

TAMIL NADU AGRICULTURAL UNIVERSITY

**PROCEEDINGS OF 32nd FORESTRY AND 13th SERICULTURE
SCIENTISTS' MEET 2022**

(Date: 02.09.2022)

LEAD CENTRE

**Forest College and Research Institute
Tamil Nadu Agricultural University
Mettupalayam-641301**

**DIRECTORATE OF RESEARCH
TAMIL NADU AGRICULTURAL UNIVERSITY
COIMBATORE - 641 003**

2022

PROCEEDINGS

32nd FORESTRY AND 13th SERICULTURE SCIENTISTS' MEET 2022 (02nd September, 2022)

The 32nd Forestry and 13th Sericulture Scientists' Meet was held on 02.09.2022 at the Committee Room, Directorate of Research, TNAU, Coimbatore.

Dr. M. Raveendran, Ph.D., Director of Research, TNAU, Coimbatore welcomed the gathering and presented researchable issues on Forestry and Sericulture. He highlighted the percent contribution of Forestry to GDP in comparison with that of agricultural produce and dairy products. While highlighting the lesser contribution of Forestry to GDP, he emphasized the Forestry Scientists to prioritize research activities towards that direction. He also stressed the Scientists to take necessary steps to popularize our released varieties in Forestry and Sericulture. He had suggested conducting brainstorming among the Scientists to identify researchable issues and challenges to reorient the research programme. He had also suggested bringing the waste and barren lands of Tamil Nadu under cultivation with forest trees and to give a suitable recommendation to the Government.

Dr.K.T. Parthiban, Dean (Forestry) presented the overview of Forestry and Sericulture Research. He had presented the results of genetic improvements made in *Eucalyptus*, *Jatropha* and Silk cotton besides highlighting the special features of advanced entries. He had presented advancements made in mini clonal nursery, value addition in *Lantana camera* and micro forest.

The action taken report on the recommendations of 31st Forestry and 12th Sericulture Scientists meet, research highlights and action plan for 2022-23 of the departments were presented by **Dr.K. Kumaran**, Professor and Head (Forest Biology and Tree Improvement), **Dr.S. Radhakrishnan**, Professor and Head (Silviculture & NRM), **Dr.M. Muruges**, Professor and Head (Agroforestry), **Dr.M.P. Divya**, Professor and Head (Forest Products and Wildlife) and **Dr.S. Manimegalai**, Professor and Head (Sericulture).

The Director of Research expressed his general remarks and way forward on forestry and sericulture research and ended with vote of thanks by **Dr. S. Selvanayagi**, Research Coordinator of Forest College and Research Institute, Mettupalayam.

The proceedings of 32nd Forestry and 13th Sericulture Scientists' Meet are furnished under the following headings for individual departments.

- A. Decisions made on OFT**
- B. Technology for Adoption / Information**
- C. Remarks on the ongoing University Research projects /Core Projects/ AICRP / Externally funded projects**
- D. Action Plan 2022-2023**
- E. Remarks**
- F. List of Participants**

DEPARTMENT OF FOREST BIOLOGY AND TREE IMPROVEMENT

A. ON FARM TRIAL

1. Annatto (*Bixa orellana*) – TNBi 20

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

S. No	Plus Tree	Parentage	Seed yield (t/acre)	Bixin Content (%)	Duration	% Increase over population mean (t/acre)	Special features
1.	TNBi 20	Selection	0.90	3.21	Perennial	136.36	High yield High Bixin Wide adoption

Centres: Farmer's Field

Experimental Details

Spacing: 3 x 3m

Area : 50 cents/1 acre

Observations to be recorded

- a) Height (m)
- b) Basal diameter (cm)
- c) No. of branches
- d) Fruit yield (kg)
- e) Seed Yield per tree (kg)
- f) Bixin content (%)

2. Neem (*Azadirachta indica*)

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

S. No.	Genotype	Parentage	Azadirachtin Content (%)	Special features
1.	TNMTP 72	Selection	1.12	High Aza content
2.	TNMTP 87	Selection	1.01	

Centers: MLT will be conducted at FC&RI, Mettupalayam and Coromandel industrial plantation sites at Pathamadai, Sivagangai &Thiyagavalli.

Experimental Details

Spacing: 4 x 4m

Area : 50 cents

Observations to be recorded

- a) Height (m)
 - b) Basal diameter (cm)
 - c) No. of branches
 - d) Fruit weight (kg)
 - e) Seed Yield per tree (kg)
 - f) Oil content (%)
 - g) Aza content (%)
- } 3 rd year after planting

2. Pillipesera (*Vigna trilobata*)

(Scientists-in-charge: Dr.S. Vennila)

S. No.	Genotype	Parentage	Seed yield (q/ha)	Green Biomass yield (q/ha)	Special features
1.	IC 550543	Selection	2.0	152.67	High seed yield coupled with green biomass
2.	IC 553517	Selection	1.9	138.00	

Centers: 1. KVK, Karamadai, Coimbatore

2. KVK, Kulithalai, Karur

3. KVK, Gandhigram, Dindigul

4. KVK, AC & RI, Madurai

5. KVK, Udayarpalayam, Ariyalur

6. KVK, Karaikal, Pudhucherry

Experimental details

- Design RBD
- No of Replication 3
- No of Rows 8 (4 each for seed & fodder yield)
- Spacing 30 x 10 cm

Observation to be recorded

Plant Height(cm), No. of branches / Plant, Days to 50 % Flowering, No. of pods/plant, Pod length (cm), No. of Seeds /Pods, 1000 seed weight(g), Days to 80% maturity, Plant stand at harvest, Green biomass yield (q/ha) and Seed yield (q /ha).

B. FOR INFORMATION

1. Assemblage of High Aza Neem Plus Trees during 2021-2022

Following four plus trees in neem with high *Azadirachtin* were identified during 2021-22 (Aza content in the parenthesis)

- ✓ TNMTP 72 (1.12%)

- ✓ TNMTP 87 (1.01%)
- ✓ TSMLG 29 (1.05%)
- ✓ TSMLG 36 (1.04%)

So far 175 neem trees representing Tamil Nadu, Karnataka and Telangana were screened and 40 high Aza Neem plus trees were assembled in the progeny evaluation trial.

2. Dye Extraction Protocol for *Hibiscus sabdariffa* Bracts/Calyx and *Terminalia chebula* fruits

The dye extraction protocol for *Hibiscus sabdariffa* Bracts/Calyx and *Terminalia chebula* fruits were standardized. The maximum extraction was observed with 1:30 matter to liquor ratio at a temperature of 60°C for 60 minutes.

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

Department	Centre	URP	AICRP	External Funded Project	Total
Forest Biology and Tree Improvement	FC&RI	2	1	2	5

S. No.	Project Number and Title	Name and Designation of the Project leader	Duration	Remarks
University Research Project				
1	CPMB/FC&RI/MTP/FOR/2021/001 Biochemical Profiling of Eco friendly Natural Dye from Roselle (<i>Hibiscus sabdariffa</i> L.) and Kadukkai (<i>Terminalia chebula</i>) for Industrial Applications	Dr.P. Radha Asst. Prof. (Biochemistry)	May, 2021 to April, 2023	To be continued

2	FCRI/MTP/FOR/2021/003 Evaluation of genetic resources of <i>Anogeissus latifolia</i> as a source of Natural dye	Dr.S.Vennila Asst. Prof. (Forestry)	May, 2021 to April, 2023	As seed germination was an issue in this species, assemblage of genetic resources could not be done. Hence this project may be closed and a new URP can be proposed to standardize clonal propagation protocol for the same species
Externally funded / ICAR Project				
1.	Enhancing seed yield in neem (<i>Azadirachta indica</i> A.Juss.) through breeding and precision silvicultural approaches	Dr.K.Kumaran Prof & Head (DFBT)	2022-2025	Continuation of the previous project. MoA signed and ASO to be obtained
2.	DST/AEC/KUM/2018/R008 – Development of Technologies for Extraction and Dormancy Reduction of Teak Seeds	Dr. P. Masilamani Professor (SST)	Aug 2018 to Dec 2021	Project may be completed
3.	AICRP/FOR/MTP/FOR/002 AICRP on Potential Crops	Dr.S.Vennila Asst. Prof. (Forestry)	Since 1982	To be continued

D. ACTION PLAN (2022 - 2023)

Theme 1: Genetic Improvement and Varietal Development in prioritized tree species			
Theme leader	Dr.K. Kumaran, Professor and Head		
Theme Activity	Name of the Scientist and centre	Works to be carried out	Deliverable/ expected outcome
Promotion of genetically improved natural dye yielding species	Dr.K.Kumaran Professor & Head Dr.S.Vennila Asst. Prof. (For) Dr.P.Kumar Asst. Prof. (For) Dr. P. Radha Asst. Prof.(Bioche.) Dr.P.S.Devanand Asst.Prof. (PBG)	Germplasm collection, assemblage and Evaluation <ul style="list-style-type: none"> • <i>Bixa orellana</i> • <i>Sapindus emarginatus</i> • <i>Anogeissus latifolia</i> • <i>Indigofera tinctoria</i> • <i>Aegle marmelos</i> • Collection and Assemblage of 75 	Superior genotypes with high dyecontent

		dye yielding species	
Identification and promotion of superior genetic resources of Tree Borne Oil Seeds	Dr.K.Kumaran, Professor & Head Dr.S.Vennila, Asst. Prof. (For)	<ul style="list-style-type: none"> • Further Assemblage of neem plus trees and promotion of contract farming • Screening of <i>Simarouba glauca</i> genetic resources for oil 	Screening of superior genotype with high oil content

Theme 2: Tree Seed Management			
Theme leader	Dr. P. Nelson Navamaniraj Asst. Prof. (ST)		
Theme Activity	Name of the Scientist and centre	Works to be carried out	Deliverable/ expected outcome
Development of tree certification standards and seed maturation studies for prioritized species	Dr. P.Nelson Navamaniraj Asst. Prof. (ST)	Developing seed testing standards <ul style="list-style-type: none"> • <i>Bixa orellana</i> • <i>Azadirachta indica</i> • <i>Terminalia chebula</i> • <i>Sapindus emarginatus</i> • <i>Indigofera tinctoria</i> • <i>Simarouba glauca</i> Studies on increasing the shelf life of Neem for oil and aza content	Seed testing standards for prioritized tree species

Theme 3: Ex-situ Conservation			
Theme leader	Dr.S.Vennila, Asst. Prof. (For)		
Theme Activity	Name of the Scientist and centre	Works to be carried out	Deliverable/ expected outcome
<i>Ex-situ</i> conservation of rare and endangered species of Southern India	Dr.S.Vennila, Asst. Prof. (For) Dr.K.Kumaran, Professor & Head	<ul style="list-style-type: none"> • Further assemblage and Characterization of rare and endangered species 	Conserve the rare and endangered species

DEPARTMENT OF SILVICULTURE AND NRM

A. ON FARM TRIAL

1. Gum Tapping in *Moringa*

(Scientists in charge: Dr.A. Balasubramanian, Dr. S. Radhakrishnan and Dr.M. Sivaprakash)

Experimental details

Diameter classes :60-90 cm
Treatments :Hand drilling with ½ inch drill + 4 ml gum inducer application - patching with moistened clay.
Replications : 3 (Three)
Experimental design : Randomized Block Design (RBD)
Observations to be recorded: Tree biometric parameters, physical observation on tree health
Gum yield on monthly basis

2 Gum Tapping in *Lannea coromendalica*

(Scientists in charge: Dr.A. Balasubramanian, Dr. S. Radhakrishnan and Dr. M. Sivaprakash)

Experimental details

Diameter classes : Above 50 cm
Treatments : Hand drilling with 4 ml gum inducer

Replications : 3 (Three)
Experimental design: Randomized Block Design (RBD)
Observations to be recorded: Tree biometric parameters, physical observation on tree health
Gum yield on monthly basis

1)Multilocational testing of teak genetic resources(Continuation of the previous year work)

(Scientists in charge: Dr.A. Balasubramanian, Dr. S. Radhakrishnan and Dr. M. Sivaprakash Dr.G. Asokan, Dr.C. Ushamalini)

Experimental details

Spacing 3m x 3m
Treatments (Teak sources) T₁ - Topslip (Tamil Nadu)
T₂ - Nilambur (Kerala)
T₃ - Shivamoga (Karnataka)
T₄ - Visakapattinam (Andhra Pradesh)
T₅ – Baroda (Gujarat)
T₆ - Lanka (Assam)
T₇ - Bhavanipatna (Odisha)
T₈ - Hakimpada (Odisha)
T₉ - 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
- Southern Zone : Farmer filed at Madurai or Virudhunagar district.
- North Western Zone: Farmer's field at Krishnagiri or Dharmapuri district.

- Cauvery Delta Zone : AC&RI, Eachangkottai (or) Farmer's field at Trichy or Pudukottai or Tanjore district

B) TECHNOLOGY FOR INFORMATION AND ADOPTION FOR ADOPTION

1. Teak fertigation for early growth stage (Upto two years)

(Scientists in charge: Dr.A.Balasubramanian, Dr. S. Radhakrishnan, Dr. M. Sivaprakash and Dr.K.Ramah)

- Irrigation level of 100 % PE and fertilizer level of 187:125:125(N: P: K) kg/hectare recommended up to two years of growth.
- Growth estimate (18 MAT)
Tree height - 4.18 m
Girth at Breast Height - 39.70 cm.



FOR INFORMATION

1. Enterolobium – A new tree species for fodder

(Scientists in charge: Dr.A.Balasubramanian, Dr. S. Radhakrishnan and Dr. M. Sivaprakash)

Enterolobium cyclocarpum is a fast growing leguminous multipurpose tree. The fodder utility of this species is tested under field and laboratory conditions and the fodder suitability studies were carried out.

Proximate analysis of leaf and pod of *Enterolobium cyclocarpum* (g/100 g DM)

Parameters	Mature leaf	Young leaf	Pod
Dry matter (%)	39.08	29.80	83.23
Crude protein (%)	17.50	14.44	9.19
Crude fibre (%)	11.50	4.00	11.00
Crude fat (%)	7.33	6.00	6.33



Leaf biomass yield in two years old *Enterolobium cyclocarpum* plantation

Pollarding height	Leaf biomass (kg/tree)	
	30 DAP	60 DAP
Pollarding at 4 ft height	3.52 ^a	6.92 ^a
Control	1.01 ^d	3.06 ^b

Leaf fodder yield: 29.30 t/acre/year



2. Insect parasitization in Farm grown trees

The following insect parasites were documented in teak, pungam and kadam plantation and the parasitization level varied between 20 % and 70 %

S. No.	Host	Pest	Natural parasites
1	Teak	Skeletonizer, <i>Eutectona machaeralis</i>	<i>Sturmiopsis</i> sp.
2		Defoliator, <i>Hyblaea puera</i>	<i>Sturmiopsis</i> sp. <i>Apanteles</i> sp
3		Aphids	<i>Chrysoperla cornea</i>
4	Pungam	Skipper, <i>Pelopidas mathias</i>	<i>Sturmiopsis</i> sp.
		Webber, <i>Crocidolomia binotalis</i>	<i>Bracon</i> sp.
5	Kadam	Citrus butterfly, <i>Nerium Sphinx</i>	<i>Apanteles</i> sp.

3. Air Pollution Tolerance Index (APTI) of tree species

Tree species were screened for air pollution abatement based on air pollution tolerance index and the trees were grouped based on their tolerance level.

Highly tolerant Species	Tolerant species	Moderately tolerant species
<i>Ficus religiosa</i> APTI 30.55	<i>Polyalthia longifolia</i> APTI 25.80	<i>Aegle marmelos</i> APTI 15.94
	<i>Pithecellobium dulce</i> APTI 19.17	<i>Syzygium samarangense</i> APTI 14.21

	<i>Albizia saman</i> APTI 18.36	<i>Artocarpus heterophyllus</i> APTI 12.76
	<i>Thespesia populnea</i> APTI 17.15	

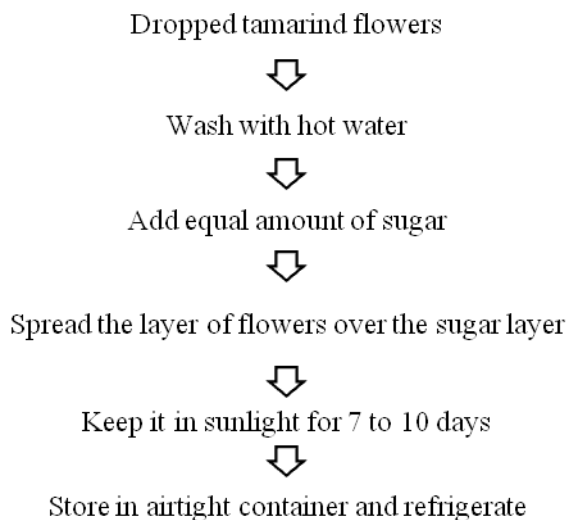
4. Value added products in Tamarind

Tamarind plantations experiences heavy natural dropping of flowers and fruits at immature stages. In order to effectively utilize those fallen flowers/fruits, value added products were developed. Tamarind pickle was made from immature pods and gulkand was prepared from fallen flowers.

A. Tamarind pickle



B. Tamarind Flower gulkand



C. REMARKS ON THE ONGOING UNIVERSITY RESEARCH PROJECTS / EXTERNAL FUNDED PROJECTS

Department	University Research Projects	External Funded Projects	Total
Silviculture and Natural Resource Management	7	5	12

S. No	Project No. and Title	Project Leader	Period	Remarks
University research Projects				
1.	CPPS/MTP/ENT/2020/02 Biodiversity studies on Oribatid mites (<i>Crypto stigmatids</i>) in districts of Tamil Nadu, utilization for decomposition of farm waste and bio agent tool	Dr.G.Asokan Professor (Agrl. Entomology)	Apr. 2020 to Mar. 2023	Project may be closed
2.	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 (Agrl. Entomology)	Aug. 2019 to Mar. 2022	Project may be closed
3.	CPPS/MTP/ENT/2020/01 Documentation of bee flora and foraging behaviour of <i>Apis cerana indica</i> f. and <i>Apis mellifera</i> l. (Hym: Apidae) in Mettupalayam area	Dr. G.Asokan (Agrl. Entomology)	Aug. 2019 to Mar. 2022	Project may be closed
4.	CPPS/MTP/PAT/2020/002 Development of management practices for the nursery diseases of forest trees (teak and sandal)	Dr.C.Ushamalini Assoc. Professor (Pl. Pathology)	Oct. 2020 to Sep. 2022	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. Professor (Forestry)	Feb. 2021 to Dec. 2023	Project may be continued
6.	URP 2022-0030: FOR/MTP/SIL/FOR/2022/ 001 Standardizing precision silvicultural techniques for <i>Enterolobium cyclocarpum</i> clones for multiple utility.	Dr.M.Sivaprakash Asst. Prof. (Forestry)	Apr. 2022 to Mar. 2025	Project may be continued
7.	FCRI/MTP/FOR/2021/003 Effect of spacing regimes on growth and yield of <i>Enterolobium cyclocarpum</i>	PI: Dr.B.Sivakumar, Asst. Professor (For), AC&RI, Tiruvannamalai Co-PI:	Apr. 2021 to Mar. 2024	Project may be continued

		Dr.M.Sivaprakash Asst. Professor (For.)		
External funded projects				
1	IINRG/FC&RI/MTP/DOS/2014/R002 Network project on "Harvesting, processing and value addition of Natural resins and gums".	Dr.A.Balasubramanian Professor (Forestry)	Apr.2020 to Mar.2022	Project may be continued
2	ICFRE/FCRI/MTP/DOS/2020/R001. Silvicultural interventions for productivity enhancement and carbon sequestration in plantations of important tree species.	Dr.A.Balasubramanian Professor (Forestry)	Mar. 2020 to Dec. 2025	Project may be continued
3	PPV/FOR/MTP/SIL/2009. DUS test centre for Neem, Karanj & <i>Jatropha</i> under PPV & FR Authority at FC&RI, TNAU, Mettupalayam	Dr.A.Balasubramanian Professor (Forestry)	Apr. 2020 to Jul.2023	Project may be continued
4	ICFRE/FCRI/MTP/DOS/2020/R002 Tamarind domestication, conservation and deployment of genetic resources for sustenance and livelihood amelioration.	Dr.A.Balasubramanian Professor (Forestry)	Mar. 2020 to Dec. 2025	Project may be continued
5	TNFD/KVK/TPR/NEM/2021/001 Development of Integrated Nematode Management Package for Agroforestry/ Agri-Silvicultural Systems in Tamil Nadu	Dr. P.G.Kavitha Assistant Prof. (Nem.)	March 2021-Feb 2023	Project may be continued

D. ACTION PLAN (2022 – 23):

Theme 1: Silviculture for Production				
Theme leader: Dr. A.Balasubramanian, Professor (Forestry), Dept. of Silviculture & NRM				
Sl. No.	Action Plan/ Activity	Name of the Scientist(s)	Observations to be recorded	Deliverable/ Expected Outcome
1	Precision silvicultural techniques for farm grown trees	Dr.A.Balasubramanian Dr.S.Radhakrishnan Dr.M.Sivaprakash Dr.K.R.Ramesh Dr.G.Asokan Dr.C.Ushamalini Centre: FC&RI, MTP Dr.B.Sivakumar Centre: AC&RI, Vazhavachanur	<u>Mandatory crops</u> <ul style="list-style-type: none"> • Teak • Enterolobium • <i>Melia dubia</i> • Sandal • Redsanders • Tamarind ✓ Scheduling of irrigation and nutrient ✓ Assessment of growth biometry ✓ Monitoring and management of pest and Diseases	Precision silviculture techniques for the mandatory crops will be developed to meet the farmers/Tree growers requirements

			✓ High density tamarind planting technique	
2	Silviculture for sustainable production of gums from lesser known tree gum yielding trees of Tamil Nadu	Dr.A.Balasubramanian Dr.S.Radhakrishnan Dr.M.Sivaprakash Dr.C.Ushamalini Centre: FC&RI, MTP	Establishing tree gum garden Growth assessment of trees Standardization of gum tapping techniques Studying the secondary infection	Potential for lesser-known gum yielding trees of regional importance will be explored
3	Growth and Yield assessment of farm grown trees	Dr.A.Balasubramanian Dr.S.Radhakrishnan Dr.M.Sivaprakash Dr.C.Ushamalini	<u>Mandatory species</u> <ul style="list-style-type: none"> • Teak • Melia • Sandal • Redsanders Estimation of Growth biometry of farm grown trees in different agro climatic zones of Tamil Nadu Assessment of wood quality parameters	Agro climatic influence on growth and yield of farm grown trees will be assessed
4	Technology transfer and multi locational testing of precision technologies	Dr. A.Balasubramanian Dr. M.Sivaprakash Dr.S.Radhakrishnan Dr.K.R.Ramesh Centre: FC&RI, MTP Dr. B.Sivakumar Centre: AC&RI, Valavachanur	Transfer of precision tree farming techniques Testing of technologies through MLTs in farmers field Conducting trainings and demonstrations	Precision silvicultural techniques developed will be transferred to farmers through training and demonstration.

Theme 2: Silviculture for greening

Theme leader: Dr. S. Radhakrishnan, Professor & Head (Dept. of Silviculture & NRM)

S. No.	Action Plan/ Activity	Name of the Scientist(s)	Observations to be recorded	Deliverable/ Expected Outcome
1.	Reforestation of degraded forest	Dr.S.Radhakrishnan Dr.K.R.Ramesh Centre: FC&RI, MTP	Floral enrichment through Massive Tree planting Biodiversity estimation Documentation of invasive species	Degraded forest will be restored through massive tree planting
2.	Protection of tree varieties in Neem, Pungam and Jatropa through PPFRA regulations	Dr. A.Balasubramanian Dr. S.Radhakrishnan Dr. M.Sivaprakash Centre: FC&RI, MTP	Recording DUS descriptors for the varieties filed by PPFRA Conducting DUS test for the mandatory crops Inviting applications for varietal registration	DUS testing will be done based on PPFRA regulation for the mandatory crops

3.	Strategies for evolving climate forest	Dr.A.Balasubramanian Dr. S. Radhakrishnan Dr. M. Sivaprakash Dr.K.R.Ramesh	Developing planting design Promoting planting of indigenous trees from major forest types of TN Sensitizing stake holders for developing climate forest	Climate resilient dense forest will be created and demonstrated to stake holders for up scaling
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DEPARTMENT OF AGROFORESTRY

A. MLT/OFT

i. Multi Location Trial:

1. Sodicity Tolerant Clones of *Casuarina junghuhniana*

- Initial sodicity tolerant clonal screening studies were conducted at ADAC & RI, Trichy from 2016 - 2019
- MLT will be conducted in Madurai, Trichy, Thanjavur & Ramanathapuram (2022 -2024)

Particulars	Mean tree height (m)	Mean tree girth cm)	Wood Yield in tha^{-1} (3 years)	Wood Yield in tha^{-1} (5 years)
CJ 3	6.87	38.25	60	130
CJ 18	7.75	31.25	70	145

ii. On Farm Trial:

1. *Ceiba pentandra*: Superior phenotype **CP 29** (more pods and high floss yield)

Parameter	CPT CP 29 yield traits
CPT No. of pods/tree	2000
Pod diameter (cm)	5.70
Pod length (cm)	42.80
Pod total weight(g)	122.62
CPT Floss wt/pod (g)	22.80 (43% higher than mean 30 CPTs)
CPT Floss wt/tree(kg)	45.60 (61 % higher than mean 30 CPTs)
Floss Yield /Ha	9302 Kg/204 trees (7x7 m)

B. TECHNOLOGY FOR ADOPTION /INFORMATION

i. FOR ADOPTION

1. Wedge grafting in Kapok (*Ceiba pentandra*) for multiplication of high floss yielding phenotype

- *C. pentandara* is being grown as a least managed profitable crop in arid and semiarid areas by the farmers. The primary produce is floss which is obtained from pods .The wood is used in match wood and plywood Industries.
- The standardized vegetative propagation using soft wood cutting success has been reported 50-60 % with lack of taproot. (Rajendran *et al*/2000).
- Since it is cross-pollinated crop and have low seed viability, the standardization of vegetative propagation for multiplication and supply of high floss yielding clones with tap root system is important since the rotation of Kapok is 30-40 years
- **OFT was conducted at Horticultural College & Research Institute, Periyakulam**

Root stock: <ul style="list-style-type: none"> • 6 months old • Thickness : 1-1.5 cm diameter • Root stock height (cm): 10 	Scion: <ul style="list-style-type: none"> • Tender Apical shoots • Length - 10,20,30 cm • 1-1.5 cm diameter
Method of grafting: <ul style="list-style-type: none"> • Wedge grafting • Grafting success :100 % • Age of grafts for field planting: 3-4 months • Scion height growth increment: 15cm in 3 months • Graft union is good and Low Cost 	Field Performance at 8 MAP: <ul style="list-style-type: none"> • Mean height:2.24 m • Mean girth :26.30 cm • Mean no. of branches :10

ii. FOR INFORMATION

1. **Tree-crop combination:** Red sanders + Cowpea

- Maximum grain yield under Red sanders – Cowpea var. CoCP 7 (1.36 t ha⁻¹)

2. **Tree-crop combination:** *Melia dubia* + Clusterbean

- Cluster bean (var. MDU 1) yield was higher under 3 years old *Melia dubia* (10.15 t ha⁻¹) when compared with 6 years old *Melia dubia* plantation (7.10 t ha⁻¹)

C. **REMARKS ON THE ONGOING UNIVERSITY RESEARCH PROJECTS, ICAR-AICRP AND EXTERNALLY FUNDED SCHEMES**

Department	Centre	URP	ICAR-AICRP	External Funded Project	Total
Agro-Forestry	FC&RI	11	1	6	18

S. No.	Project No. and Title	Project Leader	Duration	Remarks
University Research Projects				

1.	FC&RI/PKM/FOR/2020/001- Progeny Evaluation in Kapok (<i>Ceiba pentandra</i> (L.) Gaertn.)	Dr.M.Murugesh Prof. and Head (Agroforestry)	May 2019 to March 2024	Project to be continued
2.	FCRI/KDM/FOR/2016/001 Progeny Evaluation for Higher Productivity in <i>Albizia lebbek</i> L. (Benth.) for Dry Land Agroforestry System	Dr. P. Rajendran Professor (Forestry)	July 2016 to July 2021	Project may be extended upto March, 2023
3.	FCRI/KKM/FOR/2019/002 Identification of suitable pulse crop for Red Sanders based agroforestry system	Dr.P.Kumar Asst. Prof. (Forestry)	Sep. 2019 to Sep.2021	Project to be closed and completion report may be submitted
4.	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	Project to be continued
5.	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	Project may be extended upto March, 2023
6.	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	Project to be continued
7.	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	Project to be closed and completion report may be submitted
8.	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	Project to be closed and completion report may be submitted
9.	FCRI/YCD/FOR/2020/001 Introduction and evaluation of alternate industrial wood species for coffee based agroforestry system	Dr.M.Kiruba Assistant Professor (Forestry)	Jan. 2021to Dec 2025	Project may be continued
10.	FC&RI / PKM / FOR / 2020 / 001- Progeny Evaluation in Kapok (<i>Ceiba pentandra</i> (L.) Gaertn.)	Dr. M. Murugesh Professor and Head (Agroforestry)	May 2019 to March 2024	Project may be continued

11.	FCRI/KKM/FOR/2019/001 Study of compatible host plant for sandalwood cultivation	Dr.P.Kumar, Ph.D., Assistant Professor (Forestry)	September 2019 to September, 2022	The study may be continued to screen suitable host plant for commercial cultivation
ICAR-AICRP on Agroforestry				
1.	AICRP/FOR/MTP/FOR/001 Assemblage of germplasm in <i>Ceiba pentandra</i> and <i>Melia dubia</i> Scheduled Caste Sub Plan (SCSP)	Dr.R.Jude Sudhagar Assoc. Prof. (Forestry) Dr.K.Ramah Asst. Prof. (Agron.)	Continuous project since 1983	Project to be continued
EXTERNALFUNDED PROJECTS				
1.	CPL/FCRI/MTP/AGF/2017/R005 Improvement, Characterization and Utilization of tree species amenable for Composite Wood Technology (CWT)	<u>PI:</u> Dr.K.T.Parthiban <u>Co-PI:</u> Dr. C. Cinthia Fernandaz Dr.R.Jude Sudhagar	Apr 2017 to Mar 2022	The clones identified in various species amenable for composite wood may be advanced to variety release
2.	DBT – JAT/FCRI/MTP/AGF/2009/R009 Breeding and Management of <i>Jatropha</i> Hybrid Genetic resources	<u>PI:</u> Dr.K.T.Parthiban <u>Co-PI:</u> Dr. C. Cinthia Fernandaz Dr. M. Umadevi	Apr 2019 to Mar 2022	The clones of <i>Jatropha</i> hybrids may be maintained and advanced for further evaluation. The project may be closed and new proposal may be submitted for continuing the work.
3.	TNPL/FCRI/MTP/AGF/2020/R003 Improvement, Wood Quality Characterization and Utilization of pulpwood genetic resources amenable for Agroforestry	<u>PI:</u> Dr.K.T.Parthiban <u>Co-PI:</u> Dr. C. Cinthia Fernandaz Dr. S. Umesh Kanna Dr.R.JudeSudhagar	Jan 2020 to Dec 2025	Project to be continued
4.	TNSLURB/HCRI/PKM/DFL/2022/R002 Multiplication and Popularization of High Density Short Rotation (HDSR) Saline/Sodicitytolerant	<u>PI:</u> Dr. M.Murugesh <u>Co-PI:</u> Dr.K.M.Chellamuthu	2021-2024	Project to be continued

	<i>Casuarinajunghuhniana</i> clones through On Farm Trials/ Multi-Location Trials in Tamil Nadu			
5.	CIAF/FCRI/MTP/AGF/2016/R004 Consortium of Industrial Agroforestry (CIAF)	<u>PI:</u> Dr.K.T.Parthiban <u>Co-PI:</u> Dr. I. Sekar Dr. S. Umesh Kanna Dr.R.JudeSudhagar Dr. C. Cinthia Fernandaz	Since April 2015	Project to be continued
6.	TNFD/AECRI/CBE/FPE/2021/001 Development of PGPR microbial consortium for healthy seedling production in <i>Melia dubia</i>	Dr. G. Thangamani Asst. Prof. (Micro)	Jan. 2021 to Feb. 2023	Work is in progress. The project may be continued.

D. ACTION PLAN (2022 - 2023)

Theme I: Establishing economically viable new Agroforestry models to meet the Wood, Food and Fodder demand

Theme Leader: Dr. Dr.M.Muruges, Professor & Head (Agroforestry)

S. No.	Action Plan	Name of the Scientist and centre	Works to be carried out	Deliverable/ expected outcome
1.	Popularization of developed agroforestry models	Dr. R.Jude Sudhagar Assoc. Prof. (Forestry) Centre: FC&RI	Popularization of developed Multi Functional Agroforestry Model	Establishing MFAF –in one new location
2a.	New Agrisilviculture model	Dr.K.Ramah Asst. Prof. (Agron.) Centre: FC&RI	<i>Gmelina arborea</i> + TNAU released / recommended Oil seeds / Pulse Crops	<i>G. arborea</i> is short rotation timber tree. High yielding intercrops increase the productivity and economy of dry land farmers with available water source
2b.	Developing nutrient enriched animal feed formulations using identified superior tree fodder, grass fodder, legume fodder, oil cakes, and minerals with standards.	Dr.K.Ramah Asst. Prof. (Agron.) Centre: FC&RI	Palatability of fodder pellets will be assessed and economics of pellet replacement in regular concentrated feed will be estimated	Promotion of tree fodder based cattle feed to the farmers/ Cattle feed preparation industry

2c.	New Silvifloriculture model	Dr.P.Hemalatha Asst. Prof. (Hort.) Centre: FC&RI	<i>Gmelina arborea</i> + <i>Magnolia champaca</i> + <i>Jasminum grandiflorum</i>	Timber and perennial Flower source to the dry land farmers with available water source
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Theme II. Development of High Yielding Short Rotation Clones/ Progenies

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

S. No.	Action Plan	Name of the Scientist and centre	Works to be carried out	Deliverable/ expected outcome
1.	<i>Casuarina junghuhniana</i> (STC), Kapok, <i>Gmelina arborea</i>	Dr.M.Murugesh Centre: FC&RI	Initial screening / Screened superior phenotypes through OFT / MLT	Growth and adaptability studies for future progress
2.	Kapok, <i>Ailanthus excelsa</i>	Dr. R.JudeSudhagar Centre: FC&RI	Initial screening / Screened superior phenotypes through OFT / MLT	Growth and adaptability studies for future progress
3.	<i>Albizia lebeck</i>	Dr.P.Rajendran Centre: FC&RI	Initial screening / Screened superior phenotypes through OFT / MLT	Growth and adaptability studies for future progress

Theme III: Establishing Seedling Seed Orchard and Clonal Seed Orchard of important agroforestry tree species

Theme leader: Dr. M.Murugesh, Professor and Head (Agroforestry)

S. No.	Action Plan	Name of the Scientist and centre	Works to be carried out	Deliverable/ expected outcome
1.	Kapok and <i>Gmelina arborea</i>	Dr.M.Murugesh Prof. & Head (Agroforestry) Centre: FC&RI	Screened / Selection and assemblage – Seed progeny and ramets	Growth studies for selecting superior genotype
2.	<i>Ailanthus excelsa</i>	Dr. R.JudeSudhagar Assoc. Prof. (Forestry) Centre: FC&RI	Screened superior phenotypes assemblage	Growth studies for selecting superior genotype
3.	<i>Albizia lebeck</i>	Dr.P.Rajendran Prof. (Forestry) Centre: FC&RI	Screened superior phenotypes assemblage	Growth studies for selecting superior genotype
4.	Fodder trees	Dr.K.Ramah Asst. Prof. (Agron.) Centre: FC&RI	Assemblage of screened high protein / Crude Fibre trees	For seed / cutting collection and supply to the Farmers and other stake holders

Theme IV: Quantification of Environmental Services of Agroforestry

Theme Leader: Dr. M.Murugesh, Professor and Head (Agroforestry)

S. No.	Action Plan	Name of the Scientist and centre	Works to be carried out	Deliverable/ expected outcome
1.	Assessment of carbon sequestration potential of important agroforestry trees	Dr.P.Boominathan, Assoc. Prof. (Crop Physiol.)	Physiological parameters, Carbon content assessment/Carbon sequestration of <i>Gmelina arborea</i> / <i>Swietenia macrophylla</i> /Teak/ Kapok/ Melia	High carbon sequestration trees in agroforestry system will be recommended to farmers for carbon trading
2.	Assessment of soil beneficial microorganisms under important agroforestry Systems	Dr.M.Tilak Asst. Prof (Ag. Microb.) Centre: FC&RI	Studies on soil enzymes under different agroforestry systems Quantification of R:S ratio under different agroforestry systems	To establish relationship between soil enzymatic activities and microbial population

ThemeV: Augmenting the value chain system through Consortium

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

S. No.	Action Plan	Name of the Scientist and centre	Works to be carried out	Deliverable/ expected outcome
1.	Economic analysis of agroforestry models, Developing new agroforestry business based models for creating entrepreneurship opportunity, Conducting outreach programmes of agroforestry through trainings, workshops, seminars, symposium, Media through ICT/TOT	Dr.M.Murugesh, Dr.R.JudeSudhagar, Dr.P.Rajendran, Dr.P.Hemalatha, Dr.K.Ramah, Dr.P.Boominathan, Dr.M.Tilak Centre: FC&RI	<ul style="list-style-type: none"> • Identification of stakeholders and linking through Consortium of Industrial Agroforestry and Mettupalayam Agroforestry Business Incubator Forum • Utilization of ICT /IOT tools for linking various stakeholders • Periodic conduct of trainings/seminars/workshops for promotion of Agroforestry 	<ul style="list-style-type: none"> • Establishment of viable and sustainable Agroforestry based business enterprises • Transfer of Agroforestry Technologies

B. TECHNOLOGY FOR ADOPTION / INFORMATION

FOR ADOPTION

1. Identification and promotion of high nutritive native fodder in Coimbatore Elephant Reserve

The following 10 grass fodder species viz., *Cynodon dactylon*, *Chrysopogon aciculatus*, *Dichanthium aristatum*, *Enteropogon monostachyus*, *Heteropogon contortus*, *Hyparrhenia hirta*, *Oplismenus burmannii*, *Melinis repens*, *Perotis indica* and *Themeda triandra* were identified as nutrient rich grass fodder and the following 10 fodder trees viz., *Acacia leucophloea*, *Acacia nilotica*, *Albizia amara*, *Albizia lebbeck*, *Bambusa bambos*, *Ceiba pendandra*, *Ficus benghalensis*, *Ficus racemosa*, *Ficus religiosa* and *Hardwickia binata* were identified as nutrient rich tree fodder and recommended to the Forest Department for elephant habitat improvement in the Mettupalayam and Sirumugai ranges of Coimbatore Forest Division.

FOR INFORMATION

1. Seasoning schedule for Malabar Neem and Kadam

The seasoning schedule of Malabar neem (*Melia dubia*) was 5 days, 6 days and 6 days using electric kiln method for 1.5 cm, 2.0 cm and 2.5 cm plank thickness respectively and the seasoning schedule of Kadam (*Neolamarckia cadamba*) for 1.5 cm, 2.0 cm and 2.5 cm thickness was 8 days, 9 days and 9 days using electric kiln method. Hence, the seasoning schedule of 5 to 6 days for Malabar neem (*Melia dubia*) and 8 to 9 days for Kadam of different plank thickness using electric kiln is recommended.

2. Suitable preservative chemical treatment for Malabar Neem and Kadam

Wooden planks of Malabar Neem (*Melia dubia*) and Kadam (*Neolamarckia cadamba*) were treated with two preservative chemicals viz., Copper Chromium Boron (CCB) and Borax @ 5% and 5 different pressure levels. Among the two preservatives used, CCB at pressure level of 5.0 kg cm⁻² recorded the highest penetration and retention. Hence, the preservative treatment of CCB (5%) @ pressure level of 5.0 kg cm⁻² is recommended as the suitable chemical preservative for Malabar Neem and Kadam

3. Eco-friendly sambrani, mosquito repellent and agarbathi using elephant dung

For 1 kg of elephant dung powder, kungiliyam @100 g, each 50 g of neem and tulsi leaf powder and the binding material either neem gum (or) moringa gum at 20 % and the fragrance either eucalyptus (or) lemon grass oil at 2% was found to be best combination for making sambrani in terms of burning, binding and fragrance properties.

For 1kg of elephant dung, each 50g of neem leaf powder, tulsi leaf powder, nochi leaf powder and turmeric powder and the binding material either neem gum or moringa gum @ 20 % concentration was the best combination for making mosquito repellent with respect to burning properties and binding.

Elephant dung and saw dust @1:1 ratio, jigat powder at 100g/kg and the fragrance as sandal oil (or) rose oil @ 2 % concentration was found to be the best combination for making agarbathi in terms of burning, binding and fragrance properties.

4. Multi nutrient animal feed pellet

Multi nutrient animal feed pellets using four different tree fodder leaves viz, *Thespesia populnea*, *Swietenia mahogany*, *Morus alba* and *Albizia lebbeck* was prepared with various other ingredients at different compositions. The composition of leaf fodder (50 %), prosopis pod (20 %), ground nut oil cake (15 %), rice bran (4 %), maize grain (4 %), molasses (1 %), mineral mixture (1%) and salt (1%) was found to be the good composition in terms of nutrient content for preparing multi nutrient animal feed pellets.

5. Multi -nutrient tablets using exudate gum of *Acacia nilotica*

100 g of *Acacia nilotica* gum powder was taken for making multi nutrient tablet. 4 mg of Magnesium stearate ,4 mg of Talc and 25 mg of Starch were added as ingredients . Then wet screening was done using 12 mm mesh and formulations were oven dried at 40°C followed by dry screening using 18 mm mesh. Finally, 3.75 mg of lubricant and 1.80 mg of glidant were added and multi nutrient tablets were prepared.

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

Department	University Research Projects	Externally Funded Projects	Total
Forest Products and Wildlife	4	5	9

S. No.	Project No. 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 Assoc.Prof. (For.)	Sep. 2020 to Aug. 2021	Project has been completed and the completion report to be submitted

2.	FC&RI / MTP / FOR / TREE / 2021 / 001 Studies on Eithno-medicinal knowledge and phytochemistry of important medicinal trees in Nilgiris	Dr.S.Manivasakan Asst.Prof. (For.)	Apr. 2021 to Feb.2023	Work is in progress. Hence, it may be continued
3.	FCRI/MTP/FOR/2021/001 Isolation and Characterization of Exudate gum of important native gum yielding trees	Dr.R.Ravi Asst. Prof. (For.) Dr.P.Radha Asst.Prof (Biochem.)	Jan. 2021 to Dec. 2022	Work is in progress and the project may be continued
4.	CARDS/MTP/ARM/2021/001 Performance analysis of Packing Case Industries in Coimbatore District, Tamil Nadu	Dr.S.Selvanayaki Assoc. Prof (ARM)	Jan. 2021 to Dec. 2022	Work is in progress. Hence, the project may be continued
External 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	<u>PI</u> Dr. M. P. Divya Dr. K. Baranidharan <u>Co-PI</u> Dr. K.T. Parthiban Dr. S. Geetha Dr.K.N.Ganesan Dr. R. Ravi Dr. S. Manivasakan Dr. M. Vijayabhama	April 2021 to June 2022	Project has been completed and the final report has been submitted
2	PA/MPP/FCRI/MTP/FOR/2020/001 Bio-efficacy of Wild animal Repellent (Herboliv) to Mitigate Human Animal Conflicts in different Landscapes of Tamil Nadu Agricultural University Colleges/Stations	<u>PI</u> Dr.K.Baranidharan <u>Co-PI</u> Dr.M.P.Divya Dr.R.Ravi Dr.M.Vijayabhama	Nov.2020 to Oct. 2021	Project has been completed and the final report to be submitted
3	FCRI/MTP/NLC/2022/R001 Documentation and Seasonal Variations of Avifaunal Diversity in different Ecosystems of Neyveli Lignite Corporation India Limited	<u>PI</u> Dr.K.Baranidharan <u>Co -PI</u> Dr. M.P.Divya Dr.M.Viyabhama Dr. R.Ravi	March 2022 to Feb. 2023	Work is in progress and the project may be continued
4	FCRI/MTP/TFDP2022/R001 Studies on suitability of Bamboos for biochar, activated carbon, fodder pellets and briquettes	<u>PI</u> Dr.M.P.Divya <u>Co-PI</u> Dr.K.T.Parthiban Dr.P.Subramanian Dr.K.Baranidharan Dr.R.Ravi	Apr. 2022 to Mar 2024	Work is in progress. Hence, this project may be continued

		Dr.S.Manivasakan		
5	TNFD/FCRI/MTP/FPW/2022/R001 Isolation of Plant Alkaloids and Development of Plant based Wild Animal Repellent to Mitigate Human Wild Boar Conflicts in Tamil Nadu	PI Dr.K.Baranidharan Co -PI Dr.M.P.Divya Dr. M. Vijayabhama Dr. R. Ravi Dr. M. Tilak Dr. P. Radha Dr. S.Manivasakan Dr.S.Selvanayaki	April 2022 to Mar. 2023	Work is in progress. Hence, this project may be continued

D. ACTION PLAN (2022 - 2023)

Theme 1: Value Addition in Wood and Non-Timber Forest Products				
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.	Developing value added products viz., bio-char and activated carbon from seven bamboo species	Dr.M.P.Divya Dr.R.Ravi Centre: FC&RI	Physico - chemical and adsorption properties of bio-char and activated carbon will be estimated	Value added products viz., bio-char and activated carbon from bamboos will be developed
2.	Documentation of Ethno-medicinal knowledge and phyto-chemical characterization in selected medicinal trees in Kolli hills	Dr.S.Manivasakan Centre: FC&RI	Ethno-medicinal knowledge of tribals in Kolli hills will be documented using questionnaire and personal interview. Phyto chemical properties of important medicinal trees will be analyzed	Ethno-medicinal knowledge of tribals in Kolli hills and phyto chemicals present in the selected medicinal trees will be known for medicinal utility
3.	Developing activated carbon from <i>Prosopis juliflora</i> , <i>Senna spectabilis</i> and <i>Lantana camara</i>	Dr.K.T.Parthiban Dr.M.P.Divya Centre: FC&RI	Physico-chemical and adsorption properties of activated carbon from <i>Prosopis</i>	Activated carbon using <i>Prosopis juliflora</i> , <i>Senna spectabilis</i>

			<i>juliflora, Senna spectabilis</i> and <i>Lantana camara</i> will be analyzed	and <i>Lantana camara</i> will be developed
4.	Developing briquettes from <i>Prosopis juliflora</i> and <i>Lantana camara</i>	Dr.I.Sekar Dr.R.Ravi Centre: FC&RI	Physico-thermal and quality parameters of briquettes will be estimated	Briquettes will be produced from <i>Prosopis juliflora</i> and <i>Lantana camara</i>

Theme 2: Wildlife Management

Theme Leader: Dr. K. Baranidharan, Associate Professor (Forestry)

S. No.	Action plan / Activity	Scientist(s) in-charge and centre	Work to be carried out	Deliverables / Expected outcome
1.	Developing plant based wild boar repellent through Indigenous Traditional Knowledge	Dr.K.Baranidharan Centre: FC&RI	Different combinations of plant extracts using identified plants will be prepared and its bio efficacy will be tested in the farmer's field against wild boar control	Plant based wild boar repellent will be developed
2.	Habitat analysis and improvement for Avian diversity in different ecosystems of Neyveli Lignite Corporation	Dr.K.Baranidharan Dr.R.Ravi Centre: FC&RI	Habitat conditions and population dynamics of Avifauna in different ecosystems will be assessed	Coffee table book on avian diversity of Neyveli Lignite Corporation will be prepared Check list of seasonal variations of avian diversity and its diversity indices will be prepared Recommendations will be given to enhance the avian habitat conditions to improve the avian diversity

A. DECISIONS ON OFT

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

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

Location: Commercial nurseries

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

Treatments

T₁ - 1 pellet of Nutristick for four cuttings

T₂ -Farmer's practice

Replications: 13

Observations *viz.*, root initiation (%), survival rate (%), rooting percentage (%), root length (cm), shoot length (cm), no. of leaves per plant, nursery duration and benefit cost ratio will be worked out.

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

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

Locations: OFTs were conducted in progressive famers field in Tiruppur, Erode and Coimbatore districts with the following treatments.

T1 - Glycine 10 ppm + Alanine 100 ppm + Serine 100 ppm

T2- Farmer's Practice

- Observations on fifth instar larval duration (h), matured larval weight (g), larval mortality (%), effective rate of rearing (%), cocoon weight (g), shell weight (g), shell ratio (%), filament length (m), fibroin (mg/shell) and sericin (mg/shell)wererecorded.
- Administration of amino acid mixture reduced the larval duration by 6.06 hrs (3.54 %), increased the silk filament length by 79 m (7.37 %) and cocoon yield by 7.99 kgs/100 dfls(10.18 %)
- Amino acids also significantly enhanced the silk proteins *viz.*, fibroin and sericin by 10.17 and 11.44 per centrespectively.
- The benefit cost ratio was 2.02:1 against 1.91:1 in farmers practice
- Further studies on standardization of amino acid mixtures for easier application by farmers and shelf life studies are to be carried out during 2022-23.

B. FOR ADOPTION / INFORMATION

1. For Adoption

Effect of silkworm excreta on mulberry and silkworm

- 275 kgs of silkworm excreta was obtained per acre per year and the duration of composting was 60 days. OFT was conducted at three locations.
- Application of silkworm excreta compost enhanced the N (20.7; 11.5 kg ha⁻¹ harvest), P(5.2; 2.6 kg ha⁻¹ harvest), K(11.1; 5.7 (kg ha⁻¹ harvest)), Zn(249.5; 82 249.5 g ha⁻¹ harvest), Fe(2113.8; 1073.9g ha⁻¹ harvest), Bo(36.2; 17.5g ha⁻¹ harvest) and Mn (612.2; 300.0g ha⁻¹ harvest) uptake in mulberry compared to control.
- Application of silkworm excreta compost twice @ 8t/ac/year enhanced the growth and yield parameters of mulberry and silkworm economic parameters compared to control *viz.*, No. of branches/plant (10.4, 9.1), No. of leaves/branch (25.5, 22.3), and leaf yield (4393 kgs/acre/harvest, 3620 kgs/acre/harvest). It also enhanced economic parameters of silkworm compared to control *viz.*, cocoon weight (2.02, 1.68 gm), and shell weight (0.26, 0.18gm).
- Cocoon yield was increased by 21.68%
- B:C ratio was 1.82 against control (1.33).

2. For Information

Mini clonal technology for mulberry saplings production

- IBA @3000 ppm showed superior performance in V1 variety during standardization among 0, 1000, 2000, 3000, 4000 and 5000 ppm rooting hormone concentration.
- Rooting medium Soil: Coir pith: FYM (1:1:1) registered better performance among Soil, Soil: Sand: FYM, Soil :Coir pith, Soil : Sand: Vermicompost, Soil: Coir pith: FYM
- Survival% (68.80%), sprouting% (82.39%), Rooting % (63.27%), shoot length(22.05cm), root length (22.22 cm), no of roots (14.40 %) and no of leaves (18.30)
- Mini-clones performed better in growth and yield attributes like plant height, leaf area, leaf weight, number of leaves.
- Plant yield (g/plant) from mini clones for V1 and MR2 were 103.98 and 90.34 against
 - 89.1 and 77.78 in stem cuttings.
- Mulberry saplings can be produced in 60 days against 90 days in conventional method
- Needs lesser space

Crop Protection

- Leaf webber incidence in terms of per cent defoliation and number of larvae per plant was significantly lesser (5.16 %, 1.27 nos) in mulberry under forestry eco system with nine species of predatory coccinellids compared to Agroforestry ecosystem (6.23 %,1.51 nos/plant) with five species among mulberry varieties. Varietal influence on pest incidence revealed that MR 2 harboured significantly lesser population of leaf webber and pink mealy bug

than V1 and G4. Incidence of leaf webber was significantly higher under agroforestry system and pink mealy bug under forestry eco system.

- Biocontrol agent, *Trichoderma asperellum* was effective against the mulberry root rot organisms with reduced mycelial growth in both *Lasiodiplodia theobromae* (2.90 cm) and *Macrophomina phaseolina* (2.40 cm) as against control (9.00 cm) under in vitro condition.
- Fungicides *viz.*, Tebuconazole 25.9% EC at 500 ppm and the combination fungicide (Tebuconazole 50% + Trifloxystrobin 25% w/w WG (75WG) at 100 ppm was effective (100 % inhibition) against *L. theobromae* and *M. phaseolina*.

Value addition

- Mulberry fruit based value added products *viz.*, Ready to Serve, Jam and Squash were developed. Mulberry jam had moisture content (23.70 %), total soluble solids (69^obx) titrable acidity (0.4 %), pH (3.5), reducing sugar (32 %), total sugars (64 %) and ascorbic acid (2.35 mg). Similarly, mulberry squash and RTS had TSS of 52^obx and 17^o bx; titrable acidity of 1.50 and 0.56 %; total sugars of 48 % and 13.5 % and ascorbic acid of 3.42 mg and 2.73 mg/100 g respectively.
- Fruit juice extracted from mulberry fruit was found to possess antibacterial activity against *Staphylococcus aureus* ATCC11632 (17.0±1.25 mm), *Streptococcus pneumoniae* ATCC6301 (18.0± 0.43 mm) under *in vitro* condition.

C. Remarks on the on- going University Research sub Projects

Department	URP	External funded project	Total
Sericulture	08	-	08

S. No.	Project Number and Title	Project leader	Duration	Remarks
University Research Projects				
1.	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
2.	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.N.Indra Asst. Prof. (Pl. Patho.)	July 2020 to June 2023	The project may be continued
3.	NRM/MTP/ENS/2020/001 Assessing the carbon sequestration potential of mulberry tree species	Dr.P.Jothimani Assoc Prof. (Env. Sci.) Dr.P.Priyadharshini, Asst. Prof. (Seri.)	Aug. 2020 to July 2022	The project completion report may be submitted

4.	CPPS/MTP/SER/FOR/2021/001 Arthropod diversity and insect pest intensity in mulberry under forestry and agro forestry eco systems	Dr.S.Manimegalai Professor (Agrl.Entomology)	March 2021- February 2023	The project may be continued
5.	CPPS/MTP/SER/FOR/2021/002 Studies on sericomposting on soil properties, mulberry leaf quality and sericultural parameters of silkworm	Dr. R.Shanmugam Assistant Professor (Sericulture)	June 2021- May 2023	The project may be continued
6.	CPBG/MTP/SERI/SERI/2021/001 Breeding for sustainable growth and leaf yield in mulberry	Dr. P.Mangammal Assistant Professor (Sericulture)	November 2021 - October 2024	The project may be continued
7.	CPPS/MTP/SER/FOR/001 Development and evaluation of high value fruit based food products from different mulberry varieties	Dr. P.Priyadharshini, Assistant Professor (Sericulture) Dr.G.Gurumeenakshi, Professor (FSN), CPHT, AEC&RI, TNAU,Coimbatore	October, 2021 - September, 2023	The project may be continued
8.	CPPS/MTP/SER/FOR/002 Effect of organic foliar sprays on the qualitative and quantitative attributes of mulberry and silkworm	Dr.K.A.Murugesh Associate Professor (Sericulture)	November, 2021 - October, 2023	The project may be continued

D. ACTION PLAN 2022-2023

Theme 1. Host Plant Production and Management				
Theme Leader: Dr.S. Manimegalai, Professor and Head				
S. No.	Action Plan/ Activity	Name of the Scientist and centre	Work to be carried out	Deliverables /expected outcomes
1	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.N.Indra Asst. Prof. (Pl.Patho.)	F1 progenies of mulberry will be evaluated for growth and yield traits. F1 progenies will be screened for tolerance to biotic and abiotic factors	Superior progenies of mulberry for growth, yield, abiotic and biotic stress tolerance will be

2	Nitrogen Efficiency studies in mulberry	Use in	Dr.J. Balamurugan Asst. Professor (SS&AC)	To standardize the N doses per pruning on application of silkworm excreta compost for higher leaf yield.	The best possible dose of N and silkworm excreta compost for mulberry leaf yield.
3	Screening of mulberry germplasm accessions for major insect pests and diseases	of	Dr.P.Mangammal Asst.Prof. (Seri.) Dr.S.Manimegalai Prof. (Agrl.Ento.) Dr.N.Indra Asst.Prof. (Pl.Patho.)	Mulberry accessions will be screened for tolerance to insect pests and diseases	Superior progenies of mulberry for tolerance to major insect pests and diseases will be identified

V. REMARKS

a. General recommendations

- Efforts may be taken to popularize elite silk cotton trees
- The anti-termite product isolated from *Lantana camera* may be taken to the next stage.
- The research work on the concept of village forest may be intensified
- All the scientists are encouraged to propose externally funded projects and publish articles in Scopus indexed journals / > 6 NAAS rated Journals
- Seeds of all released varieties may be deposited in Ramaiah gene bank

b. Forest Biology and Tree Improvement

- Efforts may be taken to promote *Bixa* as a crop
- Studies on increasing the shelf life of Neem seeds to be initiated.
- The supply chain and marketing channel for *Annatto* seeds may be strengthened.
- Fatty acid profile for *Annatto* seed oil may be developed and the quality of oil may be studied for its pharmaceutical and neutraceutical properties.

c. Silviculture and NRM

- The fertigation studies in teak may be continued.
- High density planting studies in Tamarind may be intensified.
- Assessment of gum yield in *Moringa* and *Lannea* may be carried out.
- High gum yielding tree species may be identified and promoted
- Trees for reducing air pollution may be intensified

d. Agroforestry

- Area under agroforestry in Tamil Nadu may be worked out and mapped
- The advanced entries identified in *Jatropha* may be evaluated in large scale

- Suitability of Silver oak cultivation in plains to be observed for one more year.
- Pepper cultivation with Jack and Teak at Pudukkottai may be inspected and explored.
- Grafting techniques in Kapok may be standardized.
- New energy tree sources may be evaluated.

e. Forest Products and Wildlife

- Validation of multi nutrient animal feed pellet to be done in consultation with Veterinary Department.
- The chemical compounds in the roots of *Acorus calamus* to be identified for treating snake bite by the tribals.
- The multi nutrient tablet using exudates gum of *Acacia* to be validated
- Studies on development of cellulose based nano products may be initiated
- GCMS profiling of animal repellent may be studied and documented
- Studies on Herboliv may be intensified
- Animal waste based products may be validated and popularized

g. Sericulture

- The economics of application of amino acid to enhance yield and quality of silk may be studied
- More number of germplasm accessions may be collected and attempts may be made to widen the genetic base in mulberry
- Validation of "Nutristick" in other clonal nurseries may be attempted
- Standardization of dose and time of application of nano urea for mulberry may be done
- Use of Endophytes for the management of root rot in mulberry may be tried
- Phyto-chemical analysis of mulberry fruits may be studied

F. 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	ktparthi2001@gmail.com
2.	Dr.K.Kumaran Professor and Head (FB&TI)	9443377970	kumaran.k@tnau.ac.in
3.	Dr.M.P.Divya Professor and Head (FPW)	9486312885	divsara05@yahoo.com
4.	Dr.M.Murugesh Professor and Head (Agroforestry)	9443424181	drmm1970@gmail.com
5.	Dr.S.Radhakrishnan Professor and Head (S&NRM)	9842141216	drsradhakrishnan@gmail.com
6.	Dr.S.Manimegalai Professor and Head (Seri.)	9487550446	manimegalaianto@gmail.com
7.	Dr.A.Balasubramanian Professor (Forestry)	9443505845	balafcri@gmail.com
8.	Dr.I.Sekar Professor (Forestry)	9443003877	sekarsasi14@gmail.com
9.	Dr.S.Umesh Khanna Professor (Forestry)	9095713383	umeshkanna.s@tnau.ac.in
10.	Dr.P.Rajendran Professor (Forestry)	9566604369	rajendranforestry@gmail.com
11.	Dr.R.Jude Sudhagar Assoc. Prof. (Forestry)	9443229212	judesudhagar@rediffmail.com
12.	Dr.C.Ushamalini Assoc. Prof. (Pl. Patho.)	9789472424	ushacbe87@gmail.com
13.	Dr.P.Boominathan Assoc. Prof. (CRP)	9865676771	boominathan.p@tnau.ac.in
14.	Dr.K.Baranidharan Assoc. Prof. (Forestry)	9894424686	krisbarani@yahoo.com
15.	Dr.S.Selvanayaki Assoc. Prof (ARM)	9443044190	sselvanayaki@tnau.ac.in
16.	Dr.K.R.Ramesh Asst. Prof. (Forestry)	9443246505	rameshforestry@yahoo.co.in
17.	Dr.S.Manivasakan Asst. Prof. (Forestry)	9976142443	smanivasakan@yahoo.co.in
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.P S.Devanand Asst. Prof. (PBG)	97894 48194	devps7@yahoo.com

22.	Dr.K.Ramah Asst. Prof. (Agronomy)	9894960327	kr74@tnau.ac.in
23.	Dr.M.Sivaprakash Asst. Prof. (Forestry)	9865303506	sivaprakash.m@tnau.ac.in
25.	Dr.S.Vennila Asst. Prof. (Forestry)	9965460349	venkanika@gmail.com
27.	Dr.P.Radha Assistant Professor (Biochem.)	9786000399	radhubctnau@gmail.com
28.	Dr.P.Kumar Assistant Professor (Forestry)	9976954274	kumarforestry@gmail.com
29.	Dr.K.A.Murugesh Asst. Prof. (Sericulture)	9940851903	murugeshka2002@yahoo.co.in
30.	Dr.P.Priyadharshini, Asst. Prof. (Seri.)	7598380048	dharshinismiles@gmail.com
31.	Dr.R.Shanmugam Asst. Prof. (Seri.)	9894400881	sunmuga152@gmail.com
32.	Dr. S.Susikaran, Asst. Prof. (Sericulture)	9894197611	susi.agri@gmail.com
33.	Dr.J.Balamurugan Assistant Professor (SS&AC)	9566420760	jbalamurugan73@yahoo.co.in
34.	Dr.N.Indra Asst. Professor (Plant Pathology)	9965524495	nindra73@yahoo.com
35.	Dr. G. Thangamani Asst. Prof. (Micro)	8220302839	thangamani.g@tnau.ac.in
36.	Dr.R.Rajeswari, Asst. Prof. (SS&AC)	9976772587	rrajeswaritnau@gmail.com
37.	Dr. P.Mangammal Assistant Professor (Sericulture)	9597956268	mangammalseri@gmail.com

List of Scientists through online participation

S. No.	Name of the staff and Designation	Mobile No.	E-Mail Id
1.	Dr.P.Masilamani Professor (SST)	9443765381	masil_mahesh@yahoo.com
2.	Dr.B.Sivakumar Assistant Professor (Forestry) AC&RI, Vazhavachanur.	8056969658	drsivakumar85@yahoo.com
3.	Dr.G.Asokan Professor (Agrl. Ento.)	9443498261	asokan.g@tnau.ac.in
4.	Dr.M.Prasanthrajan Assoc. Prof. (Env. Science)	9842263878	prasanthrajan.m@tnau.ac.in
5.	Dr.G.Thiyagarajan Assistant Prof (SWC)	9486587065	gthiyagu1977@gmail.com
