MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding is made on the ____day of _____month and the year **2017** at Bangalore

BETWEEN

Institute of Wood Science and Technology, Malleswaram, Bangalore, through its Director, presently **Sri. Surendra Kumar, IFS**(Hereafter referred to as **IWST**), the one part.

AND

ICAR National Bureau of Soil Science and Land Use Planning(ICAR-NBSS&LUP), Bangalore, through its Director, presently **Dr. S.K Singh** (Hereafter referred to as **ICAR-NBSS&LUP**), the other part.

With regard to

Project No. 1. "Soil carbon sequestration potential in preservation plots in wet evergreen and moist deciduous forests in Central Western Ghats of Karnataka" and

Project No. 2: "Management of Marihal bamboo (*Dendrocalamusstocksii* (Munro) M. Kumar, Remesh&Unnikrishnan) and *Dendrocalamusstrictus* in agroforestry and block plantations"

The expressions of IWSTand ICAR-NBSS&LUP shall however mean and include the Institutions/ Organizations, their successors, appointees, assignees etc.

Whereas IWST is one of the Institutes of Indian Council of Forestry Research & Education (an autonomous body under Ministry of Environment and Forest and Climate Changes, Government of India, New Delhi). The main objectives of the IWST include:

- To conduct research on wood science and technology at national level and focus its research activities to important forestry research needs of the States of Karnataka and Goa at regional level.

WhereasICAR National Bureau of Soil Science and Land Use Planning (ICAR-NBSS&LUP), Nagpur and its Regional Centre, Bangalore hails under the Indian council for Agricultural research (ICAR) autonomous body of Ministry of Agriculture, Government of India. The ICAR-National Bureau of Soil Survey and Land Use planning (ICAR-NBSS&LUP), one among the foremost National Resource Management (NRM) institutes of ICAR is mandated to undertake RD&T activities mainly in soil resource inventory and land use planning at different levels. The main objectives of ICAR-NBSS&LUPinclude:

- Conduct and promote research in the National Agriculture Research System in the areas of Soil Survey, Pedology, Geomorphology, Remote Sensing, Geographic Information System, Cartography, Land Evaluation and Land Use Planning.
- Inventory development of the soil and land resources and judicious management and utilization of these resources suited to their production potential through land use planning.
- Assessment of degraded land, site-specific nutrient mapping and management, and assessment of carbon stock and sequestration potential, assessment of agricultural land (including prime land), being used for non–agricultural purposes.

Whereas IWST functions in the domain of forestry and wood science and ICAR-NBSS&LUP functions exclusively in the field of Soil survey and Land use planning and there is little commonality and overlap in functions of both the institutions.

Whereas despite the exclusiveness of their areas of operation, there are some converging points where both the institutions can join hands for synergizing their efforts for better development of forestry and farm sector.

Whereas this memorandum is based on equality, reciprocity and mutual benefit of either party and intended to leverage on the strength and compliment on the weaknesses of either institutions for betterment of environment, sustaining soil health of farmlands and natural forests and agro-forestry practices in farmlands.

Recognizing the importance of scientific cooperation, mutual benefit and larger public interest, the two institutions believe that a formal Memorandum of Understanding (MoU) will provide a framework for mutual collaboration. Accordingly, the following broad areasare identified:

- To actively associate in the research projects approval committees of either institutions so as to exclude duplication of efforts,
- To utilize infrastructural facilities and human resource of either institutions for collaborative research and also for imparting trainings.
- To synergize the capacity of IWST in studies on soil carbon sequestration studies in natural forests, degraded landscapes and agricultural landscapes and expertise of ICAR-NBSS&LUP to identify practices that can sequester carbon in soils.

Now therefore, the above two parties hereby agree to establish and conduct mutually agreed upon co-operative and collaborative projects, programs and/or activities, in the area of forest ecology and soil science.

Whereas, the amount and source of resources and other requirements for co-operative/collaborative activities will be borne by both institutions jointly as and when required. The concerned parties may mutually collaborate to carry out the research and developmental activities. They may also jointly or individually seek funding and other support from third parties also for the conduct of collaborative projects, programs and/or activities. This MOU does not obligate the parties to provide funds and /or resources from their own or other sources unless agreed in writing.

However this MOU seeks to identify mutual areas of collaborative research in two ongoing projects of IWST and to allocate a specific budget for carrying out certain specific research component pertaining to the area of soil science which is the domain of ICAR-NBSS&LUP.Currently IWST and ICAR-NBSS&LUP are engaged in two collaborative research projects. The first project (referred to henceforth as Project I) is on "Soil carbon sequestration potential in preservation plots in wet evergreen and moist deciduous forests in Central Western Ghats of Karnataka" is funded by Karnataka Forest Departmentfor a period of 2 years and with a project Budget of Rs. 11.53lakhs was approved by KFD in 2015-16 and operationalized in April 2017. The second project is fully funded by ICFRE is an internal project of IWST (referred to henceforth as Project II) is on "Management of Marihal bamboo (Dendrocalamusstocksii (Munro) M. Kumar, Remesh&Unnikrishnan) and Dendrocalamusstrictus in agroforestry and block plantations" has a project budget of Rs. 10.63 lakhs over a two year duration operationalized since April 2017.

The identified work plan of IWST and NBSS&LUP for project I

Activity	To be carried out by IWST	To be carried out by ICAR-NBSS&LUP
Objective 1. To study the physico-chemical properties of soils in permanent preservation plots in evergreen and moist deciduous forest types and compare with adjoining degraded lands and agricultural landscapes.	Identification of permanent preservation plots (PPPs)**in** wet evergreen and moist deciduous forestsof central Western Ghats. Comparing the permanent preservation plots in wet evergreen and moist deciduous forests of central Western Ghats with adjoining degraded landscapes and Agricultural landscapes. Malemene and Katlekan PPP representing tropical evergreen in Honnavar Forest Division, Uttar Kannada district and Karka, Bhagavati and Kulgi, in Haliyal Forest Division, Dharwad district representative of tropical moist deciduous forest type respectively have been identified (i)	• Preparation of samples and sub samples collected from study sites for basic physio-chemical analysis. • Waterretention: to determine moisture holding capacity, porosity by method: Pressure Plates pressure membrane apparatus Extraction technique.(Depends on particle size distribution). • Soil reaction- pH and EC. • Organic carbon by Walkley-Black wet digestion method • Available K, Ca, Mg and micronutrients like Cu, Fe, Mn, Zn by atomic absorption spectroscopy method. • Available Sulfur by $CaCl_2$ extraction method • Available Boron (Gupta, 1979) • Available phosphorus by Bray's and Olsen's method • Exchangeable iron oxides $CaCO_3$(equivalent) method. • Exchangeable Hydrogen and Aluminum oxides • Extractable acidity by barium chloride-TEA. • CEC- cation exchange capacity non-calcareous soils Around 300 soil samples collected from the identified study sites will be required to be analyzed by ICAR-NBSS&LUP.
Objective 2. To assess total carbon	Soil samples will be collected from profiles of 5 Permanent preservation plots (2 wet evergreen forests and 3	Collected soil samples (estimated to be around 300 nos) from different layers of the soil profile will be

stock up to 90 cm depth in PPP's as well as adjoining degraded lands and agricultural landscapes to assess the extend of depletion of carbon stock due change in land use type.	moist deciduous forests) along with soils taken from profile dug in adjoining degraded lands and agriculture landscape of each PPP (i) Digging upto 1meter in each location/preservation plot to obtain different layers of soil sample from soil profile which can be identified as Layer 1- from 0 to 15 cm, Layer 2- from 15 to 30 cm, Layer 3- from 30 to 60 cm and Layer 4- from 60 to 100 cm) (ii) A total of 60 soil profile trenches to be made which will include 4 in each preservation plots and 4 each in degraded landscapes and 4 in agricultural/agroforestry landscapes near each PPP (iii) The soils taken from the profile to be sampledseparately for C sequestration studies in CHN analyser of IWST lab.	analysed for bulk density in ICAR-NBSS&LUP lab Organic carbon of soil samples of the collected soil samples will be quantified by the method described by Jackson (1972) in ICAR-NBSS&LUP laboratory
Objective 3. To assess carbon storage in relation to size fractions of soil in all the different land use types taken for the study.	Fractionation of soil samples into aggregate sizes. The soil samples will be manually fractionated into three aggregate size classes (250 – 2000 µm, 53 – 250 µm, < 53 µm). The soil samples will be physically fractionated by wet sieving using disruptive forces of slaking and wet sieving through a series of two sieve sizes (250µ and 53µm) to obtain three fraction size classes: macro (250-2000 µm), 53- 250 µm and silt- and clay-sized fraction (<53 µm). This will be done in IWST lab Organic carbon estimation using CHN Analyzer in Plant and soil lab of TIG Div, IWST	Analysis and interpretation of data on Soil organic carbon (SOC), soil organic matter (SOM) and their correlation with bulk density (BD) to estimate carbon sinks in PPPs, degraded landscapes and agricultural landscapes

Sharing of Budget in Project I

The total budget sanctioned by KFD for Project I is Rs. 11.53 lakhs which will be released in 3 installments during the two year duration of the project. Around 25 per cent is to released on initiation of project and the next 50 per cent to be released after presenting progress of the project after a year and the next 25 per cent after submission of project completion report at the end of two years as per KFD norms. The JRF has been recruited by IWST after specific consultation with ICAR-NBSS&LUP and the fellowship and emoluments of JRF will be paid as per norms of IWST.Based on the work programme and responsibilities identified for ICAR-NBSS&LUP, budget under specific heads within the operational framework has been identified.

The proposed apportioningof the grant released by KFD within the sanctioned budget for the identified work programme between IWST and ICAR-NBSS& LUP is outlined and the amount of Rs 2.45 lakhs will be released to ICAR-NBSS & LUP by IWST proportionately in installments as received from KFD.

Budget heads	Budget allotted (Rs. In Lakhs)	IWST (Rs. In Lakhs)	ICAR-NBSS&LUP (Rs. In Lakhs)
TE(Travel)	1.8	1.2	0.60
M&S (Materials and supplies) 1.Contingencies (Chemical, Glassware, Stationary etc) 2.Maintenance of CHN analyzer and Infra red gas analyzer in IWST	2.0	1.0	1.0
FRE (field research expenses)	1.5	1.0	0.75
Fellowship of JRF recruited for 2 years (@ Rs 12,000 + HRA)	3.43	3.43	
Capital Assets (equipment) (Establishment of wet sieving laboratory for soil carbon study in IWST)	1.0	1.0	
Others (extension and dissemination of research, PCR preparation)	0.30	0.20	0.10
Institutional Charges @15% to IWST	1.50	1.5	
TOTAL	**11.53**	**9.08**	**2.45**

The second project is fully funded by ICFRE is an internal project of IWST (referred to henceforth as Project II) is on "Management of Marihal bamboo (Dendrocalamusstocksii (Munro) M. Kumar, Remesh&Unnikrishnan) and Dendrocalamusstrictus in agroforestry and block plantations"has a project budget of Rs. 10.63 lakhs over a two year duration operationalized since April 2017. The field trials will be set up in IWST experimental station at Nallal, Hoskote, where already well established D.stocksii andD.strictus plantations are existing. Additional data on productivity of these species will be taken from established Karnataka forest department bamboo plantations in Khanapur, Belgaum

Work plan for NBSS&LUP for project-II:

"Management of Marihal bamboo (Dendrocalamus stocksii (Munro) M. Kumar, Remesh & Unnikrishnan) and Dendrocalamus strictus in agroforestry and block plantations",funded by ICFRE and with a Project Budget of 10.63 lakhs over a period of 2 years (2016-2018). The project has been sanctioned by ICFRE, in March 2017after approval of the project in Oct 2016 in Research Advisory group of IWST in Bangalore. After sanction of the project in March 2017 intercropping trials have been laid out as per action plan. As per ICFRE norms the budget is released in two equal annual installments after submission of satisfactory half yearly and annual reports and monitoring of Asst Director General (Monitoring and Evaluation), ICFREas per standard procedures established. The JRF has been recruited by IWST after consultation with NBSS&LUP and the fellowship and emoluments of JRF is paid as per norms of IWST.Based on the work, programme and responsibilities identified for ICAR-NBSS & LUP, budget under specific heads within the operational framework has been identified. The involvement of ICAR-NBSS & LUP in minimal and only in Objective III and V.

Activity	**To be carried out by IWST**	**To be carried out by ICAR-NBSS&LUP**
OBJECTIVE I. To study the effects of organic amendments on biomass and productivity of D. stocksii and D.strictus plantations	1) Application of organic amendment and fertilizers in different combinations to clumps 2) Recording the clumps parameter data before and after application in first and second year	
OBJECTIVE II To study above and below	1) Establishment of intercropping trials with 3 intercrops (Red gram, Ragi and field bean) under 2	

ground resource sharing pattern in D.stocksiiand D.strictus based cropping system	spacing for two consecutive years. 2) Assess the growth and yield of intercrops and dry matter production. 3) Study the belowground resource pattern (rooting behavior and spread) after the end of cropping session using spiral trenching method	
OBJECTIVE III **To quantify annual litter fall and decomposition pattern in *D.stocksii and D.strictus species* in bamboo agroforestry models**	1) Setting up litter traps. 2) Collection and analysis of litter at monthly intervals. 3) Study litter decomposition patter through standard litter bag techniques. 4) The samples of leaf litter will be drawn by pooling the monthly litter collections from different traps will be used to analyze total N (CHN analyzer)	The samples of leaf litter will be drawn by pooling the monthly litter collections from different litter traps will be used to analyze P (Vanado-molybdo phosphoric acid yellow colour method), K (Flame photometry), sulphur (calcium chloride extraction method), Ca and Mg (Versenate titration method), by following Jackson (1973) to characterize seasonal variations in litter nutrient concentrations. This work will be done in ICAR-NBSS&LUP lab
OBJECTIVE IV.	The effect of harvest on shoot	

To optimize clump management schedule for sustainable extraction of D.stocksii and D.strictusculmsunder cultivated conditions	production will be implemented for D. stocksiiandD.strictus(9 years old) at Nallal field station. 5 different treatments with 5 replicates and 1 clump per replicate will are taken. Data will be recorded the number of standing culms was recorded for each clump before harvesting. Shoot emergence will be recorded month wise after treatment. The data will be analyzed using appropriate statistical software.	
OBJECTIVE V. **To estimate the soil organic carbon stocks in *D. stocksii and D.strictus* plantations**	1) Identification of D. stocksiiand D.strictusplantations of different age classes under same locality. 2) Collection of soil samples from different soil layers/horizon.	Analysis of soil samples for pH, EC, soil organic carbon N,P,K, Ca, Mg and S

Sharing of Budget in Project II

As per norms of ICFRE, there is no provision for sharing of allotted budget after administrative and financial sanction of budget with any other organization at this stage since it is an internal project. However certain specific activities carried out in ICAR-NBSS&LUP lab may be paid for as per actual cost basis for which is indicated in budget split up. The JRF has been recruited by IWST after specific consultation with ICAR-NBSS&LUP and the fellowship and emoluments of JRF will be paid as per norms of IWST.Based on the work programme and responsibilities identified for ICAR-NBSS& LUP, a tentative budget of Rs 1.0 lakhs under specific head within the operational framework has been identified.

Sl. No.	Major Head*		Sub Head*	IWST	ICAR-NBSS &LUP	**Total Budget**
A		1.	Fellowship (JRF)	4.03		4.03

	O.E. (Research)	2.	M&S Lab Contingency chemical & glassware	1.0	1.0	2.0
		3.	Field Research Expenses	2.5		2.5
		4.	Consultancy			
		5.	Seminar / Conference / HRD			
		6.	Extension			
		7.	Stationary			
		8.	Contingent Expenses	0.5		0.5
		9.	Printing & Publication			
		10.	Maintenance of Equipment i). Scientific ii). Office			
B	O.E. (Technical)	11.	Maintenance of Vehicle i). Fuel/ POL ii). Repair /Maintenance			
C	T.E.	12.	Travelling-Expenses i). Domestic ii). International	1.6		1.6
D	Capital Assets / Equipment	13.	i). Scientific Equipments (ii). Office Equipment iii). IT Equipment			
			Total	**9.63**	**1.0***	**10.63**

***The budget expenditure of 1.0 lakhs indicated is for the litter and soil analysis works envisaged in objective III and V of Project II and will be paid by IWST as and when actual bills are raised by** ICAR-NBSS & LUP **subject to a maximum expenditure ceiling of Rs 1.0 lakhs.**

Duration, Termination and Modification of MOU:

This MOU shall take effect when signed by both the parties and will remain in effect fo an initial period of five years and may be extended by mutual agreement in writing for a

additional period. This MOU may be terminated by either party with a six months written notice of intent to terminate. Any modification shall require a written approval of either the parties or their designees.

Protection of Intellectual Property:

- It is recognized by both the parties that the allocation of intellectual property rights will occur on the basis of a research and technology management plan developed for each project by the project proponent.
- Research outcome will be jointly patented and outcome of the patent if any will be jointly shared in mutually agreed proportions for each outcome.
- It is agreed by the parties to undertake not to disclose, divulge, part with, copy in any form for the period as specified in this MOU/agreement any scientific research document, planning, execution, and appropriate financial, legal documents involved in this MOU in various projects. All personnel involved in collaborative projects from IWST and ICAR-NBSS & LUPare subject to thisnon-disclosureclause for the period of this MOU.
- The only exception being research papers for publication, where both parties agree to publish the results of their findings in scientific journals.

Settlement of mutual differences:

That any difference or divergence derived from the interpretation or application of the present instrument shall be resolved by the parties amicably. However, in case the dispute remains unresolved, it shall be referred to Secretary MoEF&CC. and DG, ICAR

IN WITNESS WHEREOF, **Shri Surendra Kumar**,IFS, Director, IWST and **Dr.S.K. Singh, Director,** ICAR- NBSS& LUP, Nagpur mutually sign the agreement on the __day of _____ 2017.

For IWST

Shri. Surendra Kumar,IFS
Director
Institute of Wood Science and Technology
18th Cross, Malleswaram,
Bangalore-560 003

For ICAR-NBSS&LUP

Dr. S.K Singh
Director
ICAR-National Bureau of Soil Science and Land Use Planning (NBSS& LUP),
Nagpur, Maharashtra - 440007

DIRECTOR
National Bureau of Soil Survey
& Land Use Planning
Amravati Road, Nagpur - 440 033

Witnesses

1. Dr. K. S. ANIL KUMAR
Dr. K.S. Anil Kumar, M.Sc (Agri.),Ph.D.,F.I.C.
Principal Scientist
N.B.S.S. & L.U.P (ICAR)
Hebbal, BANGALORE-560024

2.

Witnesses

डॉ एस. विश्वनाथ / Dr. S Viswanath
वैज्ञानिक–जी / Scientist-G
वृक्षा सुधार एवं आनुवंशिकी प्रभाग
Tree Improvement and Genetics Division
काष्ठ विज्ञान एवं प्रौद्योगिकी संस्थान
Institute of Wood Science & Technology

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Statutory Alert:
1. The authenticity of this Stamp Certificate should be verified at "www.shcilestamp.com". Any discrepancy in the details on this Certificate and as available on the website renders it invalid.
2. The onus of checking the legitimacy is on the users of the certificate.
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The total budget sanctioned by KFD for Project I is Rs. 11.53 lakhs which will be released in 3 installments during the two year duration of the project. Around 25 per cent is to release on initiation of project and the next 50 per cent to be released after presenting progress of the project after a year and the next 25 per cent after submission of project completion report at the end of two years as per KFD norms. The JRF has been recruited by IWST after specific consultation with ICAR-NBSS & LUP and the fellowship and emoluments of JRF will be paid as per norms of IWST. Based on the work programme and responsibilities identified for ICAR-NBSS & LUP, budget under specific heads within the operational framework has been identified.

The proposed apportioning of the grant released by KFD within the sanctioned budget for the identified work programme between IWST and ICAR-NBSS & LUP is outlined and the amount of Rs 2.45 lakhs will be released to ICAR-NBSS & LUP by IWST proportionately in installments as received from KFD.

Budget heads	Budget allotted (Rs. In Lakhs)	IWST (Rs. In Lakhs)	ICAR-NBSS & LUP (Rs. In Lakhs)
TE (Travel)	1.8	1.2	0.60
M&S (Materials and supplies) 1.Contingencies (Chemical, Glassware, Stationary etc) 2.Maintenance of CHN analyzer and Infra-red gas analyzer in IWST	2.0	1.0	1.0
FRE (field research expenses)	1.5	1.0	0.75
Fellowship of JRF recruited for 2 years (@ Rs 12,000 + HRA)	3.43	3.43	
Capital Assets (equipment) (Establishment of wet sieving laboratory for soil carbon study in IWST)	1.0	1.0	
Others (extension and dissemination of research, PCR preparation)	0.30	0.20	0.10
Institutional Charges @15% to IWST	1.50	1.5	
TOTAL	**11.53**	**9.08**	**2.45**

The second project is fully funded by ICFRE is an internal project of IWST (referred to henceforth as Project II) is on "Management of Marihal bamboo (*Dendrocalamus stocksii* (Munro) M. Kumar, Remesh & Unnikrishnan) and *Dendrocalamus strictus* in agroforestry and block plantations"has a project budget of Rs. 10.63 lakhs over a two year duration operationalized since April 2017. The field trials will be set up in IWST experimental station at Nallal, Hoskote, where already well-established *D. stocksii* and *D. strictus* plantations are existing. Additional data on productivity of these species will be taken from established Karnataka forest department bamboo plantations in Khanapur, Belgaum

Work plan for NBSS&LUP for project-II:

"Management of Marihal bamboo (*Dendrocalamus stocksii* (Munro) M. Kumar, Remesh & Unnikrishnan) and *Dendrocalamus strictus* in agroforestry and block plantations", funded by ICFRE and with a Project Budget of 10.63 lakhs over a period of 2 years (2016-2018). The project has been sanctioned by ICFRE, in March 2017after approval of the project in Oct 2016 in Research Advisory group of IWST in Bangalore. After sanction of the project in March 2017 intercropping trials have been laid out as per action plan. As per ICFRE norms the budget is released in two equal annual installments after submission of satisfactory half yearly and annual reports and monitoring of Asst Director General (Monitoring and Evaluation), ICFRE as per standard procedures established. The JRF has been recruited by IWST after consultation with NBSS&LUP and the fellowship and emoluments of JRF is paid as per norms of IWST. Based on the work, programme and responsibilities identified for ICAR-NBSS & LUP, budget under specific heads within the operational framework has been identified. The involvement of ICAR-NBSS & LUP in minimal and only in Objective III and V.

Activity	**To be carried out by IWST**	**To be carried out by ICAR-NBSS & LUP**
OBJECTIVE I. To study the effects of organic amendments on biomass and productivity of *D. stocksii* and *D. strictus* plantations	1) Application of organic amendment and fertilizers in different combinations to clumps 2) Recording the clumps parameter data before and after application in first and second year	
OBJECTIVE II To study above and below ground resource sharing	1) Establishment of intercropping trials with 3 intercrops (Red gram, Ragi and field bean) under 2 spacing	

strictus based cropping system	intercrops and dry matter production. 3) Study the belowground resource pattern (rooting behavior and spread) after the end of cropping session using spiral trenching method	
OBJECTIVE III **To quantify annual litter fall and decomposition pattern in *D. stocksii and D. strictus species* in bamboo agroforestry models**	1) Setting up litter traps. 2) Collection and analysis of litter at monthly intervals. 3) Study litter decomposition patter through standard litter bag techniques. 4) The samples of leaf litter will be drawn by pooling the monthly litter collections from different traps will be used to analyze total N (CHN analyzer)	The samples of leaf litter will be drawn by pooling the monthly litter collections from different litter traps will be used to analyze P (Vanado-molybdo phosphoric acid yellow colour method), K (Flame photometry), sulphur (calcium chloride extraction method), Ca and Mg (Versenate titration method), by following Jackson (1973) to characterize seasonal variations in litter nutrient concentrations. This work will be done in ICAR-NBSS & LUP lab
OBJECTIVE IV. To optimize clump management schedule for	The effect of harvest on shoot production will be implemented for *D. stocksii* and *D.strictus* (9 years	

sustainable extraction of *D.stocksii* and *D.*strictus culms under cultivated conditions	old) at Nallal field station. 5 different treatments with 5 replicates and 1 clump per replicate will are taken. Data will be recorded the number of standing culms was recorded for each clump before harvesting. Shoot emergence will be recorded month wise after treatment. The data will be analyzed using appropriate statistical software.	
OBJECTIVE V. **To estimate the soil organic carbon stocks in *D. stocksii and D. strictus* plantations**	1) Identification of *D. stocksii* and *D. strictus* plantations of different age classes under same locality. 2) Collection of soil samples from different soil layers/horizon.	Analysis of soil samples for pH, EC, soil organic carbon N, P, K, Ca, Mg and S

Sharing of Budget in Project II

As per norms of ICFRE, there is no provision for sharing of allotted budget after administrative and financial sanction of budget with any other organization at this stage since it is an internal project. However certain specific activities carried out in ICAR-NBSS & LUP lab may be paid for as per actual cost basis for which is indicated in budget split up. The JRF has been recruited by IWST after specific consultation with ICAR-NBSS & LUP and the fellowship and emoluments of JRF will be paid as per norms of IWST. Based on the work programme and responsibilities identified for ICAR-NBSS & LUP, a tentative budget of Rs 1.0 lakhs under specific head within the operational framework has been identified.

Sl. No.	Major Head*		Sub Head*	IWST	ICAR-NBSS & LUP**	**Total Budget**
A		1.	Fellowship (JRF)	4.03		4.03
		2.	**Materials & Supply** (Lab Contingency chemical & glassware)	2.0		2.0

	O.E. (Research)	3.	Field Research Expenses	2.5		2.5
		4.	Consultancy			
		5.	Seminar / Conference / HRD			
		6.	Extension			
		7.	Stationary			
		8.	Contingent Expenses	0.5		0.5
		9.	Printing & Publication			
		10.	Maintenance of Equipment i). Scientific ii). Office			
B	O.E. (Technical)	11.	Maintenance of Vehicle i). Fuel/ POL ii). Repair /Maintenance			
C	T.E.	12.	Travelling-Expenses i). Domestic ii). International	1.6		1.6
D	Capital Assets / Equipment	13.	i). Scientific Equipments (ii). Office Equipment iii). IT Equipment			
			Total	**10.63**		**10.63**

***A budget of 1.0 lakhs out of 2.0 lakhs under Major Head O.E. (Researchl) - Sub Head* Materials & Supply (M&S) (Lab Contingency chemical & glassware) is for litter and soil analysis works envisaged in objective III and V of Project II which will be paid by IWST as and when actual bills are raised by ICAR-NBSS & LUP subject to a maximum expenditure ceiling around Rs 1.0 lakhs.**

Duration, Termination and Modification of MOU:

This MOU shall take effect when signed by both the parties and will remain in effect for an initial period of five years and may be extended by mutual agreement in writing for an additional period. This MOU may be terminated by either party with a six months written notice of intent to terminate. Any modification shall require a written approval of either the parties or their designees.

Protection of Intellectual Property:

- It is recognized by both the parties that the allocation of intellectual property rights will occur on the basis of a research and technology management plan developed for each project by the project proponent.
- Research outcome will be jointly patented and outcome of the patent if any will be jointly shared in mutually agreed proportions for each outcome.
- It is agreed by the parties to undertake not to disclose, divulge, part with, copy in any form for the period as specified in this MOU/agreement any scientific research document, planning, execution, and appropriate financial, legal documents involved in this MOU in various projects. All personnel involved in collaborative projects from IWST and ICAR-NBSS & LUP are subject to this non-disclosure clause for the period of this MOU.
- The only exception being research papers for publication, where both parties agree to publish the results of their findings in scientific journals.

Settlement of mutual differences:

That any difference or divergence derived from the interpretation or application of the present instrument shall be resolved by the parties amicably. However, in case the dispute remains unresolved, it shall be referred to Secretary MoEF & CC. and DG, ICAR

IN WITNESS WHEREOF, **Shri Surendra Kumar**, IFS, Director, IWST and **Dr. S. K. Singh, Director,** ICAR- NBSS& LUP, Nagpur mutually sign the agreement on the __day of _____ 2017.

For IWST

21.11.2017

Shri. Surendra Kumar, IFS
Director
Institute of Wood Science and Technology
18thCross, Malleswaram,
Bangalore-560 003

For ICAR-NBSS&LUP

Dr. S.K Singh
Director
ICAR-National Bureau of Soil Science and Land Use Planning (NBSS& LUP),
Nagpur, Maharashtra - 440007

Witnesses

1. (S. Viswanath) डॉ श्याम विश्वनाथ / Dr. Syam Viswanath वैज्ञानिक-जी / Scientist-G
2. PANKAJ AGGARWAL 21.11.2017 Scientist - B Extn Office Institute of Wood Science and Technology 18th Cross, Malleswaram Bangalore - 560 003

Witnesses

1. Chatterji (S. Chatterji)
2. (G.P. Obireddy)