. (For.) Dr.R.Ravi Asst. Prof. (For.) Centre: FC&RI	Nutrient status of <i>Prosopis</i> pods will be assessed. Value added food products will be validated and value added animal feeds will be developed	Value added food products and animal feed will be developed using <i>Prosopis</i> pods

THEME 3: VALUE CHAIN ANALYSIS OF WOOD AND NON-TIMBER FOREST PRODUCTS

Theme Leader: Dr. M. P. DIVYA , Professor and Head				
S. No.	Action plan / Activity	Scientist(s) in-charge(s) and centre	Work to be carried out	Deliverables / Expected outcome
1.	Value chain analysis for major Non-Timber Forest Products (NTFPs) in Nilgiris	Dr.S.Selvanayaki Asst. Prof. (ARM) Dr.K.Divya Asst. Prof. (ARM) Centre: FC&RI, Mettupalayam	Various channels through which the major Non-Timber Forest Products (NTFPs) from the Nilgiris moved from the collectors to the ultimate consumers would be analyzed.	Price spread across various channels would be estimated and strategies would be recommended for improving the income of the NTFP Collectors.
2.	Analysis of Packing case industries in terms of the raw materials used, source of procurement, quality parameters and industry applications	Dr.S.Selvanayaki Asst. Prof. (ARM) Dr.K.Divya Asst. Prof. (ARM) Centre: FC&RI Mettupalayam	Various raw materials used for making packing cases for different purposes would be identified. Source of procurement and quality parameters expected and utility would be analysed.	Suitability of indigenous tree species for packing case industry would be identified.

THEME 4: HUMAN- ANIMAL CONFLICT MANAGEMENT

Theme Leader: Dr.M.P.Divya , Professor and Head				
S. No.	Action plan / Activity	Scientist (s) incharge and centre	Work to be carried out	Deliverables / Expected outcome
1.	Human-Elephant Conflicts Management	Dr.M.P.Divya Prof. & Head Dr.K.Baranidharan	Identifying the feeding behaviour and food spectrum of elephants	Rehabilitation of native fodder in the Elephant

		Asst. Prof. (Forestry) Centre: FC&RI, Mettupalayam	Documentation, characterization and standardizing mass multiplication technology for native fodder in Coimbatore Elephant Reserve	habitat to mitigate human- elephant conflicts
2.	Human-Wild boar conflict management	Dr.K.Baranidharan Asst. Prof. (Forestry) Dr.S.Manivasan Asst. Prof. (Forestry) Centre: FC&RI, Mettupalayam	Documentation of ITKs and testing the ITKs based plant products against crop damage by wild boar to mitigate human-wild boar conflict Bioefficacy of Herboliv will be studied.	Dosage level of Herboliv will be standardized and also ITK based mitigation measures will be identified to prevent the crop damage by wild boar identified and tested for its efficacy
3.	Human-Peacock conflict management	Dr.K.Baranidharan Asst. Prof. (Forestry) Centre: FC&RI	Bioefficacy of Herboliv against crop damage by peacock will be studied	Dosage level of Herboliv against the crop damage by peacock will be standardized

F. REMARKS ON THE FORESTRY PROJECTS IN OTHER CAMPUSES

Sl. No.	Project No. & Title	Project Leader	Duration	Remarks
University Research Projects				
1.	FCRI/YCD/FOR/2020/001 Introduction and evaluation of alternate industrial wood species for coffee based agroforestry system	Dr.M.Kiruba Asst. Prof. (For.) HRS, Yercaud	Jan. 2021 to Dec. 2025	The project may be continued.
2.	FCRI/KKM/FOR/2019/002 Identification of suitable pulse crop for Red Sanders based agroforestry system	Dr.P.Kumar Asst. Prof. (For.) AC &RI, Killikulam	Sep. 2019 to Sep.2021	Project may be continued.
3.	FCR/MTP/FOR/2021/003 Effect of spacing regimes on growth and yield of <i>Enterolobium cyclocarpum</i>	Dr.B.Sivakumar Asst. Prof. (For.) AC & RI, Thiruvannamalai	April 2021 to Mar. 2024	Work has been initiated. The project may be continued.
4.	FC&RI/PKM/FOR/2020/001- Progeny Evaluation in Kapok (<i>Ceiba pentandra</i> (L.) Gaertn.)	Dr.M.Murugesh, Prof. (Forestry) HC&RI, Periyakulam	May 2019 to Mar. 2024	Work is in progress. Project may be continued
5.	FCRI/KKM/FOR/2019/001 Study of compatible host plant for sandalwood cultivation	Dr.P.Kumar, Asst. Prof (For.) AC &RI, Killikulam	Sep. 2019 to Sep. 2022	Project may be continued.

6.	CPPS/MTP/ENT/TBB/2019. Development of Tree Based Biopesticides for the Management of Diamond Back Moth, <i>Plutella xylostella</i>	Dr.M.Suganthy Assoc. Prof. (Ag. Ento.) TNAU, Coimbatore	Jan. 2019 to Dec. 2021	Project may be continued
External Funded Schemes				
1.	DST/AEC/KUM/2018/R008 Development of Technologies for Extraction and Dormancy Reduction of Teak Seeds	Dr.P.Masilamani Dean ADAC&RI, Trichy	Aug. 2018 to Aug. 2021	Project may be continued.

5. DEPARTMENT OF SERICULTURE

A. DECISIONS ON OFT

1. Amino acids as exogenous modulator for enhancing yield and quality of silk

(Scientist in charge: Dr.K.A.Murugesh, Assistant Professor)

Locations: Progressive farmer field in Tiruppur, Erode and Coimbatore districts.

Observations will be recorded in coordination with officials of State Dept. of Sericulture, Govt. of Tamil Nadu

Treatments

- T1 : Glycine 10 ppm + Alanine 100 ppm + Serine 100 ppm
T2 : Farmer's Practice

Replications : 13

Observations to be recorded

- Fifth instar larval duration
- Matured larval weight
- Effective rate of rearing
- Cocoon weight
- Shell weight
- Shell ratio
- Filament length
- Denier

2. Evaluation of "NutriStick" organic growth promoter for Mulberry cuttings

(Scientist in charge: Dr.R.Shanmugam, Assistant Professor)

Locations - Progressive farmer's field

- Udumalpet
- Gobichettipalayam
- and Annur

Observations will be recorded in coordination with officials of State Dept. of Sericulture, Govt. of Tamil Nadu.

Treatments

- T₁ : 1 pellet of Nutristick per cutting
T₂ : Farmer's practice

Replications : 13

Observations to be recorded:

- Root initiation
- Survival rate
- Rooting percentage
- Root length
- Shoot length
- No. of leaves
- Days to uprooting

3. Effect of silkworm excreta on mulberry and silkworm (ongoing)

(Scientist incharge: Dr.R.Shanmugam, Assistant Professor)

Data collected from 4 locations during 2021 will be used and additional data on decomposition of silkworm excreta will be collected through lab studies at Mettupalayam and presented during CSM 2022.

B. TECHNOLOGY FOR ADOPTION / INFORMATION**For Adoption****1. Minerals supplementation for enhanced economic traits of silkworm, *Bombyx mori* L.**

Feeding the silkworm larvae on mulberry leaves enriched with mineral solution having the combination of zinc sulphate 100 ppm, magnesium sulphate 200 ppm and potassium chloride 100 ppm twice during third (1st & 3rd day) and fourth (1st & 3rd day) instars, and thrice during fifth instar (1st, 3rd & 5th day). It significantly reduced the larval mortality by 15.95 % and increased the cocoon yield by 12.69 %.

2. Mulberry Micronutrient Mixture (MMM) to increase leaf yield and cocoon quality

Application of MMM (Fe - 1 %, Mn - 0.5 %, Zn - 0.5%, B - 0.2 % and Mo - 0.01 %) @ 11.0 kg ha⁻¹ on 10 days after pruning and 25 days after pruning improve leaf yield of mulberry and cocoon yield of silkworm

C. REMARKS ON THE ONGOING UNIVERSITY RESEARCH SUB PROJECTS AND COMPLETED CORE PROJECTS

Department	URP	Core Projects	External funded project	Total
Sericulture	5	5	-	10

Sl. No.	Project Number and Title	Project leader	Duration	Remarks
University Research Projects				
1.	NRM/MTP/SAC/2019/001 Status and dynamics of soil nutrients and carbon sequestration potential with organic manures in mulberry growing soil	Dr.R.Rajeswari Asst. Prof. (SS&AC)	Mar. 2019 to Feb. 2022	The project may be continued
2.	CPPS/MTP/SER/2020/001 Development of package of practices for tree type Mulberry	Dr.S.Susikaran, Asst. Prof. (Seri.)	May 2020 to Apr. 2023	The project may be continued
3.	CPPS/MTP/PAT/2020/001 Development of IDM Package for the Management of Root Rot Complex of Mulberry incited by <i>Lasiodiplodia theobromae</i> and <i>Macrophomina phaseolina</i>	Dr.P.Renukadevi Assoc. Prof. (Pl. Patho.)	July 2020 to June 2023	The project may be continued
4.	NRM/MTP/ENS/2020/001 Assessing the carbon sequestration potential of mulberry tree species	Dr.P.Jothimani Asst. Prof. (Env. Sci.) Dr.P.Priyadharshini, Asst. Prof. (Seri.)	Aug. 2020 to July 2022	The project may be continued
5.	NRM/MTP/ENS/SER/2018/001 Standardization of the dose of additives and inoculums for combined seri - waste composting	Dr.P.Jothimani Asst. Prof. (Env. Sci.)	Jul 2018 to Jun 2021	The project may be completed by June, 2021
Core Projects				
6.	CPPS/MTP/SER/2018/CP102 Enhancement of quantitative and qualitative traits in mulberry through mutation breeding	Dr.P.Mangammal Asst. Prof. (Seri.)	Nov. 2018 to Sept. 2020	Completion report submitted
7.	CPPS/MTP/SER/2019/CP155 Application of Amino acids as exogenous modulator for enhancing productivity and quality of raw silk	Dr.K.A.Murugesh Asst. Prof. (Seri.)	Jan. 2019 to Sept. 2020	Completion report submitted

8.	FCRI/MTP/SER/2018/CP042 Effect of probiotics on growth and development of silkworm, <i>Bombyx mori L.</i>	Dr.P.Priyadharshini Asst.Prof. (Seri.)	Sep. 2018 to Sep. 2020	Completion report submitted
9.	CPPS/MTP/SER/2019/CP155 Application of oil cakes and assessment of their impact on mulberry crop and silkworm	Dr.R.Shanmugam Asst. Prof. (Seri.)	Dec. 2018 to Sep. 2020	Completion report submitted
10.	FCRI/MTP/SER/2018/CP043 Evaluation of pharmaceutical properties of sericin	Dr.P.Priyadharshini Asst. Prof. (Seri.)	Sep. 2018 to Sep. 2020	Completion report submitted

D. General Remarks

- Periodical monitoring of pests and diseases of mulberry and silkworm shall be carried out duly following fixed plot and roving survey methods in collaboration with the officials of the State Department of Sericulture.
- Efforts shall be made to document the pathogenicity of the Black Root Rot pathogen, *Lasiodiplodea theobromae* along with its management using effective fungal antagonists in combination with well decomposed silkworm excreta.

E. Action Plan 2021-2022

THEME 1. HOST PLANT PRODUCTION AND MANAGEMENT

Theme Leader: Dr.K.Chozhan, Professor and Head				
Sl. No.	Action Plan / Activity	Name of the Scientist and Centre	Work to be carried out	Deliverables / expected outcomes
	Evaluation of mulberry F1 progenies for growth, yield, abiotic and biotic factors	Dr.P.Mangammal Asst. Prof. (Seri.) Dr.S.Manimegalai Prof. (Agrl. Ento.) Dr.P.Renukadevi Assoc. Prof. (Pl. Patho.)	F1 progenies of mulberry will be evaluated for growth and yield traits. F1 progenies will be screened for tolerance to pests, diseases and abiotic factors	Superior progenies of mulberry for growth, yield, abiotic and biotic stress tolerance will be identified.

2	Nitrogen Use Efficiency studies on mulberry cultivars	Dr.R.Rajeswari Asst. Prof. (SS & AC)	Assessment of leaf yield and quality in mulberry cultivars with different combinations of nitrogen doses. To find out use efficiency of applied nitrogen, response ratio and apparent nitrogen recovery in different mulberry cultivars	Efficient mulberry cultivar for nitrogen will be identified
3	Mini clonal technology for Mulberry Sapling production	Dr.S.Susikaran Asst. Prof. (Seri.)	Standardization of mini clonal technology. Validation of technology under field conditions	Mass production of quality mulberry saplings within shorter duration. Low cost of production

THEME 2. CROP PROTECTION

Theme Leader: Dr.S.Manimegalai, Professor (Entomology)

S. No.	Action plan / Activity	Name of the Scientist and centre	Work to be carried out	Deliverables / expected outcomes
1.	Pest and disease monitoring in Mulberry and Silkworm	Dr.S.Manimegalai Professor (Ag. Ento.) Dr.P.Renukadevi Assoc. Prof. (Pl. Patho.) Dr.R.Shanmugam Asst. Prof. (Seri.)	Documenting pests and diseases of mulberry. Documenting pests and diseases of silkworm through fixed plot and roving survey	To attain knowledge on emerging pests and disease of mulberry and silkworm Information used for developing management strategies and for forewarning.

2.	<i>Trichoderma asperellum</i> augmented with decomposed silkworm excreta for management of Mulberry root rot complex	Dr.R.Shanmugam Asst. Prof. (Seri.) Dr.P.Renukadevi Assoc. Prof. (Pl. Patho.)	Studying the survival of <i>T.asperellum</i> in decomposed silkworm excreta. Evaluating the decomposed silkworm excreta + <i>T. asperellum</i> on leaf yield of mulberry. Evaluating the decomposed silkworm excreta + <i>T. asperellum</i> against mulberry root rot complex under pot culture experiment.	Recycling of silkworm excreta combined with <i>T. asperellum</i> for yield enhancement and disease management
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THEME 3. SILKWORM PRODUCTION AND MANAGEMENT

Theme Leader: Dr.K.Chozhan, Professor and Head				
S. No.	Action plan / Activity	Name of the Scientist and Centre	Work to be carried out	Deliverables / expected outcomes
1.	Enrichment of mulberry leaves with multivitamins for increasing cocoon yield	Dr.K.A.Murugesh Asst. Prof. (Seri.)	Effect of individual vitamins on economic traits of silkworm Effect of multivitamins on economic traits of silkworm	Enhancement of cocoon yield and raw silk quality

THEME 4. VALUE ADDITION IN SERICULTURE

Theme Leader: Dr.S.Manimegalai, Professor (Entomology)				
S. No.	Action plan / Activity	Name of the Scientist and centre	Work to be carried out	Deliverables /expected outcomes
1.	High value food products from mulberry fruits	Dr.P.Priyadharshini Asst. Prof. (Seri.) Dr.G.Gurumeenakshi Assoc. Prof. (FSN) Centre for Post Harvest Technology (AEC & RI) TNAU, Coimbatore.	Value added products viz., jam, squash and jelly will be developed. Extraction of dye from mulberry fruits for food additives. Preparation of dehydrated mulberry fruits.	Mulberry fruit based food products for additional income and employment generation

THEME 5. NON MULBERRY SERICULTURE

Theme Leader: Dr.K.Chozhan, Professor and Head				
SL. No.	Action plan / Activity	Name of the Scientist and centre	Work to be carried out	Deliverables / expected outcomes
1.	Evaluation of Eri ecoraces for its suitability to different zones of Tamil Nadu	Dr.S.Susikaran Asst. Prof. (Seri.)	Screening of different Eri eco races for their suitability to Tamil Nadu conditions. Molecular Characterization for the identified superior eco races will be done. Economic parameters will be studied	Superior eco races for Tamil Nadu conditions will be identified and popularized.

G. REMARKS AND WAY FORWARD BY THE DIRECTOR OF RESEARCH

- Variety release protocol for tree crops needs to be prepared and submitted to the University for approval
- Advanced clones of various tree species need to be tested on a large scale.
- Centre for excellence in Natural Dyes to be proposed by the Department of Forest Biology and Tree Improvement.
- Measures to be taken up for vertebrate pest management.
- Methods of crop production technologies for Tree Mulberry cultivation may be standardized.
- Efforts shall be made to identify and popularize suitable Eri Silkworm races among the seri farmers of Tamil Nadu.
- The available Mulberry germplasm at FC&RI may be documented through QR coding

H. DETAILS OF SCIENTISTS PARTICIPATED IN THE CROP SCIENTIST MEET**I . CONTACT DETAILS OF SCIENTISTS PARTICIPATED IN THE CROP SCIENTIST MEET THROUGH OFFLINE**

S. No.	Name of the Scientist	Mobile No.	E-mail ID
1.	Dr.K.T.Parthiban Dean (Forestry)	8870808289	deanformtp@tnau.ac.in
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3.	Dr.M.P.Divya Professor and Head (FPW)	9486312885	divsara05@yahoo.com
4.	Dr.A.Balasubramanian Professor and Head (S&NRM)	9443505845	balafcri@gmail.com
5.	Dr.K.Chozhan Professor and Head (Seri.)	9443847067	kctnau@yahoo.co.in

6.	Dr.G.Asokan Professor (Agrl. Ento.)	9443498261	asokan.g@tnau.ac.in
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10.	Dr.M.Prasanthrajan Assoc. Prof. (Env. Science)	9842263878	prasanthrajan.m@tnau.ac.in
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18.	Dr.R.Ravi, Asst. Prof. (Forestry)	9942198200	ravig2004@yahoo.co.in
19.	Dr.P.Hemalatha Asst. Prof (Horti)	9786086226	hemahort@yahoo.com
20.	Dr.M.Tilak Asst. Prof. (Agrl. Micro.)	9245246046	mtilakiard@gmail.com
21.	Dr.S.Selvanayaki Asst. Prof (ARM)	9443044190	sselvanayaki@tnau.ac.in
22.	Dr.P S.Devanand Asst. Prof. (PBG)	97894 48194	devps7@yahoo.com
23.	Dr.C.Cynthia Fernandez Asst. Prof. (Agrl. Extn.)	9940903835	cynthia.tnau@gmail.com
24.	Dr.K.Ramah Asst. Prof. (Agronomy)	9894960327	kr74@tnau.ac.in
25.	Dr.S.Manimegalai Professor (Agrl. Ento.)	9487550446	manimegalaiento@gmail.com
26.	Dr.P.Renukadevi Assoc. Prof. (Pl. Patho.)	8826860327	renucbe88@gamil.com
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