



Report of the Committee

To

Formulate Objective Parameters for

Identification of Inviolable Forest Areas

Ministry of Environment and Forests,

Government of India

July 2012

1. Introduction

1.1. The Group of Ministers (GoM) constituted by the Cabinet Secretariat vide their O.M. No. 121/4/3/2010-Cab. dated 03.02.2011 to consider the environmental and developmental issues relating to coal mining and other development projects, in its fifth meeting held under the Chairmanship of the Hon'ble Finance Minister on 20th September 2011 *inter-alia* suggested that identified pristine forest areas where any mining activity would lead to irreversible damage to the forests should be barred from any kind of non-forest activity. The GoM further suggested that all such forests which can never be regenerated to the desired quality should be protected. The GoM therefore suggested that a committee comprising experts in the field can be constituted to identify such forests.

1.2. The Ministry of Environment and Forests (MoEF) after examination of the matter observed that for identification of such forest areas throughout India in an objective and unbiased manner, it will need to constitute two Committees. The first committee to formulate objective parameters for identification of such inviolate forest areas for any mining and related activities and after approval, the second committee to actually identify and prepare geo-referenced maps of the areas that meet the identified parameters in each State/ Union Territory.

1.3. The MoEF vide order dated 30.03.2012 therefore, constituted a committee under the Chairmanship of Secretary, Environment and Forests to formulate parameters for identification of pristine forest areas where any non-forestry activity would lead to irreversible damage, and such other forest areas which need to be conserved and protected to meet the larger objective of the long term conservation of forests and wildlife resources in the country. Apart from representatives of various institutes/organization such as National Bio-diversity Authority, Forest Survey of India, Wildlife Institute of India and National Tiger Conservation Authority, Principal Chief Conservators of Forest of Meghalaya, Tamilnadu, Madhya Pradesh, Rajasthan, Uttarakhand, Odisha and Rajasthan are also included as members of the committee. A copy of the MoEF's said order dated 30.03.2012 is enclosed as **Annexure-I**.

2. Broad Principles for Identification of Inviolate Areas

The inviolate areas are sites of significance for conservation of biodiversity (floral and faunal) and forest types that are unique and ecologically important. Besides these, the forested areas having high density coverage that are important for rendering invaluable ecological services, also need protection and conservation for sustainability of these

services through the generations. To identify and prioritize such sites/areas, global standard criteria and thresholds through effective, justifiable and transparent process using the best available scientific data/information to map such areas. Keeping this in mind, the Committee has identified following measurable parameters for identification of inviolate areas.

A. Forest Type:

Our country is endowed with a wide range of edaphic, climatic and physiographic conditions. This has resulted in a vast diversity of flora and fauna bringing the country within the mega diversity regions of the world. Of the 178 forest types identified in the country's forests as per 'Champion and Seth' classification (1968), many of them are unique (and therefore irreplaceable) to a particular site while some of these forest types, such as Tropical Wet Evergreen forests, are ecologically sensitive as they harbor a wide range of species diversity. Likewise, there are several forest types (e.g. Myristica swamp forest, reed breaks, desert dunes scrub etc.) which are either very small in extent and are found in one or few localities in the entire country and are hence irreplaceable. Based on the principles of their comparative ecological significance, extent and range, uniqueness etc. an attempt has been made to score these types on a scale of 1-100.

B. Biological Richness:

Biodiversity offers enormous economic and environmental values that are critical for human well-being. It is, however, imperiled by threats of habitat loss, degraded/impaired ecological processes, habitat fragmentation and climate change. Safeguarding significant/inviolate areas forms the backbone of biodiversity conservation. Sites of high irreplaceability and high vulnerability have the highest conservation urgency. Indian Institute of Remote Sensing have carried out biodiversity characterization for the country as a whole at landscape levels. Prioritization of the area based on the IIRS data on biodiversity, may be useful for scoring a site on the basis of this parameter.

C. Wildlife Value:

The country has a network of protected areas (PAN) in its forests. Although, global average for PAN coverage is 12%, India has only 4.9% of its geographical area under PAN comprising notified sanctuaries and national parks. These areas enjoy legal protection under Wild Life (Protection) Act, 1972 and specific provisions thereto, prohibit diversion of these areas for activities which are ecologically incompatible and may adversely affect their integrity. These PAs should therefore, be treated as inviolate. However, besides the

protected areas, there are corridors that connect these and special wildlife habitat such as wetlands, breeding sites of important bird species, congregation sites which also need to be conserved and preserved for the persistence of biodiversity. Based on these considerations, scoring criteria have been developed for assigning wildlife values to a site.

D. Forest Cover:

Forest cover density is an important parameter for assessing the health of a forest ecosystem. Biennial estimates of forest cover in country are made by Forest Survey of India and presented in India State of Forest Report (ISFR). As per ISFR 2011, very dense forests (having crown density more than 70 %) constitute only 2.54% of the geographical area, while moderately dense forest (having crown density from 40 % to 70 %) and open forest (having crown density from 10 % to 40 %) are 9.76% and 8.75% respectively. Scoring for forest cover can be done by averaging the gross forest cover and weighted forest cover, both expressed as fraction of the total area, multiplied by hundred.

E. Landscape Integrity

Integrity of landscape is an important factor to ensure integration of various elements of habitats, thereby fulfilling the requirement of connectivity, livelihoods and contiguity among them, besides lending aesthetic values. The world over, landscape approach is being adopted in land resources management and conservation. From biodiversity prospective also, it provides necessary gradients for species movement and their dispersion, thus ensuring their sustainability. Based on the land-use pattern and vegetation, some areas representing integrity of landscape, therefore, need to be protected for aforesaid reasons. An attempt has been made to give scores to such landscapes as visualized on satellite imageries/maps for the purpose of this exercise.

F. Hydrological Value:

Forests play important role in maintenance of hydrological cycle. Water is regarded as one of the important products of the forests. Maintenance of forest cover in catchment area of first order perennial streams is important for survival of these streams.

All the aforesaid parameters are measurable and information on these can be collected/compiled from data sources at Forest Survey of India (FSI), Wildlife Institute of

India (WII) and Indian Institute of Remote Sensing (IIRS)/National Remote Sensing Centre (NRSC) etc. The information being available in geo-spatial format, it is possible to carry out analysis in a GIS mode, and also facilitate storage and retrieval of information for developing a Decision Support System in a transparent and objective manner.

2.1. Methodology for identification of inviolate areas

For identification of inviolate areas, the country will be divided into 1 km x 1 km grids. For each cell of a grid, scores, based on the aforesaid parameters will be given. These scores shall be averaged for each grid. Based on the threshold average score, each grid would be assigned the attribute of 'inviolate', as necessary.

2.2 Decision Rules for inviolate areas

The basic unit for identification of inviolate areas would be a grid of 1 km x 1 km size on a map/imagery. Aggregate average score for each of the grid shall be worked out using an automated system and making use of forest cover/forest type map (digital data) of FSI, WL Map prepared by WII and biodiversity related data of IIRS. Following decision rules may be used for labelling each grid as inviolate.

Decision Rule 1

All the grids falling in Protected Areas (National Parks and Wildlife Sanctuaries), areas located within 1 km distance from boundary of protected areas, compact patches (of minimum 1 km sq size) of very dense forests, last remnants of forest types having total geographical area in entire country less than 50 sq. km, areas located in direct draining catchment of first-order perennial streams being utilised as water source/feeder stream for water supply schemes for towns and other habitations, areas located in direct draining catchment of the first-order perennial streams feeding hydro power/irrigation/ hydro power projects, and areas located within 250 meter distance from banks of the perennial streams/rivers and boundary of important wetlands (having area more than 10 ha.) and storage reservoirs of water supply/ irrigation/ hydro power projects / multi-purpose projects shall be automatically labelled inviolate.

Decision Rule 2

Grids whose average score exceeds 70 (out of 100) shall also be labelled as inviolate.

Decision Rule 3

Mining Blocks shall be considered inviolate if a majority of grids falling within a block have been labelled as inviolate.

3. Assigning Score for Each Parameter

3.1 Forest Cover

3.1.1 The FSI estimates forest cover of the country at an interval of every two years and publishes it in the form of State of Forest Reports. The latest forest cover (ISFR, 2011) layers prepared by the Forest Survey of India will be utilised to assign scores for forest cover.

3.1.2 Score for forest cover will be average of the gross forest cover and weighted forest cover, both expressed as fraction of the total area, multiplied by one hundred.

3.1.3 Gross forest cover will be the sum-total of the area of the open forest¹, moderately dense forests² and the very dense forests³.

3.1.4 Similarly weighted forest cover is defined as below:

Weighted forest cover: Area of open forest x 0.25 + Area of moderately dense forest x 0.55 + Area of very dense forest x 0.85.

3.2 Forest Type

3.2.1 The FSI has prepared forest type map by mapping of 178 forest types (of natural origin) and plantations/ trees outside forests available in the country.

¹ Forests having canopy density between 10 % to 40% and average canopy density 0.25

² Forests having canopy density between 40 % to 70% and average canopy density 0.55

³ Forests having canopy density more than 70% and average canopy density 0.85

3.2.2 Based on the functional value and abundance/rarity, each forest type has been assigned a score on 0 to 100 scale. Details of the same are given in **annexure-II**.

3.2.3 To prevent disappearance of the last remnant of each forest type, all those forest types having total area less than 50 km² have been assigned score of 100.

3.3 Biological Richness

3.3.1 The Indian Institute of Remote Sensing (IIRS) has prepared biological richness map of the country. Biological richness of a landscape as per the said map is determined as a function of ecosystem uniqueness (EU), species diversity (H), biodiversity value (BV), terrain complexity and disturbance index (DI).

3.3.2 The Biological Richness (BR) for preparation of the said map has been calculated as below:

Biological Richness = f {Ecosystem uniqueness, species richness or diversity, biodiversity value, terrain complexity and disturbance index}

$$BR = \sum_{i=1}^n (DI_i \times Wt_{i1} + TCI_i \times Wt_{i2} + SRI_i \times Wt_{i3} + BV_i \times Wt_{i4} + EU_i \times Wt_{i5})$$

where Wt = Weightages.

3.3.3 Disturbance index (DI) used in calculation of Biological richness has been computed by adopting a probabilistic weightage based linear combination of the defined parameters, as below:

Disturbance Index = f {fragmentation (F), porosity (P), interspersion (I), biotic interference (B), juxtaposition (J)}

3.3.4. The output Biological Richness spatial layer has been scaled to (0 - 100).

3.4 Wildlife Value

3.4.1 All protected areas notified under Wild Life (Protection) Act, 1972 would automatically be categorised as inviolate. However, the score for wildlife value of areas falling outside PAN would be based on its intrinsic value as wildlife habitat.

3.4.2 Rules for assigning score for wildlife value will be as below:

Description of Area	Score
Exclusive breeding sites/ habitats of rare/ endangered species even if they are not notified as Wildlife Sanctuary/ National Parks	95
Areas located outside the protected area network but located in critical migratory corridors linking important wildlife habitats	90
Area located within the eco-sensitive zones (beyond 1 km distance from boundary) around periphery of protected areas and buffer zone of tiger reserves.	75
Areas notified as Conservation Reserves	70
Areas located outside the protected area network but having presence of more than 5 Schedule-I wildlife species	60
Areas located outside the PA and having occasional presence of wildlife	25

3.5 Landscape Integrity

Depending on the level of fragmentation, size and distance from boundary of the un-fragmented landscapes in which these areas are located, a score of 0 to 100 scale will be assigned.

3.5.1 Rules to assign score for landscape integrity will be as below:

Description of Area	Score
Area located at or near the centre of an un-fragmented landscape having more than 1,000 sq. km area	100
Area located at or near the centre of an un-fragmented landscape having area between 500 – 1000 sq. km	90

Area located at or near the centre of an un-fragmented landscape having area between 100 - 500 sq. km	80
Area located at or near the centre of an un-fragmented landscape having area less than 100 sq. km	70
Areas located in the totally fragmented landscapes having not a single un-fragmented patch of size more than 5.00 hectare within and 2 km distance from boundary of the cell	0

3.6 Hydrological Value

3.6.1 The score for hydrological value of an area will be based on utility of area as catchment for a perennial/seasonal stream/river, economic importance of the river/streams fed by the catchment and distance from river/stream/wetland bank etc.

Detailed rules for assigning the score for hydrological value of an area are as below:

Description of Area	Score
Area located in catchment area of water supply schemes, not being a part of the catchment area of any first order perennial stream	75
Areas located within 100 meter distance from the banks of major seasonal streams/rivers	70
Area located in catchment area of hydro power/ irrigation/multi-purpose projects not being a part of the catchment area of a first order perennial stream	60
Area located in catchment area of perennial rivers having no hydro power/ irrigation/multi-purpose projects on them and also not being a part of the catchment area of a first order perennial stream	55
Area located in catchment area of important seasonal streams/rivers having no hydro power/ irrigation/multi-purpose projects on them	50
Area not being catchment of any perennial or any major seasonal stream/river	40

The methodology adopted if approved may be placed in the public domain for comments before adoption.

4. Strategy for Identification of Inviolate Areas

4.1 Keeping in view that country-wide geo-spatial data for all the six parameters are already available, a committee will be constituted under Chairmanship of the Director General, FSI and consisting of representatives of the WII, National Biodiversity Authority, National Tiger Conservation Authority and concerned State Forest Departments and State Remote Sensing Application Centres to identify the areas which as per decision Rules indicated in para 2.2 may be defined as inviolate and submit a list along with geo-referenced map of such candidate inviolate areas to the Ministry of Environment & Forests.

4.2 On receipt of the list along with geo-referenced maps of the candidate inviolate areas, the MoEF will place a list of such inviolate areas on website of the Ministry to seek comments of public and other stakeholders within a stipulated period. The list and geo-referenced maps of candidate inviolate areas will also be sent to the concerned State/Union Territory Governments for their comments.

4.3 After considering the views of the concerned State/ UT Governments and other stakeholders, MoEF will finalize the list and maps of inviolate areas in each State/ UT and will notify them under the Environment (Protection) Act, 1986.

Annexure-I

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F. No. 11-168/2009-FC (pt.)
Government of India
Ministry of Environment and Forests
(FC Division)

Paryavaran Bhawan,
 CGO Complex, Lodhi Road,
 New Delhi - 110 510.
 Dated: 30th March, 2012

ORDER

Whereas, a Group of Ministers (GoM) constituted by the Cabinet Secretariat vide their O.M. No. 121/4/3/2010-Cab. dated 03.02.2011 to consider the environmental and developmental issues relating to coal mining and other development projects, in its fifth meeting held under the Chairmanship of the Hon'ble Finance Minister on 20th September 2011 *inter-alia* suggested that identified pristine forest areas where any mining activity would lead to irreversible damage to the forests should be barred from any kind of non-forest activity;

2. And whereas, the GoM further suggested that all such forests which can never be regenerated to the desired quality should be protected;

3. And whereas, the GoM further suggested that a committee comprising experts in the field can be constituted to identify such forests;

4. And whereas, this Ministry after examination of the matter decided that for identification of pristine forest areas where any mining activity would lead to irreversible damage, and such other forest areas which needs to be conserved and protected to meet the larger objective of the long term conservation of forests and wildlife resources in the country, in an objective and unbiased manner, it may constitute two Committees. **First** to formulate objective parameters for identification of such areas, and **second** to actually identify and prepare geo-referenced maps of the areas that meet these parameters;

5. Now therefore, it is hereby decided that a committee, with the following composition, is constituted with immediate effect to formulate objective parameters for identification of inviolate forest areas:

1.	Secretary, Environment & Forests, Govt. of India	Chairman
2.	Director General of Forests & Special Secretary to the Government of India	Member
3.	Addl. Director General of Forests (Wildlife), Ministry of Environment & Forests, Govt. of India	Member
4.	Addl. Director General of Forests (Forest Conservation), Ministry of Environment & Forests, Govt. of India	Member
5.	Chairperson, National Bio-diversity Authority, Chennai	Member

6.	Director General, Forest Survey of India, Dehradun	Member
7.	Director, Wildlife Institute of India, Dehradun	Member
8.	Member Secretray, National Tiger Conservation Authority (NTCA)	Member
9.	Principal Chief Conservator of Forests, Madhya Pradesh	Member
10.	Principal Chief Conservator of Forests, Tamil Nadu	Member
11.	Principal Chief Conservator of Forests, Uttarakhand	Member
12.	Principal Chief Conservator of Forests, Orissa	Member
13.	Principal Chief Conservator of Forests, Meghalaya	Member
14.	Principal Chief Conservator of Forests, Rajasthan	Member
15.	Joint Secretray, Impact Assessment Division, MoEF	Member
16.	Inspector General of Forests (Forest Conservation), MoEF	Member-Secretray

6. And, it is further decided that committee will submit its report within one month from date of its constitution.

Sd/

(H.C. Chaudhary)

Assistant Inspector General of Forests

1. Chairperson, National Bio-diversity Authority, Chennai.
2. Director General, Forest Survey of India, Dehradun.
3. Director, Wildlife Institute of India, Dehradun.
4. The Member Secretray, National Tiger Conservation Authority (NTCA).
5. Principal Chief Conservator of Forests, Madhya Pradesh.
6. Principal Chief Conservator of Forests, Tamilnadu.
7. Principal Chief Conservator of Forests, Uttarakhand.
8. Principal Chief Conservator of Forests, Orissa.
9. Principal Chief Conservator of Forests, Meghalaya.
10. Principal Chief Conservator of Forests, Rajasthan.
11. Sr. PPS to Secretray, Environment & Forests, MoEF.
12. Sr. PPS to DGF &SS, MoEF.
13. Sr. PPS to Addl. DGF (WL), MoEF.
14. Sr. PPS to Addl. DGF (FC), MoEF
15. PS to IGF (FC), MoEF.
16. PS to JS (RG), MoEF.

Annexure-II

Forest Types of the Country and Their Respective Scores

Sl. No	Forest Type	Area (in Km ²)	Score
Group 1 Tropical Wet Evergreen Forests			
1	1A/C1 Giant evergreen forest	39.43	100
2	1A/C2 Andaman tropical evergreen forest	2933.23	95
3	1A/E1 (Andamans moist deciduous forest)	160.04	100
4	1A/C3 Southern hilltop tropical evergreen forest	596.59	95
5	1A/C4 West coast tropical evergreen forest	10794.66	90
6	1B/C1 Assam valley tropical wet evergreen forest (Dipterocarpus)	1916.61	95
7	1B/C2 a Kayea forest	1272.34	95
8	1B/C2 b Mesua forest	21.40	100
9	1B/C3 Cachar Tropical Evergreen Forest	2578.59	95
10	1/E1 Cane Brakes	69.73	95
11	1/E2 Wet Bamboo Brakes	59.68	95
12	1/2S1 Pioneer Euphorbiaceous Scrub	485.01	90
Group 2 Tropical Semi-Evergreen Forests			
13	2A/C1 Andaman Semi-Evergreen Forest	1976.76	85
14	2A/C2 West coast semi evergreen forest	12382.86	80
15	2A/C3 Tirunelveli semi evergreen forest	119.68	90
16	2A/2S1 West Coast Secondary Evergreen Dipterocarpus Forest	559.37	85
17	2B/ C1a Assam alluvial plains semi-evergreen forest	6913.59	80
18	2B/C1b Eastern Sub-Montane Semi-Evergreen Forest	5544.13	80
19	2B/1S1 Sub-Himalayan Light alluvial Semi-Evergreen Forest	21592.78	80
20	2B/2S1 (Pioneer Euphorbiaceous scrub)	334.64	90
21	2B/2S2 Eastern Alluvial Secondary Semi-Evergreen Forest	7445.99	80

22	2B/2S3 Sub Himalayan Secondary Wet Mixed Forest	357.50	85
23	2B/C2 Cachar Tropical Semi-Evergreen Forest	18918.77	80
24	2B/C3 Orissa Semi Evergreen Forest	106.01	90
25	2/E1 Cane brakes	31.85	100
26	2/E2 (Wet bamboo brakes)	12.80	100
27	2/E3 Moist bamboo brakes	347.20	90
28	2/E4 Lateritic Semi Evergreen Forest	239.27	90
29	2/2S1 Secondary moist bamboo brakes	21785.73	80
	Group 3 Tropical Moist Deciduous Forests		
30	3A/C1 Andaman Moist Deciduous Forest	585.43	75
31	3A/2S1 Andaman Secondary Moist Deciduous Forest	8.72	100
32	3B/C1 a Very moist teak forest	105.19	70
33	3B/C1 b Moist teak forest	10373.52	65
34	3B/C1 c Slightly moist teak Forest	8420.91	60
35	3B/C2 Southern moist mixed deciduous forest	32074.77	60
36	3B/2S1 Southern Secondary Moist Mixed Deciduous Forest	1417.08	60
37	3C/C1 a(i) East Himalayan Sal	363.96	70
38	3C/C1 a(ii) Khasi Hill Sal	1565.94	70
39	3C/C1 b(i) East Himalayan Upper Bhabar Sal	978.43	70
40	3C/C1 b(ii) East Himalayan Lower Bhabar Sal	427.94	70
41	3C/C1 c Eastern Tarai Sal Forest	326.32	70
42	3C/C1 d Peninsular (coastal) Sal Forest	4.94	100
43	3C/C2 a Moist Siwalik sal forest	3212.21	70
44	3C/C2 b(i) Bhabar-dun sal forest	662.46	70
45	3C/C2 c Moist tarai sal forest	542.20	70
46	3C/C2 d (i) Western Light Alluvial Plain Sal	1377.31	70
47	3C/C2d (iii) Eastern Heavy Alluvium plain Sal	997.77	70
48	3C/C2d (iv) App. Kamrup Sal	877.96	70
49	3C/2e (i) Moist Peninsular High level Sal Forests	6660.01	70
50	3C/2e (ii) Moist Peninsular Low level Sal Forests	24500.50	70

51	3C/2e (iii) Moist Peninsular Valley Sal Forests	1383.54	75
52	3C/DS1 Moist Sal Savannah	12.33	100
53	3C/C3 a West Gangatic moist mixed deciduous Forest	1103.97	60
54	3C/C3 b East Himalayan Moist Mixed Deciduous Forest	29806.03	60
55	3C/2S1 Northern Secondary Moist Mixed Deciduous Forest	5659.17	60
56	3C/2S2 (Secondary Euphorbiaceous Scrub)	72.60	85
57	3/E1 Terminalia tomentosa forest	14.80	100
58	3/1S1 Low Alluvial savannah woodland(Salmalia - Albizzia)	4052.47	60
59	3/1S2 a Terminalia Lagerstroemia	33.36	100
60	3/1S2 b Terminalia-Duabanga	3562.72	60
61	3/2S1 (Dry bamboo brakes)	1.29	100
	Group 4 Littoral & Swamp Forests		
62	4A/L1 Littoral Forest	105.53	70
63	4B/TS1 Mangrove Scrub	750.86	60
64	4B/TS2 Mangrove Forest	2708.17	70
65	4B/TS3 Salt Water Mixed forest (Heritiera)	487.72	70
66	4B/TS4 Brackish Water Mixed forest (Heritiera)	313.62	70
67	4B/E1 Palm Swamp	151.61	70
68	4C/FS1 Myristica Swamp forest	0.79	100
69	4C/FS2 Submontane Hill-valley Swamp Forest	10.01	100
70	4D/SS2 Barringtonia swamp Forest	10.90	100
71	4D/SS3 Syzygium cumini swamp low forest	215.10	70
72	4D/2S2 Eastern Wet Alluvial Grassland	152.37	70
73	4E/RS1 Riparian fringing forest	57.51	80
	Group 5 Tropical Dry Deciduous Forests		
74	5A/C1 a Very Dry Teak Forest	2570.88	40
75	5A/C1 b Dry Teak Forest	43275.08	40
76	5A/C2 Dry red sanders bearing forest	801.25	70
77	5A/C3 Southern Dry Mixed Deciduous Forest	102051.00	40

78	5B/C1 a Dry Siwalik Sal Forest	913.24	60
79	5B/C1 b Dry Plains Sal Forest	125.58	60
80	5B/C1 c Dry Peninsular Sal Forest	33999.48	60
81	5B/C2 Northern Dry Mixed Deciduous Forest	59370.21	40
82	5/DS1 Dry Deciduous Scrub	32550.06	40
83	5/DS2 Dry savannah Forest	842.32	40
84	5/DS3 (Euphorbia Scrub)	28.43	100
85	5/DS4 (Dry grass land)	860.10	30
86	5/E1 Anogeissus pendula Forest	5662.71	30
87	5/DS1 Anogeissus pendula Scrub	459.60	25
88	5/E2 Boswellia Forest	1098.48	25
89	5/E3 Babul Forest	138.01	20
90	5/E4 Hardwickia forest	694.33	30
91	5/E5 Butea forest	528.76	30
92	5/E6 Aegle forest	1.54	100
93	5/E7 Laterite thorn forest	272.64	30
94	5/E8 a Phoenix Savannah Forest	45.96	100
95	5/E8 b Babul Savannah Forest	26.58	100
96	5/E8 c Salvadora - Tamarix scrub	188.17	35
97	5/E9 Dry bamboo brake	5921.33	20
98	5/1S1 Dry Tropical Riverain Forest	212.44	30
99	5/1S2 Khair Sissoo Forest	2504.48	30
100	5/2S1 Secondary dry deciduous forest	4431.59	25
	Group 6 Tropical Thorn Forest		
101	6A/C1 Southern thorn forest	6902.41	20
102	6A/C2 Karnatak umbrella thorn forest	1353.59	20
103	6A/DS1 Southern thorn scrub	2802.56	10
104	6A/DS2 Southern Euphorbia scrub	28.27	100
105	6B/C1 Desert Thorn forest	1561.57	10
106	6B/C2 Ravine Thorn Forest	1011.63	15
107	6B/DS1 Zizyphus Scrub	8.83	100
108	6B/DS2 Tropical Euphorbia Scrub	643.45	15
109	6/E1 (Euphorbia scrub)	181.25	15

110	6/E2 Acacia senegal forest	870.62	15
111	6/E3 Rann Saline Thorn Forest	714.28	15
112	6/E4 Salvadora Scrub	32.98	100
113	6/1S1 Desert dune scrub	12.40	100
	Group 7 Tropical Dry Evergreen Forest		
114	7/C1 Tropical dry evergreen forest	871.17	80
115	7/DS1 Tropical dry evergreen scrub	56.84	80
	Group 8 Subtropical Broadleaved Hill Forests		
116	8A/C1 Nilgiri sub tropical hill forest	607.95	70
117	8A/DS1 South Indian sub-tropical hill savannah woodland	29.84	75
118	8A/E1 Reed brakes (Ochalandra)	8.17	100
119	8A/C2 Western Sub Tropical Hill Forest	795.10	85
120	8B/C1 East Himalayan Sub-tropical Wet Hill	12172.18	70
121	8B/C2 Khasi Sub-Tropical Wet Hill Forest	5565.58	70
122	8B/2S1 (Assam subtropical pine forest)	38.22	90
	Group 9 Subtropical Pine Forests		
123	9/C1 a Lower or Siwalik chir pine forest	5566.44	10
124	9/C1 b Upper or Himalayan chir pine forest	7880.46	10
125	9/DS1 Himalayan subtropical scrub	623.88	20
126	9/DS2 Subtropical Euphorbia scrub	42.04	90
127	9/C2 Assam Sub-Tropical Pine Forest	4067.13	10
128	9/DS1 Assam subtropical pine savannah	646.97	30
	Group 10 Subtropical Dry Evergreen Forest		
129	10/C1 a Olea cuspidata scrub forest	196.06	60
	Group 11 Montane Wet Temperate Forests		
130	11A/C1 Southern montane wet temperate forest	128.01	80
131	11A/DS1 Southern montane wet scrub	107.33	80
132	11A/DS2 Southern montane wet grassland	96.75	70
133	11B/C1 a Lauraceous forest	123.39	70
134	11B/C1 b Ban Oak forest	2745.98	65
135	11B/C1 c High Level Oak forest	20.34	100

136	11B/C2 Naga Hill Wet Temperate forest	1742.08	70
	Group 12 Himalayan Moist Temperate Forests		
137	12/C1 a Ban oak forest (Q.incana)	6402.68	65
138	12/C1 b Moru oak forest (Q.dilatata)	1020.27	65
139	12/C1/DS1 Oak scrub	568.47	60
140	12/C1 c Moist deodar forest	4856.05	70
141	12/C1 d Western mixed coniferous forest (spruce, blue pine, silver fir)	5909.53	70
142	12/C1 e Moist temperate deciduous forest	580.71	55
143	12/C1 f (Low-level blue pine forest (P.wallichiana))	2043.14	55
144	12/C2/DS1 Oak scrub	5.07	60
145	12/C1/DS2 Himalayan temperate secondary scrub	530.58	60
146	12/C2 a Kharsu oak forest (Q.semicarpifolia)	271.38	65
147	12/C2 b West Himalayan upper oak/fir forest	1146.02	65
148	12/C2 c (Moist temperate deciduous forest)	317.71	65
149	12/C3 a East Himalayan Mixed Coniferous Forest	5572.87	60
150	12/DS1 Montane bamboo Brakes	16.68	100
151	12/E1 Cypress forest	6.36	100
152	12/1S1 Alder Forest	18.11	100
153	12/1S2 Riverain blue pine forest	109.18	65
154	12/2S1 Low level blue pine forest	87.39	65
	Group 13 Himalayan Dry Temperate Forests		
155	13(i)/C1 Dry broadleaved and coniferous forest (Q.ilex-P.gerardiana)	809.59	60
156	13/C2 a Neoza pine forest (P.gerardiana)	120.68	55
157	13(i)/C2 b Dry deodar forest	1387.85	60
158	13/DS1 Pohu Scrub	76.32	55
159	13/DS2 Dry Temperate scrub	133.58	50
160	13(i)/C3 (West Himalayan dry temperate deciduous forest)	269.44	50
161	13(i)/C4 West himalayan high level dry blue pine forest (P.wallichiana)	1444.77	50

162	13(i)/C5 West Himalayan dry juniper forest (J.macropoda)	482.24	55
163	13(ii)/C6 Eastern Himalayan Dry Temperate Coniferous Forest	1027.30	60
164	13/1S1 Hippophae / Myricaria scrub	85.80	60
165	13/1S2 Poplar / Salix forest	136.86	55
166	13/1S3 (Western high-level dry blue pine forest)	1.78	100
Group 14 Sub-Alpine Forests			
167	14/C1 a West Himalayan sub-alpine fir forest	1959.15	70
168	14/C1 b West Himalayan sub-alpine birch/fir forest	2797.98	65
169	14/C2 East Himalayan Sub-alpine Birch/Fir Forest	7989.48	65
170	14/1S1 Hippophae / Myricaria scrub	19.23	100
171	14/1S2 Deciduous sub-alpine scrub	211.94	60
172	14/2S1 Sub-alpine blue pine forest	519.53	60
Group-15 Moist Alpine Scrub			
173	15/C1 Birch/Rhododendron scrub forest	1137.10	60
174	15/C2 Deciduous alpine scrub	242.64	60
175	15/E1 Dwarf Rhododendron Scrub	130.61	60
176	15/E2 (Dwarf Juniper scrub)	165.03	60
Group-16 Dry Alpine Scrub			
177	16/C1 Dry alpine scrub	1945.85	60
178	16/E1 Dwarf Juniper scrub	1134.97	60
Plantation/TOF			
179	Plantation/TOF	36294.33	10
Total		715562.53	
