Annexure – II

CERTIFICATION OF

FOREST REPRODUCTIVE MATERIAL

IN INDIA

(Revised Scheme, 1979)

सत्यमेव जयते
Government of India

Issued by

OFFICE OF THE COORDINATOR

INDO-DANISH PROJECT ON

SEED PROCUREMENT & TREE IMPROVEMENT

SAIFABAD, HYDERABAD-500 004

ANDHRA PRADESH

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FOREST REPRODUCTION MATERIAL

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SEED ZONING SYSTEM FOLLOWED

IN INDIA

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MADAN GOPAL AND P.G. PATTANATH

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Seed Zoning System Followed in India

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Madan Gopal and P.G. Pattanath

Indo-Danish Project on Seed Procurment & Tree Improvement,

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N.B. : This write-up is in pursuance of the requirement of the publication entitled. "Certification of Forest Reproductive Material in India" Revised Scheme 1979. Page 3; rule 3 (Delimiting Seed Zones;). As per this scheme, mention of seed zone number from where the reproductive material is collected, is one of the prerequisites to its certification. As such this leaflet is to be taken as a companion to the Certification Scheme.

Introduction:

The first attempt in India to create seed zones specifically to facilitate seed collection was taken up in 1978 by the Indo-Danishon Project on Seed procurement & tree improvement. This involved many considerations for a country the size of India, especially as it shows wide variations in climatic conditions, soil, physiography and species distribution. Another consideration which could not be overlooked was the administrative setup in different states of the country.

Champion and Seth (1968) described the forest types of India and divided them into six broad types ranging from tropical to alpine types. They were further divided into sixteen climatic forest types and thirty subgroups. This describes the variations in ecological conditions in relation to species distributed in the country. This knowledge is useful in understanding the range of adaptation of a species. But it does not entirely lend itself to a conversion into seed collection units, because forest type in India do not occur in continuous bends but in interrupted patches. Thus a state may contain a number of different forest types, or a given forest type may stretch from one state to another; and as each state has its own independent administrative setup the establishment of seed collection units or seed zones may become difficult it due consideration is not given to administrative boundaries.

A further complication to this situation is the fact that in the past, seeds have been obtained with out any reference to source. And this has continued to happen at

least for the last twentyfive to thirty years, when India changed its forest policy from conservation forestry to plantation forestry to meet the demands of the industries for ray material. Foresters have obtained their seeds from wherever available and mixed them all up to meet their annual plantation targets. On account of this practice, it is to be expected that genetic base of a plantation is mixed, and the areas which have been the centers of plantation activities are expected to be heterogeneous. Therefore the definition of a region of provenance as described in OECD scheme viz :-

"For a genus, species, sub species and distinct variety the region of provenance is the area or group of areas subject to sufficiently uniform ecological conditions on which are found stands showing similar genetic or phenotypic characters".

does not always, or may not always hold good for Indian conditions.

It is impractical to delineate regions of provenances for single species under Indian conditions where each species occurs in association with other species, either as predominant or frequent or occasional etc. This is especially so when we have little information on provenance variation in any species. Further the deliniation of one species into regions of provenance would overlap with another species, which occurs more or less in association causing confusion in the documentation system. This was another reason why it was found more feasible and practical from the documentation point, of view to have seed zones, with seed stands and seed production areas etc. marked out for each species within a given seed zone, instead of having regions of provenance.

Take for example teak which has a wide but discontinuous distribution in India, and occurs predominantly and frequently in tropical moist deciduous forests and tropical dry deciduous forest. It has been divided into five subgroups by Seth & Waheed Khan (1958). These are (1) very moist (2) moist (3) slightly moist (4) dry and (5) very dry teak forests. This grouping is based primarlity on average annual rainfall. Describing floristic composition (trees & shrubs) of the 5 teak types, the authors list 32 species as associates of very dry teak type, 44 species for dry teak type, 53 species for moist teak type and 13 species for very moist teak type. Some of the associates may be conspicuous in some localities but may not be so in other localities, however teak always forms constituent of the crop. A study of distribution of these 5 types on the country's map shows that each of these types, occurs in several large as well as

small tracts, widely separated from one another and at places adjoining the tracts of other types. Obviously within each of these types there may be several provenances. Further, some variations have been observed in the time of flowering, seed ripening, number of fruits per unit weight, morphological variation of tree form, texture of leaves, resistance to diseases, rate of growth, timber quality etc. But no systematic information is available on characteristics of each source. This can be obtained only after provenance tests have been conducted.

Delineation of Seed Zones on a National level

Giving due consideration to all these factors, the Project took up the exercise of delimiting seed zones, on the basis of maps showing broad forest types, along with administrative boundaries as delineated in the Forest Atlas of India. Keeping a forest division as a minimum unit, regions showing compact forest areas having more or less the same forest types were delimited into seed zones.

Country's forests were thus tentatively divided into a number of seed zones as per following criteria :

Except for hilly areas each seed zone has more or less same forest type.

Extent of seed zone is limited to territorial circle or a part thereof. This makes it some what compact and facilitates demarcation of seed collection areas and their maintenance.

It was ensured that boundaries of eaclseed zone were easily identifiable of the ground even if it entailed some compromise on criteria – (i)

In case of hill zones, each zone is to be divided into sub-zones is to be divided into sub-zones on the basis of 600 metres altitutdinal intervals.

The maps were prepared state wise and sent to Conservator of forests (research/Development) or equivalent officer in each state for corrections, modifications and final approval. Attached alongwith these maps were blank forms of SC-7 of our certification Scheme for Forest Reproductive Material, and we requested the states to fill in these forms so as to obtain division wise information on species availability. This was done because each seed zone delineated as described above,

contained a number, of species. It could not be otherwise, on account of the situations described above.

The number of seed zones approved by the different states now totals 147. Appendix-I-1 to this note gives the forest divisions included in each seed zone, altitudinal limits encountered therein, and forest types available. (N. B. : In some cases even forest division have been split into 2 or 3 parts to be included in 2 or 3 different seed zones on account of variations in ecological conditions). Map showing the boundaries and extent of these 147 seed zones has also been prepared. Its printing, however, will take some time. Appendix –II to this note is a reproduction from Champion & Seth …….. 'A Revised survery of Forest Types of India' (1968) giving classification of forest Types. This will enable the readers to judge the forest type and rough ecological status of each seed zone.

Our seed zones, therefore, may be defined as areas delineated on state forest seed zone maps for the purpose of facilitating seed collection, and as approved by the concerned Conservator of forests (Research & Development) or Equivalent Authority. Basic aims of delineating the seed zones are :-

To provide for systematic documentation of sources of seed procured for plantation programmes.

To provide a frame work for survey of genetic variation within a species and conduct trials to that effect viz provenance trails.

As we have little information on genetical traits of our plantation species, the seed zones delimited as above are essentially adhoc in their delineation at this stage. However later on, when results of provenance trials are available, it may necessitate revising the boundaries of seed zones. It may also be pertinent to point out here, that seed zones may eventually become useful to indicate (for wide spread species) those zones of their distribution range within which seeds may be transferred, and those zones which may be prohibited. This of course will be possible only after results of provenance tests are obtained.

As regards provenance trials, although trials of teak have been initiated as early as 1930 by F.R.I. in India, no conclusive results are available to date on provenance differentiation as the seeds were obtained from sources which were neither delimited, demarcated nor documented properly. For success in provenance research therefore it become necessary to develop a proper identification and documentation system of seed collection areas.

Species Availability in Seed Zones

Species listed as per form SC-7 numbered 20 initially, but different states added a few more to the list according to their local importance. This however resulted in information on some species being incomplete. This information on species availability along with states maps showing delimited seed zones were cyclostyled and circulated to states.

Further, recently a number of schemes on social forestry have also been taken up by different states and number of species being planted by the Forest Departments have suddenly increased enormously. It has thus become necessary to collect and update the information on this aspect viz species availability. This is under compilation now. However information on four species viz Teak, Semul, Chir and Kail are given hereunder.

Mapping Seed Sources of Teak

The genetic spectrum of Teak in India covers the following seed zones :- KL-I, KL-II, KL-III; KT-I, KT-III, KT-IV, KT-V, KT-VII; AP-V, AP-VI, AP-VII, AP-VIII, AP-IX, AP-X; BG-I, BH-II, BH-III, BH-V, BH-VII, BH-VIII; OS-I, OS-II, OS-III, OS-IV; WB-II, WB-III, BW-IV, WB-V, WB-VI; RJ-I, RJ-III; AS-I, AS-II, AS-III, AW-IV, QW-V; UP-I, UP-II, UP-IV, UP-V, UP-VI, UP-VII, UP-X; MH-I, MH-II, MH-III, MH-IV, MH-V, MH-VI, MH-VII; GU-I, GU-II, GU-III, GU-IV, GU-V; MP-I, MP-II, MP-III, MP-IV, MP-V, MP-VI, MP-VII, MP-VIII, MP-IX, MP-X, MP-XI, MP-XII, MP-XIII, MPXIV, MP-XV; AC-I, AC-II, AC-III, AC-IV, AC-V; AN-I, AN-II, AN-IV.

Mapping Seed Sources of *Bombax ceiba*

Similarly, the genetic spectrum of *Bombax ceiba* in India is covered by the following seed zones:- AC-III, AC-IV; AS-I, AS-II, AS-VI; AP-IX; HR-I; JK-III; MH-I, MH-V; KT-I, KT-III; KL-I, KL-II, KL-III; MP-III, MP-V, M-IX, MP-XIV; MZ-I,MZ-II. OS-I, OS-II, OS-III; RJ-I, RJ-II, RJ-IV; UP-I, UP-II, UP-III, UP-IV, UP-V, UP-VI, UP-VII, UP-VIII, UP-IX, UP-X, UP-XI; WB-II, WB-III, WB-IV, WB-V, WB-VI; BH-I, BH-II, BH-III, BH-IV, BH-V, BH-VI, BH-VII, BH-VIII; AN-I, AN-II; GU-I, GU-II, GU-III, GU-IV, GU-V, GU-VI; MG-I, MG-II, MG-III.

Mapping Seed Sources of *Pinus roxburghii*

The genetic spectrum of *Pinus roxburghii* in India is covered by the following seed zones :- UP-II, UP-III, UP-XI, UP-XII, UP-XIII, UP-XIV, HP-1, HP-II, HP-IV, HP-V, HP-VI; HP-VII; JK-I, JK-III, JK-IV, MP-IV.

Mapping Seed Sources of *Pinus Wallichiana*

The genetic spectrum of *Pinus wallichiana* in India is covered by the following seed zones :- AC-I, AC-II, AC-III, AC-IV, AC-V, JK-I, JK-II, JK-III, JK-IV, JK-V, JK-VI, JK-VII; UP-XI, UP-XII, UP-XIII, UP-XIV; HP-I, HP-II, HP-III, HP-IV, HP-V, HP-VI, HP-VII.

Importance of Seed zones

In conclusion it may be pointed out that this system will help foresters engaged in seed procurement to locate seed sources of individual species and choose the source suitable for the locations based roughly on forest types initially. It will also enable the personnel involved in provenance research, to obtain seeds of a given species from its

entire genetic spectrum. Further, where seed Certification is finally adopted by all the states, it will enable the Certification Authorities to document their seed sources in a systematic manner by which the source is easily located by even a layman.

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Appendix – 1

Seed Zones

In this that follows, each Seed Zone has been allotted a code number which consists of 2 parts separated by hyphen. First part consist of 2 letters representing the code for the state, while second part is a Roman Number allotted serially for each state, separately.

Code letters allotted to each state are as under :

S.I. No.	Name of State	Notation for Seed Zones
	Andamans & Nicobar	AN
	Arunachal Pradesh	AC
	Andhra Pradesh	AP
	Assam	AS
	Bihar	BH
	Goa	GO
	Gujrat	GU
	Haryana	HR
	Himachal Pradesh	HP
	Jammu & Kashmir	JK
	Kerala	KL
	Karnataka	KT
	Maharasthra	MR
	Madhya Pradesh	MP
	Meghalaya	MG
	Manipur	MN

Mizoram	MZ
Nagaland	NG
Orissa	OS
Punjab	PB
Rajasthan	RJ
Sikkim	SK
Tripura	TP
Tamilnadu	TN
Uttar Pradesh	UP
West Bengal	WB

State wise List of Seed Zones Showing Forest Areas Included

Seed Zone No.	Forest Divisions Included	Forest Types	Altitudinal. Limits.
	State : Andamans and Nicobar		
AN-I	(a) South Andaman Forest Division	1,3	0.90
AN-II	(a) Middle Andaman Division	1,3	0.90
AN-III	(a) Nicobar Forest Division	1,3	0.90
AN-VI	(a) North Andaman Forest Division	1,3	0.90
	State : Arunachal Pradesh		
AC-I	(a) Kameng		
AC-II	(a) Subansiri		
AC-III AC-IV	(a) Siang (a) Lohit		

AC-V	(a) Tirap		
	State : Andhra Pradesh		
AP-1	(a) Part of Chttoor West (b) Part of Chittour East (c) Most of Nellore (d) Part of Giddalur (e) Part of Markapur (f) Most of Guntur (9) Part of Eluru (h) Kakinada (i) Visakhapatnam (j) Srikakulam.	7.2	0-120
AP-II	(a) Part of Chittoor East (b) Most of Rajampet (c) Most of Cuddapha (d) Part of Nellore		
AP – III	(a) Entire Ananathapur	6	0-120
AP-IV	(a) Part of Chittoor West (b) Part of Rajamper (c) Most of Proddutur (d) Most of Murnool.		
AP-V	(a) Part of Cuddapah (b) Part of Proddutur (c) Entire Nandyal (d) Entire Atmakur (e) Entire Achampet (f) Part of Markapur (g) Most of Giddalur (h) Part of Nellore.		
Ap – VI	(a) Entire Mahaboobnagar, (b) Entire Hyderabad (c) Entire Nalgonda.	5.6	0.70
AP=VII	(a) Entire Medak, (b) entire Nizamabad (c) Entire Earimnagar West.	5.6	0.600
AP-VIII	(a) Entire Adilabad (b) Entire Nirmal (c) Entire Jannaram, 9d)		

	Entire Mancherial, (c) Entire Bellampally, (f) Entire Kagaznagar.		
AP-XI	(a) Entire Karimnagar East (b) Warangal North (c) Warangal South		
AP-X	(a) Entire Khammam, (b), Kothagudem, (c), Paioncha. (d) Bhadrachalam North (c) Part of Bhadrachalam South.		
AP-XI	(a) Most of Bhadrachalam south (b) Kakinada, (c) Part of Eluru, (d) Most of Narsipatnam, (e) Visakhapatnam, (f) Part of Srikakulam.		
AP-XII	(a) Part of Srikakulam		
State : Assam			
AS I	(a) Digboi, (b) Dumduma, (c) Lakhimpur (d) Dibrugarh		
AS II	(a) Sibsagar, (b) East Mikir		
AS –III	(a) Cachar, (b) North Cachar		
AS IV	(a) Nowgong (b) West Mikir (c) Diphu		
AS-V	(a) Goalpara (b) Dhubri (c) Kachugaon (d) Haltugaon (e) North Kamrup (f) South Kamrup		
AS-VI	(a) Darang		
	State : Bihar		
BH-1	(a) Porahat, (b) Kolhan, (c)		

	Saranda (d) South Chaibasa.		
BH-II	(a) North Chaibasa (b) Dhlbhum		
BH-III BH- IV	(a) Gumla (b) West Ranchi (c) South Daltonganj (a) North Daltonganj, (b) South Chatra (c) North Garwa, (d) Shahabad.		
BH- V	(a) North Chatra (b) South Chatra, (c) West Haxaribagh (d) East Hazaribagh, (e) Western Part of Gaya		
BH-VI	(a) Eastern part of Gaya, (b) Kodarma, (c) Giridih (d) Dhanbad.		
BH-VII	(a) Monghyr, (b) Deoghar, (c) Dumka		
BH-VIII	(a) Champaran		
	State : Goa Daman and Diu		
GO-1	(a) North Goa, (b) South Goa		
GO-II	(a) Silvasa		
	State : Gujarat		
GU-I	(a) Valsad, (b) South Dangs (c) North Dangs (d) Vyara (South of Tapti)		
GU-II	(a) Vyara (North of Tapti) (b) West Rahpipla, (c) East Rajpipla		
GU-III	(a) Chhota udepur, (d) Devgad Baria (c) Godhra, (d) Dhohad.		

GU-IV	(a) South Sabarkantha (b) North Sabarkantha, (c) Banaskantha, (d) D.R.V.P. Plaripur.		
GU-V	(a) East Gir, (b) West Gir, (c) Junagadh, (d) Ghavnagar, (e) Jamnagar, (f) Surendranagar		
GU-VI	(a) Kutch		
	State : Haryana		
HR-I	(a) Morni-Pinjore, (b) Ambala (c) Kurukshetra		
HR-II	(a) Karnal, (b) Sonipat (c) Rohtak (d) Jind. (e) Gurgaon (f) Mohindergarh (e) grugaon, (f) Mohindergarh.		
HR-II	(a) Hissar, (b) Sirsa (c) Bhiwani		
	State : Himachal		
HP-I	(a) Nahan, (b) Rajgarh (c) Sola n		
HP-II	(a) Kunihar, (b) Bilaspur (c) South Una		
HP-III	(a) Suket (b) Kotgarh (c) Kinnaur, (d) Seraj (southern Part) (e) North Simla		
HP-IV	(a) Hamirpur (b) North Una, (c) Kangra		
HP-V	(a) Nachan, (b) Kotgarh (c) Kulu, (d) Seraj (Northern Part)		
HP-VI	(a) Chamba (b) Dalhousee		
HP-VII	(a) Pangi (b) Lahul Spiti		

	State Jammu and Kashmir		
JK-I	(a) Jammu (b) Billawar (c) Udhampur		
JK-II	(a) Kishtwar, (b) Bhadwewah		
JK-III	(a) Reasi (b) Bhaderwah		
JK-III	(a) Reasi (b) Doda, (c) Ramban		
JK-IV	(a) Punch (b) Rajouri		
JK-V	(a) Kashmir (b) Pirpanjal (c) Game Reserve (Dachigam)		
JK-VI	(a) Sindh		
JK-VII	(a) Kamraj (b) Langet (c) Jhelum valley		
	State : Kerela		
KL-I	(a) Trivandrum (b) Thenmala (c) Punalur (d) Koni (e) Rani		
KL-II	(a) kottayam (b) Munnar (c) Nalayathur (d) Chalkudi (e) Trichur		
KL-III	(a) Nemmara (b) Paighat (c) Nilambur (d) Khozhikode (e) Wynad		
	State Karnataka		
KT - I	(a) Coondapur, (b) Manglore		
KT –II	(a) Mercara (b) Hassan (c) Chickmagalur (d) Koppa		
KT –III	(a) Bhadravathi (b) Shimoga (c) Sagar		
KT –IV	(a) Hunsur (b) Mysore (c)		

	Chamarajanagar (part)		
KT –V	(a) Sirsi, (b) Yellapur (c) Honnavar, (d) Karwar (e) Haliyal		
KT –VI	(a) Chamarajangar (Part) (b) Kollegal, (c) Kolar, (d) Mandya (e) Bangalore (f) Tumkur		
KT –VII	(a) Gadag (b) Bagalkot (c) Dharwad (d) Belgaum (e) Gokak		
KT –VIII	(a) Chitradurga (b) Raichur (c) Bellary (d) Gulburga (e) Bidar		
	State : Maharashtra		
MR-1	(a) Dahanu Division (b) Shahpur Division (c) West Nasik Division (d) East Nasik Division (e) Kolaba Division (h) Koya Sub-divison (i) Satara Division (i) Swantawadi division (k) Kolhapur division (i) Rathnagiri Sub-division (m) Thana division		
MR-II	(a) Ahmadnagar Division (b) Poona division (c) Satara Division (d) Sangali Sub-division (e) Kolhapur division) (f) Oamanabad Sub-division (g) Bhir Sub-divison (h) Parbhani sub-division (i) Aurangabad (j) Junnar divison (k) Sholapur division		
MR-III	(a) Nanded (b) West Yeotmal (c) Akola (d) Buldhana (e) Jalgaon (f) East Nasik (g) West Dhulia		

	(h) Amrati Sub-division		
MR-IV	(a) West Yeotmal (b) Nanded (c) East Yeotmal (d) Wardha, (e) East Melghat (f) West Melghat (g) Yawal (h) North Dhulia (i) Mewasi (j) West Dhulia		
MR-V	(a) Nagpur (b) West Chanda (c) Central Chanda		
MR-VI	(a) Bhandara Division (b) Gondia (c) South Chanda		
MR-VII	(a) Allapalli (b) Bhamragahr, (c) South Chnada		
	State : Madhya Pradesh		
MP- I	(a) Bori reserv Hoshandgabad		
MP-II	(a) North Bastar (b) East Bastar (c) Central Bastar (d) South Bastar (e) West Bastar		
MP-III	Hoshangabad (Except Bori Reserve)		
MP-IV	(a) North Mandla (b) South Mandla (c) North Balaghat (d) South Balaghat (e) South Seoni		
MP-V	(a) Kanker (b) North Rajpur (c) South Raipur (d) East Raipur		
MP-VI	(a) Bilaspur (b0 North Bilaspur (c) Raigarh		
MP-VII	(a) North Surguja (b) South Surguja (c) Jashpur		
MP-VIII	(a) Rajnandagon (b) Durg		

MP- IX	(a) Sidhi (b) Korea (c) North Schaddol (d) South Shahdol (e) Umaria.		
MP-X MP-XI MP-XII	(a) Rewa (b) Panna (c) Chatarpur (a) Sugar (b) Damoh (c) Jabalpur (d) Narsinghpur (a) North Seoni (b) West Chhindwara (c) East Chhindwara (d) North Betul (e) South Betul (f) Harda (g) N. Khandwa		
MP-XIII	(a) Bhopal (b) Raisen (c) Sehore (d) Dewas (e) Indore (f) Dhar.		
MP-XIV	(a) Jhabua (b) West Khargone (c) East Khargone (d) South Khandwa		
MP-XV	(a) Gwalior (b) Sheopur (c) Shivpuri (d) Guna (e) Tikamgarh.		
	State : Meghalaya		
MG- 1	(a) Jaintia Hills Division		
MG- II	(a) Khasi Hills Division		
MG- III	(a) Garo Hills		
	State : Manipur		
MM - I	(a) Manipur		
 MZ-I	State : Mizoram (a) Aizawl Division		
MZ - II	(a) Kolasib Division		
MZ- III	(a) Lunglei Division		
	State : Nagaland		

NG- I	(a) Nagaland		
	State : Orissa		
OS- I	(a) Jeypore, (b) Nowrangpur, (c) Kalahandi (d) Khariar, (e) Balangir (f) Phulbani		
OS -II	(a) Parlakimidi, (b) South Ghumsar, (c) Baliguda, (d) North Ghumsar (e) Nayagarh, (f) Puri (g) Rayagada		
OS-III	(a) Angul (b) Athgarh (c) Dhenakanal (d) Keonjhar, (e) Karanjia (f) Baripada.		
OS-IV	(a) Rairakhol (b) Sambalpur (c) Sundargarh, Bonal, (e) Deogarh (f) Bamra		
	State : Punjab		
PB-I	(a) Hoshiarpur (b) Ropar (c) Amritsar (d) Gurdaspur		
	State : Rajasthan		
RJ - I	(a) Jhalawar (b) Kota (c) Bundi (d) Baran		
RJ - II	(a) Tonk (b) Bharatpur (c) Jaipur (d) Ajmir minus, Aravallis		
RJ - III	(a) Chittauragarh (b) Udaipur minus Aravillis (c) Banswara		
RJ - IV	(a) Aravallis Portion of Ajmir, (b) Aravallis Portion of Udaipur, (c) Sirohi (d) Aravallis portion of Jodhpur.		

RJ - V	(a) Rest of Jodhpur		
	State : Sikkim		
SK -I	(a) Sikkim		
	State : Tripura		
TP - I	(a) Tripura		
	State : Tamilnadu		
TN - I	(a) Kanyakumari		
TN - II	(a) Tirunelvelli		
TN - III	(a) Ramangathapuram		
TN-IV	(a) North Medurai (b) South Madurai		
TN-V	(a) Tiruchi		
TN - VI	(a) Thanjavur		
TN - VII	(a) Anamalai wild life sanctuary (b) Coimbatore		
TN - VIII	(a) Nilgiris North, (b) NIlgiris South (c) Gudalur		
TN - XI	(a) Erode, (b) Sathyamangalam		
TN- X	(a) Salem		
TN - XI	(a) Cuddalore, (b) Kallakurichi		
TN- XII TN - XIII	(a) Dharmapuri (b) Hosur (a) Tirupattur (b) Vellore		
TN - XIV	(a) Chingleput		
	State : Uttar Pradesh		
UP - I	(a) West Dehradun (b) Siwalik		
UP- II	(a) Bijnor (b) Lansdowne (c) East		

	Dehradun		
UP - III	(a) Western half of Taria & Bhabar (b_ Ramanagar (c) Kalagarh		
UP - IV	(a) Eastern half of Taria & Bhabavr (b) Haldwani (c) Rohilkhand		
UP- V	(a) Pilibhit (b) South Kheri (c) North Kheri		
UP- VI	(a) Bahariach (b) North Gonda (c) South Gonda		
UP- VII	(a) Gorakhpur		
UP- VIII	(a) Norhtern Doab (b) Southern Doab, (c) Vrajbhumi, (d) Ravine Reclamation (e) Avadh.		
UP - IX	(a) Faizabad Afforestation (b) Varansasi (c) North Mirzapur (d) Dudhi (e) Aghori Vijaigarh.		
UP - X	(a) Bundelkand division (b) Banda Division		
UP - XI	(a) Chakrata (b) Tons		
UP - XII	(a) Tehri (b) Uttarakahsi (c) Yamuna		
UP- XIII	(a) Badrinath (b) Kedarnath (c) Garhwal		
UP-XIV	(a) East Almora, (b) Pithoragarh (c) West Almora (d) Nainital		
	State : West Bangal		
WB-I	(a) Sunderbans of Twenty four		

	parganas		
WB-II	(a) Puruliy (b) Bankura (c) Birbhum (d) Bardhaman (e) East Midnapur (f) West Midnapur.		
WB-III	(a) Kalimpang		
WB-IV	(a) Darjeeling (b) Karsiyang		
WB - V	(a) Baikuntpur (b) Jalpiaguri		
WB - VI	(a) Cooch Behar (b) Buxa		

Broad Forest Types Occurring in Seed Zones

Forest Types	Notations
Tropical wet evergreen forests	1
Tropical semi evergreen forests	2
Tropical Moist deciduous forests	3
Littoral and swamp forests	4
Tropical dry deciduous forests	5
Tropical thorn forests	6
Tropical dry evergreen forests	7
Sub-tropical Broadleaved hill forests	8
Sub-tropical pine forests	9
Sub-tropical dry evergreen forests	10
Montane wet temperate forests	11
Himalayan dry temperate forests	12
Himalayan Moist Temperate Forests	13
Sub-alpine forests	14
Moist alpine scrub	15

Dry alpine scrub 16

Appendix – II

Revised classification of Indian forest types

I – Moist Tropical Forests

Group –1 Tropical Wet Evergreen forests

Sub-group 1 A Southern tropical wet evergreen forests :

C1 (Giant evergreen forests)

C2 Andamans tropical evergreen forest

E1 (Andamans moist deciduous forests)

C3 Southern hill top tropical evergreen forest

C4 West Coast tropical evergreen forest

Sub-group 1B – Northern tropical wet evergreen forests :-

C1 Assam valley tropical wet ever green forest (Dipterocarpus)

C2 Upper Assam valley tropical evergreen forest Kayea forest Mesua forest

C3 Cachar tropical evergreen forest

General edaphic and seral types of wet evergreen forests:

E1 Cane brakes

E2 Wet bamboo brakes

2S1 Pioneer Euphorbiaceus scrub

Group –2 Tropical Semi-Evergreen forests

Sub-group 2A- Southern tropical Semi-evergreen forests :-

C1 Andamans Semi-evergreen forest

C2 West Coast Semi-evergreen forest

C3 Tirunelveli semi-evergreen forest

2S1 West coast secondary evergreen Dipterocarp forest

Sub-group 2B- Northern tropical evergreen forests :

C1 Assam valley semi-evergreen forest

1a Assam alluvial plains semi-evergreen forest

1b Eastern submontane semi-evergreen forest

1S1 Sub-Himalayan light alluvial semi-evergreen forest

1S2 Syzygium parkland

2S1 (Pioneer Euphorbiaceous scrub)

2S2 Eastern alluvial secondary semi-evergreen forest

2S3 Sub-Himalayan secondary wet mixed forest

C2 Cachar semi-evergreen forest

C3 Orissa semi-evergreen forest

General edaphic and seral types of semi-evergreen forest :

E1 (Cane brakes)

E2 (Wet bamboo brakes)

E3 Moist bamboo brakes

E4 Lateritic semi-evergreen forest

2S1 Secondary moist bamboo brakes

Group 3 – Tropical Moist Deciduous Forests

Sub-group 3A- Tropical Moist Deciduous Forests

C1 Andamans moist deciduous forest

2S1 Andamans secondary moist deciduous forest

Sub-group 3B – South Indian moist deciduous forests:

C1 Moist teak-bearing forest

1a Very moist teak forest

1b Moist teak forest

1c Slightly moist teak forest

C2 Southern moist mixed deciduous forest

2S1 Southern Secondary moist mixed deciduous forest

Sub-Group 3C North Indian moist deciduous forest:

C1 Very moist sal-bearing forest

1a Eastern hill sal forest

East Himalayan sal

Khasi hill sal

1b Eastern bhabar sal forest

East Himalayan upper bhabar sal

East Himalayan lower bhabar sal

1c Eastern tarai sal forest

1d Peninsular (coastal) sal forest

C2 Moist sal-bearing forest

2a Moist Siwalik sal forest

2b Moist bhabar sal forest

Bhabar-Dun sal

Damar sal

2c Moist tarai sal forest

2d Moist plains sal forest

Western light alluvium plains sal

App. Kamrup Sal

Eastern heavy alluvium plains sal

App. Kamrup Sal

2e Moist peninsular sal forest

Moist peninsular sal forest

Moist peninsular low level sal

Moist peninsular valley sal

DS1 Moist sal savannah

C3 Moist mixed deciduous forest (without sal)

3a West Gangetic moist mixed deciduous forest

3b East Himalayan moist mixed deciduous forest

2S1 Northern secondary moist mixed deciduous forest

2S2 (Secondary Euphorbiaceous scrub)

General edaphic and seral types of moist deciduous forests :

E1 Terminalia tomentosa forest

1S1 Low alluvial savannah woodland (*Salmalia-Albizzia*)

1S2 Eastern hollock forests (*Terminalia myriocarpa*)

2a *Terminalia-Lagerstroemia*

2b Terminalia-Duabanga

2S1 (Dry bamboo brakes)

Group 4- Littoral and Swamp Forests

Sub-group 4A- Littoral forests :

L1 Littoral forest

Sub-group 4B-Tidal swamp forests:

TS1 Mangrove scrub

TS2 Mangrove forest

TS3 Saltwater mixed forest (*Heritiera*)

TS4 Brackish water mixed forest (*Heritiera*)

E1 Palm swamp

Sub- Group 4C – Tropical freswater swamp forests :

FS1 *Myristica* swamp forest

FS2 Submontane hill valley swamp forest

FS3 Creeper swamp forest

Sub-group 4D- Tropical seasonal swamp forests :

SS1 Eastern seasonal swamp forest

SS2 *Barringtonia* swamp forest

SS3 Syzygium cumini swamp low forest

SS4 Eastern seasonal swamp low forest (*Cephatanthus*)

SS5 Eastern *Dillenia* swamp forest

2S1 (*Syzygium* parkland)

2S2 (Eastern wet alluvial grassland)

Sub-group 4E – Tropical riparian fringing forests:

RS1- Riparan fringing forest

II Dry Tropical Forests

Group 5- Tropical Dry Deciduous Forests

Sub-group 5A Southern tropical dry deciduous forests :

C1 Dry teak-bearing forest

1a Very dry teak forest

1b Dry teak forest

C2 Dry red sanders-bearing forest

C3 Southern dry mixed deciduous forest

Sub-group 5B- Northern tropical dry deciduous forests :

C1 Dry sal-bearing forest

1a Dry Siwalik sal forest

1b Dry plains sal forest

1c Dry peninsular sal forest

C2 Northern dry mixed deciduous forest

Degradation stages of tropical deciduous forests :

DS1 Dry deciduous scrub

DS2 Dry savannah forest

DS3 (*Euphorbia* scrub)

DS4 (Dry grassland)

General edaphic types of dry deciduous forests:

E1 *Anogeissus pendula* forest

DS1 *Anogeissus pendula* scrub

E2 *Boswellia* forest

E3 Babul forest

E4 *Hardwickia* forest

E5 Butea forest

E6 Aegle forest

E7 Laterite thorn forest

E8 Saline/alkaline scrub savannah

8a *Phoenix* savannah

8b Babul savannah

8c *Salvadora-Tamarix* scrub

E9 Dry bamboo brake

General seral types of dry deciduous forests :

1S1 Dry tropical riverain forest

1S2 Khair-sissu forest

1S3 Inundation babul forest

2S1 Secondary dry deciduous forest

Group 6 – Tropical Thorn Forests

Sub-group 6A- Southern tropical thorn forests :

C1 Southern thorn forest

C2 Karnatak umbrella thorn forest

DS1 Southern thorn scrub

DS2 Southern Euphorbia scrub

Sub-group 6B- Northern tropical thorn forest :

C1 Desert thorn forest

C2 Ravine thorn forest

DS1 *Zizyphus* scrub

DS2 Tropical *Euphorbi*a scrub

General edaphic, degraded and seral types of thorn forests :

E1 (Euphorbia scrub)

E2 Acacia Senegal forest

E3 Rann saline thorn forest

E4 Salvadora scrub

DS1 *Cassia auriculata* scrub

1S1 Desert dune scrub

Group 7- Tropical Dry Evergreen forests

C1 Tropical dry evergreen forest

DS1 Tropical dry evergreen scrub

III- Montane sub-Tropical Forests

Group 8- Sub-tropical Broadleaved Hill Forests

Sub-group 8A- Southern Sub-Tropical broadleaved hill forests :

C1 Nilgiri sub-tropical hill forest

DS1 South Indian sub-tropical hill savannah (Woodland)

E1 Reed brakes (*Ochlandra*)

C2 Western sub-tropical hill forest

C3 Central Indian sub-tropical hill forest

DS (Degradation stages of southern sub-tropical broadleaved hill forest)

Sub group 8B-Northern sub tropical broadleaved wet hill forest:

C1 East Himalayan sub-tropical wet hill forest

C2 Khasi sub-tropical wet hill forest

2S1 (Assam sub-tropical pine forest)

DS1 (Assam sub-tropical hill savannah woodland)

Group 9- Sub-tropical Pine Forests

C1 Himalayan sub-tropical pine forest

1a Lower or Siwalik chir pine forest

1b Upper or Himalayan chir pine forest

DS1 Himalayan sub-tropical scrub

DS2 Sub-tropical Euphorbia scrub

C2 Assam sub-tropical pine forests

DS1 Assam sub-tropical pine savannah

Group 10- Sub-tropical Dry Evergreen Forests

C1 Sub-tropical dry evergreen forest

1a *Olea cuspidata* scrub forest

1b *Acacia modesta* scrub forest

DS1 *Dodonaea* scrub

IV- Montane Temperate Forest

Group 11-Montane Wet Temperate Forests

Sub- Group IIA- Southern montane wet temperate forest:

C1 Southern montane wet temperate forest

DS1 Southern montane wet scrub

DS2 Southern montane wet grassland

Sub-group 11-B Northern montane wet temperate forests :

C1 East Himalayan wet temperate forests

1a Lauraceous forest

1b Buk oak forest

1c High-level oak forest

C2 Nagahills wet temperate forests

Group 12- Himalayan moist Temperate Forests

C1 Lower Western Himalayan temperate forest

1a Ban oak forest (*Q. incana*)

1b Moru oak forest (*Q. dilatata*)

DS1 Oak scrub

1c Moist deodar forest (*Cedrus*)

1d Western mixed coniferous forest (spruce, blue, pine, silver fir)

1e Western mixed coniferous forest (spruce, blue, pine, silver fir)

1e Moist temperate deciduous forest

1f (Low-level blue pine forest (P. wallichiana)

DS1 Oak scrub

DS2 Himalayan temperate secondary scrub

C2 Upper West Himalayan temperate forest

2a Kharsu oak forest (*Q. semecarpifolia*)

2b West Himalayan upper oak/fir forest)

2c (Moist temperate deciduous forest)

C3 East Himalayan moist temperate forest

3a East Himalayan mixed coniferous forest

3b *Abies delavayi* forest

Degradation stages of Himalayan moist temperate forests :

DS1 Montane bamboo brakes

DS2 Himalayan temperate parkland

DS3 Himalayan temperate pastures

General edaphic and seral types of Himalayan moist temperate forests:

E1 Cypress forest

1S1 Alder forest

1S2 Riverain blue pine forest

2S1 Low-level blue pine forest

Group 13-Himalayan Dry Temperate forests

(i) Western types

C1 Dry broadleaved and coniferous forest (Quercus ilex-p geradiana)

C2 Dry temperate coniferous forest

2a Neoza pine forest (*P. geradiana*)

2b Dry deodar forest (Cedrus)

DS1 Pohu scrub

DS2 Dry temperate scrub

C3 (West Himalayan dry temperate deciduous forest)

C4 West Himalayan high-level dry blue pine forest (P. wallichiana)

C5 West Himalayan dry Juniper forest (*F. macropoda*)

(iii) Eastern types

C6 East Himalaya n dry temperate coniferous forest

E1 Larch forest (*L. griffithiana*)

C7 East Himalayan dry Juniper/birch forest (F. wallichiana)

General seral types of dry temperate forests :

1S1 *Hippophae/Myricaria* scrub

1S2 *Populus/Salix* forest

1S3 (Western high-level dry blue pine forest)

V-Sub Alpine Forests

Group 14- Sub Alpine Forests

C1 West Himalayan sub-alpine birch/fir forests (Betula/Abies)

1a West Himalayan sub-alpine fir forest

1b West Himalayan sub-alpine birch/fir forest

C2 East Himalayan sub-alpine birch/fir forest

Seral and degraded types of sub-alpine forests :

1S1 (*Hippophae/Myricaria* brakes)

1S2 (Deciduous sub-alpine scrub)

2S1 (sub-alpine blue pine (P. Wallichiana forest)

DS1 Sub-alpine pastures

VI-Alpine Scrub

Group 15 Moist Alpine Scrub

C1 Birch/-Rhododendron scrub forest

C2 Deciduous alpine scrub

E1 Dwarf Rhododendron scrub

E2 (Dwart juniper scrub)

C3 (Alpine pastures)

Group 16- Dry Alpine Scrub

C1 Dry alpine scrub

E1 Dwarf juniper scrub.

The road to wisdom

The road to wisdom ? –

Well, it’s plain and simple to express :

Err

And err

And err again

But less

And less

And less.

-PIET HEIN