

**The Preparatory Survey
on
Tamil Nadu Biodiversity Conservation and Greening Project**

Final Report

TABLES & FIGURES

Table 2.1 Summary of solar-fencing distance and costs during 2006-2010

Year	Name of scheme	Distance fenced (km)	Cost (million Rs)	Target district/forest division	
				Area	km fenced
2006-07	Special scheme	137.5	2.20	Hosur	5.0
				Dharmapuri	5.0
				Sathyamangalam	18.0
				Erode	12.0
				Dindugal	20.0
				Kodaikanal	7.5
				Tirunelveli	30.0
				Coimbatore	20.0
				Theni	5.0
				Srivilliputtur	5.0
				Tiruchi	11.0
	12 th Finance Commission	100.0	16.4	Hosur	20.0
				Dharmapuri	10.0
				Sathyamangalam	30.0
				Kanyakumari	10.0
				Coimbatore	10.0
				Theni	10.0
				Srivilliputtur	10.0
	Project Elephant	15.0	2.4	Dharmapuri	1.0
				Satyamangalam	2.0
Dindugal				3.0	
Tirunelveli				1.0	
Coimbatore				7.0	
Srivilliputtur				1.0	
Development of Kanyakumari WLS	10.0	1.6	Kanyakumari	10.0	
Annual total (2006-07)		252.5	22.6		
2007-08	Part II Scheme	181.25	29.0	Hosur	6.0
				Dharmapuri	4.0
				Satyamangalam	10.0
				Erode	10.0
				Dindugal	10.0
				Kodaikanal	10.0
				Tirunelveli	15.0
				Kanyakumari	20.0
				Tiruvannamalai	6.0
				Tirpattur	6.0
				Vellore	10.0
				Theni	9.25
				Srivilliputtur	5.0
				Tiruchi	15.0
				Perambalur	20.0
	Pollachi	10.0			
	KMTR	15.0			
	12 th Finance Commission	50.0	8.0	Hosur	10.0
				Dharmapuri	5.0
				Satyamangalam	15.0
				Kanyakumari	5.0
				Theni	5.0
				Coimbatore	5.0
	Project Elephant	30.0	4.8	Hosur	4.0
				Dharmapuri	3.0
Satyamangalam				2.0	
Kodaikanal				2.0	
Tirunelveli				2.0	

Year	Name of scheme	Distance fenced (km)	Cost (million Rs)	Target district/forest division	
				Area	km fenced
				Coimbatore	13.0
				Pollachi	2.0
				Dindugal	2.0
	Project Elephant	12.5	2.0	Hosur	1.0
				Erode	4.0
				Coimbatore	2.5
				Gudalur	3.0
				Srivilliputtur	2.0
	Development of Kanyakumari WLS	6.00	0.96	Kanyakumari	6.0
	Development of Grizzled Giant Squirrel WLS	6.0	0.96	Srivilliputtur	6.0
	Nilgiri Biosphere Reserve	10.0	1.6	Satyamangalam	2.0
				Coimbatore	2.0
				Nilgiris north	2.0
				Nilgiris South	4.0
Western Ghats Development Program	20.0	3.2	Tirunelveli	20.0	
Annual total (2007-08)		295.75	50.52		
2008-09	Part II Scheme	115.63	18.5	Hosur	15.0
				Dharmapuri	10.0
				Satyamangalam	30.0
				Erode	10.63
				Coimbatore	30.0
				Perambalur	10.0
				Pollachi	10.0
	Project Elephant	50.0	8.0	Satyamanaglam	8.0
				Erode	10.0
				Dindugal	10.0
				Kodaikanal	5.0
				Tirunelveli	5.0
				Coimbatore	7.0
				Gudalur	3.0
	Srivilliputtur	2.0			
	Development of Kanyakumari WLS	5.0	0.8	Kanyakumari	5.0
	12 th Finance Commission	57.0	9.12	Hosur	11.0
				Dharmapuri	6.0
				Satyamangalam	16.0
				Kanyakumari	6.0
				Coimbatore	6.0
				Theni	6.0
				Srivilliputtur	6.0
Western Ghats Development Program	68.0	10.88	Dindugal	15.0	
			Tirunelveli	9.0	
			Theni	9.0	
			Srivilliputtur	7.0	
			Pollachi	28.0	
Project Tiger KMTR	15.63	2.5	KMTR	15.63	
Project Tiger ATR	10.0	1.6	ATR	10.0	
Project Tiger MTR	10.0	1.5	MTR	10.0	
Annual total (2008-09)		331.26	52.9		
2009-10	Part II Scheme	100.0	16.0	Hosur	5.0
				Dharmapuri	5.0
				Satyamangalam	15.0
				Erode	10.0
				Dindugal	3.0
				Tirunelveli	3.0

Year	Name of scheme	Distance fenced (km)	Cost (million Rs)	Target district/forest division				
				Area	km fenced			
				Kanyakumari	3.0			
				Kancheepuram	1.0			
				Tiruvannamalai	4.0			
				Tirupattur	4.0			
				Vellore	4.0			
				Coimbatore	20.0			
				Srivilliputtur	3.0			
				Tiruchi	10.0			
				Pollachi	4.0			
				Ooty	3.0			
				KMTR	3.0			
				Project Elephant	28.0	4.48	Hosur	5.0
							Dharmapuri	3.0
	Satyamangalam	4.0						
	Erode	3.0						
	Dindugal	2.0						
	Tirunelveli	4.0						
	Coimbatore	1.0						
	Theni	3.0						
	Kanyakumari WLS Development Program	3.0	0.48	Kanyakumari	3.0			
	12 th Finance Commission	60.0	9.6	Hosur	12.0			
				Dharmapuri	6.0			
				Satyamangalam	18.0			
				Kanyakumari	6.0			
				Coimbatore	6.0			
				Theni	6.0			
				Srivilliputtur	6.0			
Western Ghat Development Program	50.0	8.0	Dindugal	4.0				
			Tirunelveli	10.0				
			Kanyakumari	11.0				
			Srivilliputtur	12.0				
Project Tiger KMTR	5.0	0.875	KMTR	5.0				
Project Tiger ATR	10.0	1.75	ATR	10.0				
Project Tiger MTR	2.0	0.35	MTR	2.0				
Annual total (2009-10)		258.0	41.535					
2010-11	Part II Scheme	60.0	12.0	Hosur	5.0			
				Dharmapuri	4.5			
				Satyamangalam	5.0			
				Erode	4.5			
				Dindugal	3.0			
				Tirunelveli	3.0			
				Kanyakumari	3.0			
				Attur	5.0			
				Tiruvannamalai	3.0			
				Tirupattur	3.0			
				Vellore	3.0			
				Coimbatore	7.5			
				Srivilliputtur	3.0			
Tiruchi	4.5							
Pollachi	3.0							
Annual total (2010-11)		60.0	12.0					
Total		1197.51	179.555					

Table 6.1 Summary of management responses to threats, as described in a selection of 10 current management plans

PA reference:	NP 3	S 5	S 8	S 9	S 10	BS 4	BS 5	BS 9	BS 10
PA name:	Mukurthi	Grizzled Giant Squirrel WLS	Vallanadu Blackbuck WLS	Kanyakumari WLS	Point Calimere WLS	Vellode BS	Karaivetti BS	Kanjirankulam BS	Chitragudi BS
Area (ha):	78.46	485.20	16.41	457.77	17.26	0.77	4.54	1.04	0.48
Plan period:	2009-14	2005-10	2006-11	2007-2018	2006-10	2008-13	2005-10	2005-10	2005-10
Management threats and issues									
Poaching	sporadic	common	sporadic	minimal since 2004	under control	prohibited	nil	birds	
Other threats to wildlife			stone quarries, police shooting range, shortage of grazing land and water		water scarcity	none	none	bird-flu	
Illegal tree felling	none	10 tons cut/ day, 4000 MT removed/year	occasional (mainly for firewood)	rare		occasional	nil		
Illegal fishing	none					sporadic	licensed		
Livestock grazing	none	10,000 local + 7,000 migrant cattle present	4,293 cattle, 3,702 goats, 3,994 sheep	heavy livestock pressure	400-500 cattle graze daily	occasional	occasional	needs control	"major problem"
Fire	lots in summer	High risk in summer	none	frequent	none	none	nil	none	absent
Tourism	limited due to remoteness	large numbers pilgrims and tourists	c. 200 visitors/year, 1 eco-camp	trekking routes established	10,000 visitors per year	potential	"not heavy"		
Research and monitoring	occasional, annual tahr census	much by AVC College, annual wildlife census	none to date	23 studies approved, wildlife census conducted	major centre for wildlife research (100,000 birds ringed)	one study	no research, sporadic census	no research, sporadic bird census	no research, sporadic bird census
Invasive species	2,000 ha wattle + 10ha broom and gorse, trout		100-200 feral cattle		30% grassland invaded by <i>Prosopis</i>	Prosopis - "alarming"	"weed encroachment"	<i>Prosopis, Ipomea</i>	<i>Prosopis, Ipomea</i>
Documentation						"major grey area"			
Pocket guides / brochures	park brochure				FD produced video and book on Sanctuary	recommended			
Training	periodic			none trained in wildlife management		"neglected area"	none trained in wildlife management	no trained guides	lacking in wildlife management
Encroachment	no longer any	Cannabis fields	none	743 (404 ha total)	none			17 acres cultivated	

PA reference:	NP 3	S 5	S 8	S 9	S 10	BS 4	BS 5	BS 9	BS 10
PA name:	Mukurthi	Grizzled Giant Squirrel WLS	Vallanadu Blackbuck WLS	Kanyakumari WLS	Point Calimere WLS	Vellode BS	Karaivetti BS	Kanjirankulam BS	Chitragudi BS
				encroachments					
Firewood	none	Significant collection	much reduced		collected			collected	collected
Human-wildlife conflict		crop damage in buffer zone		wild boar raid crops	wild boar + spotted deer raid crops				
Management responses									
Ecotourism	low key ecotourism proposed	5 visitor centres proposed	interpretation centre ecotourism proposed	Sites identified for eco-development, interpretation boards along trek routes	being promoted but lack infrastructure; train VFCs and SHGs	train guides, develop infrastructure	promote wildlife tourism and eco-education	local guides	local guides
Eco-development		planned to reduce dependencies on forest resources	"eco-development, awareness programmes are done"	various provisions for Kani tribals including conversion of VFCs to EDCs	focused on reducing cattle grazing and crop damage by wildlife, drinking water supplies	improve water storage, remove <i>Prosopis</i> , habitat creation (islands)	not considered priority	alternative livelihoods	alternative livelihoods, remove <i>Prosopis</i> , habitat creation (islands)
Research and monitoring	more required but not specified	species recovery programmes	urgently required, especially on blackbuck	range of ecological studies proposed	various specific studies proposed, develop biodiversity profile of S	engage SACON, routinely record biodiversity and disturbances, document activities	engage field biologist	engage local and national institutions (e.g. BNHS)	engage local and national institutions (e.g. BNHS)
Monitoring and evaluation						institute with people's participation			
Training	training in research & monitoring by BNHS, IISc, WWF	wildlife management and eco-development	lack of trained staff	on-job training in wildlife management and eco-development, formal training at WII	train staff in eco-development facilitation and ecotourism	short-term in service, including bird-flu outbreaks	short-term training at BHNS		wildlife management
Comments			Management plan almost entirely focused on black buck.	Approved as 'ad hoc' plan by CWW but needs revision by 31.12.2010 in line with WII guidelines.					

Table 6.2 Target Divisions of the Project

Circle	Division	PAs	Project Components			District	BIO	TCPL
			Biodiversity	TCPL	Pilot REDD+			
1 Chennai	1 Kancheepuram	BS 2, BS 3	1	1		1 Kancheepuram	1	1
	2 Tiruvallur		1	1		2 Thiruvallur	1	1
2 Villupuram	3 Villupuram			1		3 Villupuram		1
	4 Kallakuruchi			1		4 Cuddalore		1
	5 Cuddalore			1				
3 Dindigul	6 Dindigul		1	1		5 Dindigul	1	1
	7 Kodaikanal			1		6 Karur		1
	8 Karur			1		7 Madurai	1	1
4 Madurai	9 Madurai	S 4	1	1		8 Theni	1	1
	10 Theni		1	1				
5 Salem	11 Salem			1		9 Salem		1
	12 Attur			1				
6 Tirunelveli	13 Thoothukudi	S 8	1	1		10 Thoothukudi	1	1
	14 Kanyakumari	S 9	1	1		11 Kanyakumari	1	1
	15 Tirunelveli	BS 12, CR 1	1	1		12 Tirunelveli	1	1
7 Dharmapuri	16 Dharmapuri		1	1		13 Dharmapuri	1	1
	17 Harur			1		14 Krishnagiri		1
	18 Hosur			1				
8 Vellore	19 Vellore			1		15 Vellore		1
	20 Thirupattur			1		16 Thiruvannamalai		1
	21 Thiruvannamalai			1	1			
9 Tiruchirappalli	22 Tiruchirappalli			1		17 Tiruchirappalli		1
	23 Thanjavur	BS 6-7		1		18 Thanjavur		1
	24 Pudukkottai			1		19 Pudukkottai		1
	25 Nagapattinam	S 10	1	1		20 Nagapattinam	1	1
	26 Tiruvarur		1	1		21 Tiruvarur	1	1
	27 Perambalur	BS 5	1	1		22 Ariyalur		1
10 Coimbatore	28 Nilgiris North		1	1		24 Nilgiris	1	1
	29 Nilgiris South	NP 3	1	1		25 Coimbatore		1
	30 Gudalur			1		26 Tiruppur		1
	31 Coimbatore		1	1		27 Erode	1	1
11 Erode	32 Erode	S 3	1	1		28 Namakkal	1	1
	33 Sathyamangalam	BS 4	1	1				
	34 Namakkal	S 2	1	1				
12 Virudhunagar	35 Gulf of Mannar	NP 5		1		29 Ramanathapuram	1	1
	36 Sivanangai Ramanad	BS 9-11	1	1		30 Sivagangai	1	1
	37 Srivilliputtur	BS 8	1	1		31 Virudhunagar	1	1
		S 5	1	1		7 Madurai		
13 AAZP	38 AAZP	NP 1				32 Chennai	1	
	39 Chennai		1					
14 KMTR	40 KMTR	S 6-7				12 Tirunelveli		
15 MTR	41 MTR	NP 2, S 1				24 Nilgiris		
16 ATR	42 AMR	NP 4, S 3				26 Coimbatore		
	43 Tiruppur					26 Tiruppur		
			21	37	1		19	31

Note No intervention within the Reserves (divisions 40 - 43) is proposed. But survey within the reserves and interventions in the periphery are proposed.

AAZP	Arignar Anna Zoological Park	S 7	Mundanthurai WLS
KMTR	Kalakad Mundanthurai Tiger Reserve	S 8	Valanadu Black Buck WLS
ATR	Anamalai Tiger Reserve	S 9	Kanyakumari WLS
MTR	Mudumalai Tiger Reserve	S 10	Point Calimere WLS
Protected Area (PA)		BS 1	Pulicat Lake BS <i>(not included in the project)</i>
NP 1	Guindy	BS 2	Karikili BS
NP 2	Mudumalai	BS 3	Vedanthangal BS
NP 3	Mukurthi	BS 4	Vellode BS
NP 4	Indira Gandhi	BS 5	Karavetti BS
NP 5	Gulf of Mannar Marine	BS 6	Vaduvor BS
S 1	Mudumalai WLS	BS 7	Udayamarthandapuram BS
S 2	Sathyamangalam WLS	BS 8	Vettangudi BS
S 3	Indira Gandhi WLS	BS 9	Kanjirankulam BS
S 4	Meghamalai WLS	BS 10	Chitrangudi BS
S 5	Grizzled Giant Squirrel WLS	BS 11	Melaselvanur-Kilaselvanu BS
S 6	Kalakad WLS	BS 12	Koonthankulam-Kadankulam BS
		CR 1	Tirupudaimaruthur <i>(not included in the project)</i>

Table 6.4 List of Villages Proposed for Eco-Development

S.No	Hamlet	Division
1.	Booliyamanur	Dindigul
2.	C Ayyanarpuram	Dindigul
3.	Kattakodiyam patti	Dindigul
4.	Lakshmipuram	Dindigul
5.	Ramachettipatti	Dindigul
6.	Vallampatti	Dindigul
7.	Alappuram thotti	Sathyamangalam
8.	Bejalatti	Sathyamangalam
9.	Centerthotti	Sathyamangalam
10.	Geddesal	Sathyamangalam
11.	Kilathur	Sathyamangalam
12.	Nandipuram	Sathyamangalam
13.	Orathi	Sathyamangalam
14.	Ramabayalur	Sathyamangalam
15.	Sujjalkorai	Sathyamangalam
16.	Ambudinchan	Kanniyakumari
17.	Chelanthurithi	Kanniyakumari
18.	Kadavalvetti	Kanniyakumari
19.	Kalaparai	Kanniyakumari
20.	Maramalai	Kanniyakumari
21.	Purathimalai	Kanniyakumari
22.	Thachamalai	Kanniyakumari
23.	Thadikarankonam	Kanniyakumari
24.	Vallarakku	Kanniyakumari
25.	Vattaparai	Kanniyakumari
26.	Attikovil	Srivilliputtur W.L.S
27.	Ayyanarkoil	Srivilliputtur W.L.S
28.	Mokkathanparai	Srivilliputtur W.L.S
29.	Taniparai	Srivilliputtur W.L.S
30.	Vinobanagar	Srivilliputtur W.L.S

Table 6.5 List of Tribal Villages Proposed for Socio Economic Development

S.No.	Hamlet	Division
1.	Kadamankombai	Coimbatore
2.	Kallarpudur	Coimbatore
3.	Keelchengalur	Coimbatore
4.	Manaar	Coimbatore
5.	Mudhalmankombai	Coimbatore
6.	Seengupathi	Coimbatore
7.	Sittuguni	Coimbatore
8.	Thondai	Coimbatore
9.	Uliyur	Coimbatore
10.	Veppamaruthur	Coimbatore
11.	Dhinnabelur	Dharmapuri
12.	Mannankuli	Dharmapuri
13.	Doddakombai	Erode
14.	Bangaudumund	Nilgiris North
15.	Bedugalmund	Nilgiris North
16.	Mathvanimund	Nilgiris North
17.	Nervenimund	Nilgiris North
18.	Koduthenimund	Nilgiris North
19.	Chinnathirupathy	Kallakurichi
20.	Kodamathi	Kallakurichi
21.	Naranapattu	Kallakurichi
22.	Kinathur	Kallakurichi
23.	Therkupattu	Kallakurichi
24.	Aavalur	Harur
25.	Naikuthy	Harur
26.	Attinatam Seeperkollai	Hosur
27.	Natrampalyam – Pudur	Hosur
28.	Thalakkumalai	Kanyakumari
29.	Mangamalai	Kanyakumari
30.	Kuliyada	Sathy
31.	Vaidhayanathapuram	Sathy
32.	Kalidhibam	Sathy
33.	Kothur	Vellore

Table 7.1 List of Orientations and Trainings

NAME OF THE TRAINING	TARGET TRAINEE	DURATION	VENUE	NO. OF TRAINEES
1 BIO DIVERSTIY CONSERVATION				
1.1 Habitat restoration, enhancement and management				
1.1.1 Strengthen Wetland Planning and Management				
1.1.1.2 Training on Wetland Management (FD staff)	Wildlife Warden, Ranger, Forester, Forest Guards and PWD where appropriate (3-4 persons x 14 PAs)	2 months (One week per batch)	In-situ + exposure visit	50
1.1.2 Improve critical habitats (terrestrial and aquatic) by removing invasive and exotic species				
1.1.2.2 Training in management of alien species, with field review of species to remove (FD staff)	Wildlife Warden, Ranger, Forester, Forest Guards (3-4 persons x 14 PAs)	3 months (One week per batch)	In-situ + exposure visit	50
1.1.3 Conserve critically endangered/ endangered species of flora and fauna				
1.1.3.4 a) Exposure visit on Dugong (DMU/FMU staff in coastal divisions)	Wildlife Warden, Ranger, Forester	One week	Orissa	50
1.1.3.4 b) Exposure visits of FD on Sea turtles (DMU/FMU staff in coastal divisions)	Wildlife Warden, Ranger, Forester	One week	Orissa	50
1.1.3.4 b) Training of veterinary doctors		One week	In-situ	10
1.2 Resource Protection				
1.2.1 Strengthen resource protection				
1.2.1.2 Train village volunteers in resource protection skills	5 trainings x 14 PAs	3 days	In-situ	80 trainings
1.2.1.5 Training & engaging anti-poaching watchers	local communities around 16 PAs	7 years	In-situ	560
1.3 Mitigating Human-Wildlife Conflict				
1.3.1 Train field staff and village volunteers in wildlife conflict management	Villagers from 14 PAs and Forest Guards, Forester		In-situ	Max 20 per training
1.4 Ecologically Sustainable Development				
1.4.2 Community biodiversity registers				
1.4.2.2 Train field staff and village ecotourism guides in compiling biodiversity registers	local communities and Forest Guards, Forester	One week/ village	Target village	
1.4.3 Eco-development activities in villages abutting PAs in 30 villages				
1.4.3.2 Orientate communities on scope and purpose of Project	local communities	1-2 days/ village	Target village	
1.4.3.4 Establish and train mixed gender field staff teams to design and facilitate participatory	local communities	1-2 days/ village	Target village	
1.4.3.6 Facilitate study tours to expose EDCs to other successful VCFs/EDCs/SHGs (local)	EDC member	1 week /EDC	To be decided	60
1.4.3.6 Facilitate study tours to expose EDCs to other successful VCFs/EDCs/SHGs (other state)	EDC member	1 week /EDC	To be decided	60
1.4.4 Ecologically sustainable development in villages peripheral to RFs in 33 villages				
1.4.4.2 Orientate communities on scope and purpose of Project	local communities	1-2 days/ village	Target village	
1.4.4.4 Establish and train mixed gender field staff teams to design and facilitate participatory	local communities	1-2 days/ village	Target village	
1.4.4.6 Facilitate study tours to expose VCFs/SHGs to other successful VCFs/EDCs/SHGs	EDC member	1 week	To be decided	66
1.4.5 Community-based ecotourism in 25 sites				
1.4.5.7 c) Training of community members (hospitality, catering, lodge management, nature and culture guiding, health & safety etc)	ecolodges (40) and other ecotourism sites (100)	One week	To be decided	140
1.4.6 Management and monitoring of ecologically sustainable development				
1.4.6.1 Train field staff and community organizations	local communities and Forest Guards, Forester	3-4 days x 2 times	Target village	
2 INCREASING THE NATURAL RESOURCE BASE				
2.1 Tree Cultivation on Private Land				
2.1.3 Village Entry & Formation of FIGs for TCPL				
2.1.3.1 Awareness programmes on scope, purpose and protocols of TCPL	local communities	1-2 days/ village	Target village	
2.1.4 Preparation of Village Microplan				
2.1.4.2 Training of staff and FIG representatives in micro-planning	FIG and FMU	2days/ village	Target village	
2.1.6 Survival survey and distribution of survival incentives				
2.1.6.2 Training of FIS, SHG and FMU on PME	FIG, SHG and FMU	2days/ village	Target village	
2.1.7 Facilitating support infrastructure and mechanisms for marketing of farm-forestry products				
2.1.7.5 Training and exposure for TGS representative/ farmer/ SHG members	FIG member	2days/ village	Target village	

Table 7.1 List of Orientations and Trainings

NAME OF THE TRAINING	TARGET TRAINEE	DURATION	VENUE	NO. OF TRAINEES
3 SUPPORTING ACTIVITIES				
3.1 Capacity Development				
3.1.2 Knowledge and Skill Development				
3.1.2.1 Preparatory Workshop	PUM, Circle office, DMU, FMU staff	1 day	Circle office	1,320
3.1.2.2 Project orientation				
a) Project orientation to Forest Guards, Watchers	Forest Guards, Watchers from the project area	3 days	TNFTC	500
b) Project orientation to Foresters and Rangers	Foresters and Rangers from the project area	3 days	TNFA	400
c) Project orientation to Assistant/Deputy Conservators of Forests	Assistant/Deputy Conservators of Forests from the	3 days	TNFA	100
d) Project orientation two days workshop for senior officers 50 persons in the level of	CF / CCF	2 days	TNFA	50
e) Project orientation to ministerial and supporting staff	Ministerial and supporting staff from the project area	3 days	TNFA	250
f) Project orientation to resource organizations	Resource organizations	3 days	TNFA	100
g) Orientation at Circle level (DMU FMU staff and ministerial staff)	Circle office, DMU FMU staff and ministerial staff	1 days	Circle office	2,000
3.1.2.3 Managerial Training				
a) Training on Public Relations, stress management and communication to the Forest Guards and Foresters	Forest Guards and Foresters	5 days	TNFTC	500
b) Training on Interpersonal Relationship, Communication & Stress Management, accounting to Rangers	Rangers	5 days	TNFA	200
c) Training on Interpersonal Relationship, Communication & Stress Management, project management and M&E to Assistant/Deputy Conservators of Forests.	Assistant/Deputy Conservators of Forests.	5 days	TNFA	100
d) Training on Public Relations, Stress Management to the Conservators of Forests and Chief Conservators of Forests.	Conservators of Forests and Chief Conservators of Forests.	5 days	TNFA	30
e) Training on stress management, office Administration, district office manual & disciplinary proceeding to the Ministerial staff.	Ministerial staff.	5 days	TNFA	200
f) Training on basics of vehicle maintenance & First Aid to the Drivers and Guard cum	Drivers and Guard cum drivers.	5 days	TNFTC	300
3.1.2.4 Thematic training for project staff (domestic)				
a) Participatory approach: RRA, RRA and Microplanning (Forester/ F.Guards)	Forester and Forest Guards	5 days	TNFA or Gandhi Gram Rural Institute	200
b) Refreshers training on participatory approach and practice (Forester/ F.Guards)	Forester and Forest Guards	5 days	TNFA or Gandhi Gram Rural Institute	200
c) Formation, strengthening, and management of CBOs / Gender mainstreaming and emerging development paradigms (Forester/ ranger)	Forester and Ranger	5 days	TNFA or Gandhi Gram Rural Institute	250
d) Revolving fund management, business development support (Forester/ Rangers)	Forester and Ranger	5 days	TNFA or Gandhi Gram Rural Institute	200
e) Marine biodiversity conservation and monitoring	Rangers and Foresters from 7 coastal District	1 week	Andaman&nicobal, Lakshadweep islands	63
f) Trainers training on Agroforestry and extension - outside the state (for staff of forest extension center)	Staff from Forestry Extension Centre	5 days	KFRRI/ ICRISAT etc	100
g) Trainers training for extension work- (within the state (for staff of forest extension center)	Staff from Forestry Extension Centre	5 days	TNAU, Madras School of Social Work, Anna Institute of Management	150
h) Faculty training for TNFA & TNFTC (outside/within the state)	Faculty of TNFA/TNFTC	1week to 2 months	To be selected	10
3.1.2.5 Training on PC, GIS and MIS				
a) Training on basic Computer knowledge	Forest officers and computer operators from PMU, Circle, DMU, FMU	5 days	TNFA	1,100
b) GPS based Survey and Mapping	Forester and Forest Guards	1 day	DMU, Circle office	1,000
c) Training on Paper based 'Data Recording Registers' and 'Monthly Reporting Formats (local training by master trainers)	Forest officers and ministerial staff from DMU, FMU	1 days x 3 times	DMU, FMU office	3,000
d) Training on Web based MIS Software (in-situ training by master trainers)	Forest officers or/and ministerial staff from DMU,	1 days x 3 times	DMU office	600
e) Training on GIS at National level institute	Ranger, Forester, computer operator selected from	3 month	NIRS, FSI etc	24
f) Master's training for paper based MIS	Ranger, Forester, computer operator selected from	1 day x 2times	Geomatic Centre	48
g) Master's training for software based MIS -1	Ranger, Forester, computer operator selected from	3days x 1 time	Geomatic Centre	24

Table 7.1 List of Orientations and Trainings

NAME OF THE TRAINING	TARGET TRAINEE	DURATION	VENUE	NO. OF TRAINEES
h) Master's training for software based MIS -2 (refreshers)	Ranger, Forester, computer operator selected from	2 days x 1 time	Geomatic Centre	24
3.1.2.6 Exposure visits related to project oriented subjects				
a) Exposure visit on successful FMIS system	Forest officer and computer operator from Circle and Geomatic centre	1 week	Chhattisgarh	20
b) Farmers exposure visit to successful plantation area & Agroforestry models (within	farmers each from 32 districts	3-5 days	To be decided	6,400
3.1.2.7 Overseas training and study tour for project staff				
a) Training on Sustainable Forest Management and Bio-diversity conservation	DCF/CF	2 weeks	US national Park Service, the US Fish & Wildlife Service, or Centre for International	2
b) Training on Sustainable Wildlife and habitat management for Guindy national park	Warden of the park	4weeks	US National park service	2
c) Training on Community based Eco tourism for conservation and development	ACF/DCF/CF	3 weeks	RECOFTC - Regional Community Forestry Training Center, Thailand	4
d) Training on biodiversity conservation and monitoring	DCF/CF	3 weeks	Great barrier leaf Australia	4
e) Training on Integrated land use planning & Environmental impact assessment	CF/CCF/APCCF	2 weeks	International Agricultural Centre (IAC), Wageningen, Netherlands	4
f) Training on Remote sensing and GIS in Natural Resources Management	APCCF/CCF	2 weeks	International Agricultural Centre (IAC), Wageningen, Netherlands	4
g) Training on Participatory Action Research for Community based Natural Resource Management	CF/CCF	2 weeks	International Institute of Rural Reconstruction, Cavite, Philippines	4
h) Training on Community based Integrated Watershed Management	ACF/DCF	3 weeks	International Institute of Rural Reconstruction, Cavite, Philippines	4
i) Training of trainers for faculty/staff of TNFA, SFRI, and Extension Centre	RO/ACF/DCF/CF/CCF	4 weeks	University of Wolverhampton-Centre for Rural Development and Training, Walsall, UK	9
j) Training on development of GIS & MIS overseas for GIS unit	GIS Unit	4 weeks	International Agricultural Centre (IAC), Wageningen, Netherlands	4
k) Training on Carbon sequestration training for 5 senior officers	APCCF/CCF/PCCF	1 week	EU countries	5
l) Participation of forest officers in International seminar /workshop	PCCF/APCCF/CCF/CF/DCF/ACF	1 week	US national Park Service, the US Fish & Wildlife Service, or Centre for International	10
m) Exposure visit inter-national centres for implement conservation plans (duqong)	(PCCF / APCCF / CCF / CF)	1 week	Australia	15
3.1.2.8 Need-based training				
a) Exposure visits related to project oriented subjects as required	To be decided	2 days	To be decided	100
b) Livelihood enhancement and other related to project oriented subjects as required	To be decided	To be decided	To be decided	

Table 7.2 Research on Production Forestry/ Agroforestry/ Farm Forestry

Research Topic	Category*1	Necessity of Research	Issues at Present	Expected Outcomes	Application of Research Results to the Project*2
2.2.1 Research on timber production & carbon sequestration	A	Clonal evaluation trials of selected timber species are needed to standardize method for developing clonal plantations. Clonal plantations can significantly improve the productivity of plantations, which in turn would make them more attractive to farmers and could help to bridge the demand-supply gap quickly.	<ul style="list-style-type: none"> • Low productivity of forestry plantations. • Clonal technology for some important timber species is not standardized. • The carbon sequestration potential for different species is not known. 	<ul style="list-style-type: none"> • Method for production of clonal plants for selected species gets standardized. • Carbon sink potential of different timber species is estimated. 	N
2.2.2 Research on fuel wood production	A	Fuelwood is the main source of pressure on natural forest. Creating high density fuelwood plantations could meet the energy needs of rural population as well as the emerging sector of power generation through gassifiers. Past research has identified some species for high density fuelwood plantations. These need to be tried in the farmer fields to understand how the system could work.	<ul style="list-style-type: none"> • Existing and increasing demand – supply gap for fuelwood. 	<ul style="list-style-type: none"> • Farm field trials would help improve understanding the system for promoting these plantations for farm forestry. 	Y/N Depends upon the species taken up for farm trial. For short-rotation species, the result could be obtained within the project period.
2.2.3 Research on Agro Forestry	A	Agro-forestry research has been one of the weak links in the research carried out by FD in the past. Identification of different tree-crop combinations for different agro-climatic zones is key to successful promotion of tree planting particularly in semi-arid regions,	<ul style="list-style-type: none"> • Lack of information on tree species ideal for agro-forestry in the geo-morphological and agro-climatic context of Tamilnadu. • Lack of understanding on cultural practices for different species as agro-forestry species. 	<ul style="list-style-type: none"> • Understanding on suitability of different species as agro-forestry species in irrigated as well as dry land farming condition. • Understanding on suitable tree-crop combination for various agro-climatic zones. • Standardization of cultural practices for utilization of timber & non-timber products 	Y/N Some understanding could be generated within the project period.

Research Topic	Category*1	Necessity of Research	Issues at Present	Expected Outcomes	Application of Research Results to the Project*2
2.2.3.1 <i>Compilation of old research findings on agro-forestry for extension</i>	B	Various agro-forestry research has been done by different institutions including FD in past. However, the learning generated from many of these research are still not in a form where they can be useful for extension. Given the focus of the project on promoting low-density block plantations and bund plantations which are ideal for inter-cropping, it would be very useful to compile the learning on research undertaken in the past for various agro-forestry models, which can then be used for extension and training.	<ul style="list-style-type: none"> Absence of quality extension material on inter-cropping and agro-forestry 	<ul style="list-style-type: none"> Compendium of various tree-species suitable for farms with suggested agricultural crops as intercrops for irrigated and dry-land farming conditions for all the seven agro-climatic zones 	<p>Y</p> <p>The Compendium could be used for extension as well as training to farmers and could help farmers to decide on inter-crop models.</p>
2.2.4 Research on bamboo	A	There has been various research on bamboos in the past. The proposed research is related to identification of new varieties of bamboo suitable for Tamilnadu, propagation method of bamboo as an agro-forestry crop and their utilization. Bamboo is one of the species actively promoted by GoI under National Bamboo Mission.	<ul style="list-style-type: none"> Low understanding of bamboo as an agro-forestry crop in Tamilnadu conditions. 	<ul style="list-style-type: none"> Standardization of tissue culture protocol Standardization of rooting technique for macro-propagation Multiplication techniques of different varieties of bamboo Understanding of bamboo's potential as agro-forestry crop. Understanding on potential utilization of bamboo as re-inforcing material 	<p>Y/N</p> <p>The research could be completed within the project period. However, it is difficult to say whether the results could be used for any of the project interventions.</p>
2.2.5 Research on bio-fertilizers	A	Bio-fertilizers being produced in the laboratory of Modern nursery division at Dharmapuri. Isolation of particular strain of bacteria has to be done for different	<ul style="list-style-type: none"> Need for improvement in techniques for production of bio-fertilizers and their utilization for tree 	<ul style="list-style-type: none"> Improved understanding on strains of bio-fertilizers for plus trees of different species like 	<p>Y/N</p> <p>On-going research. Results could be obtained within the</p>

Research Topic	Category*1	Necessity of Research	Issues at Present	Expected Outcomes	Application of Research Results to the Project*2
		tree species in the laboratory. The research is already going on and support under the project is required to continue the research.	plantation.	<i>Derris indica</i> , <i>Tamarindus indica</i> , <i>Bambusa bamboos</i> , <i>Terminalia chebula</i> , <i>Sapindus emarginatus</i>	project period. Difficult to say whether the research could be used within the project period.
2.2.6 Research on Afforestation of problem sites	A	Problem sites -- saline-alkaline soils, areas with boulders, areas with underlying sheet rocks and with shallow soil depth, or simply sheet rock -- for tree growing, exist in many parts of the state – on private as well as public land. Research is needed to identify suitable species and develop planting technique for those species.	<ul style="list-style-type: none"> Increasing area under wasteland. 	<ul style="list-style-type: none"> Improved understanding on different techniques to bring problem sites under tree plantation 	Y/N Long-term research, though some initial understanding on results related to planting technique could be available within the project period.
2.2.7 Research on wood market (Assessment of wood market characteristics in Tamil Nadu)	B	Profitable marketing of farm forestry crop is key to its sustainability and its adoption as part of the farming strategy by farmers. Market-blind extension of farm forestry could create supply glut and losses for farmers. There is a need to understand the demand supply situation for wood by different wood based industries in Tamilnadu.	<ul style="list-style-type: none"> Lack of clear understanding on existing wood market. Decisions on production (plantation) made based on hunch and perceptions. 	<ul style="list-style-type: none"> Understanding on wood market and its characteristics including demand by different industries; existing supply sources; channels quality parameters, price trend etc. Listing of various wood based industries and their raw material requirement would help to develop linkages with TCPL farmers 	Y The study would help to fine tune the project strategy for TCPL including focusing on different species.
2.2.8 Research on <i>Prosopis juliflora</i> (Study on ecological impact of <i>Prosopis</i>)	B	Infestation of <i>Prosopis juliflora</i> in natural forest as well as in areas outside fallow land is often treated as a problem. Socio-economic studies have indicated both positive and negative aspects. There is	<ul style="list-style-type: none"> Lack of understanding on ecological implications of <i>prosopis</i> infestation in wasteland. 	<ul style="list-style-type: none"> Understanding on positive and negative ecological implications of <i>prosopis</i> infestation. 	Y The understanding would help improve the project strategy for coverage of

Research Topic	Category*1	Necessity of Research	Issues at Present	Expected Outcomes	Application of Research Results to the Project*2
infestation on common and fallow land)		little understanding on ecological aspects of Prosopis infestation in Tamilnadu.			‘culturable waste’ – more than five year old fallow under TCPL. It would also inform the public policy and the project strategy related to Prosopis juliflora.
2.2.9 Research on Multi-tier forest management	B	Sustainable management of natural forest and improving the productivity and flow of forest produce could help in addressing the need for forest products and improving the livelihood of forest neighbouring community.	<ul style="list-style-type: none"> • Low volume of flow of forest produce from forests under JFM 	<ul style="list-style-type: none"> • Techniques for enhancing the productivity of regenerating natural forests by optimal utilization of the forest space. • Silvicultural management system for multi-tier forest. 	Y/N Depends on the type of interventions.
2.2.10 Research on NTFP management	B	The Non-wood forest produce (NWFP), constitute a critical lifeline for poor forest dwellers However, the NWFP resource base has been depleting due to various reasons. With shift in the focus of forest management, NWFPs present an important economic resource. However, there is little understanding on their management regime for sustainable harvesting as the main focus in past has been on management of forest for timber production. Hence the necessity of evolving a sustainable NWFP management system which could simultaneously address the twin issues of	<ul style="list-style-type: none"> • Lack of management system for NWFP management in natural forest conditions. • Concerns related to possibility of overharvesting and destructive harvesting of NWFPs from natural forest • Low income from NWFPs 	<ul style="list-style-type: none"> • Silvicultural management system and protocols for sustainable harvesting of different NWFPs from different forest types. • Protocols for value addition for different NWFPs for increased returns to NWFP collectors. 	Y/N The improved understanding would help introduce protocols and procedures for NWFP harvesting from natural forests within and outside the project area.

Research Topic	Category*1	Necessity of Research	Issues at Present	Expected Outcomes	Application of Research Results to the Project*2
		biodiversity conservation and poverty alleviation.			

*1 A – Research approved by Research Advisory Committee (RAC). RAC advises on research topics and approves research proposals, based on emerging needs and past research undertaken by FD.

B – Research proposed by JICA preparatory survey team experts based on information gaps, requirements of the project and based on discussion with CCF (Research)

*2 Y – Research findings would be available within the project period and can be used to plan and design project interventions

N – Research findings would be not be available within the project period for use within the project period

Y/N – Some findings would be available during the project period; not sure to what extent they can be used for project planning & implementation

Table 7.3 Responsibilities of the Key Staff of the Project

PMU	Responsibilities
Chief Project Director	<p>General:</p> <ul style="list-style-type: none"> ▪ To plan, implement, manage, and monitor all the activities proposed in TNBCP, ▪ To manage and monitor the budget and expenditure, ▪ To develop Operation Manual, ▪ To appraise performance of staff of TNBCP
	<p>Specific:</p> <ul style="list-style-type: none"> ▪ To manage recruitment of personnel in DMU and FMU, ▪ To act as competent Authority for Drawing and Disbursement of funds, ▪ To update Governing Body and High level Empowered Committee on the progress of the implementation, ▪ To maintain communication and compliances with JICA
Project Director (Administration & Finance)	<p>General:</p> <ul style="list-style-type: none"> ▪ To plan, implement, manage, and monitor all the activities related to administration and finance proposed in TNBCP ▪ To manage and monitor the budget and expenditure ▪ To assist CPD in appraisal of performance of staff of TNBCP
	<p>Specific:</p> <ul style="list-style-type: none"> ▪ To manage recruitment of personnel in DMU and FMU, ▪ To manage the process of Annual Plan preparation, ▪ To assist CPD in updating Governing Body and High level Empowered Committee about the progress of the implementation, ▪ To monitor the preparation of claim/ reimbursement to JICA
Finance Controller	<ul style="list-style-type: none"> ▪ To develop and manage the system for finances in the Project, ▪ To develop controls and other necessary instrument for judicious utilization of funds, ▪ To guide and monitor internal auditing, annual auditing and CAG audits, ▪ To prepare final SoEs for reimbursement claims, ▪ To maintain links with Finance Department, GoTN for smooth transfer of funds to PMU,
Deputy Project Director (Procurement)	<ul style="list-style-type: none"> ▪ To develop detail Procurement Plan for the Project, ▪ To develop procurement system compatible to JICA Procurement rules and State government rules, ▪ To assist PD (Admin & Finance) in procurement,
Project Director (Biodiversity)	<p>General:</p> <ul style="list-style-type: none"> ▪ To plan and execute all the activities relating to Biodiversity conservation work component in the Project, ▪ To help and guide planning of activities to DMU and FMU,
	<p>Specific:</p> <ul style="list-style-type: none"> ▪ To design, conduct research activities under Biodiversity conservation work components ▪ To maintain link with Consultants of the PMC, ▪ To assist CPD in monitoring the work component, ▪ To liasioning with State Biodiversity Board,
Deputy Project Director (Eco development)	<ul style="list-style-type: none"> ▪ To assist PD (Biodiversity) in executing of project component, ▪ To guide and assist DMU and FMU in planning and implementation, ▪ To facilitate the research components with PMC
Project Director (TCPL)	<p>General:</p> <ul style="list-style-type: none"> ▪ To plan and execute all the activities relating to TCPL work component in the Project, ▪ To help and guide planning of activities to DMU and FMU,
	<p>Specific:</p> <ul style="list-style-type: none"> ▪ To design, conduct research activities under TCPL work components, ▪ To design and implement REDD+ pilot ▪ To maintain link with Consultants of the PMC, ▪ To assist CPD in monitoring the work component, ▪ To guide FMU in promoting FIG,

PMU	Responsibilities
Deputy Project Director (Farm Forestry)	<ul style="list-style-type: none"> ▪ To assist PD (TCPL) in executing of project component, ▪ To guide and assist DMU and FMU in planning and implementation, ▪ To facilitate with PMC
Deputy Project Director (REDD+)	<ul style="list-style-type: none"> ▪ To assist PD (TCPL) in executing of the REDD+ Pilot, ▪ To guide and assist DMU and FMU in planning and implementation, ▪ To facilitate with PMC, ▪ To report the progress to State REDD+ Cell,
Project Director (Capacity Development)	<p>General:</p> <ul style="list-style-type: none"> ▪ To plan and execute all the activities relating to capacity development work component in the Project, ▪ To help and guide planning and execution of training activities to DMU and FMU,
	<p>Specific:</p> <ul style="list-style-type: none"> ▪ To design, plan and conduct training activities, ▪ To work with PMC in developing modules, ▪ To design and execute IEC activities. ▪ To assist CPD in monitoring the work component,
Deputy Project Director (Training)	<ul style="list-style-type: none"> ▪ To assist PD (Capacity Development) in executing of training programs, ▪ To guide and assist DMU and FMU in implementation of training program, ▪ To evaluate the impact of training regularly, ▪ To facilitate with PMC,
Deputy Project Director (IEC)	<ul style="list-style-type: none"> ▪ To assist PD (Capacity Development) in executing IEC activities, ▪ To guide and assist DMU and FMU in developing and implementation of IEC activities, ▪ To evaluate the impact of IEC activities,
Project Director (Monitoring & Evaluation)	<p>General:</p> <ul style="list-style-type: none"> ▪ To assist CPD in business relating to monitoring and evaluation of activities of TNBCP, ▪ To supervise Monitoring system developed for the Project , ▪ To generate reports regularly and make the information available to all the stakeholders of the Project,
	<p>Specific:</p> <ul style="list-style-type: none"> ▪ To be responsible for the monitoring and evaluation of the activities of TNBCP ▪ To develop M&E Guidelines and Manuals, ▪ To guide and monitors the performance of Deputy Project Directors (both MIS & GIS) ▪ To appraise Performance of Deputy Project Directors ▪ To approve monitoring and evaluation plans of Annual Operation Plan for DMUs
Deputy Project Director (MIS)	<ul style="list-style-type: none"> ▪ To design and implement MIS for the Project, ▪ To build capacities of DMU and FMU on MIS, ▪ To trouble shoot in case of any problem relating to MIS
Deputy Project Director (GIS)	<ul style="list-style-type: none"> ▪ To design and implement GIS based maps and inventories for the Project, ▪ To build capacities of DMU and FMU on GIS application and utilization of analysis,

Office of Regional CF	
Field Director	<ul style="list-style-type: none"> • To provide directions and necessary instruction to DMU in the implementation process, • To oversee the functioning of DMUs, • To accord sanctions and other administrative instruction in accordance with the norms and procedure of TNFD
Deputy Field Director	<ul style="list-style-type: none"> • To assist FD in implementation process

DMU	
DMU Officer	General: <ul style="list-style-type: none"> ▪ To plan, implement, manage, and monitor all the activities proposed in TNBCP of the Division/ District, ▪ To manage and monitor the budget and expenditure of the Division/ District, ▪ To appraise performance of staff of TNBCP at DMU and FMU levels
	Specific: <ul style="list-style-type: none"> ▪ To manage recruitment of personnel in DMU and FMU, ▪ To act as competent Authority for Drawing and Disbursement of funds for the Division and the Ranges under the Division, ▪ To update PMU about the progress of the implementation of TNBCP, ▪ To maintain communication and compliances as directed by PMU , ▪ To approve Annual Operations Plan and Budget and expenditure schedules ▪ To conduct meeting of District Convergence Committee,
Assistant DMU Officer (Planning & Implementation)	<ul style="list-style-type: none"> ▪ To assist DMU Officer in executing the Project activities, ▪ To manage and coordinate Project activities at the FMU levels, ▪ To coordinate SoEs from the FMUs, ▪ To assist DMU Officer in quality control of the Project,
Assistant DMU Officer (Monitoring & Evaluation)	<ul style="list-style-type: none"> ▪ To assist DMU Officer in monitoring the Project activities at DMU & FMU levels, ▪ To generate reports for DMU and PMU, ▪ To assist DMU Officer in performance management at FMU level,
Finance Officer	<ul style="list-style-type: none"> ▪ To facilitate disbursement to FMUs, ▪ To keep track of expenditure, ▪ To prepare consolidated SoEs, ▪ To facilitate audits,

FMU	
FMU Officer	General: <ul style="list-style-type: none"> ▪ To implement, manage, and monitor all the activities proposed in TNBCP of the Range, ▪ To manage and monitor the budget and expenditure of the Range, ▪ To provide technical guidance to EDC, SHG and FIG in implementation
	Specific: <ul style="list-style-type: none"> ▪ To update DMU about the progress of the implementation of TNBCP, ▪ To maintain communication and compliances as directed by PMU,
Assistant FMU Officer	<ul style="list-style-type: none"> • To assist FMU Officer, • To coordinate field operations with EDC, SHG, FIG etc. • To help in documentation.

Table 7.4 Proponent/Owner, Executer/Contractor and Procurement/ Implementation Methods

Components/ sub-components/ activities	Target Area	Proponent/ Owner	Executer/ Contractor	Method	
1 BIO DIVERSITY CONSERVATION					
1.1 Habitat restoration, enhancement and management					
1.1.1 Strengthen Wetland Planning and Management	11 Bird sanctuaries & Point Calimere WLS	PMU	PMU	Direct undertaking	
1.1.1.1 Procure contractors/partners			Resource Org.	Direct contract/ LCB	
1.1.1.2 Training on Wetland Management (FD staff)		DMU	DMU/FMU/ Resource Org./VFCs	Direct undertaking/ LCB/ MOU	
1.1.1.3 Wetland Participatory Management Planning					
1.1.1.4 Implement Wetland Action Plans					
a) Enhance aquatic habitats and aquatic species diversity/composition					
b) Enhance peripheral and nearby terrestrial habitats for birds					
1.1.1.5 Monitor water flows, water quality and aquatic vegetation					
1.1.1.6 Monitor fish and bird diversity and abundance					
1.1.1.7 Routinely survey birds for contagious diseases (e.g. bird flu)		PMU	Experts	Individual contract	
1.1.1.8 Interpret and display research findings in multi-media for benefit of visitors (Tamil & English)	PMU		Direct undertaking		
1.1.1.9 Enter georeferenced data in biodiversity database/GIS	5 PA & 10 Divisions in Elephant Reserves	PMU	PMU	Direct contract/ LCB	
1.1.2 Improve critical habitats (terrestrial and aquatic) by removing invasive and exotic species			Resource Org.	Direct contract/ LCB	
1.1.2.1 Procure contractors/partners		DMU	PMU/EDC	Direct undertaking/ MOU	
1.1.2.2 Training in management of alien species, with field review of species to remove (FD staff)					
1.1.2.3 Baseline survey of biodiversity in critical habitats prior to removal of alien species					
1.1.2.4 Strategy and manual on management of invasive alien species (Tamil, English)					
1.1.2.5 Remove invasive species after field assessment and biodiversity baseline survey					
a) Phased removal of Lantana, Prosopis from dry forest					
b) Phased removal of wattle from shola ecosystem in the hills					
c) Monitor impact of fencing and removal of exotics from shola / grassland habitats		Resource Org.	Direct contract/		
1.1.2.6 Monitor biodiversity in critical habitats after removal of invasive species	Direct undertaking				
1.1.2.7 Enter georeferenced data in biodiversity database/GIS	PMU	PMU	Direct undertaking		
1.1.3 Conserve critically endangered/endangered species of flora and fauna	7 PAs, 10 Divisions in elephant reserves, 8 districts in east coast, Nadugani and other sites to be identified	PMU	PMU	LCB	
1.1.3.1 Procure contractors/partners			Resource Org.	Direct undertaking/ MOU	
1.1.3.2 Undertake status and distribution surveys of selected CR/EN/DD taxa in wild		DMU/FMU/EDC			
1.1.3.3 Develop species conservation plans (Tamil, English)					
a) Develop species conservation plans for Dugong in Palk Bay (5 years)					
b) Develop species conservation plans for sea turtles in 8 coastal divisions/districts (5 years)		DMU/FMU	Direct undertaking		
c) Develop other species conservation plans (plants and terrestrial/freshwater animals)					
1.1.3.4 Implement conservation plans		PMU	PMU		
a) Implement conservation plans (dugong) including ex-situ measures as appropriate (5 year					
b) Implement conservation plans (seaturtles) including ex-situ measures as appropriate (5 ye					
c) Implement species conservation plans for plants/other animals, including ex situ	Guindy NP	PMU	PMU	LCB	
1.1.3.5 Immunise livestock in periphery of all PAs to prevent transmission of diseases to wildlife					
1.1.3.6 Create GIS database of threatened and endemic flora and fauna based on past and present research					
1.1.4 Improve management of water, habitat and herbivores in Guindy NP	Guindy NP	PMU	PMU	LCB	
1.1.4.1 Procure contractors/partners (NGO/consultant/university & civil work contractor)					
1.1.4.2 Assess water resources and develop Water Management Strategy and Action Plan to address biodiversity and supplementary supply needs		DMU	Resource Org.	Direct undertaking	
1.1.4.3 Assess capacity of present vegetation to support current herbivore population					
1.1.4.4 Strengthen Management Plan by adopting Water Management Strategy and Action Plan					
1.1.4.5 Remove invasive species to retain integrity of vegetation and provide grazing for herbivores		DMU/FMU/EDCs	Civil Contractor	Direct undertaking/ MOU	
1.1.4.6 Water storage and distribution interventions (including underground storage and invasive					
a) Create permanent waterholes	Vallanadu Blackbuck Sanctuary	PMU	PMU	LCB	
b) Improve water storage and supply					
1.1.5.2 Develop Water Management Strategy and Action Plan and strengthen management plan	DMU	Resource Org.	MOU		
1.1.5.3 Improve water retention capacity within seasonal water bodies					
a) Create permanent waterholes	5 PAs and 10 Divisions within elephant reserves	PMU	PMU	LCB/MOU	
b) Improve water storage & supply					
1.1.5.4 Increase grasslands for blackbuck by removing previously introduced woody scrub					
1.1.6 Improve management of water in other PAs	5 PAs and 10 Divisions within elephant reserves	DMU	Resource Org.	MOU	
1.1.6.1 Procure contractors/partners					
1.1.6.2 Develop Water Management Strategy and Action Plan		Resource Org.	LCB/MOU		
1.1.6.3 Improve water retention capacity within seasonal water bodies					
a) Create permanent waterholes					
b) Improve water storage and supply		6 PAs	PMU	PMU	MOU/ LCB
1.1.6.4 Monitor biodiversity and socio-economic impacts of interventions					
1.1.7 Monitor impacts of climate change on biodiversity	6 PAs	PMU	Resource Org.		
1.1.7.1 Procure contractors/partners					
1.1.7.2 Identify vegetation types representing climatic/topographic gradients in Tamil Nadu					
1.1.7.3 Undertake baseline surveys of biodiversity distribution and status in vegetation types					
1.1.7.4 Manual on monitoring and analysis protocols (Tamil and English)					
1.1.7.5 Undertake second surveys of biodiversity following 5-year interval					
1.1.7.6 Enter georeferenced data in biodiversity database/GIS					
1.1.7.7 Report on survey results (Tamil and English)					
1.2 Resource Protection					
1.2.1 Strengthen resource protection	6 PAs & 10 Divisions within elephant reserves	PMU	PMU/ Procurement	MOU	
1.2.1.1 Solar-powered torches for night protection staff			PMU/DMU	Direct undertaking	
1.2.1.2 Train village volunteers in resource protection skills		DMU	DMU/FMU	Direct undertaking	
1.2.1.3 Augment FD protection units with anti-poaching squads (1 FD staff per squad of 4 villagers)					
1.2.1.4 Annual training fellowships awarded to meritorious anti-poaching staff					
1.2.1.5 Monitor incidences of fire, poaching and encroachment in PAs and RFs		DMU/RO/EDC/VFCs	DMU/FMU		
1.2.1.6 Consolidation of forest boundaries by construction of RF Cairns					
1.2.1.7 Enter georeferenced data in biodiversity database/GIS	PMU	PMU			

Components/ sub-components/ activities	Target Area	Proponent/ Owner	Executer/ Contractor	Method	
1.3 Mitigating Human-Wildlife Conflict					
1.3.1 Train field staff and village volunteers in wildlife conflict management	4 PAs & 10 Divisions within elephant reserves	PMU DMU	PMU Resource Org.	LCB/MOU	
1.3.1.1 Procure contractors/partners					
1.3.1.2 Establish anti-depredation squads to help protect revenue lands from wildlife					
1.3.2 Identify and manage traditional migratory routes (elephant and gaur)	4 PAs & 10 Divisions within elephant reserves	PMU DMU	PMU Resource Org. DMU/FMU	LCB/MOU Direct undertaking	
1.3.2.1 Procure contractors/partners					
1.3.2.2 Review historic data and information on large mammal movements					
1.3.2.3 Monitor migratory movements of wildlife (elephant and gaur) using GPS					
1.3.2.4 Consolidate existing corridors and designate new ones, based on monitoring results					
1.3.2.5 Drive elephants back to forest and corridors					
1.3.2.6 Enter georeferenced data in biodiversity database/GIS					
1.3.3 Establish wildlife-proof barricades around villages	3 PAs & 10 Divisions within elephant reserves	DMU	DMU/FMU/ EDCs/VFCs	Direct undertaking/ MOU	
1.3.3.1 Provide and maintain for 5 years elephant-proof trenching where appropriate					
1.3.3.2 Provide and maintain for 5 years solar-powered fencing where appropriate					
1.3.3.3 Monitor incidences of human-wildlife conflict					
1.3.3.4 Monitor and report on effectiveness of wildlife-proof barricades around villages					
1.3.3.5 Translocate animals as required					
1.3.3.6 Establish and operate mobile veterinary facility			DMU/FMU/ PMU/ DMU/ ELCOT	Direct undertaking MOU	
1.4 Ecologically Sustainable Development					
1.4.1 Socio-economic and forest dependency surveys of village communities	63 villages within or abutting 15 PAs and 10 RF	PMU DMU	PMU Resource Org.	LCB	
1.4.1.1 Procure contractors/partners and hold state-level workshop					
1.4.1.2 Survey socio-economic and forest dependence status at outset of Project					
1.4.1.3 Survey socio-economic and forest dependence status 5 years after initial survey					
1.4.1.4 Prepare and publish manual on survey and analysis protocols (Tamil and English)					
1.4.1.5 Enter georeferenced data in 'peoples' database/GIS					
1.4.1.6 Report on survey results (Tamil and English)			PMU DMU	PMU Resource Org.	Direct undertaking LCB
1.4.2 Community biodiversity registers	88 project villages covering sites abutting PAs, villages on the periphery of RFs,	PMU DMU	PMU Resource Org.	LCB	
1.4.2.1 Procure contractors/partners					
1.4.2.2 Train field staff and village ecotourism guides in compiling biodiversity registers					
1.4.2.3 Provide communities with expertise in plant/animal identification, survey methods, oral history etc to record biodiversity					
1.4.2.4 Survey biodiversity in village revenue lands and ecotourism sites/routes					
1.4.2.5 Enter georeferenced data in biodiversity database/GIS					
1.4.2.6 Produce guide books, posters etc for ecotourists in 3 languages (Tamil, Hindi, English)			PMU PMU/ PMU/experts	Direct undertaking Individual contract	
1.4.3 Eco-development activities in 33 villages abutting PAs	Sathyamangalam WLS, Kanyakumari WLS and Srivilliputtur WLS or lie within 5 km radius of a RF boundary within an Elephant Reserve	PMU DMU	PMU PMU/DMU Resource Org. DMU EDC/ Resource Org.	LCB Direct undertaking LCB Direct undertaking LCB MOU	
1.4.3.1 Procure contractors/partners and hold state-level workshop					
1.4.3.2 Orientate communities on scope and purpose of Project					
1.4.3.3 Assess socio-economic and ecological infrastructure of villages and their periphery as necessary					
1.4.3.4 Establish and train mixed gender field staff teams to design and facilitate participatory					
1.4.3.5 Facilitate participatory planning of eco-development plans					
1.4.3.6 Facilitate study tours to expose EDCs to other successful VCFs/EDCs/SHGs					
1.4.3.7 Establish protocols and coordination mechanisms with appropriate village institutions					
1.4.3.8 Constitute EDCs and their Executive Committees					
1.4.3.9 Identify and prioritise viable livelihood options (linked to CBRs and socio-economic/forest					
1.4.3.10 Prepare eco-development plans, addressing socio-economic and ecological requirements and opportunities through series of business plans					
1.4.3.11 Implement eco-development plans via series of business plans for eco-enterprises, including skills training programmes					
a) Basic amenities					
b) Protection and management of natural resources					
c) Water augmentation and agriculture and allied development					
d) Revolving funds					
1.4.3.12 Participatory assessment of impacts of interventions					
1.4.4 Ecologically sustainable development in 33 tribal villages peripheral to RFs	33 tribal villages located around RFs that are part of Nilgiris-Eastern Ghats and Nilambur-Silent Valley-Coimbatore Elephant Reserves. Certain tribal villages located near PFs in Kallakurichi and RFs in Vellore divisions are included.	PMU DMU	PMU Resource Org. DMU/FMU Resource Org.	Direct undertaking LCB Direct undertaking LBC MOU	
1.4.4.1 Procure contractors/partners and hold state-level workshop					
1.4.4.2 Orientate communities on scope and purpose of Project					
1.4.4.3 Assess socio-economic and ecological infrastructure of villages and their periphery					
1.4.4.4 Establish and train mixed gender field staff teams to design and facilitate participatory processes using appropriate tools					
1.4.4.5 Facilitate participatory planning of micro-plans					
1.4.4.6 Facilitate study tours to expose VCFs/SHGs to other successful VCFs/EDCs/SHGs					
1.4.4.7 Establish protocols and coordination mechanisms with appropriate village institutions (Panchayat and/or Grama Sabha)					
1.4.4.8 Constitute VCFs/SHGs and their Executive Committees					
1.4.4.9 Identify and prioritise viable livelihood options (linked to CBRs and socio-economic/forest dependancy surveys)					
1.4.4.10 Prepare eco-development plans, addressing socio-economic and ecological requirements and opportunities through series of business plans					
1.4.4.11 Implement eco-development plans via series of business plans for eco-enterprises, including skills training programmes					
a) Basic amenities					
b) Protection and management of natural resources					
c) Water augmentation and agriculture and allied development					
d) Revolving funds					
1.4.4.12 Participatory assessment of impacts of interventions					
1.4.5 Community-based ecotourism in 25 sites	7 destinations are located around four wildlife sanctuaries, 18 other sites in 12 forest divisions	PMU DMU	PMU Resource Org.	Direct undertaking LCB	
1.4.5.1 Procure contractors/partners and hold state-level workshop					
1.4.5.2 Assess socio-economic infrastructure of villages and opportunities for ecotourism based on natural and cultural heritage					
1.4.5.3 Visit candidate sites, assess potential ecotourism activities and identify opportunities for synergy within clusters of sites					
1.4.5.4 Develop ecotourism strategies for clusters of sites, with feasibility studies of target sites and synergies between sites					
1.4.5.5 Constitute ecotourism SHGs in the absence of EDCs or VFCs					
1.4.5.6 Develop Business Plans for ecotourism enterprises, including skills training programmes					

Components/ sub-components/ activities	Target Area	Proponent/ Owner	Executer/ Contractor	Method
1.4.5.7 Implement Business Plans and establish ecotourism enterprises			EDCs/VFCs/ Resource Org./ FMU	MOU
a) Construction of tourism-related infrastructure				
b) Equipment (powered by renewable resources)				
c) Training of community members (hospitality, catering, lodge management, nature and culture guiding, health & safety etc)				
d) Revolving funds				
1.4.5.8 Develop village ecotourism charters as benchmark for participatory monitoring of sustainability of interventions			Local Interest Groups	MOU
2 INCREASING THE NATURAL RESOURCE BASE				
2.1 Tree Cultivation on Private Land				
2.1.1 Village Cluster Selection Including Rapid Appraisal				
2.1.1.1 Multi-criteria based screening of villages		PMU	PMU/ JRF	Direct undertaking/
2.1.1.2 Preparing guidelines for Rapid Appraisal (RA)			PMU/ expert	
2.1.1.3 Orientation of DMU / FMU staff in RA process and tools			PMU	Direct undertaking
2.1.1.4 Rapid Appraisal of potential villages		DMU	FMU	
2.1.1.5 Village-wise Rapid Appraisal Reports				
2.1.1.6 Preparation of list of selected villages		PMU	PMU	
2.1.2 Procurement of Resource Organizations for each cluster			Resource Org.	LCB
2.1.3 Village Entry & Formation of FIGs for TCPL				
2.1.3.1 Awareness programmes on scope, purpose and protocols of TCPL		DMU	Resource Org./ FMU	LCB
2.1.3.2 Preparing guidelines for Farmer Interest Groups (FIG)		PMU	PMU/ Expert	Direct undertaking/
2.1.3.3 Formation of FIGs		DMU	Resource Org./FMU	Direct undertaking/ LCB
2.1.3.4 Exposure visit for FIG & SHG members				
2.1.4 Preparation of Village Microplan for TCPL		DMU	Resource Org./FMU	Direct undertaking/ LCB
2.1.4.1 Manual on Micro-planning for TCPL				
2.1.4.2 Training of staff and FIG representatives in microplanning				
2.1.4.3 Base-line survey of farmers and potential land for TCPL				
2.1.4.4 Participatory Assessment & Planning				
2.1.4.5 Approval of Micro-plan and Annual Action Plan			DMU	Direct undertaking
2.1.5 Implementation of Microplan (Annual Action Plan)		DMU	FMU/ farmers	Application
2.1.5.1 Organizing farmer-industry meetings				
2.1.5.2 Establishing cluster nurseries				
2.1.5.3 Planting operations				
2.1.5.4 Training of FIG & SHG members related to maintenance & management				
2.1.6 Participatory Monitoring & Evaluation (PME)				
2.1.6.1 Manual for Participatory Monitoring and Evaluation and Survival Survey				
2.1.6.2 Training of FIG, SHG and FMU on PME				
2.1.6.3 Participatory Monitoring & Evaluation				
2.1.6.4 PME Report including Seedling Survival Survey				
2.1.6.5 Distribution of survival incentives				
2.1.7 Cluster Exit Strategy - Facilitating support institutions and mechanisms for sustainability				
2.1.7.1 Designing and establishing Wood Market Information System		PMU	Experts	Direct contract
2.1.7.2 Linking FIGs with wood-based & NWFP based industries		DMU	FMU/ farmers	Direct undertaking
2.1.7.3 Organising common meetings of FIG members at Taluk / Range level				
2.1.7.4 Facilitating formation and strengthening of TG(C)S		PMU	PMU	Direct undertaking
2.1.7.5 Training and exposure for TG(C)S representatives/ farmers/ SHG members		DMU	DMU/FMU	Direct undertaking
2.2 Research on Production Forestry / Agro-forestry / Farm Forestry				
2.2.1 Research on Timber Production	SFRI	PMU	SFRI	Direct
2.2.1.1 Second generation and First generation seed orchards, seed stands Seed Production areas.				
2.2.1.2 Hedge stool nursery for clones of species taken				
2.2.1.3 Clonal evaluation trials and progeny trials				
2.2.1.4 Production of clonal plants				
2.2.2 Research on Fuel Wood Production	SFRI	PMU	SFRI	Direct
2.2.3 Research on Agro Forestry	SFRI	PMU	SFRI	Direct undertaking/ MOU
2.2.3.1 Evaluation of agriculture crops as inter crop - effect of irrigation on tree species and agri crop, growth rate of tree species, Genetic Combing of Agro Forestry tree species, cultural package				
2.2.3.2 Multiplication of clones through micro and macro propagation				
2.2.3.3 Fruit yield table for NTFP species in Agro Forestry				
2.2.3.4 Post harvest technology and timber testing and treatment for various immature timbers grown under Agro Forestry.				
2.2.4 Research on Bamboo	SFRI	PMU	SFRI	Direct undertaking/ MOU
2.2.4.1 On farm trials and off farm trials of various bamboo species including introduction of bamboo species, reeds, canes in various forest types				
2.2.4.2 Standardization of protocol medium in tissue culture lab				
2.2.4.3 Standardisation of rooting technique for Macropropagation				
2.2.4.4 Bamboo as reinforcement material - Partially replacing steel				
2.2.4.5 Multiplication of 10 Bamboo varieties.				
2.2.5 Research on Bio-fertilizers	SFRI	PMU	SFRI	Direct undertaking/ MOU
2.2.5.1 Isolation of Phosphobacteria, Rhizobium and VAM				
2.2.5.2 Establishment of Sandal seedlings with inoculation of Bio-fertilizers				
2.2.6 Research of Afforestation of problems sites.	SFRI	PMU	SFRI	Direct undertaking/
2.2.6.1 Growing vegetation on sheet rock, tree growing on bouldary site with different SMC measures				
2.2.7 Research on Wood Market (Assessment of wood market characteristics in Tamilnadu)	Whole state	PMU	TNFUD/ Resource Org.	Direct undertaking/
2.2.8 Research on Prosopis juliflora (Study on ecological and socio-economic impact of prosopis infestation on common and fallow land including commercial/comsumptive use)		PMU	SFRI/ Resource Org.	Direct undertaking/ LCB
2.2.9 Research on Multi-tier forest management				
2.2.9.1 Introduction of under storey and middle storey crops in natural forest plots		PMU/DMU	SFRI/ Resource Org.	Direct undertaking/ MOU/ LCB
2.2.9.2 Silviculture and management of the multi-tier forest				
2.2.10 Research on NTFP management	7 sites (one per agro-climatic zone)	PMU/DMU		
2.2.10.1 Develop resource assessment methodologies				
2.2.10.2 Establishing Non-destructive harvesting regime for different NTFPs				
2.2.10.3 Grading, processing and value addition of different NTFPs				

Components/ sub-components/ activities	Target Area	Proponent/ Owner	Executer/ Contractor	Method
3 SUPPORTING ACTIVITIES				
3.1 Capacity Development				
3.1.1 Training Needs Analysis		PMU	Resource Org.	LCB
3.1.2 Knowledge and Skill Development				
3.1.2.1 Preparatory Workshop		PMU	PMU	Direct undertaking
3.1.2.2 Project orientation				
a) Project orientation to Forest Guards, Watchers			PMU/TNFTC	Direct undertaking/ MOU
b) Project orientation to Foresters and Rangers			PMU/TNFA	
c) Project orientation to Assistant/Deputy Conservators of Forests				
d) Project orientation two days workshop for senior officers 50 persons in the level of CF /				
e) Project orientation to ministerial and supporting staff				
f) Project orientation to resource organizations				
g) Orientation at Circle level (DMU FMU staff and ministerial staff)			PMU	
3.1.2.3 Managerial Training				
a) Training on Public Relations, stress management and communication to the Forest Guards and Foresters		PMU	TNFTC	MOU
b) Training on Interpersonal Relationship, Communication & Stress Management, accounting to Rangers			TNFA	
c) Training on Interpersonal Relationship, Communication & Stress Management, project management and M&E to Assistant/Deputy Conservators of Forests.				
d) Training on Public Relations, Stress Management to the Conservators of Forests and Chief Conservators of Forests.				
e) Training on stress management, office Administration, district office manual & disciplinary proceeding to the Ministerial staff.				
f) Training on basics of vehicle maintenance & First Aid to the Drivers and Guard cum				
g) Training on basics of vehicle maintenance & First Aid to the Drivers and Guard cum				
3.1.2.4 Thematic training for project staff (domestic)				
a) Participatory approach: RRA, RRA and Microplanning (Forester/ F.Guards)		PMU	TNFC/TNFA	MOU
b) Refreshers training on participatory approach and practice (Forester/ F.Guards)				
c) Formation, strengthening, and management of CBOs / Gender mainstreaming and				
d) Revolving fund management, business development support (Forester/ F.Guards)			TNFA	
e) Marine biodiversity conservation and monitoring			Univ/ Research	
f) Trainers training on Agroforestry and extension - outside the state (for staff of forest extension center)			KFRI/ ICRISAT etc	
g) Trainers training for extension work- (within the state (for staff of forest extension center)			Univ/ Research	
h) Faculty training for TNFA & TNFTC (outside/within the state)			Univ/ Research	
3.1.2.5 Training on PC, GIS and MIS				
a) Training on basic Computer knowledge		PMU	TNFA	MOU
b) GPS based Survey and Mapping			PMU/DMU/Circle	Direct undertaking
c) Training on Paper based 'Data Recording Registers' and 'Monthly Reporting Formats (local training by master trainers)			PMU/DMU/FMU	
d) Training on Web based MIS Software (in-situ training by master trainers)			PMU/DMU	
e) Training on GIS at National level institute			NIRS, FSI	MOU
f) Master's training for paper based MIS			PMU	Direct undertaking
g) Master's training for software based MIS -1				
h) Master's training for software based MIS -2 (refreshers)				
3.1.2.6 Exposure visits related to project oriented subjects				
a) Exposure visit on successful FMS system		PMU	PMU	Direct undertaking
b) Farmers exposure visit to successful plantation area & Agroforestry models (within the			PMU/DMU	
c) Exposure visit for TGS members office bearers (management, marketing etc) (within the			PMU/DMU	
3.1.2.7 Overseas training and study tour for project staff				
a) Training on Sustainable Forest Management and Bio-diversity conservation		PMU	PMU	Direct undertaking
b) Training on Sustainable Wildlife and habitat management for Guindy national park				
c) Training on Community based Eco tourism for conservation and developmen				
d) Training on marine biodiversity conservation and monitoring				
e) Training on Integrated land use planning & Environmental impact assessment				
f) Training on Managing Forests and , Managing change				
g) Training on Remote sensing and GIS in Natural Resources Management				
h) Training on Communication skill for Extension				
i) Training on Participatory Action Research for Community based Natural Resource				
j) Training on Community based Integrated Watershed Management				
k) Training of trainers for faculty/staff of TNFA, SFRI, and Extension Centre				
l) Training on development of GIS & MIS overseas for GIS unit				
m) Training on Carbon sequestration training for 5 senior officers including 1 person from facilitation cell to EU or other countries.				
n) Participation of forest officers in International seminar /workshop				
o) Training of veterinary doctors /FD on treatment of dugong				
p) Exposure visit inter-national centres for implement conservation plans (dugong)				
q) International expore visit for iconervation plans (seaturtles)				
r) Train for Warden / Field Staff on Black buck management				
3.1.2.8 Need-based training				
a) Exposure visits related to project oriented subjects as required		PMU/DMU	PMU/DMU/ other institutions	Direct undertaking/ MOU
b) Livelihood enhancement and other related to project oriented subjects as required				
c) Training related to project oriented subjects as required				
3.1.3 Workshops and Conference/ Seminars				
3.1.3.1 Organising national seminar		PMU	PMU	Direct undertaking
3.1.3.2 Organize international workshop				
3.1.4 Review Meetings				
3.1.4.1 Annual consultative / review meetings at state level		PMU	PMU	Direct undertaking
3.1.4.2 Biannual consultative / review meetings at circle level		Circle office/DMU	Circle office/DMU	

Components/ sub-components/ activities	Target Area	Proponent/ Owner	Executer/ Contractor	Method
3.1.5 Enhanced Outreach and Environmental Education				
3.1.5.1 Website creation		PMU	PMU/Expert	Direct undertaking/ Individual expert
a) Project website				
b) Ecotourism website				
3.1.5.2 Publicity Activities		DMU	DMU/ Expert	Direct undertaking
a) Publicity through wall paintings				
b) Conducting exhibition at district level				
c) Writing publicity boards with messages of awareness creation				
3.1.5.3 Awareness Generation		PMU/DMU	Resource Org.	LCB
a) Eco education to school children of 10 schools in 25 Districts.	25 districts			
b) Education to school children on marine biodiversity for 7 coastal districts	7 coastal districts			
c) Training to school teachers				
d) Conducting street play / puppet show			DMU	Direct undertaking
e) Rewards to farmers / NGOs / students / Schools and Extension Staff at district level			PMU/DMU	
3.1.5.4 Publication		PMU	PMU/Expert	Direct undertaking/ Individual contract
a) Newsletter				
b) Guidelines, Manuals, and Reports				
c) Brochure/Leaflet				
d) Videography				
3.2 Monitoring & Evaluation				
3.2.1 Web-enabled management Information System (MIS)				
3.2.1.1 Software development cost (additional module only)		PMU	Expert/ Contractor	Direct contract/ LCB
3.2.1.2 Maintenance of MIS software				
3.2.2 Computerized Financial Management and Accounting System (FMAS)				
3.2.2.1 Software development cost (additional module only)			Expert/ Contractor	Direct contract/ LCB
3.2.2.2 Maintenance of MIS software				
3.2.3 Periodic Reviews and Assessments				
3.2.3.1 Monthly Review at Circles level (12 Circle x 12 months x 7.5 year = 1,080 nos.)		PMU/Circle	PMU/Circle	Direct undertaking
3.2.3.2 Annual assessment at Circle level (12 Circles x 8 years = 96 nos.)				
3.2.4 Studies				
3.2.4.1 Studies under Biodiversity Conservation Component (including Ecological Sustainable Develop		PMU/DMU	Resource Org.	LCB
3.2.4.2 Studies under TCPL				
3.2.4.3 Short Studies		PMU	Expert/ Resource Org.	Direct contract/ LCB
3.2.5 Baseline and Socio-economic Impact Evaluation Surveys		PMU	Resource Org.	LCB
3.2.5.1 Baseline survey				
3.2.5.2 Mid-term/ End-term evaluation				
3.2.5.3 Quarterly concurrent monitoring and reporting				
3.2.6 Participatory M&E by community (twice in project life)		DMU	FMU/ Resource Org / EDC/ Community based	Direct undertaking/ LCB
3.2.7 Social audits including Grievance Redressal Mechanism (every 6 months in 137 EDC villages)		DMU	EDC/ Community based	Direct undertaking
3.2.8 Video and photo documentation (the cost of equipment included in Items 5.3.1 - 5.3.3)		PMU/DMU	PMU/DMU	Direct
3.3 Construction of Buildings				
3.3.1 Construction of PMU office building at Chennai (1)		PMU	Contractor	LCB
3.3.2 Construction of SFRI Building at Kolapakkam (1)		PMU	Contractor	LCB
3.3.3 Construction of Forest Inspection Bungalow (6)		DMU	DMU/ Special. agency	Direct undertaking
3.3.4 Construction of Circle offices (2)		Circle	Circle/ Special. agency	
3.3.5 Construction of District offices (8)		DMU	DMU/ Special. agency	
3.3.6 Construction of Range offices (58)		DMU		
3.3.7 Construction of Forestry Extension centres at Tiruppur and Ariyalur districts (2)		DMU		
3.3.8 Construction of Forestry Extension Offices - office buildings (26)		DMU		
3.3.9 Construction of Van shed for Forestry Extension Centres (12)		DMU		
3.3.10 Construction of modern interpretation centre at Nanmangalam of Kancheepuram Districts (1)		DMU		
3.3.11 Construction of interpretation hass in the existing extension centre area - Trichy, Coimbatore,		DMU		
3.3.12 Construction of GIS cum Bio-diversity Laboratory at training college, Vaigaidam (1)		PMU		
3.3.13 Antipoaching camp building (29)		DMU		
3.4 Augmentation of Office Facilities & Equipment				
3.4.1 At PMU		PMU	PMU/ ELCOT	MOU
3.4.1.1 Desktop computer including office software and accessories				
3.4.1.2 Notepads (Lap top) including office software and accessories				
3.4.1.3 Printer (Laser)				
3.4.1.4 Printer (Dot Matrix)				
3.4.1.5 Table, Charis etc.				
3.4.1.6 A4 size scanner				
3.4.1.7 Copier/ Fax				
3.4.1.8 UPS 1 KVA				
3.4.1.9 Handycam				
3.4.1.10 Digital camera				
3.4.1.11 Upgradation of hardware and software				
3.4.2 At Circle Offices		PMU	PMU/ ELCOT	MOU
3.4.2.1 Desktop computer including office software and accessories				
3.4.2.2 Notepads (Lap top) including office software and accessories				
3.4.2.3 Printer (Laser)				
3.4.2.4 Printer (Dot Matrix)				
3.4.2.5 Table, Charis etc.				
3.4.2.6 A4 size scanner				
3.4.2.7 Copier/ Fax				
3.4.2.8 UPS 1 KVA				

Components/ sub-components/ activities	Target Area	Proponent/ Owner	Executer/ Contractor	Method
3.4.2.9 Handycam				
3.4.2.10 Digital camera				
3.4.2.11 Upgradation of hardware and software				
3.4.3 At DMUs		PMU	PMU/ ELCOT	MOU
3.4.3.1 Desktop computer including office software and accessories				
3.4.3.2 Note pads (Lap top) including office software and accessories				
3.4.3.3 Printer (Laser)				
3.4.3.4 Printer (Dot Matrix)				
3.4.3.5 Table, Charis etc.				
3.4.3.6 A4 size scanner				
3.4.3.7 Copier/ Fax				
3.4.3.8 UPS 1 KVA				
3.4.3.9 Handycam				
3.4.3.10 Digital camera				
3.4.3.11 Upgradation of hardware and software				
3.4.4 At FMUs		PMU	PMU/ ELCOT	MOU
3.4.4.1 Desktop computer including office software and accessories				
3.4.4.2 Printer (Dot Matrix)				
3.4.4.3 Table, Charis etc.				
3.4.4.4 Copier/ Fax				
3.4.4.5 UPS 1 KVA				
3.4.4.6 Digital camera				
3.4.4.7 Upgradation of hardware and software				
3.4.5 At Extension Centers		PMU	PMU/ ELCOT	MOU
3.4.5.1 Desktop computer including office software and accessories				
3.4.5.2 Printer (Dot Matrix)				
3.4.5.3 Table, Charis etc.				
3.4.5.4 Copier/ Fax				
3.4.5.5 UPS 1 KVA				
3.4.5.6 Digital camera				
3.4.5.7 Upgradation of hardware and software				
3.4.6 Geomatic center		PMU	PMU/ ELCOT	MOU
3.4.6.1 GIS window based work station including office software and accessories				
3.4.6.2 Note pads (Lap top) including office software and accessories				
3.4.6.3 GIS application software				
a) Arc GIS v 9.3 (Arc View) Windows				
b) Arc GIS v 9.3 (Arc Editor, Spatial Analyst, 3D Analyst) Windows				
c) Erdas 8.7 (for Windows)				
3.4.6.4 A4 size scanner				
3.4.6.5 A3 size Laser jet printer (Color)				
3.4.6.6 A0 size plotter				
3.4.6.7 UPS 10KVA				
3.4.6.8 Upgradation of hardware and software				
3.4.6.9 Acquisition of satellite images and FSI digital data for GIS analysis & interpretation			ISRO	
a) LISS-III (2007-2011 for 2 seasons - 15 no. x 2 seasons X 2 Years AND during end of 3rd				
b) LISS-IV (covering roughly 25% of geographical area of the state X 2 Years)				
c) Cartosat-1 (covering roughly 25% of geographical area of the state X 2 Years)				
d) Village map (from Survey of India- Open Map Series)			FSI	
3.4.7 GIS gadgets & tools for geomatic center, DMUs and FMUs		PMU	PMU/ ELCOT	MOU
3.4.7.1 Hand held GPS				
3.4.7.2 Mobile GPS (Vehicle mounted)				
3.4.7.3 PDA				
3.4.8 Equipment & tools for resource protection (the cost is included in Item 1.2.1 "Resource Protection")		PMU	PMU/ ELCOT	MOU
3.4.8.1 Solar-powered torches for night protection staff				
3.4.8.2 Infrastructure kit for fire fighting extinguishing				
3.4.8.3 Fire fighting equipment sets				
3.4.8.4 GPS				
3.4.8.5 Night vision binoculars				
3.4.8.6 Fixed and mobile wireless sets				
3.4.8.7 Walkie talkies				
3.4.8.8 Cellphone				
3.5 Strengthening Mobility				
3.5.1 Staff car		PMU	PMU/ ELCOT	MOU
3.5.2 Jeeps				
3.5.3 Wildlife Safari van				
3.5.4 35 Seater Bus for extension study and study tour purpose				
3.6 Project Management		TNFD	TNFD	Direct undertaking
4 CONSULTING SERVICES		PMU	Consulting firm	ICB

Project activity	Total Project Cost (Rs. 1,000)			Financial Plan (Rs. 1,000)																			
	Total	JICA Loan	TN State Fund	Year 1 (2011/12)		Year 2 (2012/13)		Year 3 (2013/14)		Year 4 (2014/15)		Year 5 (2015/16)		Year 6 (2016/17)		Year 7 (2017/18)		Year 8 (2018/19)		Year 9 (2019/20)		Year 10 (2020/21)	
				JICA	TN	JICA	TN	JICA	TN	JICA	TN	JICA	TN	JICA	TN	JICA	TN	JICA	TN	JICA	TN	JICA	TN
3.2.6 Participatory M&E by community (twice in project life)	3,082	3,082				154		462		616		616		616		462		154					
3.2.7 Social audits including Grievance Redressal Mechanism (every 6 months in 137 EDC villages)	3,288	3,288			206		411		411		411		411		411		411		206				
3.2.8 Video and photo documentation (the cost of equipment included in Items 3.4.1 - 3.4.3)																							
3.3 Construction of Buildings	320,548	5%	313,540	7,008	127,539	2,614	156,770	3,504	29,231	890													
3.4 Augmentation of Office Facilities & Equipment	124,480	2%	113,807	10,672	51,032	4,794	30,025	2,806	14,620	1,445	11,143	1,099	4,610	369	373	36	933	89	1,071	36			
3.4.1 At PMU	5,500		5,022	477	2,178	205	1,277	115	984	98	533	55	9	1	9	1	23	2	9	1			
3.4.2 At Circle Offices (12 nos.)	8,001		7,339	662	3,637	326	2,682	232	564	57	406	42	9	1	9	1	23	2	9	1			
3.4.3 At DMUs (66 nos)	32,476		29,704	2,773	14,678	1,361	10,094	907	2,607	266	2,174	225	27	3	27	3	68	7	27	3			
3.4.4 At FMUs (202 nos.)	40,276		36,650	3,626	18,828	1,847	10,699	1,046	3,755	385	3,268	338	18	2	18	2	46	4	18	2			
3.4.5 At Extension Centers (32 nos.)	6,449		5,868	580	2,983	293	1,701	166	601	62	533	55	9	1	9	1	23	2	9	1			
3.4.6 Geomatic center	13,859		12,865	994	5,457	451	300	29	2,837	265	958	71	1,266	50	300	29	750	71	998	29			
3.4.7 GIS gadgets & tools for geomatic center, DMUs and FMUs	17,918		16,358	1,560	3,272	312	3,272	312	3,272	312	3,272	312	3,272	312									
3.4.8 Equipment & tools for resource protection (the cost is included in Item 1.2.1 "Resource Protection")																							
3.5 Strengthening Mobility	116,790	2%	106,629	10,161	21,172	2,018	25,664	2,446	25,664	2,446	17,064	1,626	17,064	1,626									
3.6 Project management	1,600,714	24%	241,853	1,358,861	15,116	3,023	30,232	6,046	30,232	193,259	30,232	193,259	30,232	193,259	30,232	193,259	30,232	193,259	30,232	193,259	15,116	190,236	
3.6.1 Preparatory Works																							
3.6.2 Personnel Cost	1,333,928	20%	241,853	1,092,075	15,116		30,232		30,232	156,011	30,232	156,011	30,232	156,011	30,232	156,011	30,232	156,011	30,232	156,011	15,116	156,011	
3.6.3 Running and Maintenance Cost (20% of personnel cost)	266,786	4%		266,786		3,023		6,046		37,248		37,248		37,248		37,248		37,248		37,248		34,225	
4 Sub-total (1~3)	5,241,245		3,817,505	1,423,740	237,187	13,012	649,888	23,742	791,291	207,845	889,794	203,889	655,526	200,681	350,091	195,677	151,762	194,327	76,440	194,332	15,525	190,236	
5 Price Contingency	787,679		496,825	290,854	7,590	416	42,258	1,544	78,421	20,598	119,478	27,377	111,815	34,231	72,830	40,707	37,438	47,938	21,906	55,692	5,088	62,350	
6 Sub-total (4 + 5)	6,028,925		4,314,330	1,714,595	244,777	13,428	692,146	25,285	869,712	228,443	1,009,273	231,266	767,341	234,911	422,920	236,384	189,200	242,265	98,346	250,025	20,614	252,586	
7 Physical Contingency	602,892		431,433	171,459	24,478	1,343	69,215	2,529	86,971	22,844	100,927	23,127	76,734	23,491	42,292	23,638	18,920	24,226	9,835	25,002	2,061	25,259	
8 Subtotal (6 + 7)	6,631,817		4,745,762	1,886,054	269,255	14,771	761,361	27,814	956,683	251,288	1,110,200	254,393	844,075	258,402	465,213	260,023	208,120	266,491	108,181	275,027	22,675	277,845	
9 CONSULTING SERVICES (including price escalation and contingency)	118,683	2%	107,601	11,083	18,348	1,890	30,785	3,171	24,239	2,497	16,873	1,738	17,355	1,788									
10 GRAND TOTAL (8 + 9)	6,750,500		4,853,363	1,897,137	287,603	16,661	792,146	30,985	980,922	253,784	1,127,073	256,131	861,430	260,190	465,213	260,023	208,120	266,491	108,181	275,027	22,675	277,845	

72% 28%

Table 9.1 Annual Economic Cost of the Project by Component

Components	Financial Cost (Rs. 1,000)	Total (Rs. 1,000)	Annual Economic Cost (Rs. 1,000)								
			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
1 Biodiversity Conservation	1,053,716	926,123	1,971	155,589	255,122	238,012	124,447	76,536	54,409	20,037	0
1.1 Habitat restoration, enhancement and management	422,796	374,381	1,381	60,373	120,364	75,804	41,946	36,014	36,014	2,484	0
1.2 Resource protection	299,468	258,409	590	53,021	63,735	42,608	37,071	31,535	14,924	14,924	0
1.3 Mitigate human-wildlife conflict	214,724	191,002	0	36,256	55,396	53,561	32,306	7,902	2,952	2,628	0
1.4 Ecologically sustainable development	116,728	102,331	0	5,939	15,627	66,039	13,123	1,085	518	0	0
2 Increasing the Natural Resource Base	1,853,867	1,659,071	2,695	176,737	341,254	488,607	399,304	197,952	44,919	7,605	0
2.1 Tree Cultivation on Private Land	1,783,955	1,596,150	270	167,310	329,580	477,810	389,835	189,045	37,350	4,950	0
2.2 Research on Production Forestry / Agro-forestry / Farm Fores	69,913	62,921	2,425	9,427	11,674	10,797	9,469	8,907	7,569	2,655	0
2.3 REDD Plus Pilot Project	0	0	0	0	0	0	0	0	0	0	0
3 Supporting Activities	2,333,663	2,073,535	211,523	258,015	289,719	248,130	240,156	214,527	211,192	215,088	185,185
3.1 Capacity Development	137,295	123,491	12,184	30,933	23,284	18,801	13,575	10,249	6,549	7,916	0
3.2 Monitoring & Evaluation	33,836	28,822	3,244	3,218	2,730	2,800	5,932	2,800	2,662	5,066	369
3.3 Construction of Buildings	320,548	282,186	114,785	141,093	26,308	0	0	0	0	0	0
3.4 Augmentation of Office Facilities & Equipment	124,480	102,427	45,929	27,022	13,158	10,029	4,149	336	839	964	0
3.5 Strengthening Mobility	116,790	95,966	19,055	23,098	23,098	15,358	15,358	0	0	0	0
3.6 Project management	1,600,714	1,440,642	16,325	32,650	201,142	201,142	201,142	201,142	201,142	201,142	184,817
Sub-total (1)	5,241,245	4,658,729	216,189	590,341	886,095	974,748	763,907	489,015	310,519	242,729	185,185
4 Price Contingency	787,679										
Sub-total (2)	6,028,925	4,658,729	216,189	590,341	886,095	974,748	763,907	489,015	310,519	242,729	185,185
5 Physical Contingency	602,892	465,873	21,619	59,034	88,610	97,475	76,391	48,901	31,052	24,273	18,519
Sub-total (3)	6,631,817	5,124,602	237,808	649,375	974,705	1,072,223	840,297	537,916	341,571	267,002	203,704
6 Consulting Services	118,683	91,898	16,627	26,976	20,375	13,960	13,960	0	0	0	0
TOTAL	6,750,500	5,216,500	254,435	676,351	995,079	1,086,184	854,258	537,916	341,571	267,002	203,704

Table 9.2 Economic Cost and Benefit Flow of TCPL Plantation under the Project (Casuarina)

Species **Casuarina**
 Planting density: 10,000 seedlings/ha
 Total area planted **3,000** ha
 Harvested products at Year 5
 Fuelwood **20** ton/ha
 Polywood **80** ton/ha
 Price of fuelwood: #2 **0.8** Rs.1,000/ton
 Price of polywood: #2 **1.8** Rs.1,000/ton
 SCF: **0.90**

Unit: Rs.1,000/ha

Year	Financial Cost		Economic Cost		
	Project #1	Farmer	Project	Farmer	Total
Year 1	70.0	13.0	63.0	11.7	74.7
Year 2		10.0	0.0	9.0	9.0
Year 3		7.0	0.0	6.3	6.3
Year 4		2.0	0.0	1.8	1.8
Year 5 #2	2.0		1.8	0.0	1.8

#1: Rs. 70,000 consist of the cost of seedlings (Rs.2.75/seedlings) and planting cost (Rs.4.25/seedlings) multiplied by 10,000 seedlings per ha. It is assumed that this cost will be shouldered by farmers at and after 2nd rotation. The incentive to be provided by the Project is not counted as economic cost of the Casuarina plantation.

#2: The cost of harvesting is borne by buyer and not reflected in the cost and benefit flow because the price of products are set considering the arrangement.

Refer to Table 9.3

Planting schedule	Year	Area planted (ha)	Area harvested (ha)	Economic Investment Cost (Rs.,1000)											Gross Economic Benefit from Thinning and Harvesting (Rs. 1,000)					Net Economic benefit					
				Planting Cost (the year 1 cost)					Maintenance and harvesting cost (the cost of Year 2-5)						Total (A)	Total (B)									
				1st batch	2nd batch	3rd batch	4th batch	5th batch	Total	1st batch	2nd batch	3rd batch	4th batch	5th batch		Total	1st batch	2nd batch	3rd batch		4th batch	5th batch	Total		
	1														0	0						0	0		
10%	2	300													0	3,510						3,510	3,510	0	-3,510
40%	3	1,200													0	2,700	14,040					16,740	16,740	0	-16,740
50%	4	1,500													0	1,890	10,800	17,550				30,240	30,240	0	-30,240
	5	0													0	540	7,560	13,500				21,600	21,600	0	-21,600
	6	0	300												0	0	2,160	9,450				11,610	11,610	48,000	36,390
	7	300	1,200												18,900	3,510	0	2,700				6,210	25,110	192,000	166,890
	8	1,200	1,500												0	75,600	2,700	14,040	0			16,740	92,340	240,000	147,660
	9	1,500	0												0	0	10,800	17,550				30,240	124,740	0	-124,740
	10	0	0												0	540	7,560	13,500				21,600	21,600	0	-21,600
	11	0	300												540	0	2,160	9,450				11,610	12,150	48,000	35,850
	12	300	1,200												18,900	3,510	0	2,700				6,210	27,270	192,000	164,730
	13	1,200	1,500												0	75,600	2,700	14,040	0			16,740	95,040	240,000	144,960
	14	1,500	0												0	0	10,800	17,550				30,240	124,740	0	-124,740
	15	0	0												0	540	7,560	13,500				21,600	21,600	0	-21,600
	16	0	300												540	0	2,160	9,450				11,610	12,150	48,000	35,850
	17	300	1,200												18,900	3,510	0	2,700				6,210	27,270	192,000	164,730
	18	1,200	1,500												0	75,600	2,700	14,040	0			16,740	95,040	240,000	144,960
	19	1,500	0												0	0	10,800	17,550				30,240	124,740	0	-124,740
	20	0	0												0	540	7,560	13,500				21,600	21,600	0	-21,600
	21	0	300												540	0	2,160	9,450				11,610	12,150	48,000	35,850
	22	300	1,200												18,900	3,510	0	2,700				6,210	27,270	192,000	164,730
	23	1,200	1,500												0	75,600	2,700	14,040	0			16,740	95,040	240,000	144,960
	24	1,500	0												0	0	10,800	17,550				30,240	124,740	0	-124,740
	25	0	0												0	540	7,560	13,500				21,600	21,600	0	-21,600
	26	0	300												540	0	2,160	9,450				11,610	12,150	48,000	35,850
	27	300	1,200												18,900	3,510	0	2,700				6,210	27,270	192,000	164,730
	28	1,200	1,500												0	75,600	2,700	14,040	0			16,740	95,040	240,000	144,960
	29	1,500	0												0	0	10,800	17,550				30,240	124,740	0	-124,740
	30	0	0												0	540	7,560	13,500				21,600	21,600	0	-21,600
	31	0	300												540	0	2,160	9,450				11,610	12,150	48,000	35,850
	32	300	1,200												18,900	3,510	0	2,700				6,210	27,270	192,000	164,730
	33	1,200	1,500												0	75,600	2,160	14,040	0			16,740	94,500	240,000	145,500
	34	1,500	0												0	0	10,800	17,550				30,240	124,740	0	-124,740
	35	0	0												0	540	7,560	0				8,100	8,100	0	-8,100
	36	0	300												540	0	2,160	0				2,160	2,700	48,000	45,300
	37	300	1,200												18,900	3,510	0	540				4,050	25,110	192,000	166,890
	38	1,200	1,500												0	75,600	2,700	14,040	0			16,740	95,040	240,000	144,960
	39	1,500	0												0	0	10,800	17,550				30,240	124,740	0	-124,740
	40	0	0												0	540	7,560	13,500				21,600	21,600	0	-21,600

Table 9.3 Financial and Economic Analysis of Casuarina Plantation per Hectare

Model: Block Plantation
 Species: Casuarina
 Spacing: 1m X 1m (10,000 trees/ha)
 Site: Irrigated
 Rotation: 4 years

Financial Analysis

Particulars	Unit	Financial price	Growth Year						NPV *5	IRR	
			Year 0	Year 1	Year 2	Year 3	Year 4	Total			
Investment Cost	TNFD										
	Seedling cost	Rs./ seedling	2.75	27,500					27,500		
	Planting cost	Rs./ seedling	4.25	42,500					42,500		
	Survival Incentive	Rs./seedling	0.25					2,000	2,000		
	Total Cost by TNFD	Rs.		70,000	0	0	0	2,000	72,000	69%	
	Farmer										
	Land preparation *1	Rs./ ha		2,000					2,000		
	Maintenance *2										
	Irrigation	Rs./Irrigation	500	6,000	6,000	3,000			15,000		
	Weeding/soil works	Rs./ ha			3,000	2,000			5,000		
	Farm manure	Lumpsum		5,000					5,000		
	Pruning & tending	Lumpsum			1,000	1,000	1,000		3,000		
	Watch & Ward	7-10 MD				1,000	1,000		2,000		
	Harvesting *3								0		
	Total Cost by Farmer	Rs.		13,000	10,000	7,000	2,000	0	32,000	31%	
	Total Investment Cost	Rs.		83,000	10,000	7,000	2,000	2,000	104,000		91,586
Benefit	Fuel wood *4	ton/ha						20			
		Rs./ ton	800					16,000	16,000		
	Wood *4	ton/ha						80			
		Rs./ ton	1,800					144,000	144,000		
	Total Benefit			0	0	0	0	160,000	160,000		99,347
B/C											1.08
B-C				-83,000	-10,000	-7,000	-2,000	158,000	56,000		12%

Assumptions

- Survival Rate **80%**
- Seedlings per ha **10,000**
- *1 Land preparation (ploughing) is farmer's responsibility, while pit digging and planting works will be done by the project.
- *2 Farmer estimate, including inputs, irrigation cost - watering for first two years, weeding, and watch & ward
 Irrigation: twice a month for 6 dry months (12 times/yr) for the initial 2 years and once a month at 3rd year at the cost of Rs.500/ha/time
 Watch & ward: against possibility of theft in year 3,4
- *3 The cost of harvesting is borne by buyer
- *4 Based on information from farmers (100 to 150 ton/ha in 4 year rotation). Assumed 20% of the products (20ton/ha) are fuelwood and the rest (80ton/ha) pulpwo
 The sales prices of fuelwood (Rs.800/ton) and pulywood (Rs.1,800/ton) are also based on information from farmers.
- *5 At discount rate of 10%

Economic Analysis

SCF= 0.9

Particulars	Unit	Economic price	Growth Year						NPV *5	IRR	
			Year 0	Year 1	Year 2	Year 3	Year 4	Total			
Investment Cost	TNFD										
	Seedling cost	Rs./ seedling	2.48	24,750					24,750		
	Planting cost	Rs./ seedling	3.83	38,250					38,250		
	Survival Incentive	Rs./seedling	0.23					1,800	1,800		
	Total Cost by TNFD	Rs.		63,000	0	0	0	1,800	64,800	62%	
	Farmer										
	Land preparation	Rs./ ha		1,800					1,800		
	Maintenance										
	Irrigation	Rs./Irrigation	450	5,400	5,400	2,700			13,500		
	Weeding/soil works	Rs./ ha			2,700	1,800			4,500		
	Farm manure	Lumpsum		4,500					4,500		
	Pruning & tending	Lumpsum			900	900	900		2,700		
	Watch & Ward	7-10 MD				900	900		1,800		
	Harvesting								0		
	Total Cost by Farmer	Rs.		11,700	9,000	6,300	1,800	0	28,800	28%	
	Total Investment Cost	Rs.		74,700	9,000	6,300	1,800	1,800	93,600		82,427
Benefit	Fuel wood *6	ton/ha						20			
		Rs./ ton	800					16,000	16,000		
	Wood *6	ton/ha						80			
		Rs./ ton	1,800					144,000	144,000		
	Total Benefit			0	0	0	0	160,000	160,000		99,347
B/C											1.21
B-C				-74,700	-9,000	-6,300	-1,800	158,200	66,400		16%

*6 Financial prices are assumed to be equivalent to economic prices with no distortion in prices.

Table 9.4 Economic Cost and Benefit Flow of TCPL Plantation under the Project (Teak)

Species **Teak**
 Planting density: 500 seedlings/ha
 Estimated total no. of seedlings: **20,000** x 1,000 =20,000,000 seedlings
 Total area planted: **40,000** ha
 Harvesting at Year 20 (10%): **57.0** m³/ha (note: 70% of this is taken as timber: 39.9m³/ha)
 Harvesting at Year 30 (90%): **90.0** m³/ha (note: 70% of this is taken as timber: 63.0m³/ha)
 Harvesting cost: **2.07** Rs.1,000/m³
 Price of timber: **58.0** Rs.1,000/m³
 SCF: **0.90**

Unit: Rs.1,000/ha

Growth Year	Financial Cost		Economic Cost		Planting schedule
	Project	Farmer	Project	Farmer	
Year 0	6.5	6.6	5.8	5.9	10%
Year 1	0.0	3.0	0.0	2.7	20%
Year 2	2.2	2.0	2.2	1.8	30%
Year 3	0.0	2.0	0.0	1.8	30%
Year 4	0.0	1.0	0.0	0.9	10%
Year 5		1.0	0.0	0.9	
Year 6		1.0	0.0	0.9	
Year 7		1.0	0.0	0.9	
Year 8		1.0	0.0	0.9	
Year 9		1.0	0.0	0.9	
Year 10		1.0	0.0	0.9	
Year 11		1.0	0.0	0.9	
Year 12		1.0	0.0	0.9	
Year 13		1.0	0.0	0.9	
Year 14		1.0	0.0	0.9	
Year 15		1.0	0.0	0.9	
Year 16		1.0	0.0	0.9	
Year 17		1.0	0.0	0.9	
Year 18		1.0	0.0	0.9	
Year 19		1.0	0.0	0.9	
Year 20		12.8	0.0	11.5	
Year 21		1.0	0.0	0.9	
Year 22		1.0	0.0	0.9	
Year 23		1.0	0.0	0.9	
Year 24		1.0	0.0	0.9	
Year 25		1.0	0.0	0.9	
Year 26		1.0	0.0	0.9	
Year 27		1.0	0.0	0.9	
Year 28		1.0	0.0	0.9	
Year 29		1.0	0.0	0.9	
Year 30		168.7	0.0	151.8	

Refer to Table 9.5

Project Year	Area planted (ha)	Area harvested (ha)	Economic Cost (Rs. 1,000)						Gross Economic Benefit from Thinning and Harvesting (Rs. 1,000)					Net Economic benefit		
			Maintenance, thinning & harvesting cost shouldered by farmers						1st batch	2nd batch	3rd batch	4th batch	5th batch		Total (B)	
			1st batch	2nd batch	3rd batch	4th batch	5th batch	Total (A)								
1								0						0	0	
2	4,000		23,625	<i>The planting cost is included in the project</i>				23,625							0	-23,625
3	8,000		10,800	47,250				58,050							0	-58,050
4	12,000		7,200	21,600	70,875			99,675							0	-99,675
5	12,000		7,200	14,400	32,400	70,875		124,875							0	-124,875
6	4,000		3,600	14,400	21,600	32,400	23,625	95,625							0	-95,625
7			3,600	7,200	21,600	21,600	10,800	64,800							0	-64,800
8			3,600	7,200	10,800	21,600	7,200	50,400							0	-50,400
9			3,600	7,200	10,800	10,800	7,200	39,600							0	-39,600
10			3,600	7,200	10,800	10,800	3,600	36,000							0	-36,000
11			3,600	7,200	10,800	10,800	3,600	36,000							0	-36,000
12			3,600	7,200	10,800	10,800	3,600	36,000							0	-36,000
13			3,600	7,200	10,800	10,800	3,600	36,000							0	-36,000
14			3,600	7,200	10,800	10,800	3,600	36,000							0	-36,000
15			3,600	7,200	10,800	10,800	3,600	36,000							0	-36,000
16			3,600	7,200	10,800	10,800	3,600	36,000							0	-36,000
17			3,600	7,200	10,800	10,800	3,600	36,000							0	-36,000
18			3,600	7,200	10,800	10,800	3,600	36,000							0	-36,000
19			3,600	7,200	10,800	10,800	3,600	36,000							0	-36,000
20			3,600	7,200	10,800	10,800	3,600	36,000							0	-36,000
21			3,600	7,200	10,800	10,800	3,600	36,000							0	-36,000
22		400	7,848	7,200	10,800	10,800	3,600	40,248	925,680						925,680	885,432
23		800	3,240	15,695	10,800	10,800	3,600	44,135		1,851,360					1,851,360	1,807,225
24		1,200	3,240	6,480	23,543	10,800	3,600	47,663			2,777,040				2,777,040	2,729,377
25		1,200	3,240	6,480	9,720	23,543	3,600	46,583				2,777,040			2,777,040	2,730,457
26		400	3,240	6,480	9,720	9,720	7,848	37,008					2,777,040		925,680	888,672
27			3,240	6,480	9,720	9,720	3,240	32,400							0	-32,400
28			3,240	6,480	9,720	9,720	3,240	32,400							0	-32,400
29			3,240	6,480	9,720	9,720	3,240	32,400							0	-32,400
30			3,240	6,480	9,720	9,720	3,240	32,400							0	-32,400
31			3,240	6,480	9,720	9,720	3,240	32,400							0	-32,400
32		3,600	546,491	6,480	9,720	9,720	3,240	575,651	13,154,400						13,154,400	12,578,749
33		7,200	0	1,092,982	9,720	9,720	3,240	1,115,662		26,308,800					26,308,800	25,193,138
34		10,800	0	0	1,639,472	9,720	3,240	1,652,432			39,463,200				39,463,200	37,810,768
35		10,800	0	0	0	1,639,472	3,240	1,642,712				39,463,200			39,463,200	37,820,488
36		3,600	0	0	0	0	546,491	546,491					13,154,400		13,154,400	12,607,909
37			0	0	0	0	0	0							0	0
38			0	0	0	0	0	0							0	0
39			0	0	0	0	0	0							0	0
40			0	0	0	0	0	0							0	0

Table 9.5 Financial and Economic Analysis of Teak Plantation per hectare

Model: Block Plantation
 Species: Teak
 Spacing: 4m X 5m (500 trees/ha)
 Rotation: 30 years

Financial Analysis

Particulars	Unit	Financial price	Growth Year										Total	NPV *5	IRR		
			Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 20	Year 30							
Investment Cost	TNFD																
	Seedling cost	Rs./ seedling	6.5	3,250											0		
	Planting cost	Rs./ seedling	6.4	3,200											3,250		
	Survival Incentive	Rs./seedling	5.0			2,200									2,200		
	Total Cost by TNFD	Rs.		6,450	0	2,200	0	0	0	0	0	0	0	0	8,650		
	Farmer														0		
Land preparation *1	Rs./ ha			563										563			
Maintenance *2	Rs./ ha			6,000	3,000	2,000	2,000	1,000	1,000	1,000	1,000	1,000	1,000	40,000			
Harvesting *3	Rs./m ³	2,070									11,799	167,670	179,469				
Total Cost by Farmer	Rs.		6,563	3,000	2,000	2,000	1,000	1,000	1,000	1,000	12,799	168,670	220,032				
Total Investment Cost	Rs.		13,013	3,000	4,200	2,000	1,000	1,000	1,000	12,799	168,670	228,682	35,469				
Benefit	Timber *4	m ³ /ha									5.7	81.0					
		Rs./ m ³	58,000	0	0	0	0	0	0	0	330,600	4,698,000	5,028,600	289,434			
B/C														8.16			
B-C				-13,013	-3,000	-4,200	-2,000	-1,000	-1,000	-1,000	317,801	4,529,330	4,799,919		21%		

Assumptions

- Survival Rate **88%**
- Seedlings per ha **500**
- *1 Land preparation (ploughing) is farmer's responsibility, while pit digging and planting works will be done by the project.
- *2 Farmer estimate, including inputs, irrigation cost - watering for first two years, thinning, and watch & ward. The annual cost born by farmer after Year 5 is constant except for Years 20 and 30 when harvesting is scheduled.
- *3 Data obtained from TNFD
- *4 J.B. Ball, D. Pandey, and S. Hirai, Global Overview of Teak Plantations (1999). The paper shows a pessimistic scenario of Teak plantation with MAI of 3m³/ha/yr. 10% of the area will be harvested at Year 20 and the rest at Year 30. Harvestable volume will be 5.7m³/ha (57m³/ha x 10%) at Year 20 and 81m³/ha (90m³/ha x 90%) at Year 30.
- *5 At discount rate of 10%

Economic Analysis

SCF= 0.9

Particulars	Unit	Economic price	Growth Year										Total	NPV *5	IRR		
			Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 20	Year 30							
Investment Cost	TNFD																
	Seedling cost	Rs./ seedling	5.85	2,925											0		
	Planting cost	Rs./ seedling	5.76	2,880											2,925		
	Survival Incentive *6	Rs./seedling	5.0			2,200									2,880		
	Total Cost by TNFD	Rs.		5,805	0	2,200	0	0	0	0	0	0	0	0	8,005		
	Farmer														0		
Land preparation	Rs./ ha			506										506			
Maintenance	Rs./ ha			5,400	2,700	1,800	1,800	900	900	900	900	900	900	36,000			
Harvesting	Rs./m ³	1,863									10,619	150,903	161,522				
Total Cost by Farmer	Rs.		5,906	2,700	1,800	1,800	900	900	900	900	11,519	151,803	198,028				
Total Investment Cost	Rs.		11,711	2,700	4,000	1,800	900	900	900	11,519	151,803	206,033	32,088				
Benefit	Timber *6	m ³ /ha									5.7	81.0					
		Rs./ m ³	58,000	0	0	0	0	0	0	0	330,600	4,698,000	5,028,600	289,434			
B/C														9.02			
B-C				-11,711	-2,700	-4,000	-1,800	-900	-900	-900	319,081	4,546,197	4,822,567	257,346	21%		

*6 Financial prices are assumed to be equivalent to economic prices with no distortion in prices.

Table 9.7 Economic Cost and Benefit Flow of TCPL Plantation (Milea dubia)

Species		Milea dubia
(1) Planting density:		600 seedlings/ha
(2) Assumed number of seedlings planted		24,000,000 seedlings
(3) Total area planted		40,000 ha
(4) Harvesting period		15 years
(5) Wood density		0.40 ton/m ³
(6) Economic maintenance cost	Year 1	5,850 Rs./ha
	Year 2	4,500 Rs./ha
	Year 3	3,150 Rs./ha
	Year 4	900 Rs./ha
	Year 5~	1,000 Rs./ha
Year x	1,000 Rs./ha	
(7) Harvesting cost:		300 Rs./ton
(8) Harvested products (at Year 10)	Fuelwood 30%	9 ton/ha
	Timber 70%	21 ton/ha
(9) Price of products	Fuelwood	800 Rs./ton
	Timber	2,500 Rs./ton

Source/ assumptions:

Data from TNFD
FAO (<http://www.fao.org/docrep/w4095e/w4095e0c.htm>)

It is assumed a half of the economic maintenance cost of Casuarina considering much lower planting density

Indicative cost. 130,000.0
75m³ x 0.40 (WD) x 30% 91,000
75m³ x 0.40 (WD) x 70% 39,000
The same as the fuel wood price of Casuarina
Data from TNFD

Project Year	MAI (m ³ /ha)					Planting schedule	Area		Harvested Products		Gross econ. benefit (Rs.1000) (A)	Economic maintenance/harvesting cost (Rs.1000)					Net Econ. Benefit (Rs.1000) (A-B)		
	Batch1	Batch2	Batch3	Batch4	Batch5		Planted (ha)	Harvested (ha)	Fuelwood (ton)	Timber (ton)		Batch1	Batch2	Batch3	Batch4	Batch5		Total (B)	
1																	0	0	
2	0					10%	Batch1	4,000									23,400	-23,400	
3	5	0				20%	Batch2	8,000									18,000	-64,800	
4	10	5	0			30%	Batch3	12,000									12,600	-118,800	
5	15	10	5	0		30%	Batch4	12,000									3,600	-153,000	
6	20	15	10	5	0	10%	Batch5	4,000									25,200	-126,400	
7	25	20	15	10	5												7,200	-78,600	
8	30	25	20	15	10												10,800	-47,400	
9	35	30	25	20	15												12,000	-39,600	
10	40	35	30	25	20												12,000	-40,000	
11	45	40	35	30	25												4,000	-40,000	
12	50	45	40	35	30												8,000	-40,000	
13	55	50	45	40	35												8,000	-40,000	
14	60	55	50	45	40												8,000	-40,000	
15	65	60	55	50	45												8,000	-40,000	
16	70	65	60	55	50												4,000	-40,000	
17	75	70	65	60	55		Batch1		4,000	36,000	84,000	238,800	36,000	8,000	12,000	12,000	4,000	72,000	166,800
18	80	75	70	65	60		Batch2		8,000	72,000	168,000	477,600		72,000	12,000	12,000	4,000	100,000	377,600
19	85	80	75	70	65		Batch3		12,000	108,000	252,000	716,400			108,000	12,000	4,000	124,000	592,400
20	90	85	80	75	70		Batch4		12,000	108,000	252,000	716,400				108,000	4,000	112,000	604,400
21	95	90	85	80	75		Batch5		4,000	36,000	84,000	238,800					36,000	36,000	202,800

Table 9.8 Detailed Computation of Net Anthropogenic GHG removals by Sink (2/2)

Items	5					6					7	8	9	10	11	12	13	14	15	
	Total carbon stocks in biomass in each strata at time t under the project scenario					Total carbon stocks in biomass at time t under the project scenario					Removal component of actual net GHG removals by sinks per annum	Project emissions	Actual net GHG removals by sinks in year t	Leakage attributable to the project activity at time t	Carbon stocks in biomass at time 0 that would have occurred in the absence of the project activity	Baseline net GHG removals by sinks	Net anthropogenic GHG removals by sinks	Net anthropogenic GHG removals by sinks (Cumulative)	Net benefits of GHG removals by sinks	
Symbol	N(t) _i					N(t)					ΔC _{proj,t}	GHG _{proj,t}	ΔC _{actual,t}	L _t	B (t C)	ΔC _{bsl,t}	ER _{arcdm,t}	ΣER _{arcdm,t}	100%	
Formula	{NA(t) _i +NB(t) _i } x A _i					Sum of N(t) _i					N(t)-N(t-1)		ΔC _{proj,t} - GHG _{proj,t}	ΔC _{actual,t} x 0.15 (If L _t < 0, 0)	B (t C)	B(t C) _t - B(t C) _{t-1} x 44/12	ΔC _{proj,t} - GHG _{proj,t} - L _t - ΔC _{bsl,t}		ER _{arcdm,t} x Rs.89.0 per t CO ₂ e	
Unit	t C					t C					t CO ₂ -e/year	t CO ₂ -	t CO ₂ -e/year	t CO ₂ -e/year	t C	t CO ₂ -e/ year	t CO ₂ -e/year	t CO ₂ -e	Rs. 1,000	
Project year	Casuarina					Teak														
	Batch-1	Batch-2	Batch-3	Batch-4	Batch-5	Batch-1	Batch-2	Batch-3	Batch-4	Batch-5										
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	2,485	0	0	0	0	13,864	0	0	0	0	16,349	59,946	59,946	8,992	0	0	50,954	50,954	4,535	
4	4,915	9,938	0	0	0	27,390	27,728	0	0	0	69,971	196,616	196,616	29,492	0	0	167,123	218,077	14,874	
5	7,326	19,659	12,423	0	0	40,799	54,779	41,593	0	0	176,579	390,896	390,896	58,634	0	0	332,261	550,339	29,571	
6	9,726	29,305	24,574	0	0	54,136	81,598	82,169	41,593	0	323,100	537,242	537,242	80,586	0	0	456,656	1,006,994	40,642	
7	0	38,903	36,631	0	0	67,419	108,272	122,397	82,169	13,864	469,656	537,372	537,372	80,606	0	0	456,767	1,463,761	40,652	
8	2,485	0	48,629	0	0	80,662	134,839	162,407	122,397	27,390	578,809	400,228	400,228	60,034	0	0	340,194	1,803,955	30,277	
9	4,915	9,938	0	0	0	93,870	161,323	202,258	162,407	40,799	675,511	354,575	354,575	53,186	0	0	301,389	2,105,344	26,824	
10	7,326	19,659	12,423	0	0	107,049	187,740	241,985	202,258	54,136	832,576	575,905	575,905	86,386	0	0	489,519	2,594,863	43,567	
11	9,726	29,305	24,574	0	0	120,204	214,098	281,610	241,985	67,419	988,920	573,261	573,261	85,989	0	0	487,272	3,082,135	43,367	
12	0	38,903	36,631	0	0	133,336	240,407	321,148	281,610	80,662	1,132,697	527,180	527,180	79,077	0	0	448,103	3,530,238	39,881	
13	2,485	0	48,629	0	0	146,449	266,672	360,611	321,148	93,870	1,239,864	392,947	392,947	58,942	0	0	334,005	3,864,242	29,726	
14	4,915	9,938	0	0	0	159,544	292,898	400,008	360,611	107,049	1,334,964	348,702	348,702	52,305	0	0	296,397	4,160,639	26,379	
15	7,326	19,659	12,423	0	0	172,623	319,089	439,347	400,008	120,204	1,490,679	570,956	570,956	85,643	0	0	485,312	4,645,951	43,193	
16	9,726	29,305	24,574	0	0	185,688	345,247	478,633	439,347	133,336	1,645,855	568,977	568,977	85,346	0	0	483,630	5,129,581	43,043	
17	0	38,903	36,631	0	0	198,739	371,376	517,870	478,633	146,449	1,788,600	523,400	523,400	78,510	0	0	444,890	5,574,471	39,595	
18	2,485	0	48,629	0	0	211,777	397,477	557,063	517,870	159,544	1,894,845	389,565	389,565	58,435	0	0	331,130	5,905,601	29,471	
19	4,915	9,938	0	0	0	224,803	423,553	596,216	557,063	172,623	1,989,111	345,642	345,642	51,846	0	0	293,796	6,199,397	26,148	
20	7,326	19,659	12,423	0	0	237,818	449,606	635,330	596,216	185,688	2,144,065	568,162	568,162	85,224	0	0	482,938	6,682,335	42,981	
21	9,726	29,305	24,574	0	0	250,823	475,636	674,408	635,330	198,739	2,298,540	566,407	566,407	84,961	0	0	481,446	7,163,782	42,849	
22	0	38,903	36,631	0	0	263,818	501,646	713,454	674,408	211,777	2,440,637	521,023	521,023	78,153	0	0	442,869	7,606,651	39,415	
23	2,485	0	48,629	0	0	276,803	527,636	752,468	713,454	224,803	2,546,278	387,352	387,352	58,103	0	0	329,249	7,935,900	29,303	
24	4,915	9,938	0	0	0	289,780	553,607	791,453	752,468	237,818	2,639,980	343,574	343,574	51,536	0	0	292,038	8,227,938	25,991	
25	7,326	19,659	12,423	0	0	302,749	579,561	830,410	791,453	250,823	2,794,404	566,221	566,221	84,933	0	0	481,288	8,709,226	42,835	
26	9,726	29,305	24,574	0	0	315,709	605,498	869,341	830,410	263,818	2,948,380	564,578	564,578	84,687	0	0	479,892	9,189,118	42,710	
27	0	38,903	36,631	0	0	328,662	631,419	908,246	869,341	276,803	3,090,006	519,294	519,294	77,894	0	0	441,400	9,630,517	39,285	
28	2,485	0	48,629	0	0	341,608	657,324	947,128	908,246	289,780	3,195,200	385,714	385,714	57,857	0	0	327,857	9,958,374	29,179	
29	4,915	9,938	0	0	0	354,546	683,215	985,986	947,128	302,749	3,288,478	342,017	342,017	51,303	0	0	290,714	10,249,089	25,874	
30	7,326	19,659	12,423	0	0	367,478	709,092	1,024,823	985,986	315,709	3,442,497	564,738	564,738	84,711	0	0	480,027	10,729,116	42,722	

357,637

Note for benefit estimation:

- (1) The price per ton of CO₂e is conservatively set at US\$3.0 based on the study on opportunity cost per ton of CO₂e (The Financial Costs of REDD: Evidence from Brazil and Indonesia, IUCN, 2009)
 - (2) US\$ 1.0/ton CO₂e is used as implementation and transaction costs of REDD plus (the same source above)
- Opportunity cost (A) US\$3.0
 Transaction cost (B) US\$1.0
 (C=A - B) US\$2.0
IDR 89.00
 Exchange rate (US\$ ->INR) IDR 44.50

Table 9.9 Economic Internal Rate of Return (EIRR) of the Project

Year	Economic Cost (Rs. 1,000)			Net Economic Benefit (Rs. 1,000)								B-C (Rs. 1,000)	
	Investment Cost *1	O&M Cost *2	Total	Biodiversity Conservation		TCPL					Total		
				Eco- developmen	Ecotourism	Casuarina *3	Teak *4	Ailanthus excelsa *5	Milea dubia *6	Carbon *7			
1	254,435	0	254,435			0	0	0	0	0	0	0	-254,435
2	676,351	0	676,351			-3,510	-23,625	-15,210	-23,400	0	-65,745	-742,096	
3	995,079	0	995,079			-16,740	-58,050	-42,120	-64,800	4,535	-177,175	-1,172,254	
4	1,086,184	0	1,086,184			-30,240	-99,675	-77,220	-118,800	14,874	-311,061	-1,397,245	
5	854,258	0	854,258			-21,600	-124,875	-99,450	-153,000	29,571	-369,354	-1,223,612	
6	537,916	0	537,916	15,120	13,713	36,390	-95,625	-82,160	-126,400	40,642	-198,320	-736,236	
7	341,571	0	341,571	15,120	13,713	166,890	-64,800	-51,090	-78,600	40,652	41,885	-299,686	
8	267,002	0	267,002	15,120	13,713	147,660	-50,400	-30,810	-47,400	30,277	78,160	-188,842	
9	203,704	52,165	255,869	15,120	13,713	-124,740	-39,600	-25,740	-39,600	26,824	-174,023	-429,892	
10	0	52,165	52,165	15,120	13,713	-21,600	-36,000	-26,000	-40,000	43,567	-51,200	-103,365	
11	0	52,165	52,165	15,120	13,713	35,850	-36,000	-26,000	-40,000	43,367	6,050	-46,115	
12	0	52,165	52,165	15,120	13,713	164,730	-36,000	54,990	-40,000	39,881	212,434	160,269	
13	0	52,165	52,165	15,120	13,713	144,960	-36,000	138,580	-40,000	29,726	266,099	213,934	
14	0	52,165	52,165	15,120	13,713	-124,740	-36,000	224,770	-40,000	26,379	79,242	27,077	
15	0	52,165	52,165	15,120	13,713	-21,600	-36,000	232,570	-40,000	43,193	206,996	154,831	
16	0	52,165	52,165	15,120	13,713	35,850	-36,000	78,390	-40,000	43,043	110,116	57,951	
17	0	52,165	52,165	15,120	13,713	164,730	-36,000	0	166,800	39,595	363,958	311,793	
18	0	52,165	52,165	15,120	13,713	144,960	-36,000	0	377,600	29,471	544,864	492,699	
19	0	52,165	52,165	15,120	13,713	-124,740	-36,000	0	592,400	26,148	486,641	434,476	
20	0	52,165	52,165	15,120	13,713	-21,600	-36,000	0	604,400	42,981	618,614	566,449	
21	0	52,165	52,165	15,120	13,713	35,850	-36,000	0	202,800	42,849	274,332	222,167	
22	0	52,165	52,165	15,120	13,713	164,730	885,432	0	0	39,415	1,118,411	1,066,246	
23	0	52,165	52,165	15,120	13,713	144,960	1,807,225	0	0	29,303	2,010,321	1,958,156	
24	0	52,165	52,165	15,120	13,713	-124,740	2,729,377	0	0	25,991	2,659,461	2,607,296	
25	0	52,165	52,165	15,120	13,713	-21,600	2,730,457	0	0	42,835	2,780,525	2,728,360	
26	0	52,165	52,165	15,120	13,713	35,850	888,672	0	0	42,710	996,066	943,901	
27	0	52,165	52,165	15,120	13,713	164,730	-32,400	0	0	39,285	200,448	148,283	
28	0	52,165	52,165	15,120	13,713	144,960	-32,400	0	0	29,179	170,572	118,407	
29	0	52,165	52,165	15,120	13,713	-124,740	-32,400	0	0	25,874	-102,433	-154,598	
30	0	52,165	52,165	15,120	13,713	-21,600	-32,400	0	0	42,722	17,555	-34,610	
31	0	52,165	52,165	15,120	13,713	35,850	-32,400	0	0	0	32,283	-19,882	
32	0	52,165	52,165	15,120	13,713	164,730	12,578,749	0	0	0	12,772,312	12,720,147	
33	0	52,165	52,165	15,120	13,713	145,500	25,193,138	0	0	0	25,367,471	25,315,306	
34	0	52,165	52,165	15,120	13,713	-124,740	37,810,768	0	0	0	37,714,861	37,662,696	
35	0	52,165	52,165	15,120	13,713	-8,100	37,820,488	0	0	0	37,841,221	37,789,056	
36	0	52,165	52,165	15,120	13,713	45,300	12,607,909	0	0	0	12,682,042	12,629,877	
37	0	52,165	52,165	15,120	13,713	166,890	0	0	0	0	195,723	143,558	
38	0	52,165	52,165	15,120	13,713	144,960	0	0	0	0	173,793	121,628	
39	0	52,165	52,165	15,120	13,713	-124,740	0	0	0	0	-95,907	-148,072	
40	0	52,165	52,165	15,120	13,713	-21,600	0	0	0	0	7,233	-44,932	
											EIRR	11.6%	
											NPV	2,045,114	

*1: Refer to Table 9.1

236,815 5,377,817 -86,142 -162,323 238,178

*2: The O&M cost is estimated at 1% of the economic investment cost.

*3: Refer to Table 9.2

*4: Refer to Table 9.4

*5: Refer to Table 9.6

*6: Refer to Table 9.7

*7: Refer to Table 9.8

*8: Refer to Table 9.9

Results of sensitivity analysis

		Change of Benefit		
		0% (Base case)	-10%	-20%
Change of Cost	0% (Base case)	11.6%	11.2%	10.8%
	+10%	11.3%	10.9%	10.4%
	+20%	10.9%	10.6%	10.1%

Table 9.10 Environmental and Social Considerations

Subcomponents	Expected Environmental and Social Impacts	Mitigation Measures	Alternative Activities	Evaluation	
Biodiversity Conservation					
1.1 Habitat restoration, enhancement and management	<p>1.1.1 Strengthen Wetland Planning and Management</p>	<p><u>Environmental</u></p> <p>Positive impact such as biodiversity promotion is expected.</p> <p><u>Social</u></p> <p>Negative impact such as crop raiding by birds is expected.</p> <p>Ecosystem services such as increase of fish catch is expected as positive impact.</p>	<p><u>Social</u></p> <p>Improvement of ground habitat to feed in the bird sanctuaries</p>	<p>N/A</p>	<p>C⁻¹</p> <p>B+</p> <p>If scientific analysis is undertaken to prepare the management plan, wetland condition may be improved. (e.g. birds that nest in aquatic vegetation and amongst grass and reeds are important.)</p>
	<p>1.1.2 Improve critical habitats by removing invasive and exotic species</p>	<p><u>Environmental</u></p> <p>Negative impact such as soil erosion and proliferation of weeds is expected. Positive impact such as improvement</p>	<p><u>environmental</u></p> <p>Simultaneous planting and in some cases establishing water</p>	<p>No removal is an alternative option, but native species will continue to have pressure by exotic</p>	<p>C-</p> <p>B+</p>

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¹ A+/-: Significant positive/negative impact is expected. B+/-: Some positive/negative impact is expected to some extent.

C+/-: Extent of positive/negative impact is unknown. (A further examination is needed, and the impact could be clarified as the study progresses).

Subcomponents		Expected Environmental and Social Impacts	Mitigation Measures	Alternative Activities	Evaluation
		<p>of wildlife habitat is expected.</p> <p><u>Social</u></p> <p>Positive impact such as income generation of local people is expected.</p>	holes are recommended.	species and some native species may disappear.	
	1.1.3 Conserve critically endangered species of flora and fauna	<p><u>Environmental</u></p> <p>Positive impact on marine biodiversity and selected species of endemic and endangered plants is expected.</p> <p><u>Social</u></p> <p>Use of TED will lead to better market opportunities of fish and other marine products</p>	N/A	N/A	<p>B+</p> <p>If scientific analysis is undertaken to prepare the management plan, wetland condition may be improved.</p>
	1.1.4 Improve management of water and habitat	<p><u>Environmental</u></p> <p>Positive impact such as improvement of wildlife habitat is expected.</p> <p><u>Social</u></p> <p>Positive impact such as income generation of local</p>	N/A	N/A	B+

Subcomponents		Expected Environmental and Social Impacts	Mitigation Measures	Alternative Activities	Evaluation
		people with selling charcoal, firewood and handicraft is expected.			
1.2 Resource Protection	1.2.1 Strengthen resource protection	<u>Environmental and Social</u> Positive impact such as local awareness raising for biodiversity conservation is expected	N/A	N/A	B+
1.3 Mitigating Human-Wildlife Conflict	1.3.2 Identify and manage traditional migratory routes (elephant and gaur)	<u>Social</u> Positive impact such as protection of crops and livelihood is expected.	N/A	N/A	B+
	1.3.3 Establish wildlife-proof barricades around villages	<u>Social</u> Positive impact such as protection of infrastructure and human life is expected.	N/A	N/A	B+
1.4 Ecologically Sustainable Development	1.4.2 Community biodiversity registers	<u>Environmental and Social</u> Positive impact such as local awareness raising for biodiversity conservation is expected.	N/A	N/A	B+
	1.4.3 Eco-development	<u>Environmental</u> Positive impact such as	N/A	N/A	B+

Subcomponents		Expected Environmental and Social Impacts	Mitigation Measures	Alternative Activities	Evaluation
	activities in villages abutting PAs	<p>biodiversity promotion is expected.</p> <p><u>Social</u></p> <p>Positive impact such as income generation of local people is expected.</p>			
	1.4.4 Ecologically sustainable development in villages peripheral to RFs	<p><u>Environmental</u></p> <p>Negative impact is expected with construction of economical infrastructure. Positive impact such as biodiversity promotion is expected.</p> <p><u>Social</u></p> <p>Positive impact such as income generation of local people is expected.</p>	<p><u>Environmental</u></p> <p>Construction in harmony with the environment in consideration of colour, material, and size of infrastructure.</p>	No construction is an alternative option, but it will probably proceed illegal activities.	C- B+
	1.4.5 Ecotourism	<p><u>Environmental</u></p> <p>Negative impact is expected with introduction of tourists and construction of infrastructure.</p> <p>Positive impact such as</p>	<p><u>Environmental</u></p> <p>Limiting construction and observation site. Construction in harmony with the environment in</p>	No ecotourism is an alternative option, but the magnitude of negative impact of ecotourism is probably smaller than the positive	B- B+

Subcomponents		Expected Environmental and Social Impacts	Mitigation Measures	Alternative Activities	Evaluation
		<p>improvement of wildlife habitat is expected.</p> <p><u>Social</u></p> <p>Positive impact such as income generation of local people is expected.</p>	<p>consideration of colour, material, and size of infrastructure.</p>	<p>impact.</p>	
Increasing the Natural Resource Base					
2.1 Tree Cultivation on Private Land	2.1.1-2.1.7 Developing TCPL	<p>Expected negative impacts are as follows;</p> <p><u>Environmental</u></p> <ul style="list-style-type: none"> - Large scale monoculture plantations are created to target industrial supply for raw material - Some species may lose habitats <p><u>Social</u></p> <ul style="list-style-type: none"> - Farmer may not be able to sell the trees profitably - Unless specific efforts are made to focus on small and poor farmers as beneficiaries; more large farmers may get 	<p>Mitigation measures for negative impacts are as follows;</p> <p><u>Environmental</u></p> <ul style="list-style-type: none"> - Avoid creating block plantation on 'culturable waste' – land kept fallow for more than 5 years. Instead take up gap planting <p><u>Social</u></p> <ul style="list-style-type: none"> - Small farmers make 	<p>No TCPL is an alternative option, but with proposed activities, tree cover outside forest will increase.</p> <p>Land acquisition, and resettlement is not envisaged; restoration of forest may be employed.</p>	<p>C- B+</p> <p>Social negative impact could be large unless mitigation measures are adopted.</p>

Subcomponents		Expected Environmental and Social Impacts	Mitigation Measures	Alternative Activities	Evaluation
		<p>supported as they own more land. This would increase the prevailing economic inequities</p> <p><u>Environmental and Social</u></p> <ul style="list-style-type: none"> - Groundwater table may go down due to large scale plantation of short-rotation fast growing trees - Could lead to land use changes with decrease in the area under agricultural crop <p>Expected positive impacts are as follows</p> <ul style="list-style-type: none"> - Fuel wood and fodder supply increases and become easy - Farmers get income from plantations (if they are able to sell trees) - Micro-climate in project 	<p>cooperative for selling trees and have better access to market information</p> <ul style="list-style-type: none"> - Demand and supply assessment for different forest based industries (pulpwood, veneer, match, pencil, etc.) - Adopt differentiated incentive mechanism for poor and better-off farmers. - Adopt norms to avoid taking up land under food crop for TCPL <p><u>Environmental and Social</u></p> <ul style="list-style-type: none"> - Financial 		

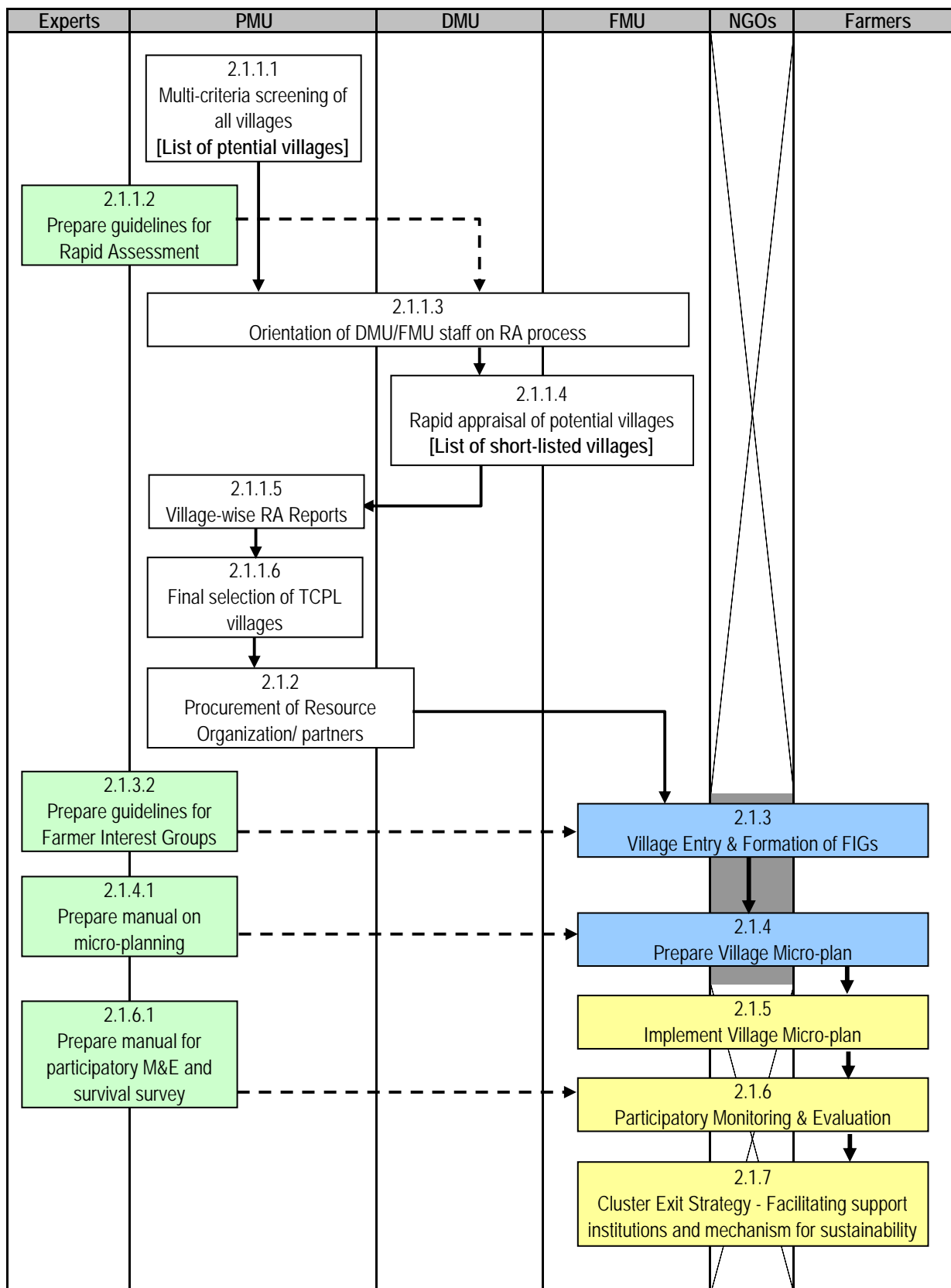
Subcomponents		Expected Environmental and Social Impacts	Mitigation Measures	Alternative Activities	Evaluation
		<p>villages would improve</p> <ul style="list-style-type: none"> - Trees would provide habitat to different species (fauna) - Farmers would gain new skills and knowledge on agro-forestry 	incentive and subsidy should encourage more bio-diverse plantation		
2.2 Research on Production Forestry / Agro-forestry / Farm Forestry	2.2.2-2.2.5 Biological and Chemical Research	<p><u>Social</u></p> <p>Positive impact such as price down of saplings and cultivation activities is expected.</p>	N/A	N/A	C+
REDD Plus Pilot Project					
2.3.5 Implementation of a pilot project	2.3.5.1 Activities to improve forest conditions/ carbon stock (afforestation, forest management, etc.)	<p><u>Environmental</u></p> <p>Positive impact such as habitat improvement is expected.</p>	N/A	N/A	B+
	2.3.5.2 Livelihood promotion activities to reduce dependence on forests.	<p><u>Environmental</u></p> <p>Positive impact such as decrease of human pressure in forests is expected.</p>	N/A	N/A	B+

Subcomponents		Expected Environmental and Social Impacts	Mitigation Measures	Alternative Activities	Evaluation
	2.3.5.3 Promotion of renewable energy activities to reduce usage of firewood	<u>Environmental</u> Negative impact such as noise, water deterioration may be expected. To reduce usage of firewood is positive impact.	<u>Environmental</u> Selection of construction site where negative impacts to people and wildlife are minimized.	N/A	C- C+
Capacity Development					
3.2 Knowledge and Skill Development	3.2.5 Thematic training for project staff (domestic)	<u>Environmental</u> Positive impact such as improvement of biodiversity management is expected.	N/A	N/A	C+
	3.2.11 Training to VFCs and EDCs	<u>Environmental</u> Positive impact such as improvement of biodiversity is expected	N/A	N/A	C+
Supporting Activities					
3.7 Construction of Buildings	3.7.1 – 3.7.5 Construction buildings in town	<u>Environmental</u> Negative impact is negligible. Positive impact to improve biodiversity management system is	N/A	N/A	C+

Subcomponents		Expected Environmental and Social Impacts	Mitigation Measures	Alternative Activities	Evaluation
		expected a little.			
	3.7.6 – 3.7.13 Construction of small building in PAs and FRs	<u>Environmental</u> Negative impact such as increase of human pressure is expected. <u>Social</u> Positive impact such as improvement of awareness and management system is expected.	Construction in harmony with the environment in consideration of colour, material, and size of infrastructure.	No construction is deemed, but natural resources management system will not improved.	C- C+

Source: JICA Survey Team

Figure 7.1 Implementation Process of TCPL



**The Preparatory Survey
on
Tamil Nadu Biodiversity Conservation and Greening Project**

Final Report

ANNEXURES

Annexure 2.1 Angiosperms Endemic to Tamil Nadu

No.	Family	Species (Binominal)	Habitat	Distribution	E*
1	Ranunculaceae	<i>Clematis theobromina</i>	Climbing Shrub	Nilgiri	
2	Annonaceae	<i>Polyalthia tirunelveliense</i>	Tree	Tirunelveli	
3	Berberidaceae	<i>Berberis nilghiriensis</i>	Erect Shrub	Nilgiri	
4	Pittosporaceae	<i>Pittosporum anamallayense</i>	Shrub	Coimbatore	
5	Pittosporaceae	<i>Pittosporum viridulum</i>	Small Tree	Nilgiri	
6	Caryophyllaceae	<i>Polycarpaea diffusa</i>	Undershrub	Tirunelveli	
7	Tiliaceae	<i>Grewia pandaica</i>	Large Tree	Tirunelveli	
8	Balsaminaceae	<i>Impatiens viscida</i>	Herb	Madurai, Tirunelveli	
9	Olacaceae	<i>Olax imbricata</i>	Shrub	Coimbatore, Tirunelveli	
10	Celastraceae	<i>Celastrus paniculatus</i> subsp. <i>dependens</i>	Shrub	Nilgiri	
11	Celastraceae	<i>Celastrus paniculatus</i> subsp. <i>aggregatus</i>	Shrub	Madurai	
12	Celastraceae	<i>Euonymus paniculatus</i>	Shrub	Tirunelveli	
13	Celastraceae	<i>Salacia beddomei</i>	Shrub	Coimbatore	
14	Anacardiaceae	<i>Nothopegia aureofulva</i>	Small tree	Tirunelveli	
15	Anacardiaceae	<i>Nothopegia racemosa</i> var. <i>angustifolia</i>	Small tree	Madurai, Nilgiri, Tirunelveli	
16	Anacardiaceae	<i>Nothopegia vajravelui</i>	Tree	Madurai	
17	Fabaceae	<i>Crotalaria barbata</i>	Herb	Nilgiri, Tirunelveli	
18	Fabaceae	<i>Crotalaria willdenowiana</i>	Perennial	Coimbatore	
19	Fabaceae	<i>Dalbergia congesta</i>	Shrub	Nilgiri, North Arcot	
20	Fabaceae	<i>Desmodium barbatum</i> subsp. <i>sauliereri</i>	Herb	Pulney Hills	
21	Fabaceae	<i>Desmodium dolabriforme</i>	Herb	Kanniyakumari, Tirunelveli	
22	Fabaceae	<i>Indigofera barberi</i>	Undershrub	Salem, South Arcot	
23	Fabaceae	<i>Indigofera tirunelvelica</i>	Herb	Ramanathapura m, Tirunelveli	
24	Fabaceae	<i>Tephrosia barberi</i>	Undershrub	Ramanathapura m, Tirunelveli	
25	Rhizophoraceae	<i>Rhizophora annamalayana</i>	Shrub	South Arcot (Pichavaram)	
26	Myrtaceae	<i>Syzygium gambleanum</i>	Large shrub	Kanniyakumari, Tirunelveli	
27	Myrtaceae	<i>Syzygium sriganesanii</i>	Tree	Madurai	
28	Myrtaceae	<i>Syzygium zeylanicum</i>	Shrub	Tirunelveli	
29	Myrtaceae	<i>Syzygium zeylanicum</i> var. <i>megamalay anum</i>	Shrub	Madurai	

Annexure 2.1 Angiosperms Endemic to Tamil Nadu

No.	Family	Species (Binominal)	Habitat	Distribution	E*
30	Melastomataceae	<i>Memecylon bremeri</i>	Shrub	Salem	
31	Melastomataceae	<i>Memecylon flavescens</i>	Large shrub	Nilgiri	E
32	Melastomataceae	<i>Memecylon gopalanii</i>	Large shrub	Tirunelveli	
33	Melastomataceae	<i>Memecylon kollimalayana</i>	Large shrub	Salem	
34	Melastomataceae	<i>Memecylon sisparense</i>	Large shrub	Coimbatore, Nilgiri	E
35	Melastomataceae	<i>Osbeckia tirunelvelica</i>	Shrub	Tirunelveli	
36	Melastomataceae	<i>Sonerila elegans</i>	Herb	Coimbatore, Nilgiri	
37	Melastomataceae	<i>Sonerila inaequalis</i>	Herb	Tirunelveli	
38	Melastomataceae	<i>Sonerila kanyakumariana</i>	Herb	Kanniyakumari	
39	Melastomataceae	<i>Sonerila parameswaranii</i>	Herb	Madurai	
40	Melastomataceae	<i>Sonerila pulneyensis</i>	Herb	Madurai	E
41	Begoniaceae	<i>Begonia aliciae</i>	Herb	Nilgiri	
42	Begoniaceae	<i>Begonia anamalayana</i>	Herb	Coimbatore	
43	Apiaceae	<i>Heracleum hookerianum</i>	Herb	Nilgiri	
44	Apiaceae	<i>Peucedanum anamallayense</i>	Herb	Coimbatore, Madurai	
45	Apiaceae	<i>Pimpinella pulneyensis</i>	Herb	Madurai	
46	Araliaceae	<i>Schefflera maduraiensis</i>	Tree	Madurai	
47	Rubiaceae	<i>Hedyotis barberi</i>	Shrub	Tirunelveli	E
48	Rubiaceae	<i>Hedyotis eualata</i>	Undershrub	Kanniyakumari, Tirunelveli	
49	Rubiaceae	<i>Hedyotis gamblei</i>	Shrub	Kanniyakumari, Tirunelveli	E
50	Rubiaceae	<i>Hedyotis hirsutissima</i>	Shrub	Nilgiri	
51	Rubiaceae	<i>Hedyotis purpurascens</i>	Shrub	Tirunelveli	
52	Rubiaceae	<i>Hedyotis shettyi</i>	Shrub	Madurai	
53	Rubiaceae	<i>Hedyotis sisparensis</i>	Undershrub	Nilgiri	E
54	Rubiaceae	<i>Hedyotis villosostipulata</i>	Shrub	Kanniyakumari	E
55	Rubiaceae	<i>Hedyotis viscida</i>	Shrub	Nilgiri, Tirunelveli	
56	Rubiaceae	<i>Ixora monticola</i>	Shrub	Madurai	E
57	Rubiaceae	<i>Ixora saulierei</i>	Tree	Madurai	E
58	Rubiaceae	<i>Knoxia sumatrensis</i> var. <i>linearis</i>	Herb	Tirunelveli	E
59	Rubiaceae	<i>Lasianthus blumeanus</i>	Shrub	Tirunelveli	
60	Rubiaceae	<i>Lasianthus ciliatus</i>	Shrub	Nilgiri	
61	Rubiaceae	<i>Lasianthus cinereus</i>	Shrub	Kanniyakumari, Tirunelveli	
62	Rubiaceae	<i>Lasianthus dichotomous</i>	Shrub	Kanniyakumari, Tirunelveli	

Annexure 2.1 Angiosperms Endemic to Tamil Nadu

No.	Family	Species (Binominal)	Habitat	Distribution	E*
63	Rubiaceae	<i>Lasianthus jackianus</i>	Shrub	Coimbatore, Nilgiri	
64	Rubiaceae	<i>Lasianthus oblongifolius</i>	Shrub	Tirunelveli	
65	Rubiaceae	<i>Neanotis monosperma</i> var. <i>tirunelvelica</i>	Herb	Tirunelveli	E
66	Rubiaceae	<i>Ophiorrhiza incarnata</i>	Undershrub	Nilgiri	E
67	Rubiaceae	<i>Ophiorrhiza pykarensis</i>	Undershrub	Nilgiri	E
68	Rubiaceae	<i>Ophiorrhiza tirunelvelica</i>	Herb	Kanniyakumari, Tirunelveli	
69	Rubiaceae	<i>Pavetta oblanceolata</i>	Shrub	Tirunelveli	E
70	Rubiaceae	<i>Psychotria globicephala</i>	Shrub	Tirunelveli	E
71	Compositae	<i>Cissampelopsis ansteadii</i>	Shrubby Climber	Kanniyakumari, Tirunelveli	
72	Compositae	<i>Vernonia pothigaiana</i>	Herb	Tirunelveli	
73	Lobeliaceae	<i>Lobelia courtallensis</i>	Shrub	Tirunelveli	
74	Ericaceae	<i>Vaccinium leschenaultia</i> var. <i>pubescens</i>	Tree	Virudhunagar	
75	Sapotaceae	<i>Palaquium bourdillonii</i>	Tree	Kanniyakumari, Tirunelveli	
76	Symplocaceae	<i>Symplocos macrocarpa</i> subsp. <i>macrocarpa</i>	Tree	Kanniyakumari, Tirunelveli	
77	Symplocaceae	<i>Symplocos macrocarpa</i> subsp. <i>Kanarana</i>	Tree	Coimbatore, Tirunelveli	
78	Symplocaceae	<i>Symplocos macrophylla</i> subsp. <i>microphylla</i>	Shrub	Nilgiri	
79	Symplocaceae	<i>Symplocos monantha</i>	Shrub	Tirunelveli	E
80	Symplocaceae	<i>Symplocos pulchra</i>	Shrub	Nilgiri	
81	Symplocaceae	<i>Symplocos pulchra</i> subsp. <i>coriacea</i>	Shrub	Kanniyakumari	
82	Apocynaceae	<i>Wrightia indica</i>	Shrub	Dharmapuri, Nilgiri	
83	Asclepiadaceae	<i>Caralluma nilagiriana</i>	Herb	Nilgiri	E
84	Asclepiadaceae	<i>Ceropegia mannarana</i>	Twining Herb	Gulf of Mannar	
85	Asclepiadaceae	<i>Ceropegia omissa</i>	Climber	Madurai, Tirunelveli	
86	Asclepiadaceae	<i>Hoya kanyakumariana</i>	Herb	Kanniyakumari	
87	Asclepiadaceae	<i>Marsdenia tirunelvelica</i>	Twining Undershrub	Tirunelveli	E
88	Asclepiadaceae	<i>Toxocarpus beddomei</i>	Climber	Tirunelveli	E
89	Asclepiadaceae	<i>Tylophora subramanii</i>	Climbing Undershrub	Coimbatore, Kanniyakumari, Tirunelveli	
90	Gentianaceae	<i>Exacum pumilum</i>	Herb	Coimbatore	

Annexure 2.1 Angiosperms Endemic to Tamil Nadu

No.	Family	Species (Binominal)	Habitat	Distribution	E*
91	Gentianaceae	<i>Exacum wightianum</i> var. <i>uniflorum</i>	Shrubby Herb	Tirunelveli	
92	Boraginaceae	<i>Cordia diffusa</i>	Shrub	Chengalpattu, Coimbatore	
93	Convolvulaceae	<i>Argyreia nellygherya</i>	Climber	Nilgiri	
94	Convolvulaceae	<i>Bonamia evolvuloides</i>	Undershrub	Kanniyakumari, Tirunelveli	
95	Convolvulaceae	<i>Ipomoea pescaprae</i> var. <i>perunkulamensis</i>	Prostrate Herb	Gulf of Mannar	
96	Solanaceae	<i>Solanum vagum</i>	Shrub/undershrub	Ramanathapuram, Tirunelveli	
97	Gesneriaceae	<i>Didymocarpus gambleanus</i>	Herb	Coimbatore, Madurai, Tirunelveli	
98	Gesneriaceae	<i>Didymocarpus lyrata</i> var. <i>lyrata</i>	Herb	Tirunelveli	
99	Gesneriaceae	<i>Didymocarpus meeboldii</i>	Herb	Madurai, Tirunelveli	
100	Gesneriaceae	<i>Didymocarpus missionis</i>	Herb	Kanniyakumari	E
101	Gesneriaceae	<i>Didymocarpus ovalifolia</i>	Herb	Kanniyakumari, Tirunelveli	E
102	Gesneriaceae	<i>Didymocarpus repens</i>	Creeping Herb	Tirunelveli	
103	Acanthaceae	<i>Andrographis lobelioides</i> var. <i>lobelioides</i>	Herb	Nilgiri	
104	Acanthaceae	<i>Andrographis neesiana</i> var. <i>rotundifolia</i>	Herb	Coimbatore	
105	Acanthaceae	<i>Andrographis rothii</i>	Straggling Undershrub	Tirunelveli	
106	Acanthaceae	<i>Andrographis stenophylla</i>	Undershrub	Coimbatore	
107	Acanthaceae	<i>Ecbolium viride</i> var. <i>rotundifolia</i>	Undershrub	Coimbatore	
108	Acanthaceae	<i>Santapaua madurensis</i>	Herb	Madurai	E
109	Acanthaceae	<i>Stenosiphonium wightii</i>	Shrub	Tirunelveli	E
110	Thunbergiaceae	<i>Thunbergia bicolor</i>	Climber	Nilgiri	
111	Verbenaceae	<i>Premna balakrishnanii</i>	Shrub	Tirunelveli	
112	Verbenaceae	<i>Premna latifolia</i> var. <i>henryi</i>	Tree	Chengalpattu	
113	Verbenaceae	<i>Premna mundanthuraiensis</i>	Shrub	Tirunelveli	
114	Labiatae	<i>Anisochilus henryi</i>	Shrub	Madurai	
115	Labiatae	<i>Anisochilus suffruticosus</i>	Undershrub	Nilgiri, Tirunelveli	
116	Labiatae	<i>Leucas anandaraoana</i>	Herb	Gulf of Mannar	
117	Labiatae	<i>Leucas lamifolia</i>	Shrub	Nilgiri	
118	Labiatae	<i>Leucas wightiana</i>	Herb	Coimbatore, Kanniyakumari,	

Annexure 2.1 Angiosperms Endemic to Tamil Nadu

No.	Family	Species (Binominal)	Habitat	Distribution	E*
				South Arcot	
119	Labiatae	<i>Orthosiphon rubicundus</i> var. <i>hohenackeri</i>	Herb	Nilgiri	
120	Labiatae	<i>Pogostemon hedgeri</i>	Shrub	Kanniyakumari	
121	Labiatae	<i>Pogostemon nilagiricus</i>	Herb	Nilgiri	E
122	Labiatae	<i>Pogostemon paludosus</i>	Herb	Nilgiri	
123	Labiatae	<i>Teucrium plectranthoides</i>	Herb	Tirunelveli	
124	Labiatae	<i>Teucrium wightii</i>	Herb	Nilgiri	
125	Piperaceae	<i>Piper barberi</i>	Climber	Kanniyakumari, Tirunelveli	E
126	Piperaceae	<i>Piper schmidtii</i>	Shrub	Nilgiri	
127	Balanophoraceae	<i>Balanophora indica</i> var. <i>agastyamalayana</i>	Herb	Kanniyakumari, Tirunelveli	
128	Balanophoraceae	<i>Balanophora indica</i> var. <i>tirunelveliensis</i>	Herb	Kanniyakumari, Tirunelveli	
129	Euphorbiaceae	<i>Claoxylon wightii</i> var. <i>Shrubangustatum</i>	Shrub	Tirunelveli	
130	Euphorbiaceae	<i>Claoxylon wightii</i> var. <i>Shrubhirsutum</i>	Shrub	Tirunelveli	
131	Euphorbiaceae	<i>Euphorbia balakrishnanii</i>	Herb	Tirunelveli	
132	Euphorbiaceae	<i>Euphorbia cotinoides</i>	Shrub	All districts	
133	Euphorbiaceae	<i>Euphorbia vajravelui</i>	Tree	Tirunelveli	
134	Euphorbiaceae	<i>Glochidion balakrishnanii</i>	Shrub	Tirunelveli	
135	Euphorbiaceae	<i>Glochidion sisparensense</i>	Tree	Nilgiri	
136	Euphorbiaceae	<i>Jatropha maheshwarii</i>	Undershrub	Kanniyakumari, Tirunelveli	
137	Euphorbiaceae	<i>Jatropha villosa</i>	Shrub	Ramanathapuram	
138	Euphorbiaceae	<i>Micrococca wightii</i> var. <i>ramnadensis</i>	Undershrub	Tirunelveli	
139	Euphorbiaceae	<i>Pseudoglochidion anamalanum</i>	Undershrub	Coimbatore	
140	Moraceae	<i>Ficus angladei</i>	Tree	Madurai	
141	Orchidaceae	<i>Anoectochilus rotundifolius</i>	Herb	Madurai	
142	Orchidaceae	<i>Brachycorythis splendida</i>	Herb	Coimbatore, Madurai, Nilgiri, Tirunelveli	
143	Orchidaceae	<i>Brachycorythis splendida</i>	Herb	Coimbatore, Kanniyakumari, Madurai	
144	Orchidaceae	<i>Bulbophyllum agastyamalayanum</i>	Epiphyte	Tirunelveli	
145	Orchidaceae	<i>Bulbophyllum albidum</i>	Pseudobulbs	Nilgiri and Tirunelveli	E

Annexure 2.1 Angiosperms Endemic to Tamil Nadu

No.	Family	Species (Binominal)	Habitat	Distribution	E*
146	Orchidaceae	<i>Bulbophyllum elegantulum</i>	Herb	Nilgiri	
147	Orchidaceae	<i>Bulbophyllum fuscopurpureum</i>	Epiphyte	Coimbatore, Nilgiri	
148	Orchidaceae	<i>Bulbophyllum kaitiense</i>	Epiphyte	Coimbatore, Nilgiri, Salem	
149	Orchidaceae	<i>Bulbophyllum nodosum</i>	Epiphyte	Nilgiri	E
150	Orchidaceae	<i>Bulbophyllum proudlockii</i>	Herb	Nilgiri	E
151	Orchidaceae	<i>Chrysoglossum hallbergii</i>	Epiphyte	Madurai	
152	Orchidaceae	<i>Coelogyne glanulosa</i> var. <i>bournei</i>	Herb	Madurai	
153	Orchidaceae	<i>Coelogyne glanulosa</i> var. <i>sathanarayananae</i>	Herb	Madurai	
154	Orchidaceae	<i>Coelogyne mossiae</i>	Epiphyte or Lithophyte	Madurai, Nilgiri	
155	Orchidaceae	<i>Dendrobium anamalayanum</i>	Epiphyte	Coimbatore, Salem	
156	Orchidaceae	<i>Dendrobium aquem</i>	Epiphyte	Coimbatore, Salem, Tiruchchirappalli	
157	Orchidaceae	<i>Dendrobium barbatulum</i>	Epiphyte	Coimbatore, Kanniyakumari, Nilgiri	
158	Orchidaceae	<i>Dendrobium dioidon</i>	Epiphyte	Kanniyakumari	
159	Orchidaceae	<i>Dendrobium microbulbon</i>	Epiphyte	Coimbatore, Nilgiri, Salem, Tirunelveli	
160	Orchidaceae	<i>Dendrobium nanum</i>	Epiphyte	Coimbatore, Kanniyakumari, Madurai, Nilgiri, Salem, Tirunelveli	
161	Orchidaceae	<i>Dendrobium wightii</i>	Herb	Coimbatore, Kanniyakumari, Nilgiri, Salem, Tirunelveli	
162	Orchidaceae	<i>Dendrobium panduratum</i> subsp. <i>villosus</i>	Epiphyte	Tirunelveli	
163	Orchidaceae	<i>Eria albiflora</i>	Epiphyte	Nilgiri	
164	Orchidaceae	<i>Eria dalzellii</i>	Herb	Nilgiri	
165	Orchidaceae	<i>Eria mysorensis</i>	Epiphyte	Coimbatore, Nilgiri	
166	Orchidaceae	<i>Eria nana</i>	Herb	Coimbatore, Madurai, Nilgiri, Salem	
167	Orchidaceae	<i>Eria pauciflora</i>	Lithophyte	Coimbatore,	

Annexure 2.1 Angiosperms Endemic to Tamil Nadu

No.	Family	Species (Binominal)	Habitat	Distribution	E*
				Kanniyakumari, Madurai, Nilgiri, Salem	
168	Orchidaceae	<i>Eria polystachya</i>	Epiphyte Herb	Kanniyakumari, Nilgiri, Salem	
169	Orchidaceae	<i>Eria pseudoclavicaulis</i>	Epiphyte	Madurai	
170	Orchidaceae	<i>Eulophia ramentacea</i>	Herb	Madurai	
171	Orchidaceae	<i>Flickingeria nodosa</i>	Epiphyte	Nilgiri, Salem, Tirunelveli	
172	Orchidaceae	<i>Habenaria barnesii</i>	Herb	Nilgiri	
173	Orchidaceae	<i>Habenaria cepholotes</i>	Herb	Nilgiri	
174	Orchidaceae	<i>Habenaria denticulata</i>	Herb	Nilgiri	
175	Orchidaceae	<i>Habenaria digitata</i> var. <i>travancorica</i>	Herb	Coimbatore, Madurai	
176	Orchidaceae	<i>Habenaria elliptica</i>	Herb	Madurai, Nilgiri, Tirunelveli	
177	Orchidaceae	<i>Habenaria elwesii</i>	Herb	Nilgiri	E
178	Orchidaceae	<i>Habenaria heyneana</i>	Herb	Coimbatore, Nilgiri, Salem	
179	Orchidaceae	<i>Habenaria hollandiana</i>	Herb	Coimbatore, Nilgiri	
180	Orchidaceae	<i>Habenaria multicaudata</i>	Herb	Coimbatore, Nilgiri, Salem	
181	Orchidaceae	<i>Habenaria perrottetiana</i>	Herb	Coimbatore, Kanniyakumari, Madurai, Nilgiri	
182	Orchidaceae	<i>Habenaria polyodon</i>	Herb	Nilgiri	
183	Orchidaceae	<i>Habenaria rariflora</i>	Herb	Coimbatore, Madurai, Nilgiri, Ramanathapura m, Salem, Tiruchchirappalli	
184	Orchidaceae	<i>Habenaria richardiana</i>	Herb	Coimbatore, Nilgiri	
185	Orchidaceae	<i>Hetaeria ovalifolia</i>	Herb	Coimbatore, Tirunelveli	
186	Orchidaceae	<i>Liparis beddomei</i>	Herb	Madurai	
187	Orchidaceae	<i>Liparis biloba</i>	Herb	Nilgiri, Salem	
188	Orchidaceae	<i>Liparis platyphylla</i>	Herb	Coimbatore, Nilgiri	
189	Orchidaceae	<i>Loxoma maculata</i>	Herb	Kanniyakumari	
190	Orchidaceae	<i>Luisia pulniana</i>	Epiphyte	Madurai	
191	Orchidaceae	<i>Malaxis intermedia</i>	Herb	Madurai, Nilgiri	
192	Orchidaceae	<i>Oberonia anamalayana</i>	Epiphyte or	Coimbatore	

Annexure 2.1 Angiosperms Endemic to Tamil Nadu

No.	Family	Species (Binominal)	Habitat	Distribution	E*
			Lithophyte		
193	Orchidaceae	<i>Oberonia santapau</i>	Epiphyte	Coimbatore, Kanniyakumari, Madurai, Nilgiri, Salem, Tirunelveli	
194	Orchidaceae	<i>Oberonia sebastiana</i>	Epiphyte	Coimbatore	
195	Orchidaceae	<i>Oberonia wightiana</i> var. <i>arnottiana</i>	Epiphyte	Nilgiri	
196	Orchidaceae	<i>Oberonia wightiana</i> var. <i>nilgirensis</i>	Epiphyte	Nilgiri	
197	Orchidaceae	<i>Peristylus brachyphyllus</i>	Herb	Coimbatore, Nilgiri	
198	Orchidaceae	<i>Porpax reticulata</i>	Herb	Nilgiri	
199	Orchidaceae	<i>Proteroceras holtumii</i>	Epiphyte	Coimbatore	
200	Orchidaceae	<i>Robiquetia josephiana</i>	Epiphyte	Coimbatore, Nilgiri, Ramanathapuram	
201	Orchidaceae	<i>Schoenorchis jerdoniana</i>	Epiphyte	Coimbatore, Kanniyakumari, Madurai, Salem, Tirunelveli	
202	Orchidaceae	<i>Sirhookera latifolia</i>	Epiphyte	Coimbatore, Kanniyakumari, Tirunelveli	
203	Orchidaceae	<i>Spiranthes sinensis</i> var. <i>wightiana</i>	Herb	Nilgiri	
204	Orchidaceae	<i>Thrixspermum muscaeflorum</i> var. <i>nilagiricum</i>	Epiphyte	Coimbatore, Nilgiri	
205	Orchidaceae	<i>Trias stocksii</i>	Herb	Coimbatore, Kanniyakumari, Tirunelveli	
206	Orchidaceae	<i>Vanda wightii</i>	Epiphyte	Nilgiri	E
207	Dioscoreaceae	<i>Dioscorea wightii</i>	Climber	Tirunelveli	
208	Araceae	<i>Theriophonum sivaganganum</i>	Grass	Ramanathapuram	
209	Eriocaulaceae	<i>Eriocaulon panagudianum</i>	Grass	Tirunelveli	
210	Eriocaulaceae	<i>Eriocaulon pectinatum</i>	Grass	Nilgiri	
211	Eriocaulaceae	<i>Eriocaulon ramnadense</i>	Grass	Ramanathapuram	
212	Eriocaulaceae	<i>Eriocaulon robustum</i>	Grass	Nilgiri	
213	Cyperaceae	<i>Carex pseudoaperta</i>	Grass	Nilgiri	
214	Cyperaceae	<i>Carex raphidocarpa</i>	Grass	Madurai	

Annexure 2.1 Angiosperms Endemic to Tamil Nadu

No.	Family	Species (Binominal)	Habitat	Distribution	E*
215	Cyperaceae	<i>Carex vicinalis</i>	Grass	Nilgiri	
216	Cyperaceae	<i>Carex wightiana</i>	Grass	Tirunelveli	
217	Cyperaceae	<i>Fimbristylis aggregata</i>	Grass	Coimbatore	
218	Cyperaceae	<i>Fimbristylis contorta</i>	Grass	Tirunelveli	
219	Cyperaceae	<i>Fimbristylis narayanii</i>	Grass	Salem, Tirunelveli	
220	Cyperaceae	<i>Fimbristylis paupercula</i>	Grass	Madurai, Nilgiri, Tirunelveli	
221	Cyperaceae	<i>Fimbristylis rectifolia</i>	Grass	Nilgiri	
222	Cyperaceae	<i>Fimbristylis rugosa</i>	Grass	Kanniyakumari, Madurai, Nilgiri	
223	Cyperaceae	<i>Fimbristylis subtraceculata</i>	Grass	Coimbatore	
224	Cyperaceae	<i>Fimbristylis uliginosa</i>	Grass	Coimbatore, Madurai, Tiruchchirappalli, Tirunelveli	
225	Cyperaceae	<i>Fuirena pubescens</i> var. <i>pergamentacea</i>	Grass	Coimbatore, Madurai	
226	Cyperaceae	<i>Fuirena trilobites</i>	Grass	Salem	
227	Poaceae	<i>Agrostis peninsularis</i>	Grass	Madurai, Nilgiri	
228	Poaceae	<i>Agrostis schmidii</i>	Grass	Nilgiri	E
229	Poaceae	<i>Andropogon longipes</i>	Grass	Nilgiri	
230	Poaceae	<i>Anthoxanthum borii</i>	Grass	Madurai	
231	Poaceae	<i>Acrachne henrardiana</i>	Grass	Ramanathapura m	
232	Poaceae	<i>Acrachne sundararajii</i>	Grass	Kanniyakumari	
233	Poaceae	<i>Arundinaria wightiana</i> var. <i>hispida</i>	Grass	Nilgiri	
234	Poaceae	<i>Arundinella purpurea</i> var. <i>laxa</i>	Grass	Nilgiri	
235	Poaceae	<i>Arundinella setosa</i> var. <i>nilagiriana</i>	Grass	Nilgiri	
236	Poaceae	<i>Brachiaria munaee</i>	Grass	Madurai	
237	Poaceae	<i>Brachiaria nilagirica</i>	Grass	Nilgiri	
238	Poaceae	<i>Cenchrus glaucus</i>	Grass	Coimbatore	
239	Poaceae	<i>Chloris wightiana</i>	Grass	Tirunelveli	
240	Poaceae	<i>Chrysopogon copei</i>	Grass	Tirunelveli	
241	Poaceae	<i>Cymbopogon flexuosus</i> var. <i>coimbatorensis</i>	Grass	Coimbatore	
242	Poaceae	<i>Cynodon barberi</i>	Grass	Madras	
243	Poaceae	<i>Dichanthium pallidum</i>	Grass	Nilgiri	
244	Poaceae	<i>Dimeria acutipes</i>	Grass	Chengalpattu	

Annexure 2.1 Angiosperms Endemic to Tamil Nadu

No.	Family	Species (Binominal)	Habitat	Distribution	E*
245	Poaceae	<i>Dimeria balakrishnaniana</i>	Grass	Madurai	
246	Poaceae	<i>Dimeria kollimalayana</i>	Grass	Salem	
247	Poaceae	<i>Enteropogon coimbatorensis</i>	Grass	Coimbatore	
248	Poaceae	<i>Eragrostis dayanandanii</i>	Grass	Chengalpattu	
249	Poaceae	<i>Eragrostis deccanensis</i>	Grass	Salem	
250	Poaceae	<i>Eragrostis rottleri</i>	Grass	Thanjavur	E
251	Poaceae	<i>Eriochrysis rangacharii</i>	Grass	Nilgiri	E
252	Poaceae	<i>Eulalia wightii</i>	Grass	Madurai	
253	Poaceae	<i>Garnotia exaristata</i>	Grass	Coimbatore	
254	Poaceae	<i>Garnotia schmidii</i>	Grass	Nilgiri	
255	Poaceae	<i>Helictotrichon polyneurum</i>	Grass	Nilgiri	
256	Poaceae	<i>Helictotrichon schmidii</i>	Grass	Madurai, Nilgiri	
257	Poaceae	<i>Heteropogon fischerianus</i>	Grass	Coimbatore, Madurai	
258	Poaceae	<i>Indopoa paupercula</i>	Grass	Western Ghats	
259	Poaceae	<i>Isachne angladei</i>	Grass	Coimbatore, Madurai	
260	Poaceae	<i>Isachne dispar</i>	Grass	Madurai	
261	Poaceae	<i>Isachne oreades</i>	Grass	Nilgiri	E
262	Poaceae	<i>Iseilema jainiana</i>	Grass	Gulf of Mannar	
263	Poaceae	<i>Ochlandra scriptoria</i> var. <i>sivagiriana</i>	Grass	Madurai	E
264	Poaceae	<i>Panicum fischeri</i>	Grass	Nilgiri, Tirunelveli	
265	Poaceae	<i>Perotis indica</i> var. <i>keelakaraiensis</i>	Grass	Gulf of Mannar	
266	Poaceae	<i>Poa gamblei</i>	Grass	Nilgiri	
267	Poaceae	<i>Sporobolus hajrae</i>	Grass	Gulf of Mannar	
268	Poaceae	<i>Tripogon jacquemonti</i>	Grass	Coimbatore, Nilgiri, Tirunelveli	
269	Poaceae	<i>Tripogon pungens</i>	Grass	Coimbatore, Madurai	
270	Poaceae	<i>Tripogon wightii</i>	Grass	Nilgiri	

E*: Endangered Species

Source: Government of TN, Department of Environment, ENVIS Database

Annexure 2.2 Endangered Animals in Tamil Nadu
(Schedule I of the Wildlife (Protection) Act 1972)

Mammals

No.	Species (Binominal)	English common name
1	<i>Antelope cervicapra</i>	Blackbuck
2	<i>Cetacean spp.</i>	Whales
3	<i>Dugong dugon</i>	Dugong
4	<i>Tetraceros quadricornis</i>	Four-horned antelope
5	<i>Bos gaurus</i>	Gaur
6	<i>Ratufa macroura</i>	Giant squirrel
7	<i>Elephas maximus</i>	Indian elephant
8	<i>Panthera pardus</i>	Leopard
9	<i>Felis bengalensis</i>	Leopard cat
10	<i>Macaca silenus</i>	Lion-tailed macaque
11	<i>Loris tardigradus</i>	Loris
12	<i>Viverra megaspila</i>	Malabar civet
13	<i>Tragulus meminna</i>	Mouse deer
14	<i>Presbytis johni</i>	Nilgiri langur
15	<i>Hemitragus hylocrius</i>	Nilgiri tahr
16	<i>Manis crassicaudata</i>	Pangolin
17	<i>Aonyx cinerea</i>	Clawless otter
18	<i>Melursus ursinus</i>	Sloth bear
19	<i>Petinomys fuscopapillus</i>	Small Travancore flying squirrel
20	<i>Panthera tigris</i>	Tiger

Reptiles

No.	Species (Binominal)	English common name
1	<i>Crocodylus spp.</i>	Crocodiles
2	<i>Chelonia mydas</i>	Green sea turtle
3	<i>Eretmochelys imbricate imbricata</i>	Hawksbill turtle
4	<i>Lissemys punctata</i>	Indian soft-shelled turtle
5	<i>Hoesemys sylvatica</i>	Kerala forest terrapin
6	<i>Caretta caretta</i>	Loggerhead turtle
7	<i>Lepidochelys olivacea</i>	Oliveback loggerhead turtle
8	<i>Genus Python</i>	Pythons

**Annexure 2.2 Endangered Animals in Tamil Nadu
(Schedule I of the Wildlife (Protection) Act 1972)**

Aves

No.	Species (Binominal)	English common name
1	<i>Aviceda leuphotes</i>	Black baza
2	<i>Aviceda jерcoloni</i>	Jerdon's baza
3	<i>Batrachostomus</i> spp.	Frogmouths
4	<i>Buceros bicornis</i>	Great Indian hornbill
5	Accipitridae spp.	Hawks
6	<i>Falco peregrinus</i>	Large falcon
7	<i>Falco biarmicus</i>	Large falcon
8	<i>Falco chicquera</i>	Large falcon
9	<i>Dendrocygna bicolor</i>	Large whistling teal
10	<i>Pandion haliaetus</i>	Osprey
11	<i>Pavo cristatus</i>	Peafowl
12	<i>Haliaetus leucogaster</i>	White-bellied sea eagle
13	<i>Platalea ieucorodia</i>	White spoonbill

Source: Wildlife (Protection) Act, 1972

Vide Notification published in the Gazette of India, Extraordinary, pt.II, Sec-3(i), dated 5th October 1977

Vide Notification published in the Gazette of India, Extraordinary, pt.II, Sec-3(i), dated 2nd October, 1980

Vide, S.O. 859(E), dated 24th November, 1986, published in the Gazette of India, Extraordinary, pt.II, Sec-3(i), dated 24th November, 1986

Vide Notification dated 29th August, 1977, published in the Gazette of India, Extraordinary, pt.II, Sec-3(i), dated 3rd September, 1977

JICA Survey Team

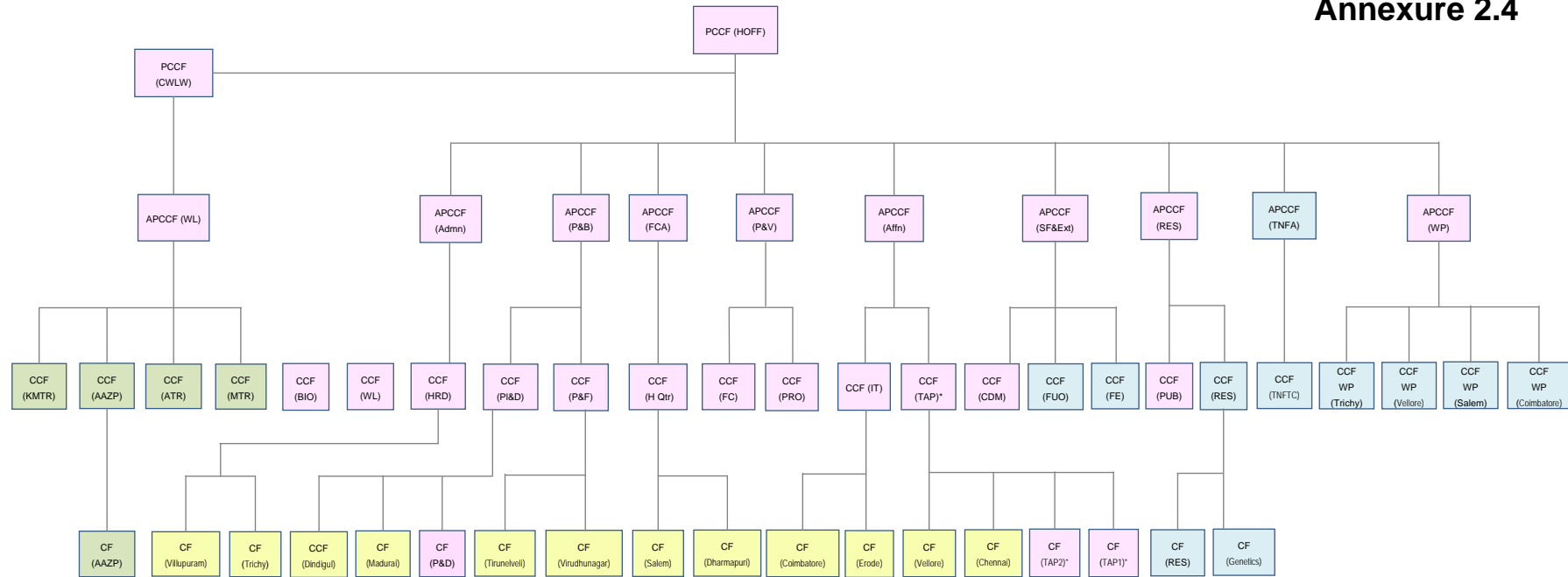
Annex 2.3 Field-level set-up of TN Forest Department

Type of Circle	S. No	Name of Region	Name of Circle	Name of Division	No of Territorial Division	No of Functional Division	No of Territorial Range	No of Functional Range	No. of Beat		
Forestry	1	Territorial	Chennai	Chennai	Kancheepuram Division	2	2	4	2	24	
	2	Territorial			Tiruvallur Division, Tiruvallur			5	5	14	
	3	Functional			Chengalpet Social Forestry Division			0	7	0	
	4	Functional			Urban Forestry Division			0	9	0	
					Sub Total			9	23	38	
	5	Territorial		Vellore	Vellore	Vellore Division	3	4	5	0	61
	6	Territorial				Thirupattur Division			6	0	47
	7	Territorial				Thiruvannamalai Division			11	0	89
	8	Functional				Social Forestry Division Vellore			0	6	0
	9	Functional				Afforestation Tiruvannamalai			0	4	0
	10	Functional				Rural Fuel wood Division - Thirupattur			0	6	0
	11	Functional	Crash Plantation Division Vellore			0			5	0	
				Sub Total			22	21	197		
	12	Territorial	Villupuram	Villupuram	Villupuram Forest Division	3	1	4	5	13	
	13	Territorial			Kallakuruchi Forest Division			5	0	26	
	14	Territorial			Cuddalur Forest Division			4	2	8	
	15	Functional			Inter Face Forestry Division, Villupuram			0	6	0	
				Sub Total			13	13	47		
	16	Territorial	Trichy	Trichy	Trichy Division	6	2	4	3	37	
	17	Territorial			Thanjavur Division			3	2	19	
	18	Territorial			Pudukkottai Division			5	0	5	
	19	Territorial			Nagapattinam Wildlife Division			3	3	8	
	20	Territorial			Perambalur Division			1	4	14	
	21	Territorial			Tiruvarur Division			3	1	14	
	22	Functional			Social Forestry Division, Trichy			0	6	0	
	23	Functional			Forest Engineering Division			0	8	0	
				Sub Total			19	27	97		
	24	Territorial	Madurai	Madurai	Theni Division	2	2	8	4	0	
	25	Territorial			Madurai Division			6	0	31	
	26	Functional			Varushanadu Soil Conservation Division			0	5	0	
	27	Functional			Social Forestry Division, Madurai			0	6	0	
				Sub Total			14	15	31		
	28	Territorial	Madurai	Dindigul	Dindigul Forest Division, Dindigul	2	3	8	5	61	
	29	Territorial			Kodaikanal Forest Division			7	3	39	
	30	Functional			Crash Plantatin Division, Karur			1	5	5	
	31	Functional			Ayyalur Interface Forestry Division, Dindigul			0	7	0	
	32	Functional			Sirumalai Interface Forestry Division, Dindigul			0	7	0	
				Sub Total			16	27	105		
	33	Territorial	Tirunelveli	Virudhunagar	Sivagangai Ramnad Forest Division	3	3	3	1	13	
	34	Territorial			Srivilliputtur Wildlife Division			5	0	33	
	35	Territorial			Gulf of Mannar Marin National Park Ramnathapuram			4	0	12	
	36	Functional			Social Forestry Division - Virudhunagar			0	5	0	
	37	Functional			Social Forestry Division - Sivagangai			0	3	0	
	38	Functional			Social Forestry Division - Ramnad			0	3	0	
				Sub Total			12	12	58		
	39	Territorial	Tirunelveli	Tirunelveli	Tirunelveli Division	3	1	5	0	45	
	40	Territorial			Kanyakumari Division			5	1	25	
	41	Territorial			Thoothukudi Forest Division			5	1	12	
	42	Functional			Social Forestry Division, Tirunelveli			0	6	0	
				Sub Total			15	8	82		
	43	Territorial	Salem	Salem	Salem Division	2	2	4	4	42	
	44	Territorial			Attur Division			4	2	40	
	45	Functional			Moisture and Soil Conservation MSCS Division			0	5	0	
	46	Functional			Interface Forestry Division, Salem			0	6	0	
					Sub Total			8	17	82	
	47	Territorial		Salem	Dharmapuri	Dharmapuri Division	3	2	4	3	35
	48	Territorial	Harur Division			4			1	48	
	49	Territorial	Hosur Division			7			1	54	
	50	Functional	Soil Conservation - MSCS Division, Dharmapuri			0			5	0	
51	Functional	Inter Face Forestry Division - Krishnagiri	0			6			0		
			Sub Total			15	16	137			
52	Territorial	Coimbatore	Coimbatore	Coimbatore Division	4	0	6	3	64		
53	Territorial			Nilgiri North Division			7	3	45		
54	Territorial			Nilgiri South Division			7	2	32		
55	Territorial			Gudalur Division			4	4	34		
			Sub Total			24	12	175			
56	Territorial	Erode	Erode	Erode Division	3	1	5	1	39		
57	Territorial			Sathyamangalam Division			5	3	49		
58	Territorial			Namakkal Division			4	1	32		
59	Functional			Bamboo Estate Division Gobichettipalayam			0	5	0		

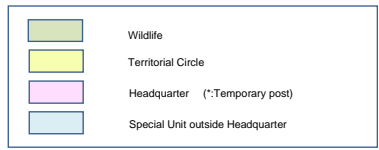
Type of Circle	S. No	Name of Region	Name of Circle	Name of Division	No of Territorial Division	No of Functional Division	No of Territorial Range	No of Functional Range	No. of Beat
				Sub Total			14	10	120
				FORESTRY CIRCLE SUB TOTAL	36	23	181	201	1169
Wildlife	60	Territorial	AAZP	Wild life Warden, Chennai	4	2	2	1	6
	61	Functional	AAZP	Arignar Anna Zoological Park			0	8	0
	62	Territorial	KMTR	Kalakkad			7	4	30
	63	Territorial	MTR	Mudumalai Tiger Reserve			6	3	24
	64	Territorial	ATR	Anamalai Tiger Reserve			6	0	35
	65	Functional	ATR	Tiruppur Tiger Reserve			0	8	0
				WILDLIFE CIRCLE SUB TOTAL	4	2	21	24	95
Special Unit	66	Functional	TNFA	TNFA Coimbatore			0	0	0
	67	Functional	TNFA	Forestry Training College, Vaigaidam			0	0	2
	68	Functional	Research	Modern Nursery, Dharmapuri			0	4	0
	69	Functional		IWRD, Trichy			0	4	0
	70	Functional		State Forestry Research Institute			0	4	0
	71	Functional		Agro Forestry Research Division, Salem			0	6	0
	72	Functional		Agro Forestry Research Division, Madurai			0	7	0
	73	Functional		Genetics Division, Coimbatore			0	5	0
	74	Functional	Working plan	WP Trichy			0	5	0
	75	Functional		WP Salem			0	3	0
	76	Functional		WP Vellore			0	5	0
	77	Functional		WP Coimbatore			0	3	0
	78	Functional	Forest extension	Forestry Extension Division Trichy			0	1	0
	79	Functional		Forestry Extension Division Madurai			0	1	0
	80	Functional		Forestry Extension Division Tirunelveli			0	1	0
	81	Functional		Forestry Extension Division Krishnagiri			0	1	0
	82	Functional		Forestry Extension Division Dharmapuri			0	1	0
	83	Functional		Forestry Extension Division Cuddalore			0	1	0
	84	Functional		Forestry Extension Division Ramanathapuram			0	1	0
	85	Functional		Forestry Extension Division Coimbatore			0	1	0
	86	Functional		Forestry Extension Division Thanjavur			0	1	0
	87	Functional		Forestry Extension Division Namakkal			0	1	0
	88	Functional		Forestry Extension Division Erode			0	1	0
	89	Functional		Forestry Extension Division Nilgiris			0	1	0
	90	Functional		Forestry Extension Division Chennai			0	1	0
	91	Functional		Forestry Extension Division Villupuram			0	1	0
	92	Functional		Forestry Extension Division Kancheepuram			0	1	0
	93	Functional		Forestry Extension Division Karur			0	1	0
	94	Functional		Forestry Extension Division Dindigul			0	1	0
	95	Functional		Forestry Extension Division Pudukottai			0	1	0
	96	Functional		Forestry Extension Division Nagapattinam			0	1	0
	97	Functional		Forestry Extension Division Tiruvanamalai			0	1	0
	98	Functional		Forestry Extension Division Tiruvarur			0	1	0
	99	Functional		Forestry Extension Division Salem			0	1	0
	100	Functional		Forestry Extension Division Theni			0	1	0
	101	Functional		Forestry Extension Division Perambalur			0	1	0
	102	Functional		Forestry Extension Division Vellore			0	1	0
	103	Functional		Forestry Extension Division Thoothukudi			0	1	0
	104	Functional		Forestry Extension Division Sivagangai			0	1	0
	105	Functional		Forestry Extension Division Thirvallur			0	1	0
	106	Functional	Forestry Extension Division Kanniyakumari			0	1	0	
	107	Functional	Forestry Extension Division Virudhunagar			0	1	0	
108	Functional	Forest Protection Squad	Forest protection Squad (North)	Squad North Chennai			0	1	0
109	Functional			Squad North Vellore			0	1	0
110	Functional			Squad North Dharmapuri			0	1	0
111	Functional			Squad North Salem			0	1	0
112	Functional			Squad North Erode			0	1	0
113	Functional		Squad North Coimbatore			0	1	0	
114	Functional		Squad North Udagammandalam			0	1	0	
115	Functional		Squad South Villupuram			0	1	0	
116	Functional		Squad South Trichy			0	1	0	
117	Functional		Squad South Dindigul			0	1	0	
118	Functional	Squad South Madurai			0	1	0		
119	Functional	Squad South Virudhunagar			0	1	0		
120	Functional	Squad South Tirunelveli			0	1	0		
				SPECIAL UNIT SUB TOTAL	0	55	0	89	2
				TOTAL	40	80	202	314	1266

121 Research SFRA(Chennai) (CCF(Research))
122 Research SFRA(Chennai) (CF(Research))

Annexure 2.4



A - 15



- HOFF: Head of Forest Force
- CWLW: Chief Wildlife Warden
- WL: Wildlife
- Admn: Administration
- P&B: Planning & Budgetary
- FCA: Forest Conservation Act
- Affn: Afforestation
- P&V: Protection & Vigilance
- RES: Research
- SF&Ext: Social Forestry & Extension
- TNFA: Tamil Nadu Forest Academy
- MTR: Mudumalai Tiger Reserve
- BIO: Biodiversity
- HRD: Human Resource Development
- P&D: Planning & Development
- P&F: Project Formulation
- H. Qtrs: Head quarter
- TAP: Tamilnadu Afforestation Project
- IT: Information Technology
- FC: Forest Conservation
- PRO: Protection
- PUB: publicity
- WP: Working Plan
- KMTR: Kalakad Mundanthurai Tiger Reserve
- ATR: Anamalai Tiger Reserve
- AAZP: Arignar Anna Zoological Park
- CDM: clean development mechanism
- FUA: Forest Utilization Officer
- FE: Forest Extension
- TNFTC: Tamil Nadu Forestry Training College

Organization of Tamil Nadu Forest Department

Annexure 2.5 Post-wise Responsibilities of TNFD

Cadre	Post	Duties and responsibilities
I.F.S.	Principal Chief Conservator of Forests (Head of Forest Force)	Administrative Head of the Department.
I.F.S.	Principal Chief Conservator of Forests & Chief Wildlife Warden	In charge of Wildlife matters.
I.F.S.	Additional Principal Chief Conservator of Forests	Assisting Principal Chief Conservator of Forests & Chief Wildlife Warden in all matter related to department.
I.F.S.	Additional Directors (TNFA) (Additional Principal Chief Conservator of Forests Rank)	Administrative head of the Tamil Nadu Forest Academy.
I.F.S.	Chief Conservator of Forests	Assisting Principal Chief Conservator of Forests / Additional Principal Chief Conservator of Forests in Management & Administrative affairs of Department.
I.F.S.	Principal TNFTC Vaigai Dam (Chief Conservator of Forests cadre)	Administrative head of the Vaigai Dam Forestry Training Collage.
I.F.S.	Conservator of Forests	Chief Forest Officer of the circle and possesses complete control over Divisional Forest Officers.
I.F.S.	Deputy Conservator of Forests (I.F.S. Cadre)	Controlling charge of a division.
I.F.S.	A. District Forest Officer	In charge of general management of Forest in territorial division & control over the establishment employed there in.
I.F.S.	B. Divisional Forest Officer (SF. Division)	Officer in charge of an overall control of functional division.
I.F.S.	C. Wildlife Warden (Including D.D. Vandalure)	Manage the natural resources.
I.F.S.	ECO Development Officer	To mobilize people in resource conservation.
T.N.F.S.	Assistant Conservator of Forests (State)	Assisting the District Forest Officer in the General Management of the Forest Division.
T.N.F.S.	Deputy Conservator of Forests (State)	Controlling charge of a division.
T.N.F.S.S.	Rangers	Executive charge of a Range.
T.N.F.S.S.	Foresters	In charge of protection of a section.
T.N.F.S.S.	Forest Guards (including Forest Guard with driving license)	In charge of protection of a Beat.
T.N.F.S.S.	Forest Watcher	Assisting the Forest Guard in the protection of Beat.
T.N.F.S.S.	Mahouts	Maintaining the Elephants in the Department.
T.N.F.S.S.	Cavady	Assisting the Mahouts in the maintenance of elephants.
T.N.M.S.	Tamil Nadu Ministerial Staff and others	Supporting staff in the department.

Annexure 2.6 Details of Faculty / Resource Persons of TNFA and TNFTC

	Name of faculty/resource person	Subject	Full time/ part time	Designation and institution	Years of teaching experience
Tamil Nadu Forest Academy					
1	Mita Banerjee, IFS.,	Wildlife	Full time	Conservator of Forests, TNFA	5 years
2	R. Subbaraj	Forest Surveying and Drawing	Full time	Assistant Conservator of Forests, TNFA	10 years
3	G. Chandrasekaran	Forest Protection & Law	Full time	Assistant Conservator of Forests, TNFA	10 years
4	C. Thangaraj	Wildlife Management	Full time	Ranger, TNFA	6 years
5	T. Ragupathy	Forest Mensuration	Full time	Ranger, TNFA	2 years
6	S. Selvaraj	Forest Utilization	Full time	Ranger, TNFA	2 years
7	K. Sundararaj	Office Procedure and Accounts	Part time	Faculty	5 years
8	K.R.Varadharajan	Silviculture	Part time	Faculty	3 years
9	N.Kalaiselvan	Forest Engineering	Part time	Faculty	5 years
10	Dr.P.Thiyagarajan	Soil Conservation and Land Management	Part time	Faculty	30 years
11	Dr.P.Muruganathan	Forest Botany	Part time	Faculty	30 years
Guest Faculties from Institute of Forest Genetics and Tree Breeding					
12	Dr. A. Balu	Plant Protection	Part time	Scientist	15 years
13	Dr. V. Mohan	Plant Protection	Part time	Scientist	15 years
14	Dr. Venkatasubramanian	Forest Botany	Part time	Research Assistant Grade - I	15 years
Tamilnadu Forestry Training College, Vaigaidam.					
1	Manoj Kumar Sarcar, IFS	Overall administration and review of progress in training for all subjects	Full time	Additional Director & Dean	
2	P.Senthikumar	Forest Utilisation	Full time	Ranger	7 years
3	S.Vijayakumar	1. Wildlife Management 2. Forest Protection & Law	Full time	Ranger	5 years
4	M.Thangavel	Joint Forest Management	Full time	Ranger	4 years
5	M.Viswanathan	Environment & Ecology	Full time	Ranger	1 year
6	K.Arumugaperumal	Botany	Full time	Ranger	1 month
7	G.Sivakumar	Mensuration	Full time	Ranger	6 months
8	V.Radhakrishnan	Soil Conservation and Management	Full time	Ranger	6 months
9	M.Ramamoorthy	Forest Engineering	Full time	Jr. Engineer	2 years
Guest Faculties					
10	B.Gunasekaran	Silviculture		Ranger (Retd)	12 years
11	S.Inbasekaran	Survey & Drawing		Ranger (Retd)	10 years
12	P.Mohan	PT / Parade / Weapon training		Ex-service man	16 years

Source: TNFA and TNFTC

Annexure 2.7 Infrastructure and facilities at TNFA and TNFTC

		TNFC	TNFA
Infrastructure	Lecture halls	2	5nos
	Auditorium	1	1
	Conference room	Nil	1
	Hostel	126 persons	180 persons
	Kitchen & Dining hall	2	2
	Recreation room	Nil	Nil
	Guest room (Rest house)	3 rooms	6 rooms
	Library	1	1
	Books	Old books	13500 books.
	Office room	1	1
	Staff quarters	36 (Old) 16 (New)	87 Nos. All old buildings requiring major repairs (Out of 87, 24 are occupied by TNFA staff and 63 are occupied by Staff of Coimbatore Forest Circle)
	Tube well	1	2
	Water supply condition	Adequate	Not adequate
	Equipment	Computer	25 Nos. (7 to 8 years old)
Projector		1 (old version)	1
OHP		1	1
Slid projector		1	1
GIS unit		Nil	to be equipped
TV		2	2
VCR		Nil	1
Survey equipment		25 sets (old)	42 sets.
Bus		2	1
Car/Jeep		1 Maruthi Omni Van	3 Jeep
Generator		2	2
Human resource	APCCF	Nil	1
	CCF	1	2
	CF	-	-
	DCF/ACF	Nil	2
	Forester	3	-
	Ranger	7	4
	Sociologist/Social Worker	Nil	-
	Guard	Nil	Nil
	Clerk	10	9
	Driver	3	2
Others	23	8	
External resource person	University lecturer	Nil	2 (Retired persons)
	Other Department	1	5
	Others – Retired Forest officials	2	5
Conditions of infrastructure and equipment		Satisfactory	Satisfactory
Renovation/upgrading plan		Hostel capacity has to be increased by constructing new building. Also the additional class rooms are required. New Staff quarters are to be constructed in place of old dilapidated areas.	Quarters for faculty to be constructed. Recreation facilities to Staff to be developed. Play ground is to be developed.

Source: TNFA and TNFTC

Annexure 2.8 Post-wise Training for TNFD Staff and others during TAP 2

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11 Plan	Total
TNFA							
CF	45	22	20	40	1		128
DFO	29	27	28	49	24		157
DCF	3	2	2	1	-		8
ACF	35	8	4	-	9		56
RFO	132	77	55	180	99		543
Forester	-	-	-	185	-		185
Superintendent/Assistant/Junior Assistant	83	143	173	132	-		531
JDO/DO	33	58	31				122
SHG		43	138	130			311
Farmer (VFC)			335	230			565
Others (Customized Software Developed)		169					169
Total	360	549	786	947	133		2775
No. of Batches	26	29	32	36	18		141
TNFTC							
Guard		362					362
SHG		57		468			525
Total		419		468			887
No. of Batches		9		12			21

Source: TNFA and TNFTC

Annexure 2.9 Subject-wise Training for TNFD Staff and others during TAP 2

Subject/ name of training course	Duration (days)	Participants	Number of trainings					2010-11 Plan	Total persons trained
			2005-06	2006-07	2007-08	2008-09	2009-10		
TNFA									
Training for CF	5 days	CF	1	1	1	1			128
TOT (Pre Project Training)	5 days	DFO/DCF/ACF	1	1	1	1			212
HRD Training (Micro credit)	3 days	ACF					1		9
TOT (Pre project training)	5 days	Ranger	1	1	1	1			444
HRD Training (Micro credit)	3 days	Ranger					1		99
TOT (Pre project training)	5 days	Forester				1			185
Training of Project Supporting Staff	3 days	Superintendent/Assistant/Junior Assistant	1	1	1				335
Refresher Course for Project Supporting Staff	3 days	Superintendent/Assistant/Junior Assistant		1	1	1			318
SHG	3 days	Members		1	1				181
SHG	5 days	Members				1			130
VFC	3 days	Members			1				335
VFC	5 days	Members				1			230
Training on Customized Software Developed for TNFD	3 days	Assistant/Junior Assistant		1					169
Total			4	7	7	7	2		2775
TNFTC									
Phase II TAP Training	5 days	Forest Guard		362					362
Phase II TAP Training		SHG/NGO		57		468			525
Total				419		468			887

Source: TNFA and TNFTC

Annexure 3.1 Concepts of Tourism and Ecotourism

1. Tourism and related concepts concerning its sustainability

Tourism is travel away from home for purposes of business, recreation or pleasure and includes the associated activities¹. *Sustainable* tourism is the standard to be achieved by the industry through self-regulation. The most widely accepted definition of *sustainable tourism* is that of the World Tourism Organisation (1996):

“tourism which leads to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems.”

The development of *sustainable tourism* is considered to be a process which meets the needs of present tourists and host communities, whilst protecting and enhancing needs in the future. It adopts the *triple bottom line*² approach of environmental, socio-cultural and economic sustainability. This approach and more is enshrined within the World Tourism Organization’s Global Code of Ethics (1999), which calls for the tourism sector to work closely with local communities to help eliminate poverty and to ensure a sustainable future for natural and cultural resources, as well as for the sector.

The lack of progress in realising sustainable tourism during the 10 years since the 1992 Rio de Janeiro ‘Earth Summit’ is partly attributed to everyone expecting others to be sustainable. This has led to the concept of responsible tourism, which shares with sustainable tourism the same goal of sustainable development and three pillars of environmental integrity, social justice and local economic benefits but differs in its approach. Responsible tourism focuses on encouraging individuals, organisations and businesses to take responsibility for their actions and the impacts of their actions.

Ecotourism is essentially a nature-based subset of responsible tourism that places emphasis on conservation, education, traveller responsibility and active community participation. It has been defined by The International Ecotourism Society, the world’s largest and oldest ecotourism organisation established in 1990, as:

Responsible travel to natural areas that conserves the environment and improves the welfare of local people. (TIES, 1991)

Most tourism in natural areas today is not sustainable and, therefore, is not ecotourism (The Nature Conservancy³).

The social dimension of ecotourism is advanced further in *community-based ecotourism* to an extent “. . . where the local community has substantial control over, and involvement in, its development and management, and a major proportion of the benefits remain within the community”⁴. How the community is defined will depend on the social and institutional structures in the concerned locality but this approach implies some kind of collective responsibility and approval by representative bodies. In many places, particularly those inhabited by indigenous peoples, there are collective rights over lands and resources. Thus, *community-based ecotourism* should foster sustainable use and collective responsibility, while also embracing individual initiatives within the community.

¹ This World Tourism Organisation definition recognises the trip to be more than 50 km and the stay to be overnight but less than 12 months. Such criteria are not appropriate when considering travel within a country by residents who more commonly undertake tourism activities without involving an overnight stay.

² Triple bottom line accounting accommodates ecological and social performance within traditional economic performance.

³ <http://www.nature.org/aboutus/travel/ecotourism/about/art667.html>

⁴ WWF International (2001). *Guidelines for Community-based Ecotourism Development*. Prepared by Richard Denman, The Tourism Company.

2. International trends in tourism, including ecotourism

Tourism has become one of the world's largest and fastest growing industries in the global economy. International tourism was estimated in 2006 to be growing at 4.6% per year globally and 9.5% in the case of developing nations⁵. In 2003 international tourism receipts, totalling US\$ 525 billion, accounted for 6% of global exports of goods and services. When considering service exports exclusively, the share of tourism exports was 29%⁶. India accounted for 0.37% of international tourist arrivals and 0.66% of the world tourism revenue⁷.

The United Nations World Tourism Organisation's *Tourism 2020 Vision* forecasts that international arrivals will reach nearly 1.6 billion by 2020, of which 1.2 billion will be intraregional and 378 million will be long-haul travellers. Although Europe, East Asia & Pacific and the Americas will continue to dominate the market, accounting for 89% of international arrivals, growth in international arrivals is expected to fall below the world average of 4.1% in the mature regions (Europe and the Americas). South Asia, along with East Asia & Pacific, Middle East and Africa, is forecasted to grow at rates above 5% per year. Annual growth in South Asia is expected to be 6.2%, accounting for 1.2% of the market share by 2020, signifying a 60% increase in its market share since 1995.

Beginning in the 1990s, ecotourism has been growing 20-34% per year and by 2004 ecotourism (including nature tourism) was growing globally three times faster than the tourism industry as a whole. Most of tourism's expansion is occurring in and around the world's remaining natural areas. Sustainable tourism could grow to 25% of the world's travel and tourism market within six years. Analysts predict a growth in eco-resorts and hotels, and a boom in nature tourism, with 'experiential' tourism (eco-, nature, cultural, adventure tourism) expected to grow quickest over next 20 years (TIES, 2006). While such predictions were made prior to the recent global recession, they do indicate that there are market gains to be won by early converts to sustainable tourism as economies recover.

⁵ TIES (2006). Fact sheet: global ecotourism. Update edition, September 2006. The International Ecotourism Society, Washington DC. http://www.ecotourism.org/webmodules/webarticlesnet/templates/eco_template.aspx?articleid=351

⁶ <http://www.unwto.org/facts/eng/economy.htm>

⁷ Rahul J.S. and Joel T.H. (2003). Sustainable nature based tourism in South Asia. ENVIS Centre, Sikkim, Ecotourism Newsletter 5(1):.12.

Annexure 4.1 Existing Infrastructure - Hardware, Software, Satellite images, GIS Data, Connectivity

Hardware		Unit	At HQ	At Circle	At District Level	At Division (functional)	At Range
1	Computer (Desktop)	no.	139			309	
2	Laptop (Notebook)	no.	18				
3	Other Hardware	no.					
3.1)	GPS	no.					
	- Hand held GPS	no.	31			428	
	- DGPS	no.	1				
	- PDA	no.	2				
3.2)	Laser Printer - A4	no.	8	9			
3.3)	Laser Printer - A3	no.	1				
3.4)	Dot-Matrix - A4/A3	no.	57			295	
3.5)	Plotter - A0	no.	1				
3.6)	Scanner Colour- A4	no.	3	11			
3.7)	Scanner Colour- A0	no.	1				
3.8)	Anti-Virus Softwares	no.	1 no. for 15 users, 2 no. 25 users				
3.9)	UPS	no.				298	
4	GIS Software/ Image Processing Software	Unit	At HQ	At Circle	At District Level	At Division (functional)	At Range
4.1)	ArcView/ Arc GIS (Version-9x)	no.	5	17	-	26	
4.2)	Erdas Imagine (Version-8.7)	no.	2				
4.3)	ENVI (Version-4.6)	no.	1				
4.4)	IDRISI (Version-16.01)	no.	1				
5	Satellite Images (Name)	Unit	Satellite Scenes	Vintage (Year)	Coverage (Entire State/Partial)	If Partial, specify Districts Covered	Main Usage
5.1)	IRS-P6 - LISS-IV (5.8 mt)	no.	30	2005, 2006, 2008	Partial	Coastal Districts	Coastal Vegetation
5.2)	IRS-1C, 1D - LISS-III (23.5 mt)	no.	32	2000, 2001, 2002	Entire	-	Forest Atlas
5.3)	IRS-P6 - LISS-III (23.5 mt)	no.	26	2004, 2005	Entire	-	Fire Study
5.4)	IRS-P6- AWIFS (56 mt)	no.	8	2006, 2007, 2008, 2009	Entire	-	Fire Study
5.5)		no.					
6	GIS database	Unit	Vintage (Year)	Coverage (Entire State/Partial)	If partial then specify % coverage	Specify Type of Data (Point, Polygon, Line, Raster)	Entities
6.1)	State level Village Map	-	As per SOI	Entire	-	Point	-
6.2)	Forest Administrative Map (District, Range, Beat)	-	2002	Entire	-	Polygon	-
6.3)	Protected Forest and Reserved Forest	-	2010	Entire	-	Polygon	-
6.4)	TAP-1 Village Map (Study Area)	-	-				-
6.5)	TAP-2 Village Map (Study Area)	-	2005-2008	Entire	-	Polygon	-
6.6)	Forest Fire Map	-	2001-2009 (except 2003)	Entire	-	Polygon	-
6.7)	Bio-diversity						
	- National park	-	2009	Entire	-	Polygon	5
	- Wild Life sanctuaries	-	2009	Entire	-	Polygon	10
	- Bird sanctuaries	-	2009	Entire	-	Point	12
	- Tiger Reserves	-	2009	Entire	-	Polygon	3
	- Biosphere Reserves	-	-	-	-	-	3
	- Elephant Reserves	-	2009	Entire	-	Polygon	4
	- Proposed Areas under Bio-Diversity Component (TAP-3)	-	-	-	-	-	-
6.8)	Land Cover Map	-	-	-	-	-	-
7a	Presently Connected through Internet/ TNSWAN	Unit	HQ & Circle	District/ Division	Range		
	7.1 Dial-up connectivity through service providers	no.	-	-	0		
	7.2 Broadband connectivity through service providers	no.	-		0		
	7.3 Wireless Data Cards connectivity through service providers	no.	-		0		
	7.4 TNSWAN connectivity	no.	Yes		0		

7b	Availability of Connectivity through Internet/ TNSWAN	Availability	HQ & Circle	District/ Division	Range
	7.1 Dial-up connectivity through service providers	Yes/ No	Yes	Yes	-
	7.2 Broadband connectivity through service providers	Yes/ No	Yes	Yes	-
	7.3 Wireless Data Cards connectivity through service providers	Yes/ No	Yes	Yes	-
	7.4 TNSWAN connectivity	Yes/ No	Yes	Yes	1

8	Staff Details (Skill Sets)	Unit	Level	Level-1: Basic Understanding	Level-2: Middle level Understanding	Level-3: Expert level Understanding	Total
	GIS	no. of staff	At HQ	4	5	4	13
		no. of staff	At District	17	-	-	17
		no. of staff	At Division	26	-	-	26
		no. of staff	At Range	193	-	-	193
	GPS based Surveys	no. of staff	At HQ	19	5	4	28
		no. of staff	At District	23	-	-	23
		no. of staff	At Division	95	-	-	95
		no. of staff	At Range	462	-	-	462
	Remote Sensing data processing	no. of staff	At HQ	6	3	4	13
		no. of staff	At District	-	-	-	0
		no. of staff	At Division	-	-	-	0
		no. of staff	At Range	-	-	-	0
	Computer Usage	no. of staff	At HQ	120	120	15	255
		no. of staff	At District	100	50	10	160
		no. of staff	At Division	360	180	10	550
		no. of staff	At Range	200	-	-	200

Annexure 6.1 JICA Criteria for the Project Scope
Under Tamil Nadu Sustainable Natural Resource Management Project

1. Basic Stance

- A) Biodiversity conservation is 1st Priority.
- B) Every component needs to be linked with biodiversity conservation.
- C) Consistency with international standards which are supported by academic research or scientific data.

2. Criteria of Selecting Each Component

- A) Management of PA should be conducted by the activities which effectively address the biodiversity issues (such as invasive alien species and human-animal conflict).
- B) Importance of TOF for biodiversity can be explained that TOF can contribute increasing demand of timber and prevent trees of PA not only in Tamil Nadu but also other states of India and other countries from illegal cutting. (The exception is urban forestry which mainly targets the better management of landscape in city areas).
- C) In terms of research, consistency with biodiversity conservation, state strategy, and tangible effectiveness should be explained.
- D) Enhanced outreach and environmental education is linked with biodiversity conservation and its importance.
- E) Tribal development is for the village inside / near PA.
- F) Eco tourism is nature-oriented (not merely tourism).

3. Non Eligible Portion

- A) The target areas should not include the areas intervened in TAP (I) and TAP (II).
- B) "Category A" related activities (significant influence on environment and social issues such as land expropriation and resettlement) under JICA Guideline
- C) General Administration Expense
- D) Tax and Duties
- E) Purchase of Land and Other Real Property
- F) Compensation
- G) Other Indirect Items

<END>

Annexure 7.1 Proposed Ecotourism Sites and Activities under the Project

SL.NO	Circle	District	Division	Destination	Sites features	Proposed activities
1	Vellore	Vellore	Tirupattur	Jalagamparai falls in foot hills of Elagiri	Water falls	Trekking , Boating, Cultural Tourism
2		Tiruvannamalai	Tiruvannamalai	Jamnamarathur Bheeman,fallsin Veerappanur RF	Waterfalls, River, and hill station	Forest stay, Nature camp, Nature trail, Bathing
3				Shenbagathope Tribal Hamlet in Malyalam RF	Valleys, river and backwaters	Boat raid, wildlife viewing, forest stay, nature camp.
4	Villupuram	Villupuram	Kallakurichi	Megham waterfalls in Parigam-vellimalai Ghat Road	Waterfalls	Bathing, Nature trail
5						Kaviyam waterfalls in Kaviyam village
6	Dharmapuri	Krishnagiri	Hosur	Aiyur	Eco-awareness centre, bamboo forests	Nature Trail, Eco- camps, wildlife viewing, trekking
7						Ungatti
8		Dharmapuri	Harur	Theerthamalai in Theerthamalai RF	Hill, Theerthamalai temple	Nature trail, cultural tourism, bathing
9	Salem	Salem	Attur	Mylambadi in Belur RF	Pachamalai Hills	Trekking, Wild Life Viewing, bird watching, Nature camps
10						Anaivari Odai and anaivari pool in Jadayaqoundan RF
11	Coimbatore	Coimbatore	Coimbatore	Sottaiyur Vayal	River, Forest	Boat ride, River crossing, river rafting, trekking
12						Palamalai
13		Nilgiris	Nilgiris North	Longwood shola and Kodanad	Shola Forest	Trekking, Wildlife viewing, Nature camps
14				Nilgiris South	Cairn Hill, School Mund	Shola Forests, Grass lands
15	Anamalai Tiger Reserve	Coimbatore	Indra Gandhi Wild Life sanctuary and National Park	Amaravathy-Chinnar-Kootar- Thoovanam	Dam, Crocodile park, river, falls, forests	Nature trail, trekking,crocodile park, wildlife viewing, boating
16	Dindigul	Dindigul	Dindigul	Alagarkoil RF	Forest, Temple, MPCA	Trekking, Herbal tourism
17			Kodaikkanal	Berijam		Lake, Shola forests
18	Madurai	Theni	Theni	Vannathiparai	Forests	Trekking, Bird Watching, Forest stay
19						Highwavys
20	Virudhunagar	Virudhunagar	Grizzled Squirrel WLS	Sasthakoil	Forests, river	Trekking, Bathing, nature camp, wildlife viewing
21						Kovilar Dam
22	Tirunelveli	Kanyakumai	Kanyakumari	Zeropoint near Pechiparai dam, Rettai aruvi Kaduvaparai - Iruttuchalai	MPCA, Forests, Waterfalls, Dam	Boat ride, bathing, bird watching, Nature camps, Trekking.
23						Kalikesam river, Inchikadavu
24	Kalakadu Mundanthurai Tiger Reserve	Tirunelveli	Kalakadu Mundanthurai WLS	Agasthiyar falls, Sorimuthu Ayyanar temple, Kolakanatham temple	Forests, Falls, Shrines, River	Trekking, Bathing, Wildlife viewing, cultural tourism, Nature camp
25						Thalayanai River

Source: TNFD (2010)

Annexure 7.2 Main Agro-forestry Practices Agro-climatic Zones of Tamil Nadu

SI. NO	Zone	District	Annual Rainfall	Soil type	Major crop	Dominant Tree Species	Major Agro forest practices
1	North Eastern	Chennai Kanchipuram Thiruvallur Cuddalore Vellore Thriuvanna- Malai Villupuram	1054 mm	Red loam, Red Danyloam, Black clayey And black Clay loam To limited Extend, Saline Alluvia in Sea coast	Ground nut Sesame Rice Bajra Ragi and Sugarcane	Casuarinas equisetifolia Thespesia Populnea, Ponagamia Pinnata, Lannea coramendensis Acacia, Anacardium occidentale	a. Monoculture Casuina equisetifolium b. Inter cropping Ground nut, sesame and pulsed with Casurania c. Bund palnting of Thespesia populea and Lannea coromendalica Monoculture of Acacia aurculiformise. Inter cropping of ground nut, pules and minor millets with Anacardium Occidentale.
2	North Western	Dharmapuri Krishnagiri	825 mm	Red to Brown Loamy soil	Groundnut Tapioca Sugar cane And Vegetables, Ragi, Sesame, Horsegram, And Castor	Delonix alata, Ponagamia Pinnata, Ailanthus Excelsa, Albizia Amara and Tamirindus Indica	a. Bund planting of pongamia pinnata, (Dharmapuri), delonix alata, Albizia amara (salem). b. Intercropping tapioca with eucalyptus tereticounis. c. Monoculture of eucalyptus tereticornis
3	Cauvery Delta	Thirchirapalli (part of the district) perambalur (part of the district) puddukotti (part of District), Thanjavur, Nagapattinam	900- 1000 mm	Alluvial in The old delta And Red Loam with Pockets of Letricite in the New delta	Paddy, Sugarcane, Banana, Pulses	Thespesia Populnea, Bamboo, Acacia Nilotic, Prosopis Juliflora, Ailanthus Excelsa, Casuriana Equistifolia, Eucalyptus Tereticornis	a. Bund palnting of acacia nilotica and bambusa bambooss. b. Intercropping ground nut coriander with B.Bambos c. Boundary planting of Tectona grandis and Dalbergia sisoo along water courses and canals, Live fence of Lannea coromende- lica wood lots of terminalia arjuna
4	Western Zone	Erode, Coimbatore, And Theni	638 mm	Thin red With Block soil	Rice, sugar Cane, cotton Sorgham, Ragi, Turmeric, Banana, Ground nut, Bengal, Gram	Hardwickia Binata, Holoptelia Integrifolia, Ailanthus Excelsa, Acacia Leophlea, Acacia Ferruginea, Santalum Album	a. Bund planting Of Albizia lebback, Excelsesa, Hardwickia binata, b. Intercropping tapioca, ground nut sesame with eucalyptus tereticounis, wood lots of ceiba pentandra
5	Southern Zone	Ramanathapuram Thineliveli Madurai	776 mm	Black clays Saline Coastal	Cotton, Sorghum, Fodder,	Acacia Ceiba, Bassia	a. wool lots of tamirind b. B.Silipasture consist

Sl. NO	Zone	District	Annual Rainfall	Soil type	Major crop	Dominant Tree Species	Major Agro forest practices
		Sivgangai Virudhu nagar And Thoothukudi		Alluvial or River Alluvium, Red sandy Soil and Deep red Soil	Sorhum, Minor Millets, Ground nut, Chilli and Vegetables	Latifolia, Prosphus Juliflora Tamarindus Indica, Eucalyptus, Azardirachta Indica	of Lucaene c. Intercroppin pules with kapok d. Monoculture of Euclayptus teriticornis, Acacia niltia, e. A. Prosopis julifora f. Bund planting of Eucalyptus kapak
6	High Rainfall Zone	Kanya kumari	1500 mm	Deep loam, Saline Coastal Alluvium (South eastern belt)	Rice Tapica, Cocon nut, Peper, Clove. Nut mug, Cardomom And Coffee.	Rubber, Tarmaind Calophyllum And Albizia Falcataria	a. Home garden b. Intercropping food crop, spices and pastures with coconut c. Bund planting of Albizia falcataria d. Intercropping food crop with Calophyllum inophyllum. Bassia latifolia and Pongamia pinnata
7	Hilly Zone	Chethery, Nilgris, Shevroys, Elagri, Javadhu, Koli, Anamala, Palani and Podhigai hill Ranges	100 mm	Laterite	Tea, coffee, Cabbage, Cauliflower	Grevillea Robusta Eucalyptus Globulese Acacia Terminalia spp	a. Intercropping potato, beans with eucalyptus globules grevillea robusta and erthrina indica as shade tree in tea and coffee garderns.

Annexure 7.3 Intercropping patterns observed across different Agro-climatic zones

Zone	Locality	Intercrops	Tree spp
North Eastern	Cudalore	Ground nut, Vegetables	Casuarinas equisetifolia
	Cudalore	Gingelly and Ground nut	Tectona grandis, Cocos nucifera
	Viruthachalam	Gingelly	Anacardium occidentale
	Chithambaram	Brinjal	Anacardium occidentale
	Kancheepuram	Ground nut, Vegetables	Anacardium occidentale, Cocos nucifera
	Thiruvannamalai	Gingally, Ground nut, Banana	Azadirachta indica
	Chengalpat	Vegetables, Ground nut, Rize	Tectona pentandra
	Villupuram	Ground nut, gingally, pulses	Ceiba pentandra
	Thiukovilur	Pearl Millet (cumbu), Ground nut	Anacardium occidentale
	Sriperunpudur	Red gram, Pules	Anacardium occidentale
	Sriperunpudur	Black gram, red gram	Anacardium occidentale
Thiuvallur	Gingelly, ground nut	Anacardium occidentale, Tamarindus indica	
North Western	Namakkal	Ground nut	Casuarinas equisetifolia
	Rasipuram	Fodder crops, Rice	Mangifera indica
	Rasipuram	Fodder crops, Cotton	Tamarindus indica
	Rasipuram	Fodder crops, Ground nut	Tamarindus indica
	Thiruchankodu	Agriculture crops(pulses)	Tamarindus indica
	Salem	Sorghum	Mangifera indica
	Omalar	Sorghum	Cocos nucifera
	Erode	Sorghum	Mangifera indica
	Gobichettipalayam	Sorghum, Vegetables	Cocos nucifera, Tectona grandis
	Dharmapuri	Sorghum, Hores gram	Mangifera indica, azadirachta indica
	Harur	Ground nut, Rice, Cotton	Mangifera indica Cocos nucifera Tectona grandis
	Krishnagiri	Sorghum, ragi, cumb	Tectona grandis ,Mangifera indica
	Hosur	Sorghum, Vegetables, Rice	Cocos nucifera, Tectona grandis
	Hosur	Sorghum, Vegetables, Ground nut	Tectona grandis, Mangifera indica, azadirachta indica, Borassus flabellifer
Pudukkottai	Sorghum ,Ground nut, Banana, Onion, Flower	Casuarinas equisetifolia, Tectona grandis	
Cauvery Delta	Pudukkottai	Ground nut	Emblica officinalis
	Thanjavur	Onion, Cotton	Eucalyptus tereticornis
	Kumbakonam	Cotton	Bambusa bamboo
	Orathanadu	Pulses	azadirachta indica
	Perambalure	Ground nut, Onion	Casuarinas equisetifolia
	Thiruvarur	Onion, Cotton	Ailanthus excelsa
	Mannrkudi	Ground nut	Bambusa bamboo
	Trichy	Coffee Fodder crops	azadirachta indica, Tectona grandis
	Ariyalore	Fodder crops	Tectona grandis
	Lalgudi	Vegetables, Banana	Eucalyptus tereticornis
	Perambalore	Pulses, Fodder crops	Eucalyptus tereticornis, azadirachta indica, Tectona grandis,
Theni	Vegetables	Casuarinas equisetifolia, etc	
High Rainfall	Kanyakumari	Home garden	Pongamia pinnata, Delonix regia
	nagarkoil	Vegetables	Eucalyptus tereticornis, Artocarpus heterophyllus
Hill Zone	Chithery	Tea, Pepper	Grevelia robusta
	Chithery	Coffee, Cardamon	Artocarpus heterophyllus, Erythrina indica
	Madurai	Vegetables, Coffee	Casuarinas equisetifolia
	Sivagangai	Pulses, Ground nut,	Casuarinas equisetifolia, Simaruba glauca
	Manamadurai	Sorghum, Vegetables	Emblica officinalis
	Ramanathapuram	Sorghum, Vegetables, Flowers	Tamarindus indica
	Vedasadur	Banana, Rice	Banana, Tapioco
Natham	Cowpea	azadirachta indica, Cocos nucifera	

Zone	Locality	Intercrops	Tree spp
Western	Natham	Banana	Ailanthus excelsa, azadirachta indica
	Karur	Banana, Tapioco	indica
		Banana, Tapioco Tumeric, Tomato	Ailanthus excelsa, Tectona grandis Ailanthus excelsa, Tectona grandis
		Turmeric, Rice, Vegetables	
		Medicinal plants	Tectona grandis, Tamarindus indica
		Banana, M. kuinji, Onion	Tectona grandis ,Tectona grandis
		Sorghum, Cowpea, vegetables	Cocos nucifera, Ailanthus excelsa, Azadirachta indica
	Karur	Sorghum, Banana, Cotton	Azadirachta indica, Casuarinas equisetifolia
	Aravankurichi	Beetroot, Flowers, Banana	Casuarinas equisetifolia
	Aravankurichi	Ground nut	Casuarinas equisetifolia
	khnarayapuramris	Fodder crops	Azadirachta indica, Tectona grandis Broassus flabellifer
	Narayapuram	Fodder crops	Tectona grandis
	Kulithalai	Cotton, Fodder crop	Broassus flabellifer, Prosopis juliflora
	Coimbatore	Fodder crops	Emblica officinalis, Tamarindus indica
	Coimbatore	Cotton, Ground nut, Vegetables	Azadirachta indica, Tectona grandis Broassus flabellifer, Ailanthus excelsa
	Pollachi	Ground nut, Vegetables, Fodder crops, Pluses	Azadirachta indica, Tectona grandis Tamarindus indica, Simaruba glauca
Udmalaipet	Cotton	Simaruba glauca	
udmalaipet	Sapota, Nelli	Emblica officinalis, Casuarinas equisetifolia	
udmalaipet	Vegetables, Cotton	Tectona grandis, Tamarindus indica, Broassus flabellifer	
Southern	Madurai	Vegetables, Cotton	Casuarinas equisetifolia
	Sivagangai	Pulses, Cotton, Ground nut	Casuarinas equisetifolia Simaruba glauca
	Manamadurai	Sorghum, , Vegetables	Emblica officinalis
	Ramanathapuram	Sorghum, Flowers, Vegetables	Tamarindus indica
	Kamuki	Sorghum, Cotton, Rice	Casuarinas equisetifolia
	Viruthunagar	Cotton, Ground nut	Casuarinas equisetifolia
	Sivagasi	Fodder crops	Tectona grandis, Tamarindus indica, Azadirachta indica
	Tuticorin	Fodder crops	Casuarinas equisetifolia, Tamarindus indica,
	Kovipatty	Fodder crops, Cotton	Broassus flabellifer, Prosopis juliflora
	Thirunelveli	Fodder crops	Tamarindus indica
	Nanguneri	Cotton, Ground nut	Tamarindus indica, Tectona grandis

Annexure 7.4 Farmer Interest Group

A Farmer Interest Group (FIG) is a self managed, independent group of farmers with a shared goal and interest. The members work together to achieve this goal by pooling their existing resources, gaining better access to other resources and to share in the resulting benefits.

Benefits of forming a group

- Access to technical and market information
- Improved buying and selling power
- Likely to maintain useful and relevant activities
- High motivation for sustainability
- Builds social cohesion

Objectives of a group

- To address **production and marketing issues**
- To develop **'self-help'** approaches
- To provide **pooled resources**
- To allow members to exploit an **economy of scale**
- To provide a **forum for training and information sharing**
- To provide a **focal point for technical and training activities**

Activities of a group

- Conduct meetings
- Engage in information sharing (including networking with other groups)
- Receive technical training
- Conduct field trials
- Organise bulk selling and purchasing
- Develop market networks and make market assessments
- Support individual members on a needs basis
- Manage a 'revolving' fund for group activities
- Identify technical and product opportunities
- Invest in issues that cannot be covered by individuals
- Gain access to credit not available to individuals

Characteristics of a group

- Action focussed
- Single topic
- Limited lifespan
- Members with a vested interest

Pre requisites in forming a Group

Decide The Topic Of The Group

To decide on the topic of the group you can follow the following steps:

Identify a problem or an issue

You and your neighbours are experts in your businesses. You will notice problems and issues every day that people 'outside' don't necessarily see or understand, and most probably, you discuss them with each other.

Gain an overview of needs

You identify your needs by looking at the ways in which you can address your problems. This can be done by the group itself, or you can enlist the help of a facilitator such as the commune extension worker or someone else to help guide the process.

For example:

Common types of needs you may identify:

- Technical assistance to help you improve production or use improved technology
- Technical assistance for the introduction, trial or development of a promising new product or enterprise
- Technical assistance for deciding whether to implement a new idea

Identify the topic of your group

The topic of your group is the strategy that you develop to address these needs that are more effectively carried out in a group than as individuals. The most important factor in selecting a topic is that it should be market focussed. That is, it should not focus on an isolated production problem or need, but should have some basis in improving the ability to sell a product or improve the profit. If addressing your chosen problem or need does not improve your ability to sell or improve the price of your product, there is not point in forming a group to address it and interest in the group will quickly diminish. You may already have some ideas about problems or needs that should be addressed in your business, but the following process may help you if you are unsure.

- **Brainstorm problems:** eg low rice yields, grubs in mangos, maize harvest taking too long, - all which affect profit / income.
- **Identify the type of need that will help address each problem:** eg low rice yield = technical assistance for production improvement or technology implementation.
- **List needs:** this list can be as short as one item or as long as you wish. Prioritise this list if the group thinks that it is useful to do so.
- **Choose one need** and make that the initial focus of your discussions, requests and activities. This will become the theme or the topic of your group. You should focus on a single topic. If you wish to address other topics, you may need more than one group or deal with them one after another.

Responsibilities in the Group

Even though the idea of a FIG is that everyone works together to address their common issue, the group will probably still need to elect a group leader and to assign responsibilities such as bookkeeping and record keeping to other members.

When should responsibility be assigned?

During the conception of the group and the initial preparation, informal leadership is likely to form naturally. The people who come up with the idea for the group will automatically start the process. The activities in this process are likely to include gauging interest, initiating discussion, preparing and chairing the interest assessment meeting. During the group establishment meeting this leadership should be formalised by nominating and voting candidates into the required positions. The initial leaders do not necessarily have to be voted into the formal leadership positions.

What leadership positions should there be?

The actual leadership positions required will vary from group to group, but it is likely that each group will require at least some of the following positions:

Position	Responsibilities
Group Leader	Chair meetings; represent group; overall management responsibility; spokesperson; co-financial signatory
Deputy Group Leader	Deputize when Group Leader is unavailable, share tasks with Group Leader when Group Leader needs support
Secretary	Receives, prepares and sends correspondence; takes and maintains minutes
Treasurer/Bookkeeper	Keeps groups financial records; has responsibility for banking and petty cash; manages revolving fund; collects fees from members; manages credit facility if applicable; co-financial signatory
Record Keeper	Stores and maintains records and reference material

In addition, the group may have various activity specific leaders for group activities. Depending on the size and needs of the group, some of these functions can be undertaken by multiple people (For example the Deputy Group Leader may also be the Bookkeeper or the Secretary may also be the Record Keeper), but it is up to the group.

Annexure 7.5 List Of Commonly Cultivated Agro-Forestry Tree Species In Tamil Nadu

Sl. No.	Species	Tamil Name	Distribution	Parts uses	Purpose
1	Acacia leucophloea	Vevel	Dry tract of Tamil Nadu	Wood	Main Secondary timber & fuel wood
2	Acacia nilotica	Karuvel	Dry tract of Tamil Nadu	Timber	Main quality secondary timber & fuel wood tannin Gum used for calico printing and dyeing
3	Aegle marmelos	Vilvam	Dry tract of Tamil Nadu	Leaves Fruit	Treatment of diabetes Antiseptic as unripe fruit astringent used in treating stomach disease, stomachic, ripe fruit in diarrhea dysentery. Fuel.
4	Ailanthus excelsa thikuchimaram	Thikuchimaram	Throughout Tamil Nadu (Except hill)	Wood	Wood is light used for match sticks packing cases, boats ,toy & drums. All the parts viz leaves, bark, root are used as medicine. Good fodder for cattle.
5	Albizia amara	Usil	Throughout Tamil Nadu (Except hill)	Wood Leaves Seeds	Making tool handles, and agri implements. Medicine and also green manure. Astringents
6	Albizia lebbeck	vagai	Throughout Tamil Nadu (Except hill)	Leaves Wood Bark	Suitable to make furniture interior decoration,panelli, parquet & strip flooring, Agri. Implements and good for produce gum & tannin. Green manure & fodder. Roots, Leaves & Seeds also used as a medicine.
7	Anacardium occidentale	Mundhri		Seed Fruit	Edible Edible
8	Anona squamosa	Sitha	Throughout Tamil Nadu	Fruit Seed powder Roots Seed kernels (30%Oil) wood Leaves Fruitpulp	Edible Destroys hair lice Strong Purgative Soap making Fuel Medicine Making custard powder.
9	Areca catechu	Pakku	Foot hill of Tamil Nadu	Areca Nut Flower Borneo Seed	Aromatic and astringent Sweet – scented Medicines – healing of the sick Used in beetal
10	Artocarpus heterophyllus	Pala	Hill zone and also Coastal area of Tamil Nadu	Fruits Wood	Edible Suitable for carpentry lay work, tunery & musical instrument. All the parts are used in various purpose.
11	Azdirachta indica	Veppam	Throughout Tamil Nadu (Except hills)	Wood	Main secondary timber throughout Tamil Nadu All other parts are used. All parts are highly medicinal.
12	Bauhinia racemose	athi	Throughout Tamil Nadu	Leaves Wood	Medicine Fuel & Furniture making
13	Bambax ceiba	Vavu	Throughout Tamil Nadu	Fruits Wood Bark	For boxes, general works & for ligh abiner works, match box toys ect., Fiber & gum Fibre, Roots bark and flower buds

Sl. No.	Species	Tamil Name	Distribution	Parts uses	Purpose
					are used as medicine.
14	Barassus flabelifer	Palmyra palm	Dry tract of Tamil Nadu	All parts	All parts are used, more than 800 product are prepared from Palmyra tree.
15	Butea monosperma	Purasu	Southern parts of Tamil Nadu	All parts	All parts are used
16	Calophyllum inophyllum	Pinnai	East to West coast of Tamil Nadu	Seed oil Leaves Wood	Treatment of Skin disease and rheumatism Fish poison / bait Cabinet work, sleepers in ship industry for cooperage.
17	Carica papaya	Papali	Throughout Tamil Nadu	Fruits Leaves Latex	Used medicinally Brewing and wine making and the textile and tanning industries.
18	Cassia fistula	Sarakkonrai	Hill zone	Fruit Leaves Bark	Herbal medicine (burns, cancer, convulsion, delirium, diarrhea, epilepsy, gravel, hematurai, pimples, syphilis) Vomiting, nausea, abdominalpain and cramps
19	Cassia siamea	Manjakkonai	Throughout Tamil Nadu	Leaves Wood	Organic fertilizer fuel
20	Casuarina equisetifolia	Savukku	Cultivated Extensively in Tamil Nadu	Wood Wood Bark Needles	Used for poles, Beams for construction work and small furniture. Wood is used for fuel and charcoal Used for astringent Used for making activated carbon
21	Ceiba pentandra	Iiava white silk cotton (Kapok)	Hotter parts of Tamil Nadu	Ripe fruits Seed Oil Young leaves Root Wood Oil cake	Fiber Edible Medicinal use Used for canoes to matches & bent work Cattle feed.
22	Chloroxylon swietenia	Purasu	Dry tracts of al districts.	Bark Leaves Wood Bark Wood Leaves seed	Astringent Applied to wounds used in treatment of rheumatism Cabinet making, frames for carving ect., Yields gum Yields yellow dye Antiseptic seed oil
23	Citrus aurantifolia	Lemon	Throughout Tamil Nadu	Leaves & Fruits	Medicinal value
24	Cocos nucifera	Tengai Thennai	Throughout Tamil Nadu (Highly coastal area)	Whole plant	Fresh kernel is rich in protein, fat lignin, sugars and inorganic subatances. Oil is expressed from the dried flesh of the mutt. Coconut water contains proteins, fats, minerals and carbohydrates, fermented toddy contains proteins, calcium and phosphorous. Coconut oil contains free caprylic acid in addition to glycerides of lauric, myristic, palmitic and stearic acid.
25	Delonix elata	Vadanarayanan	Throughout Tamil Nadu In road sides	Twigs Wood	Live fences For churns, combs & matches Medicinal value

Sl. No.	Species	Tamil Name	Distribution	Parts uses	Purpose
				Leaves Bark	Manure
26	<i>Delonix regia</i>	Mayirkonrai	Throughout Tamil Nadu	Wood Seed	Good avenue, tree, wood for Cheep item & as fuel. Seed gum edible used also Intextile industry.
27	<i>Diospyros chloroxylon</i>	Karvakkanai	Throughout Tamil Nadu	Ripe fruit Twigs Wood	Edible Good fodder General construction work, Fuel.
28	<i>Emblica officinalis</i>	Malai nelli	Tropical Region of Tamil Nadu	Fruits Leaves Bark	Medicinal purpose
29	<i>Erythrina indica</i>	Kalyanamurungai	Hilly area Of Tamil Nadu	Shade Bark Wood	Tree for coffe plantation Yields fibre & tannin Fuel
30	<i>Eucalyptus Globules</i>	Nilgiri thyla Maram	Throughout Tamil Nadu	Dry leave Gum and Oil, Distilled from the fresh leaves Wood	Leaves contain volatile oil. Timber and fuel
31	<i>Feronia elephantum</i>	Vila	Decedious Region	Fruit Leaves	Medicinal
32	<i>Ficus religious</i>	Arasamaram	Throughout Tamil Nadu	Root Bark	Tannin & wax Medicinal Purpose
33	<i>Grevillea robusta</i>	Silver oak	Hilly area of Tamil Nadu	Leaves Bark Wood	Good manure Adhesive and in tanning Industry Casks, cooperage plywood. Paneling work & also fuel.
34	<i>Harddwickia binata</i>	Aacha	Dry tract of Tamil Nadu	Wood Bark Leaves Yong Branches	Used largely for naves of Carts, oil mills, plorghs, Clod crushes, floors, bridges, Well lathe chucks, handles, Sheaves of rope blocks Railways keys, pegs, brake Blocks. Red brown fibre for ropes & Other agri. Purposes. Fodder & green manure fibre for cord
35	<i>Hibiscus tiliaceus</i>	Mallow tree	Coatal areas Of Tamil Nadu	Whole Plants	All the parts are very Economical value.
36	<i>Holoptelea integrifolia</i>	Aya	Throughout Tamil Nadu	Wood Bark Leaves Fruits Bark Juice	Brush backs, dusting broom, Good charcoal, industry Cheep furniture, carving Works, ploughs, yokes Waper bobbins, combs etc. Pulp for insulation boards. Yellow oil in paint as Illuminant Edible Applied to Rheumatic swellings.
37	<i>Jtropa curcas</i>	Katamanugu	Throughout Tamil Nadu	Fruits Wood	Edible Used as a secondary Timber.
38	<i>Manilkara zapota</i>	Sapota	Tropical	Fruits	Fruits for ice cream and

Sl. No.	Species	Tamil Name	Distribution	Parts uses	Purpose
			Region of Tamil Nadu		Milk shake in its fresh Form. Fruit can also be Used for preparing liquor And alcohol because of its Richness in sugar.
39	Melia azedarach	Malaivembu	Throughout Tamil Nadu (Except hills)	Wood Leaves Bark Fruits	Multiple use Cattle feed Insect repellent
40	Mimusops elengi	Mahil	Southern District of Tamil Nadu	Plant Wood Dried Flowers Oil Ripe fruits Seed oil Bark Leaves Yong twigs Bark and Fruits Powedered Seed paste	Is a good pollution Indicator Building purpose Piles, bridges oars, boats, Masts etc., Anti bacterial, used for Stuff, Pillows etc., As per stimulant edible Eaten and as illuminand for Tanning dn dueing Fooder For cleaning teeth Tonic for dysentery Flower as snuff in Headached and pain Ghee to remove constipation
41	Moringa oleifera	Murngakai	Throughout Tamil Nadu	Leaves & fruits	vegetable
42	Morus alba	Mulberry	North Eastern Parts of Tamil Nadu	Leaves Wood Leaves Wood Fibre Twigs bark & Leaves	Used for raing silk worms For the manufacture of Sports goods. Cattle food As medium grade fuel Wood. Tanning purpose And coloring cotton red. In tentile industry for Making basked medicinal Uses.
43	Strychnos nux-Vomica	Etti	Dry region Of Tamil Nadu	Seeds & Wood	Homeopathic remedies for Hangovers, backpain, Digestive problems, Headaches, allergies, colds, Flu, emotional stress, Constipation, menstrual Problems, and hemorrhoids.
44	Pithecellobium dulce	Konappuli, Kodukkapuli	Throughout Tamil Nadu	Wood fruits Fruits	Fire wood food
45	Pongamia pinnata	Pogam tree	Throughout Tamil Nadu	Seed oils Seed cake Wood Leaves Leaf juice Hot leaf Wood	Used in tanning industry, Soap making medicing for Skin diseases, highly Antiseptic as lubuicant as Fuel in diesel engine. Manure For ploughs cart, furniture Fuel and etc., Green manure, fodder In flatulence dyspepsia, Diarrhea and cough Influsion as bath in Rheumatic pain .
46	Prosopis juliflora	Vilidathan	Throughout	Wood	The wood is used for

Sl. No.	Species	Tamil Name	Distribution	Parts uses	Purpose
			Tamil Nadu		Parquet floors, furniture, And turnery items, Fencepost, pilings, as a Substrate for producing Single – cell protein, but Most of all for fuel. Toasted seeds are added to Coffee. Bark, rich in Tannin, is used for Roofing in Colombia
47	Precarpus santalinus	Sensantanam	Throughout Tamil Nadu	Leaves Wood	It is used in the treatment Of pimples, acne, wrinkle Etc. It us also used Internally in chronic Brongitis, gonorrhoea and Gleet, chronic cystitis With benzoic and boric Acid. Wood is used for making Fancy article and is much carved
48	Ptericarpus Santalinus	Sensantanam	Throughout Tamil Nadu	Bark & Leaves	Medicinal use
49	Samanea saman	Enal vagai			
50	Syzygium cuminii	Naval	Throughout Tamil Nadu	Ripe fruits Seed powder Unripe fruit Wood Bark extract Flower Leaves seed Cakes, bark	Edible Medicine Preparing Vinegar diuretic Carminative in nature Construction workboat, Building industry, plywood Medicine tanning dyeing Good for honey cattle Feed Manures as illuminant and Soap varnish
51	Ta,arindus indica	Puli	Throughout Tamil Nadu	Ripe fruite Pulp Bark & Pulp Seeds Seedpowder Kernels wood	Edible Tartaric acid used in Medicine Used tanning and dyeing for Polishing and cleaning Metal wares Yield jelly for making jams Marmalade Cattle feed Edible after boiled Many uses also as fuel
52	Tectona grandis	Teak	Throughout Tamil Nadu	Wood Leaves Flowers	First class timber Tanning and medicines
53	Terminalia chebulla	Kadukai	Dry region	Dried fruit	Medicinal purpose
54	Thespesia populnea	Poovarasu	Costal areas Tamil Nadu	Dried fruit Timber Wood Bark Bark leaves Flower	Medicinal purpose For carts, Musical Instruments, bent weeks, Puddles, spokles, boats, Rafter joints Agriculture implementation Beams etc. fuel and tunning Antuseotic used to Treatment such as skin Diseases Scabies ring worm Eczema. Fodder

Sl. No.	Species	Tamil Name	Distribution	Parts uses	Purpose
				Leaves Fruit & Bark	Given yellow dye Yield fiber
55	Wrightia tinctoria	Palai	Throughout Tamil Nadu	Wood Bark seeds Flower Fruit juices	Used in many works Medicine As vegetable Coagulant, Give blue dye

Annexure 7.6 Economic Uses of Various Tree Species in Agro-forestry systems

Trees For Fodder	Trees Used As Green Manure	Trees / Shrubs For Ornamental Purpose	Trees For Industries
Acacia nilotia	Leucaena glauca	Nerium (Nerium odorum)	Alamaram
Albizia lebbek	Neem (Azadartica indica)	Hibiscus	Accasia sp
Anacardium occidentale	Neli (Phyllanthus emblica)	(Hibiscus rosinensis)	Porusa
Anogeissus sp	Casuarinas	Peltophorum ferafineum	Casuarinas
Artocarpus hirsutus	(Casuraina equstifolium)	Poovarasamaram	coconut
Bauhinia racemosa	Eucalyptus	(Thespesia populnea)	EucalyptusJ
Bambusa bambos	(Eucalyptus Glbolus)	Punnamaram	Ackfruit
Musa paradisiaca	Vaathamaram	Calopyllum inophyllum	Guava
cacao	punnamaram	Ashoka maram	Mango
Casuarinas equistifolia	(Calophyllum inophyllum)	(Saraca indica)	Moongil
Ceiba pentandra	Pongamia (Pongamia pinnata)	Delonix regia	Neem
Citrus spp	Thuringi	Cassia fistula	Palm
Elaeis guinensis	Udhaya		Pakku
Eucalyptus globus	Vathamaram		punnamaram
Ficus exasperata	Punna maran		Pithecelobium
Gava (Psidium guajava)	Poovarasu		Reed sandal
Emblica officinalis	(Chloroxylon swietenia)		Tamarindus
Leucaena leucocephala (glauca)	Tamarindus (Tamarindus indica)		Teak
Mangifera indica	Lannea coromandelica		Thikuchimaram
Coconut (Cocos nucifera)			Vagaimaram
Azadirachta indica			Vepalamaram
Murunga (Moringa Oleifera)			udhyamaram
Musa sapientum			
Pala (Artocarpus intergrifolius/ Hererophyllus)			
Piliostigma thonninge			
Pithacelobium dulce			
Sitha (Annona Squamosa)			
Spondias mangifera			
Tamarindus (Tamarindus indica)			
Odhayamaram			
Vathamaram			
Albizia Lebback (Vagai)			
vepala			

Trees Used For Domestic Consumption	Trees For Medicinal Purpose	Trees For Timber
Papaya, Nelli	Alamaram Arasamaram	Acacia nilotica indica
Athi	Athimaram	Acacia tortilis
Banana	Eucalyptus	Accasia auriculformis
Cashew	Guava	Acasia sp
Ceiba pentandra	Neli	Albizia lebbeck
Coconut	Murngamaram	Alagium
Guava	Karuveppila	Etimaram (Nux-Vomica)
Mango	Vatja,ara,	Anacardium sp
Murungai	Neem	Anogeissus latifolia
Curry leaves	Nux-Vomica	ARECA CATECHU
Elantha	Papaya	Artocarpus hisrsutus
Lemon	Palm	Arocarpus occidentale
Jackfruit	Pakku	Bambusa
Tamarind	Punnamaram	Bombax spp
Velampazham	Velikathan, Alingimaram (Alangium)	Porusu
Sitha	Thurungi (Albizia anova)	Casuarinas
Naval	Sitha	Coconut
Sapota	Sapota	Ceiba sp
Pakku	Tamarindus	Dalbergia latifolia
pithecelobium	Vagai	Diospyros melanoxyton
	vathamaram	Elanthai
		Ettimaram
		Eucalyptus
		Ficus sp
		Gymnema sylvestris
		Guava
		Leucaena
		Mango
		Neem Nux-Vomica
		palmyrah
		Pakku
		Poovarasu
		Pongamia
		Pethecelobium
		Punnamaram
		Prosopis juliflora
		Pterocarpus marsupium
		Red sandal
		Silver oak
		Sitha
		Tamarindus
		Tectona grandis
		Thuringi
		Ulmus spp
		Odhayamaram
		Velamaram
		Vathmaram
		Vepala
		Xylia xylocarpa

**Annexure 7.7 Details of Membership in Existing District Tree Growers Association
(as on 31/07/2010)**

Sl. No.	District	No. of male member	No. of female member	Total member
1	Coimbatore	296	48	344
2	Pudukkottai	172	38	210
3	Erode	150	20	170
4	Tiruvannamalai	120	30	150
5	Dindigul	117	27	144
6	Salem	130	10	140
7	Kancheepuram	125	5	130
8	Kanniyakumari	85	35	120
9	Tirunelveli	73	0	73
10	Cuddalore	60	5	65
11	Thanjavur	60	4	64
12	Dharmapuri	63	0	63
13	Perambalur	48	2	50
14	Vellore	48	1	49
15	Ramanathapuram	35	10	45
16	The Nilgiris	31	11	42
17	Villupuram	38	2	40
18	Thiruvallur	35	3	38
19	Thoothukudi	32	0	32
20	Madurai	30	0	30
21	Karur	20	5	25
22	Theni	16	4	20
23	Namakkal	15	0	15
24	Thiruvarur	11	0	11
25	Nagapattinam	11	0	11
26	Chennai	0	0	0
27	Krishnagiri	0	0	0
28	Tiruchirappalli	0	0	0
29	Virudhunagar	0	0	0
30	Sivagangai	0	0	0
31	Ariyalur	0	0	0
32	Tiruppur	0	0	0
	TOTAL	1821	260	2081

Annexure 7.8 Training on GIS and MIS

1. Training on basic Computer knowledge

Considering the importance of usage of computers in day to day functioning of the office related activities it is imperative to have computer literate staff at all levels. The basic training on computer covering practical usage of office automation software with a focus on developing preliminary understanding of database and operations in excel. The 5 days hands on training need to be made mandatory at all levels for staff not conversant with computers and its functionalities from PMU, Division, Circle and Range. The training should also include a session on communication through e-mails.

2. GPS based Survey and Mapping

Considering the need for effective monitoring mechanisms and the need for quality location specific data collection from the field, it is imperative to organize more focused trainings for the field staff of Range and Beat level covering GPS based field survey data collection aspects, understanding about projection system, operations of GPS instrument, data quality aspects with respect to GPS survey, downloading the GPS data into computers using GPS downloading software, data conversion, data exporting, printing etc.

3. Training on GIS

(1) Training at Geomatics Centre

Although hardware and GIS software has been provided to all Circles and Divisions but the GIS software is not being used due to lack of technical manpower at Circle and Division. It is being suggested that two persons (with relevant qualification – MCA/Diploma in Computers as 1st Priority and in case if the person with required qualification is not available then Masters and Bachelors in Science/Geography as 2nd Priority with basic understanding about GPS/GIS aspects) from each circles should be handpicked for minimum 3 weeks dedicated hands on preliminary GIS training course at Geomatics Centre.

(2) National Level Training

The Circle level staff being trained for 3 weeks at Geomatics Centre shall be sent in 2 batches to an institute of national repute, such as NRSC at Hyderabad; IIRS at Dehradun, FSI at Dehradun on GIS/Remote Sensing Application in Forestry, for 3 months certificate course. After being trained, the trained staff should be positioned at respective Circle office for assistance in survey and mapping activities mainly related to GPS data collection and to provide hand holding and day to day support and feedback on the quality aspects to the field staff.

(3) Establishment of Regional Centre for Training

The Training institute at Coimbatore is well established with required infrastructure under TAP-II and is well suited and conducive location for conducting trainings because of inherent advantages such as equidistant from northern, eastern and southern part of the state. The centre is equipped with facilities such as lecture halls, Auditorium, Hostel facility for 180 persons, Rest House, Library with around 13500 books, 20 computers (although they are 7 to 8 years old), projector, OHP etc. The centre needs to be equipped with the required computer hardware and software so that GIS based trainings could be arranged in the centre.

(4) National Level Exposure visit cum training on FMIS

Staff from Geomatics Centre and concerned staff from Circles shall be sent on 1 weeks training cum exposure visit on FMIS to Chhattisgarh or Madhya Pradesh forest Department or similar centre in India having functional FMIS with sound GIS database.

4. Trainings on MIS

(1) Paper based 'Data Recording Registers' and 'Monthly Reporting Formats

Training on paper based 'data recording registers' should be provided to foresters for proper maintenance and timely recording of information on prescribed registers. The data need to be maintained for individual site on day to day basis. The trainings should also cover aspects related to filling up of 'Monthly Reporting Formats'. These trainings need to be arranged for project staff at both Range and Division level including Computer operators at Range and Division level. The trainings should cover aspects like familiarization with formats structure, what information need to be filled in, how to fill the progress, who is going to fill the data, when to report the progress etc. These trainings need to be arranged at Division level.

(2) Training on Web based MIS Software

After the development , trial and testing of project specific Web-based MIS software, intensive 3 days hands on trainings need to be arranged for staff from PMU, Circle and Division, initially covering computer operators, clerical staff, staff conversant with computers etc. The trained staff from respective Circle and Division shall become a Master Trainer for conducting trainings at their respective Circles/Divisions and to test run the software at their respective office for a month.

A two days capsule course should be conducted after one month of the trial run of the software and practice of data entry by respective staff, to assess the understanding developed by the staff got trained (who attended the earlier course) and to solve the problems or queries reported by the participants before final launching of the software.

(3) Exposure visit to Chhattisgarh or Madhya Pradesh

Chhattisgarh Forest Department is having one of the web-based and functional FMIS. In order to develop and establish a simple and functional FMIS for TNFD, it is suggested that concerned top officials from TNFD (CCF, APCCF) should visit FD Chhattisgarh for getting an overall idea of functional FMIS system. This would go a long way in developing FMIS for TNFD through state Government Funds.

**Tamil Nadu Biodiversity
Conservation and Afforestation
Project
(TN-BiCAP)**

**Monitoring & Evaluation Plan and
Results Framework**

September 2010

Prepared by:

Dr. Sanjay Verma, M&E Specialist

**Preparatory Survey on Tamil Nadu Sustainable
Natural Resources Management Project**

Glossary

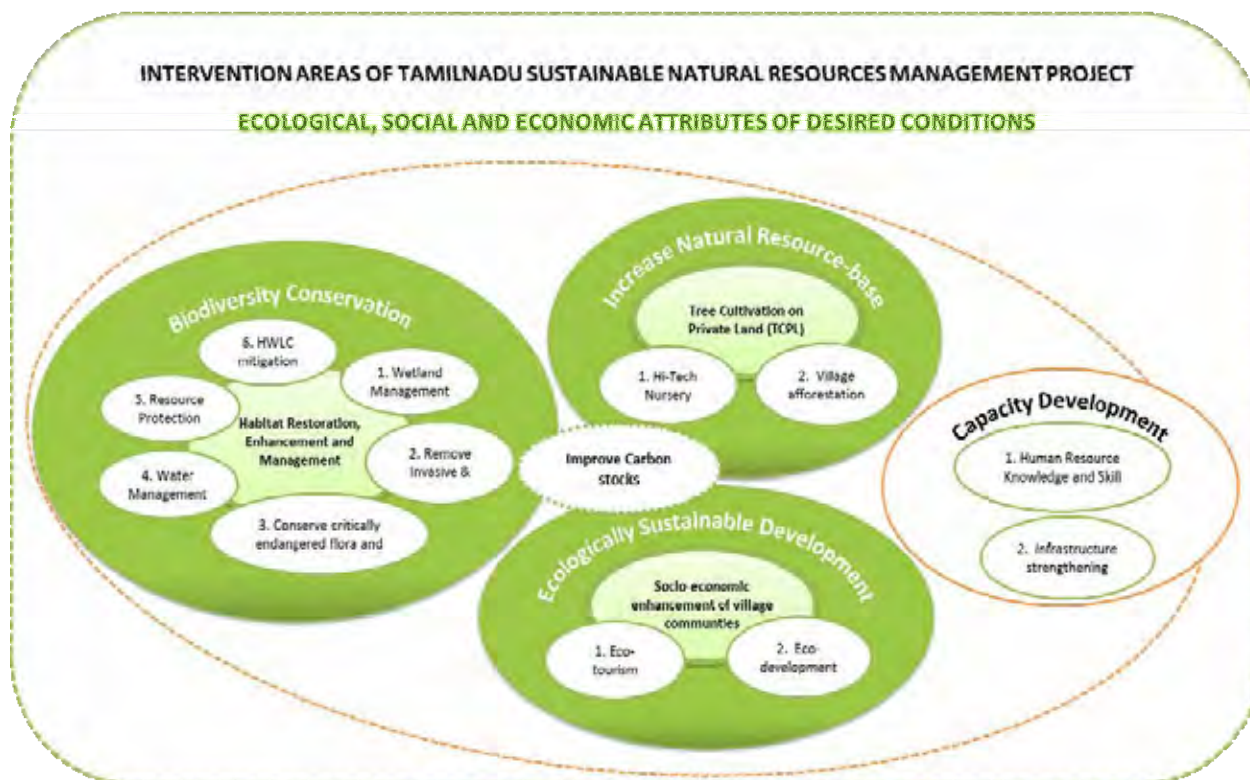
Biodiversity	Biodiversity is an umbrella term encompassing all species of plants, animals, and microorganisms, and the variation in ecosystems and ecological processes of which they are part. It is a multi-dimensional concept, difficult to define in an operational sense and difficult to measure.
Biodiversity Monitoring	<p>Monitoring biodiversity is not as simple as monitoring other environmental characteristics, such as air or water quality for which there are well established standards or benchmarks. The biodiversity values of an area undergo considerable fluctuations as a result of natural processes.</p> <p>These natural variations need to be identified and monitored so that they can be taken into account in evaluating the results of project interventions. Moreover it is often difficult to assess the impact of project activities on biodiversity in the short term. Therefore, monitoring must rely on indicators of likely success rather than absolute measurements of biodiversity.</p>
Project Monitoring	Project monitoring is the collection of data prior to, and during, the project. These data, when analyzed, pinpoint progress or constraints as early as possible, allowing project managers to adjust project activities as needed. Monitoring is a continuing process throughout project implementation and often extends beyond project completion.
Measuring vs. Monitoring	There is an important difference between measuring biodiversity (e.g. number of species present) and monitoring changes in biodiversity. Measuring biodiversity provides a snapshot of biodiversity at the time of the measurement. It is useful for comparing relative biodiversity values of different areas (i.e. is one area more species-rich than another). Monitoring is measuring trends over time to determine whether management is having the desired result or needs to be changed.
Evaluation	Monitoring provides the basis for evaluation, which involves answering two questions: “has the activity met its objectives?” and “what accounts for its level of performance?” Evaluation tells implementers whether they are moving toward, or away from, project or management goals, and why. It provides feedback to adjust future management interventions.
Indicator	Indicators can be quantitative or qualitative variables which can be measured or described and which, when observed periodically, demonstrate trends in characteristics overtime.
Periodic Reviews	Designed to review progress and performance, and to anticipate likely effects of the project, are carried out during the project implementation period.
Mid-term and terminal Impact evaluations	<p>Are carried out jointly at mid-term and at the end of the project by the government and the funding agency, with the government and the PMU having particular inputs.</p> <p>Impact evaluations, measuring direct and indirect project impacts, are normally undertaken at completion or several years after final disbursement by implementing/ funding agencies or by independent authorities.</p>

Background

Tamil Nadu Biodiversity Conservation and Afforestation Project (TN-BiCAP) is designed on the assumption that project interventions, in general will lead to conserve biodiversity together with ameliorating ecosystems and sustainably use these resources to facilitate alternate livelihoods, and to increase natural resource base outside recorded forest area. Monitoring and Evaluation (M&E) is the mechanism to assess whether the project is meeting its targets, objectives and goal.

M&E being integral part of project management will require adequate resources, including budget, institutional capacity, clear institutional responsibilities, and reporting mechanisms. It will be important to build capacity and incentives to collect, use, maintain and analyse data for monitoring and evaluation. Since, M&E will require additional capacity, work and budget beyond the lifetime of the project it is important to TNFD develop phase-out strategy so that M&E plans can be resourced sustainably.

M&E plan and Results framework is suggested as integral elements of the project to provide information to management on whether project interventions are successful in achieving project objectives, and on how social, economic and institutional factors are affecting project performance.



Though scoping of monitoring and evaluation has been done during project preparation, however it would be important to develop detailed terms of reference for the M&E activities to be outsourced. As a support activity costing under M&E/ project management components provides a basis for operationalizing suggested M&E plan as soon as possible after project commencement. Further, based on experience gained during project implementation and field testing, improvement and refinement of the M&E plan could be done, as necessary, to make M&E plan more efficient. The plan include estimate of costs for undertaking M&E processes / activities, and identifies training and capacity building needs for the project staff and institutions responsible for this M&E.

Approach

Considering the capabilities of the staff at all operational level, and particularly at field level, it is important to have an M&E plan that is simple, inexpensive, and sustainable in terms of the financial, institutional, and technical resources available.

The most important aspect of any M&E in a project is the choice of suitable and meaningful indicators. Clearly identifying the assumptions for project interventions will help identify indicators for monitoring both changes in threats, and the effectiveness of project interventions in mitigating those threats. Most importantly, indicators must be practical and realistic, and should, whenever possible, be meaningful at both the state and site level, as well as consistent with the main objectives/ goal of the project.

Identification of relevant indicators should, as much as possible, involve those communities and institutions likely to be involved or affected by project interventions. The identification of indicators and appropriate sampling regimes should also take into account existing monitoring programs and data sets at the local and state level, capacity at these levels, and the need to establish agreed sampling and recording protocols at the state level. Consistency of monitoring approaches across local areas and protected area systems should have a high priority.

M&E plan, that considers four set of indicators viz., (1) Outcome indicators, (2) Effect indicators, (3) Operation indicators, and (4) Monitoring indicators and includes MIS and GIS initiatives proposed under the project, is a detailed program of work which defines what monitoring activities will take place, when and by whom, and how that information will feed back into management decisions.

Monitoring of biodiversity is not the same as measuring biodiversity. Measuring biodiversity provides a snapshot of biodiversity at the time of measurement. Monitoring is a continuing process which allows one to identify changes and trends over time so that they can assess whether interventions are achieving biodiversity goals and adapt management accordingly, and thus would require a comprehensive biodiversity baseline survey. It would be good approach for short duration project to focus on monitoring trends rather than measuring absolute values.

Most threats to biodiversity result from human activities which, in turn, depend on social and economic factors. Monitoring of socioeconomic factors, therefore, is an important part of biodiversity M&E. However, it is necessary to recognize that the relationships between biodiversity health and the socioeconomic characteristics of human groups causing impacts are far from clearly established. In fact they are likely to vary from one location to another. This has been taken into account in designing M&E plans and particularly in identifying and interpreting socio-economic indicators. Similarly, a range of institutional factors can impact on biodiversity health and the effectiveness of biodiversity management and should also be monitored.

In this project process monitoring has not been visualized as it requires commitment, institutions and systems in place at lowest level for all component activities, and given scatter of project areas, in and outside forest boundaries, it would require more rigorous efforts and resources. Therefore, it is particularly important to define the spatial and temporal scales of monitoring activities. Because biodiversity management deals with ecological processes which are generally long-term (e.g. changes in numbers of a population of a key species) changes resulting from management interventions may be slow to emerge, sometimes beyond the project timeframe.

Key Assumptions and Likely Risk

The key assumptions made while suggesting the M&E plan and Results framework are:

- The present project design would be adopted with little or no change.
- State government and Forest Department would work in a facilitation and capacity building mode.
- PMU will be responsible for overall project planning and management of TN-BiCAP
- Target group (community based organizations -CBOs) like VFCs/ EDCs/ FIG, SHGs) will be actively involved and play a key role in planning, implementing and O&M of the project interventions.
- Support organizations (NGOs/ institutions for social intermediation and technical guidance) will be in place to provide mobilization, planning, and capacity building and support to the target group.
- Project / forest staff will be receptive and M&E System will be owned by PMU/ FD.
- Activities are finalized around the indicators designed for the M&E system.

The likely risk is that in case the eventual project design is considerably different from the one assumed, the M&E system would need to be redesigned, pilot tested and operationalized.

Monitoring and Evaluation Plan

Overall Framework

The emphasis of the project M&E system will be to monitor and evaluate project activities in a timely manner in order to (i) track project activities progress, (ii) identify what is working well and what is not and help management during the course of implementation, (iii) evaluate the performance of activities and various institutions, and (iv) estimate project impacts and results on-the-ground. M&E will emphasize stakeholder participation and be designed to facilitate rapid identification of shortcomings and problem areas and facilitate mid-term corrections, where necessary, to project design and/or implementation arrangements to ensure that the project meets its goal and objectives.

M&E by implementing agencies and project stakeholders

M&E will be undertaken in parallel by various entities. Various implementing units viz., forest divisions (Territorial and Wildlife, Social Forestry and Extension), circles, forest research and training institute, line departments, and the PMU will regularly monitor and report the physical and financial inputs and outputs of project activities. To facilitate this, PMU will establish M&E Cell at state level and will deploy a senior forest official having relevant experience and skills as full-time M&E officer, and recruit MIS specialist and GIS specialist. This project specific M&E Cell could be housed within Geomatic Centre of the TNFD. At the division level, PMU will coordinate with the PROJECT RANGES and support organizations (NGOs, institutions etc.) through PROJECT DIVISIONs and Circles in monitoring the activities. The involvement of project beneficiaries, more precisely the CBOs - EDCs, VFCs, FIGs, SHG etc., will also be explored in monitoring and reporting activities at the local level. The CBOs members/ representatives will be trained to use simple tools to monitor project progress and impacts and discuss implications.

The responsibility to manage and analyse data generated during project implementation would be with M&E Cell. PMU will have in-place a web-enable monitoring information system (MIS) to consolidate and manage data received from the various implementation units/ agencies, and to collect its own data. The MIS software would have feature to integrate data with GIS to undertake spatial analysis. In addition, PMU will also develop computerized Financial Management and Accounting System (FMAS), and use it for efficient management of funds and generating statement of expenditures at all operational levels. Data will be used to update the indicators of the project to input into the monthly, quarterly, and annual progress reports. Use of GIS and other modern information tools will help collate, compare, analyse, and visualize the information.

Reporting

PMU will furnish to the JICA quarterly progress reports and annual report at completion of fiscal year. PMU will develop templates for reporting during first six months of project commencement discussing in-house, and if necessary organize workshop to finalize reporting templates, and obtain concurrence from JICA. These reports will include: (a) up-to-date physical and financial expenditure data by components/ sub-components compared to annual and end-project targets; (b) updated indicators of project performance compared to annual and end-project targets; (c) successes and problems encountered during the reporting period, with suggested remedial actions, (d) observation

and recommendations of external M&E agency, and; (e) socio-economic and environmental impacts of the project¹ .

In addition, the Annual Action Plan (AAP) will be prepared and submitted to JICA for information prior to the upcoming fiscal year, and will have synergy with overall project implementation schedule. PMU will establish a system of preparing demand responsive AAP to plan and implement intervention as per situations and capacities with implementation units. To generate a demand responsive AAP, PMU will prepare a timeline, provide necessary guidance and support, and regularly follow-up with lower units to compile annual plan. This process should get initiated at lowest operational level in the month of October and PMU should compile the AAP by February so that after obtaining necessary approvals budget is available from April onwards. Preparing demand responsive AAP would require capacity development of the project staff and institutions at each operational level.

Annual Project Status Report (PSR) for completed fiscal year, Annual Action Plan (for ensuing fiscal year) and Quarterly reports produced will be approved by Governing Body of the society. PMU will on regular basis communicate to JICA all Quarterly Reports, Annual PSRs and Annual Action Plans produced during the project implementation along with the minutes of the meeting of Governing Body that reviewed and approved the reports / plan.

The template of the reports will be designed to follow a clear, logical format with supporting graphics (charts and GIS maps). The reports will be submitted in hardcopy as well as in electronic form to facilitate further analysis and dissemination. The reports will also be accessible in the web-based project monitoring system. The reports will be discussed at the PMU on a monthly basis with key stakeholders and relevant agencies. Annual workshops will be held to discuss the monitoring observations at a higher administrative level in order to facilitate any adaptive management decisions required.

Independent of PMU the M&E agency hired to undertake baseline and impact evaluations will submit: (i) brief quarterly reports summarizing concurrent monitoring observations to the PMU; (ii) annual reports summarizing project M&E of preceding quarters, cross-cutting issues and recommendations, and updated project indicators; and (iii) three comprehensive reports – the baseline survey and the impact evaluations at mid-term and project completion.

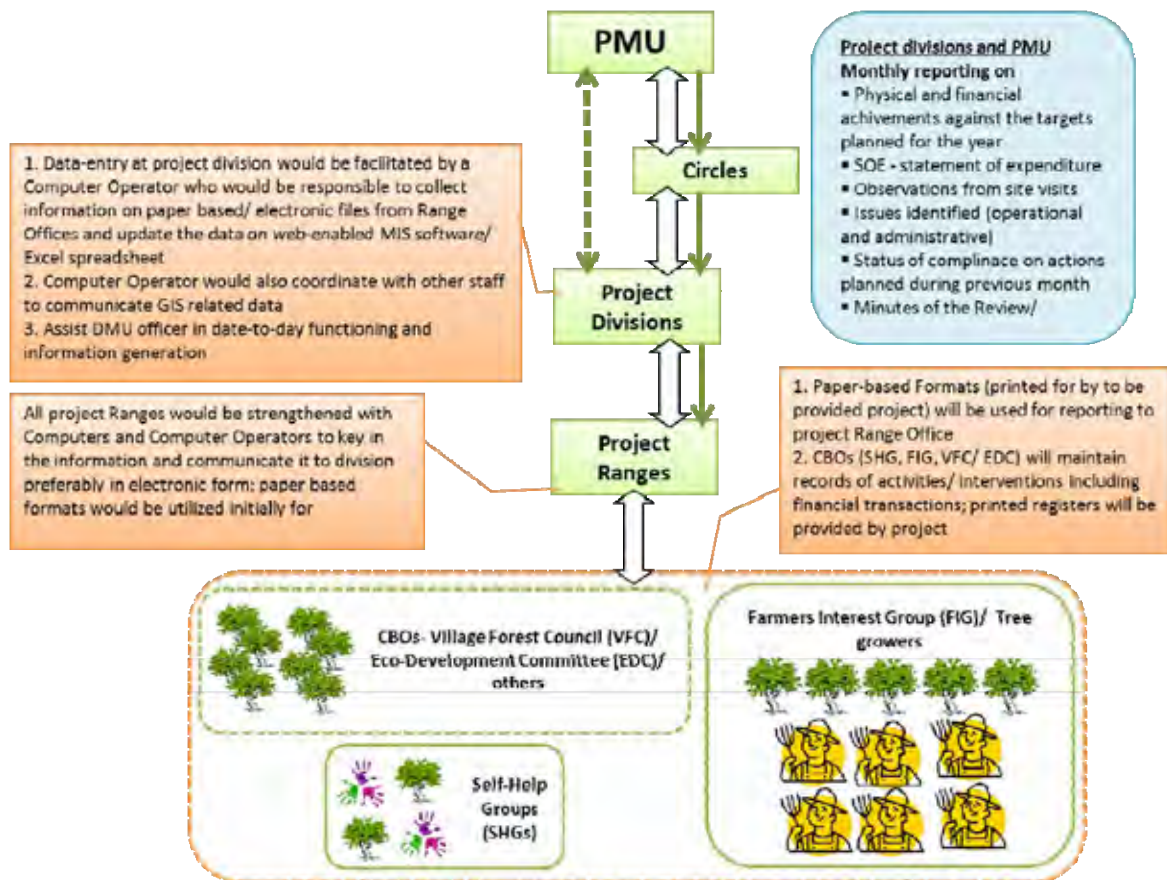
In addition to such M&E reporting, the project proposes to have a Project Completion Results Report (PCRR) developed at project component level to facilitate faster transfer of lessons learned during implementation. The preparation of these component-wise PCRRs will be coordinated by PMU with inputs from the reports submitted by other agencies involved in various studies and the M&E agency. In addition, project will receive regular implementation support/ review missions from JICA, and the project will also receive a formal mid-term review at age of around 5 years (October/ November) from project commencement.

Information Flow and Users

The information would flow back-and-forth from lowest operational level to the PMU, and will be utilized to generate reports indicated in previous section. Figure below illustrates the flow of information and uses at different level of operations.

¹ Section (e) to be included in annual report only referring the Environment and Social Safeguard Plan (refer Table III.5.1 Environmental and Social Considerations) under the project

Figure 1: Information Flow and Users



Results Framework

TN BiCAP requires continuous monitoring and assessment in the project areas, which spreads over entire state, to have the basis for evaluation of the effects of interventions to the end that perhaps may produce substantial measurable results. Biodiversity conservation is an adaptive management process requiring evaluations of social, economic, and ecological conditions and trends that contribute to sustainability and that, therefore, reflect progress towards the biodiversity goals. Thus, monitoring efforts and evaluations characterize key social, economic, and ecological performance measures relevant to the project areas.

Results framework, built primarily on the development objectives of the project, which includes:

1. Conserve biodiversity and restore ecosystems for the well-being of nature and people
2. Increase and sustainably use the natural resources base including Trees Outside Forest and, as appropriate, promote alternate livelihoods, thereby contributing to the reduction of pressure on natural areas.
3. Enhance capacities of forest department, communities and other stakeholders to protect, restore and sustainably manage biodiversity and ecosystems through research, capacity building and sustainable management and development.

Globally, now biodiversity is valued through its impact on the different ecosystems' ability to provide services. In turn, ecosystem services play a crucial role in offering a wide range of benefits, and therefore important steering forces of human well-being. Therefore, ecosystem conservation could be motivated by making the explicit link between human well-being (endpoints) and the underlying, specific processes and functions that generate the services that ultimately deliver these endpoints.

Four result areas have been identified that summarize key impact areas expected from project design and reflect interrelated and interdependent social, economic, and ecological elements of sustainability. These result areas are categorised for vital functions and attributes (biodiversity, ecosystem health, and soil and water management), ecosystem services and human well-being, institutional strengthening, and infrastructure for delivery of multiple biodiversity conservation objectives.

Result Area	Description
RA-1: Biodiversity Conservation	<p>The result area addresses contributions in securing state's heritage of plant and animal species in the project areas. The approach for conserving biodiversity is by ameliorating habitats and ecosystems, and at the same time also attempting to protect resources by controlling incidences of fire, grazing, and vegetative degradation, and by curbing poaching, human-wildlife conflicts with introduction of barricades around potential villages.</p> <p>This result area also addresses the ecological condition (for soil, air, and water) of habitat to protect the physical, chemical and biological integrity; the productive capacity of forest land; water quality and quantity; and opportunities for beneficial uses.</p>
RA-2: Ecosystem services and human well-being	<p>Given the opportunities and settings, suitable uses, and activities designed to make progress towards desired conditions, there are goods and services that come off the land particularly from ecosystems. Key contributions of goods and services include revenue and livelihoods associated with recreation, tourism, amenities, environmental services, and commodities such as NTFPs and the potential for timber production.</p>

Result Area	Description
RA-3: Institutional Capacity	This result area addresses institutional capacity built with communities, support organizations, local institutions/ CBOs, farmers, women and forest department to conserve biodiversity conservation and increase and manage natural resource base.
RA-4: Infrastructure Capacity	This result area addresses infrastructure ability to contribute to the aspirations characterized in the biodiversity conservation and ecologically sustainable development.

Collectively, the result areas provide a monitoring and evaluation (M&E) framework for gauging project progress towards sustaining the multiple uses of its resources in perpetuity and for assessing contributions to social, ecologic, and economic systems in the project area. Desired conditions to be monitored would be logically organized in form of indicators under each result area.

Indicators are basically measures of project progress towards realization of project development objectives. The three project components proposed are: biodiversity conservation; increasing the natural resource base; and capacity development. Pilot on REDD plus has not been considered under the result areas. Hence, the indicators also have to be logically organized in terms of these components. The proposed project results chain (indicators) is given in **Table 1**.

Keeping in view the usage requirements of various stakeholders, the information coming in into the system through indicators are proposed to be presented in four categories that include– (1) Outcome indicators, (2) Effect indicators, (3) Operation indicators, and (4) Monitoring indicators capturing both qualitative and quantitative (physical/ financial) dimension of interventions. While tracking the physical and financial progress on an on-going basis would be a critical project management requirement, monitoring the project progress towards the project development objectives and sustainability dimension of the project intervention would be of immense strategic importance.

The project development objective indicators are largely outcome type of indicators, whereas the physical and financial progress indicators contain both input and output types of indicators. PMU will work to develop the output formats corresponding to input formats to facilitate the process of data collection and entry.

Table 1: Arrangements for Results Monitoring

Outcome Indicators	Baseline	Target Values								Data Collection and Reporting		
		YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	Frequency and Reports	Data Collection Instruments	Responsibility for Data Collection
<ul style="list-style-type: none"> % increase in family-income of target beneficiaries compared to non-beneficiaries from Eco-development ventures 	0%					>15%			>30%	Baseline, mid/ end-term	Surveys	External M&E agency
<ul style="list-style-type: none"> Increased grasslands area 	x ha		>5%		>7%		>15%		>20%	Annual	Report	PMU/ project divisions
<ul style="list-style-type: none"> Improved water retention capacities of water-bodies in natural areas 	x days in June				>5%				>10%	Annual	Report	PMU/ project divisions
<ul style="list-style-type: none"> Increase in cropping intensity 	x%					>10%			>20%	Baseline, mid/ end-term	Surveys	External M&E agency
<ul style="list-style-type: none"> Additional area under plough 	x ha		>10%			>15%			>20%	Annual	Reports; GIS data	PMU/ project divisions
<ul style="list-style-type: none"> Reduction in pressure on natural areas (measure change) 	prior to initiation of activities				>7%				>15%	Baseline, mid/ end-term	Study	Hired agency
<ul style="list-style-type: none"> Increase in family-income of target beneficiaries compared to non-beneficiaries from sale of tree products 	0%					>15%			>30%	Baseline, mid/ end-term	Surveys	External M&E agency
<ul style="list-style-type: none"> Reduction in household 	0%					>15%			>30%	Baseline,	Surveys	External M&E

Outcome Indicators	Baseline	Target Values								Data Collection and Reporting		
		YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	Frequency and Reports	Data Collection Instruments	Responsibility for Data Collection
expenses on fuel, fodder, etc.										mid/ end-term		agency
<ul style="list-style-type: none"> % of household adopting alternate and efficient energy sources 	0%					>25%			>40%	Baseline, mid/ end-term	Surveys	External M&E agency
•												
Intermediate Outcome/ Outputs												
Component 1: Biodiversity Conservation												
<ul style="list-style-type: none"> Established Eco-development ventures 	0%		>25%		>50%		>90%			Annual	Report	PMU/ project divisions
<ul style="list-style-type: none"> Reduction in incidences of fire, poaching and encroachment 	0%		>25%		>50%		>90%			Annual	Report	PMU/ project divisions
<ul style="list-style-type: none"> Reduction in incidences of wildlife destroying agricultural crops 	0%		>25%		>50%		>90%			Annual	Report	PMU/ project divisions
<ul style="list-style-type: none"> Per cent of land cleared of invasive species 	0%	>15%	>25%	>50%	>90%					Annual	Report/ MIS	PMU/ project divisions
<ul style="list-style-type: none"> Proportion of turtle eggs hatched and hatchlings released to sea 	prior to initiation of activities								>0.70	Annual	Report of Turtle hatcheries	PMU/ project divisions
<ul style="list-style-type: none"> Bird species diversity and population sizes of migrant species at BSs 	prior to initiation of activities								>30%	Seasonal	Report/ MIS	PMU/ project divisions

Outcome Indicators	Baseline	Target Values								Data Collection and Reporting		
		YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	Frequency and Reports	Data Collection Instruments	Responsibility for Data Collection
<ul style="list-style-type: none"> Increase in blackbuck population in Vallanadu Sanctuary 	>20%									Annual	Report/ MIS	PMU/ project divisions
<ul style="list-style-type: none"> Operational eco-tourism sites 	0%		>25%		>50%		>90%			Annual	Report/ MIS	PMU/ project divisions
<ul style="list-style-type: none"> % of tribal population benefited by project 	0%					>15%			>30%	Baseline, mid/ end-term	Surveys	External M&E agency
•												
Component 2: Increasing the Natural resource base												
<ul style="list-style-type: none"> Increased tree cover outside recorded forest areas 	0%					>15%			>30%	Baseline, mid/ end-term	GIS	PMU/ project divisions
<ul style="list-style-type: none"> Increased availability of fuel wood 	0%					>15%			>30%	Baseline, mid/ end-term	Surveys	External M&E agency
<ul style="list-style-type: none"> Survival percentage under different models over years by farmers category 	0%	>70%	>80%	>90%						Monthly	Report/ MIS	PMU/ project divisions
<ul style="list-style-type: none"> % of small and marginal farmers covered under TCPL 	0%	>70%	>80%	>90%						Annual	Report/ MIS	PMU/ project divisions
<ul style="list-style-type: none"> % of area owned by small and marginal farmers covered under TCPL 	0%			>60%		>80%				Baseline, mid/ end-term	Surveys	External M&E agency

Outcome Indicators	Baseline	Target Values								Data Collection and Reporting		
		YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	Frequency and Reports	Data Collection Instruments	Responsibility for Data Collection
• Number of tree planted by species and model				>90%						Monthly	Report/ MIS	PMU/ project divisions
• Number of SHGs/ FIG associated with tree plantation				>90%						Monthly	Report/ MIS	PMU/ project divisions
• Area planted by SHGs/ FIG associated under TCPL				>90%						Monthly	Report/ MIS	PMU/ project divisions
Component 3: Capacity Development (including institutional and infrastructure capacity)												
• Number of persons trained by skill and themes	0%		>25%		>50%		>90%			Annual	Report/ MIS	PMU/ project divisions
• % of community institutions (EDC/ VFC) that could raise funds through conversion	0%					>25%			>40%	Baseline, mid/ end-term	Surveys	External M&E agency
• % of Civil Works completed	0%	>25%	>50%	100%						Annual	Report/ MIS	PMU/ project divisions
• Institutions established and strengthen with infrastructure	0%	>25%	>50%	100%						Annual	Report/ MIS	PMU/ project divisions

Monitoring & Evaluation of outcomes/results

Systematic M&E will be carried out under the project to monitor performance of the project interventions, and to ensure that lessons learned are used throughout project implementation.

As the project is being implemented in different forest divisions and on private lands interventions will be completed in a phased manner, the M&E system will enable the project to take any remedial action as project implementation proceeds. M&E system will have following eight key elements, and PMU would ensure to put the system in place.

- 1) Web-enabled Management Information System (MIS) – results to be integrated with GIS
- 2) Computerized Financial Management and Accounting System (FMAS)
- 3) Periodic Reviews and Assessments
- 4) Short Studies
- 5) Baseline and Socio-economic Impact Evaluation Surveys - M&E by external agency
- 6) Participatory M&E by community
- 7) Social Audits including Grievance Redressal Mechanism
- 8) Video and photo documentation

1) Web-enabled Management Information System (MIS)

Web-enabled MIS will be developed with-in first year of project initiation by PMU. Specialized technical agency could be engaged to design and implement a web-based project monitoring system, in case PMU / forest department finds inefficient to develop MIS in-house. MIS operation manual would also be developed for the software MIS prior to commissioning, and will be used to train the project staff at all level of operation. The MIS software would have feature to integrate data with GIS to undertake spatial analysis. The MIS software will be driven by set indicators to be used mainly for day-to-day progress tracking. These indicators will be measurable and objectively verifiable, and will form the basis of all information entering the system. The output reports generated by the system would be organized to give overall perspective of project performance. The information would be collected using paper based input formats and would get fed into the system at FMU/ PROJECT DIVISION level. The information collection would be carried out by the concerned field level project staff, CBOs and other support organizations/ institutions engaged during project implementation.

2) Computerized Financial Management and Accounting System (FMAS)

Financial and accounting policies for the project will developed and included in the Financial Management Manual. These policies will be crucial for ensuring transparency, providing clarity regarding financial aspects to the various stakeholders and finance staff, ensuring uniformity, and enforcing accountability. These policies interalia cover the following aspects: (i) expenditures which would be treated as project expenditures including their classification; (ii) expenditures which would be eligible for reimbursement from the JICA; (iii) provision of advances, and accounting of funds provided; and (iv) project accounting policies. All units of operations will comply with the financial and accounting policies of the project indicated in the Financial Management Manual approved and adopted by the project.

Based on the Financial Management Manual a computerized Financial Management and Accounting System (FMAS) would be developed and adopted for financial management, disbursement as per

annual plans and efficiently compiling Statement of Expenditures (SOEs) for submission to TNFD, state government, Central Aids, Accounts and Audit Division (CAAA) under Ministry of Finance, Department of Economic Affairs and JICA.

3) Periodic Reviews and Annual Assessments

A system of undertaking periodic reviews and annual assessment would be one of the important elements of the proposed M&E system. The periodic reviews are suggested at all phases of the project implementation, viz., during planning, implementation, and operation and maintenance phases. PMU would review the project implementation **every month** utilizing reports generated through MIS and FMAS. System of undertaking such reviews will also be in place at PROJECT DIVISION and circle level. Each Circle and PROJECT DIVISION will monitor the activities against the annual action plan approved prior to March 31 of each year for the following year. These reviews will also be monitored by the M&E Cell at PMU to feedback management, particularly Executive Body and Governing Body.

In addition, PMU would undertake **annual assessment** to be carried out using a set of parameters clearly identified well in advance. Concurrence on these parameters will be obtained from Governing Body prior to initiating this exercise. This would be an annual exercise that would be jointly undertaken by a team constituted at Circle level by PMU. This team would have representation from PMU and community institutions as well. This team would be supplemented by existing Formulation, Evaluation, Monitoring and Statistics (FEMAS) wing staff at state level that would help the team to comprehensively undertake the reviews. The outcome of this exercise would be utilized by PMU / Governing Body to improvise strategy and make policy changes, and would get reflected in the annual reports.

Case Studies: While undertaking the annual assessments, where there is evidence of interesting results in specific areas of the project's work, or particular innovations which led to lessons being learned, then the project will document the experience following case-study method. Such case studies will be utilized by the project as learning material and during knowledge events, updating training modules/ courses and developing IEC material.

4) Short Studies

The project will require conducting short duration studies (2-3 months or less) around themes e.g. factors effecting performance of community institutions engaged in eco-tourism/ development activities, effectiveness of the capacity development initiatives, performance of various institutions etc., to develop understanding and identify casual factors for issues emerging out of regular M&E system. However, topics and themes for such studies will not limit to suggested themes, and will be decided by PMU during the project implementation. Tentative budget has been worked out to commission eight such short studies. Other studies that would input to project management are listed under different project components.

5) Baseline and Socio-economic Impact Evaluation Surveys – M&E by external agency

The project will enlist the services of an independent external M&E agency for the duration of the project, to monitor the progress of project activities, and carry out periodic impact evaluations at various intervals (annually, mid-term, end of the project). The M&E agency will prepare and

undertake a baseline survey with collaboration of the project units/ forest department, collect data on the key project indicators using agreed upon (with PMU) statistical sampling from project sites/ areas and districts under the project, and assist with documentation for project reporting and lessons learned. These independent studies would focus on socio-economic dimensions of the interventions planned mainly under two project components viz., Ecologically Sustainable Development and Tree Cultivation on Private Land (TCPL). Terms of reference for the M&E agency (including the questionnaire and formats of the baseline surveys) will be prepared, and procurement initiated for the M&E agency to be in place early in the first year of project implementation.

Baseline and Evaluation surveys

The Baseline for the project will be developed by PMU with inputs from surveys and analysis from the M&E agency. Baseline will also capture situations in control villages for making comparisons during evaluations exercise. Information on some of the more challenging indicators (e.g. family income, land holding size with tree growing farmers, additional income from interventions, capacity built etc.) will be gathered from survey data and refined as necessary during the early stages of the project but, prior to initiation of project interventions. The focus of this exercise will be to track the indicators specified in **Table 1** as well.

Sound methodology for analysis should be worked out prior to undertaking baseline survey, and sampling frame will be designed to capture situations and variability across project implementations sites. Follow up surveys will use same households and same villages, to the extent possible.

Sample size for ESD intervention in proposed 137 villages has been suggested as 20 villages (15 target and 5 control), and for TCPL 96 villages (72 target and 24 control), and accordingly cost has been worked out. However, sample size could be re-examined at the time of implementation to ensure that programme impacts on different segments of the population and community as a whole are statistically meaningful and procedures for use of control households and villages to isolate the impacts of other programme interventions that have taken place in these villages over the timeframe of the project.

Surveys will also be carried out at mid-term and post project completion in the same areas/ sites/ households to allow for an accurate evaluation of project impacts on targeted areas and beneficiaries. To enable comparative assessment of a with and without project situation, as opposed to the more standard before/after project situation, the impact assessments and analyses will collect and use statistically robust comparable data from selected non-project areas also. Both primary data collected through sample surveys and spatial data would be utilized for analysis and bring out findings. Appropriate statistical tools and techniques, graphs/ visuals should be utilized for present the findings. Preparation of evaluation studies for different components will be an on-going process resulting in a mid-term review, and a final project completion (end-term) review.

6) Participatory M&E

It is important that the project has a well-developed system in which community institutions, both individually and collectively, can monitor and review the performance of interventions regularly and recommend changes in its approaches based on this exercise. A mechanism will be established which allows community institutions to periodically compare and review the progress being made project interventions, discuss common constraints and identify possible solutions and new ideas in relation to project approaches and policy. Annual Plan by community for ensuing year, based on the micro-plan, would be an opportunity to incorporate changes/ improvise strategy.

Basic participatory monitoring and evaluation system will consist of an agreed process, and these mechanisms could be built into the community organizing and micro-planning processes, but it will be critical to ensure that the community members arrive at their own conclusions regarding performance including that of the project staff, without being influenced by local actors such as foresters, beat rangers, NGO facilitators etc.

A caution is required that such a system should get evolved by community themselves rather than be project-driven. To ensure that it happens initial hand-holding and capacity development on participatory M&E tools and processes, both for community representatives and project staff, would be required.

7) Social Audits and Grievance Redressal Mechanism

Social audit of the interventions in the project areas will be carried out by the community institutions along with the project staff every six-month during the entire project implementation period. Community institution representatives/ members and project staff at field level will receive training in these aspects. Micro-plans prepared by these community institutions would form the basis of undertaking social audits once in six-months. The results of Social Audits would be compiled by FMU staff and community representative who participated in the exercise, and would submit the findings to PROJECT DIVISION for action on identified issues.

The GoTN already has in place a TN Transparency in Tenders Act, 1998, which provides for transparency in procurement, and provisions for appeal and disclosure of information at all stages of the procurement process. The recent enactment of the Right to Information Act (RTI) has created additional opportunities for enhancing transparency and accountability. Arrangements under this project will make use of this opportunity to enhance disclosure of information and facilitate civil society partnership resulting in increased responsiveness. The key elements of the strategy that PMU will follow will include:

- a) Enhance disclosure of information utilizing project website;
- b) Facilitate civil society involvement for project implementation for social intermediation and other support
- c) Develop a credible system to handle comments, suggestions and grievances
- d) Define clearly incentives and remedies available
- e) Develop monitoring indicators for compliance to the above and for impact on outcomes

8) Video and photo documentation

TNFD has been using this approach to document pre and post-intervention situations. This good practice would be continued under TN BiCAP. Effort would be made to synchronize location of photograph, videoing the process (small clips) and GPS coordinates at two time-durations. M&E Cell would be responsible to maintain repository of such images, clips and all such documents, reports and information produced during the project period.

M&E Capacity Development

Project will have a sound capacity development strategy to achieve project objectives and as well capacitate stakeholders in project implementation: To ensure that M&E system function efficiently

greater focus is required to build capacity on project management, monitoring and evaluation tools and techniques, and software developed and/ or used for project at all level of operations.

Training areas/ topic	Target group	Module duration	Location
<ul style="list-style-type: none"> MIS software 	Project staff at PMU, project divisions and ranges	2-3 days	In-situ/ In-house
<ul style="list-style-type: none"> Financial Management for project Double-accounting system 	Project staff at PMU, project divisions and ranges	2-3 days	State/ outside state institutions
<ul style="list-style-type: none"> FMAS software 	Project staff at PMU, project divisions and ranges	2-3 days	In-situ/ In-house
<ul style="list-style-type: none"> Preparing demand responsive annual plan Project management tools & techniques 	Project staff at PMU, project divisions and ranges	2-3 days	In-situ/ In-house State/ outside state institutions
<ul style="list-style-type: none"> Monitoring & Evaluation (M&E) techniques Data analysis using statistical tools and techniques 	Project staff at PMU, project divisions and ranges	2-3 days	State/ outside state institutions
<ul style="list-style-type: none"> Participatory M&E tools and techniques 	Project staff at PMU, project divisions, ranges and community representatives	5 days	State/ outside state institutions
<ul style="list-style-type: none"> Developing community based M&E for eco-development enterprises, eco-tourism, tree growers etc. 	Project staff at PMU, project divisions, ranges and community representatives	2-3 days	In-situ/ In-house
<ul style="list-style-type: none"> Documentation/ writing reports including case studies 	Project staff at PMU, project divisions and ranges	2-3 days	State/ outside state institutions
<ul style="list-style-type: none"> Contract management/ procurement 	Project staff at PMU, project divisions and ranges	2-3 days	State/ outside state institutions

M&E Cost

To put proposed M&E system in action cost is supported from the project. Based on the suggested M&E system total cost has been worked out as **Rs.3,20,24,200** and detailed in Table-1 in subsequent page.

Phase-out strategy

PMU will develop a phase-out strategy to continue monitoring results beyond the project life. This would require TNFD to identify funds to support M&E system including manpower, and M&E Cell created and housed with-in Geomatic Centre.

Table 1: M&E Cost

Particulars	Unit	Quantity	Unit Rate (Rs.)	Yr.1	Yr.2	Yr.3	Yr.4	Yr.5	Yr.6	Yr.7	Yr.8	Total Amount (Rs.)
1) Web-enabled Management Information System (MIS)				10,70,000	7,20,000	7,20,000	7,20,000	7,20,000	7,20,000	7,20,000	7,20,000	61,10,000
a) Software development cost (additional modules only)/ 1	modules	7	50,000	3,50,000								3,50,000
b) Maintenance of MIS software/ 2	person	4	15,000	7,20,000	7,20,000	7,20,000	7,20,000	7,20,000	7,20,000	7,20,000	7,20,000	57,60,000
2) Computerized Financial Management and Accounting System (FMAS)				2,00,000	-	-	-	-	-	-	-	2,00,000
a) Software development cost (additional modules only)/ 3	modules	4	50,000	2,00,000								2,00,000
b) Maintenance of FMAS software/ 4		0	-	-	-	-	-	-	-	-	-	-
3) Periodic Reviews and Assessments				8,88,000	8,88,000	8,88,000	8,88,000	8,88,000	8,88,000	8,88,000	8,88,000	71,04,000
a) Reviews/ 5	month	12	2,000	2,88,000	2,88,000	2,88,000	2,88,000	2,88,000	2,88,000	2,88,000	2,88,000	23,04,000
b) Annual Assessment / 6	village	10	5,000	6,00,000	6,00,000	6,00,000	6,00,000	6,00,000	6,00,000	6,00,000	6,00,000	48,00,000
4) Studies				2,50,000	2,50,000	2,50,000	2,50,000	2,50,000	2,50,000	2,50,000	2,50,000	20,00,000
a) Studies under Biodiversity Conservation/ 7												
b) Studies under TCPL/ 8												
c) Studies under Ecologically Sustainable development (ESD) / 9												
d) Short studies/ 10	studies	8	2,50,000	2,50,000	2,50,000	2,50,000	2,50,000	2,50,000	2,50,000	2,50,000	2,50,000	20,00,000
5) Baseline and Socio-economic Impact Evaluation Surveys				24,40,000	1,20,000	1,20,000	1,20,000	36,00,000	1,20,000	1,20,000	36,00,000	1,02,40,000
a) Baseline survey / 11	village	116	20,000	23,20,000								23,20,000
b) Mid-term/ End-term Evaluation / 12	village	116	30,000					34,80,000			34,80,000	69,60,000
c) Quarterly Concurrent monitoring and reporting/ 13	Quarter	4	2,500	1,20,000	1,20,000	1,20,000	1,20,000	1,20,000	1,20,000	1,20,000	1,20,000	9,60,000
6) Participatory M&E by community / 14								15,41,100				30,82,200
7) Social Audits including Grievance Redressal Mechanism / 15												
8) Video and photo documentation / 16												
Total Cost (Rs.)				68,00,100	23,89,000	23,89,000	23,89,000	74,10,100	23,89,000	23,89,000	58,69,000	3,20,24,200
Assumptions												
/1 Developing 7 modules; Biodiversity Conservation, TCPL, Ecodevelopment, Capacity Building, Civil Works, Procurement (of Goods & Services), and Analytical Reports												
/2 Service engineer cost at Rs.15000 per month @ one person per three circles												
/3 Developing 4 modules; Advances and Payments, Budgets and Expenditures by Components, SOEs, Financial Reports												
/4 Service engineer cost is included in 1 (b)												
/5 Reviews at Circle level; every month one day exercise; all 12 circles to review component-wise progress; cost includes event and documentation cost												
/6 Annual Assessment at Circle level; 2 days exercise in 10 representative project villages selected randomly; all 12 circles to undertake assessment on pre-determined parameters approved by Governing Body; cost includes event and documentation cost												
/7 Biodiversity studies (xx nos.); cost included in main cost tables												
/8 TCPL studies (xx nos.); cost included in main cost tables												
/9 ESD studies (xx nos.); cost included in main cost tables												
/10 Short studies @ one per year for developing understanding on generic issues coming across project implementation												
/11 Assuming representative sample villages (target and control) would be selected; 15 target and 5 control out of total 137 villages (39+42+56) planned for ESD interventions, and 72 target villages for TCPL @ 6 per circle and 24 control villages @ 2 per circle												
/12 Same villages with detailed scope of works at two stages - mid-term and end-term												
/13 Monitoring of activities at random being implemented during the year visiting sites, implementing units (DMU/ FMU and Circle); all 12 circles												
/14 Cost of providing printed Registers for community institutions/ FIG; 137 villages under ESD and around 5000 villages under TCPL; twice in project life												
/15 Social Audits every six-month in each ESD village based on the action plans drawn out of Micro-plans; cost towards organizing one-day event and refreshments												
/16 Cost of providing Handycam and Digital Camera has been mentioned under support activity												

Annexure 7.10 CONSTRUCTION OF PMU BUILDING AT VELACHERRY, CHENNAI

Area requirement for PMU Building, Chennai

Sl. No.	Purpose	No. of person/s	Area required per person (in Sq. mt.)	Total (area in Sq. mt.)
1	IFS Officers	20	30	600
2	Second Level Officers	15	15	225
3	Sections	25	40	1000
4	Library	1	250	250
5	GIS Cell	1	500	400
6	MIS Cell	1	250	150
7	Conference Hall	1	400	300
8	Auditorium	1	750	650
9	Mini Conference Hall	1	100	100
10	Visitors Hall	1	30	30
11	Reception Hall	1	20	20
12	Visitors Rest Room	1	200	200
13	Record Room	1	800	800
14	Staircase / Lift / Open area	1	1,500	1,275
				6,000

Specifications:

1. Necessary land has been identified in Velacherry and is available.
2. The land will be 25000 Sq. mt. The built up area will be about 6,000 Sq. mt. in Ground + 5 floors.
3. Parking of vehicles will be done in underground and ground floor.
4. The building will be an eco-friendly green building.
 - ☞ Fly ash bricks will be used in construction.
 - ☞ CFC / LED lamps will be used lighting.
 - ☞ Central poly carbon dome will be provided for natural lighting and ventilation.
5. Automatic fire protection system will be installed as per the National Building Code.
6. Modular work stations with ergonomically designed Furniture not sourced from Natural Forests but made from plantation timber will be used.
7. All sections in the entire office will have computer LAN network and will have internet connection.
8. The officer's rooms will be centrally air conditioned.
9. There will be 3 elevators. There will be three conference halls each with a capacity of 60 / 35 / 20 persons.
10. A high tech GIS lab / A State level REDD+ cell will be located to enable tree growers to get carbon credit.
11. Provision for a pantry / kitchen & cafeteria will be made in the proposed building.

Budget of PMU Building

Budget for PMU Building					
Sl. No.	Item of work	Carpet area (Sq. mt.)	Approximate Rate for Sq. mt	Total Cost	Remarks
1	Construction cost	6,000	12,000	7,20,00,000	
2	False Ceiling	6,000	925	55,50,000	Page 7
3	A.C. Provision (for 50% plinth area)	6,000	5,095	1,52,85,000	Page 8
4	Generator Set (250 KVA capacity)		22,94,000	22,94,000	Page 9
5	Lift – 13 persons capacity 2 Nos. (upto Ground + Four floors)	2 sets	13,95,000	27,90,000	Page 8
6	Mini Conference Hall equipments – public address systems	3 sets	3,83,000	11,49,000	Page 9
7	Intercom with EPABX arrangements upto 300 lines		19,10,000	19,10,000	Page 9
8	Furniture		Lump Sum	75,00,000	
Total				10,84,78,000	
Unforeseen items @ 2.5% of building cost				27,11,950	Page 12
P.S. charges and contingencies				27,11,950	Page 12
Provision towards compensation to be given for the work in which price adjustment clause @ 5.0% of building cost per one year of period of completion				34,71,296	Page 12
Provision towards compensation to be given for the work in which physical contingency @ 10.0% of building cost per Two years of period of completion				1,04,47,800	Page 12
Landscaping works, drainage facilities etc. in the campus (3000 Sq. Mt @ Rs. 300/- per Sq. Mt.)				9,00,000	Lump Sum
Total				12,87,20,996	
SAY				13,00,00,000	

Annexure 7.11
Draft Terms of References of the Consulting Services
For
Tamil Nadu Biodiversity Conservation and Greening Project

1. Scope of the Consulting Services

- (a) Assist PMU in formulating a comprehensive plan of operation for the implementation of the Project;
- (b) Assist PMU in preparation of guidelines and manuals relevant to the project;
- (c) Assist PMU and DMUs in organizing various trainings for the project staff and stakeholders;
- (d) Assist PMU in procuring NGOs, consultants, various resource organizations, construction contractors and other contractors that may be needed;
- (e) Assist PMU in establishing an efficient and reliable system for monitoring and evaluation and in operating such systems for progress monitoring and impact assessment;
- (f) Assist PMU in annual planning and budgeting;
- (g) Provide technical assistance to PMU, DMUs, FMUs and various contractors and NGOs in the execution of their works such as survey, assessment, monitoring, capacity development, community organizing, and micro-planning;
- (h) Review and analyze and recommend improvements in existing policies and guidelines relevant to the project;
- (i) Assist PMU in designing the course module and identification of institutions/ places for international training/ study tours;
- (j) Develop capacity, knowledge, and skills of PMU staff and field officers who play key roles in project activities through technical and managerial assistance; and
- (k) Assist PMU in organizing seminars and workshops.

2. Required Experts and Man-Months

Experts	MM
1. Team leader (International)	13
2. Biodiversity Expert	38
3. Community Development Expert	38
4. Monitoring & Evaluation Expert	22
5. GIS/MIS Expert	20
6. REDD+ Expert	18
7. Training Coordinator	14
Sub-total	163
Supporting Staff	MM
1. Administrative Officer/ Accountant	52
2. Utility man	52
Sub-total	104

3. Specific Tasks of Experts

(1) Team Leader (International)

- (a) Supervise activities of all experts;
- (b) Undertake managerial responsibilities for the consultant team, including preparation of work schedule for the consulting services, preparation and updating of detailed plan of operation for the consulting services, human resources management, accounting and general affair of the consultant team;
- (c) Maintain close coordination with PMU, field offices concerned, and relevant departments of the state government and to assist PMU in coordinating with JICA;
- (d) Assist PMU in preparing annual action plan for project implementation;
- (e) Assist PMU in reviewing, analyzing and recommending improvement of relevant policies of the state government based on the results of project activities and international trend; and
- (f) Assist PMU in monitoring progress of the project and preparing progress reports and documents required by Forest Department and JICA.

(2) Biodiversity Expert

- (a) Assist PMU in procuring specialized NGOs, consultant, research institutions and resource organizations for research, assessment, surveys, and monitoring, related to habitat restoration/ management and mitigating human-animal conflict;
- (b) Assist PMU and DMU in supervising the work of contractors mentioned above and ensuring the quality of their outputs;
- (c) Assist PMU and DMU in compiling outputs of specialized NGOs, consultant, research institutions and resource organizations;
- (d) Assist PMU and DMU in conducting IEC (Information, Education and Communication) activities including drafting materials
- (e) Assist PMU in organizing seminars/workshops on biodiversity conservation including drafting presentation materials;
- (f) Participate in training of project staff and communities as a resource person;
- (g) Assist DMU in strengthening management plans of protected areas based on research, surveys, assessment, and monitoring;
- (h) Assist DMU and FMU in implementing project interventions;
- (i) Assist PMU and DMUs in implementing Children Forest Programme to enhance awareness of children on biodiversity conservation;
- (j) Assist PMU and DMUs in developing IEC materials;
- (k) Participate in training of project staff and communities as a resource person;
- (l) Accomplish the tasks related to the Project as directed by the Team Leader; and

- (m) Prepare brief travel reports and monthly accomplishment reports pertaining to his specialty and submit them to the Team Leader.

(3) Community Development Expert

- (a) Assist PMU in preparing manuals for socio-economic and forest dependency survey and eco-development;
- (b) Assist PMU in procuring NGOs/consultant for TCPL and ecotourism development;
- (c) Assist PMU in selection of target villages for TCPL implementation including preparation of manual;
- (d) Assist PMU and DMUs in supervising the works of NGOs/ consultant;
- (e) Assist DMU and NGOs in organizing communities, identifying feasible eco ventures, and implementing the eco ventures;
- (f) Assist DMU and NGOs in preparing manual for micro-planning for TCPL;
- (g) Assist PMU and DMUs in creating linkages between local communities and local tour operators for offering eco-tour services;
- (h) Assist DMU, NGOs and Tree Grower Societies (TGS) in developing linkages and mechanism for marketing farm-forestry products;
- (i) Assist DMUs in creating and operating Eco tourism Hubs;
- (j) Assist PMU and DMUs in developing IEC materials;
- (k) Participate in training of project staff and communities as a resource person;
- (l) Accomplish the tasks related to the Project as directed by the Team Leader; and
- (m) Prepare brief travel reports and monthly accomplishment reports pertaining to his specialty and submit them to the Team Leader.

(4) Monitoring and Evaluation (M&E) Expert

- (a) Assist PMU in procuring facilities and equipments for M&E, MIS and GIS;
- (b) Assist PMU in procuring contractors for MIS establishment;
- (c) Assist PMU in designing, reviewing and revising a list of project performance indicators for monitoring and evaluation and developing methodologies for verification to each indicator;
- (d) Assist PMU in preparing guidelines and manuals for M&E;
- (e) Assist PMU in supervising the work of above contractors and ensuring the appropriate qualities of their outputs;
- (f) Assist PMU and DMUs in monitoring and evaluating the progress and outputs of project activities and financial disbursement;
- (g) Assist PMU in compiling monitoring data and preparing periodical reports;

- (h) Assist PMU, DMUs and FMUs in field validation;
- (i) Participate in training of project staff as a resource person;
- (j) Accomplish the tasks related to the Project as directed by the Team Leader; and
- (k) Prepare brief travel reports and monthly accomplishment reports pertaining to his specialty and submit them to the Team Leader.

(5) GIS/MIS Expert

- (a) Assist PMU in procuring equipment and software necessary for enhancing GIS unit and MIS establishment;
- (b) Assist PMU in procuring contractor for software development for MIS;
- (c) Assist PMU in supervising activities of above contractor and ensure the quality of outcome in accordance with M&E procedures and requirement of the project;
- (d) Assist PMU, DMU and FMUs in operating MIS;
- (e) Assist PMU in integrating MIS with GIS;
- (f) Assist GIS unit of PMU in developing GIS database, producing maps as required by the project;
- (g) Train staff of GIS unit in maintaining GIS database
- (h) Assist PMU and DMUs in developing IEC materials;
- (i) Participate in training of project staff as a resource person;
- (j) Accomplish the tasks related to the Project as directed by the Team Leader; and
- (k) Prepare brief travel reports and monthly accomplishment reports pertaining to his specialty and submit them to the Team Leader.

(6) REDD Plus Expert

- (a) Assist PMU in selecting a site for implementing a REDD Plus pilot project;
- (b) Assist PMU and DMU in organizing orientation to local communities and stakeholders concerned;
- (c) Assist PMU in procuring NGOs/ consultant to conduct capacity building and in assisting micro-planning of local communities and stakeholders with regard to REDD plus pilot project;
- (d) Assist PMU in devising institutional mechanism and sharing of carbon revenue;
- (e) Assist PMU in developing monitoring framework and protocols in line with national and international level guidelines and protocols;
- (f) Assist PMU and DMU in monitoring forest stock and carbon stock;
- (g) Assist PMU in coordinating with REDD plus Cell at State and National levels;

- (h) Assist PMU and DMUs in developing IEC materials;
- (i) Participate in training of project staff as a resource person;
- (j) Accomplish the tasks related to the Project as directed by the Team Leader; and
- (k) Prepare brief travel reports and monthly accomplishment reports pertaining to his specialty and submit them to the Team Leader.

(7) Training Coordinator

- (a) Assist PMU in conducting training need analysis (TNA) and preparing detailed training plans for project staff;
- (b) Provide technical assistance to the training contractors / resource persons in appropriate module preparation, curriculum designing, training material development, evaluation of training and assessment of training impact on training participants;
- (c) Assist DMUs in supporting and supervising NGO contractors which undertake capacity developing of local project participants including members of EDCs, VFCs, and SHGs;
- (d) Assist DMUs in organizing international and out-of-state training;
- (e) Monitoring the changes of levels of capabilities of project staff members;
- (f) Accomplish the tasks related to the Project as directed by the Team Leader; and
- (g) Prepare brief travel reports and monthly accomplishment reports pertaining to his specialty and submit them to the Team Leader.

Annexure 8.1 Detailed Cost Estimation of Biodiversity Conservation Component

Ref	Activity	Item of work	Unit	Qty	Unit Cost (Rs.)		Cost of Activity (Rs.)		
					w/o Tax	Tax	with Tax	w/ot Tax	Tax
1.1	Habitat restoration, enhancement and management								
BC-1	1.1.1.2 Training (Inland) on wetland management	Specialist (Remuneration)	MM	2	75,000		150,000	150,000	
		Specialist (Travel to site of exposure visit)	Round trip	1	50,000		50,000	50,000	
		Specialist (Travel to site of training)	Round trip	1	25,000		25,000	25,000	
		Training expense/allowance for 3-4 persons x 13 PAs (50 pax) x 7 days	Day	350	1,000		350,000	350,000	
		Exposure visit/travel (50 pax)	Round trip	50	10,000		500,000	500,000	
		Resource material	LS	1	300,000		300,000	300,000	
		Office running costs	Month	2	10,000		20,000	20,000	
		Overhead	10%				139,500	139,500	
		Service Tax	10.3%				158,054		158,054
	Total						1,692,554	1,534,500	158,054
BC-2	1.1.1.3 Wetland participatory management planning	Specialist (Remuneration)	MM	24	75,000		1,800,000	1,800,000	
		Specialist (Travel to site of planning)	Round trip	1	25,000		25,000	25,000	
		Specialist (Travel to BS)	Round trip	1	150,000		150,000	150,000	
		Planning workshops (11 BS)	Day	33	10,000		330,000	330,000	
		Preparation of action plans (11 BS)	LS	1	220,000		220,000	220,000	
		Printing 20 copies of action plan (11 BS)	LS	1	220,000		220,000	220,000	
		Office running costs	Month	24	10,000		240,000	240,000	
		Overhead	10%				298,500	298,500	
		Service Tax	10.3%				338,201		338,201
	Total						3,621,701	3,283,500	338,201
BC-3	1.1.1.4 Implement Wetland action plans	Plant restubq / nesting trees (11 BS)	Sapling	55,000	63		3,481,500	3,481,500	
		Maintenance I year	Sapling	55,000	7		368,500	368,500	
		Maintenance II year	Sapling	55,000	2		88,000	88,000	
		Planting native aquatic plants (11 BS)	Seedling	55,000	35		1,925,000	1,925,000	
		Maintenance I year	Seedling	55,000	7		368,500	368,500	
		Maintenance II year	Seedling	55,000	2		88,000	88,000	
		Introducing fish fingerlings (11 BS) @ 20000/BS/year	Fingerling	1,100,000	1		1,100,000	1,100,000	
			Total						7,419,500
BC-4	1.1.1.5 Monitor water flows, water quality and aquatic vegetation	Registers / data books (13 Pas)	Number	1,092	40		43,680	43,680	
		Water sampling kits / collection bottles (13 Pas) 5 kits/PA	Kits	85	1,000		85,000	85,000	
		Depth measuring poles 5 /PA permanently erected	Poles	85	1,000		85,000	85,000	
		GPS for mapping water spread and marking sampling points 1 / PA	Number	13	15,000		195,000	195,000	
		Testing water samples (monthly in 13 Pas over 8 years)	Samples	1,248	1,000		1,248,000	1,248,000	
			Total						1,656,680
BC-5	1.1.1.6 Monitor fish and bird diversity and abundance	Cast nets for sampling fish 5 / PA	Number	85	2,000		170,000	170,000	
		Infrastructure for storing fish samples (cupboards/racks)	Number	13	25,000		325,000	325,000	
		Consumables - Gloves, forceps, formaldehyde, specimen jars, etc. 1 / PA	LS	1	1,040,000		1,040,000	1,040,000	
			Total						1,535,000
BC-6	1.1.1.7 Routinely survey birds for contagious diseases (eg. Birds flu)	Refrigerator 1/PA (including stabilizer)	Number	13	15,000		195,000	195,000	
		Boxes for transporting samples with cold packs 5/PA	Number	85	1,000		85,000	85,000	
		Dispatch of bird/fish samples for forensic/toxological studies (max. 6 dispatches a year /PA	Sample	624	300		187,200	187,200	
			Total						467,200
BC-7	1.1.1.8 Interpret and display research findings in multi-media for the benefit of the visitors	Literature / Brochures etc. for 13 Pas @500000/PA	LS	13	500,000		6,500,000	6,500,000	
		Computer and accessories for interactive learning	Number	13	500,000	43,500	7,065,500	6,500,000	565,500
			Total						13,565,500
BC-8	1.1.1.9 Geo-referenced data maintained in biodiversity database /GIS	Grant to GIS cell Chennai for additional infras	LS	1			-	-	
			Total						-

Annexure 8.1 Detailed Cost Estimation of Biodiversity Conservation Component

Ref	Activity	Item of work	Unit	Qty	Unit Cost (Rs.)	Cost of Activity (Rs.)		
BC-9	1.1.2.2 Training in management of alien species after field review of species to be removed	Specialist (Remuneration)	MM	3	75,000	225,000	225,000	
		Specialist (Travel to site of exposure visit)	Round trip	1	50,000	50,000	50,000	
		Specialist (Travel to site of training)	Round trip	1	25,000	25,000	25,000	
		Training expense/allowance for 3-4 persons x 14 Pas (50 pax) x 7 days	Day	350	1,000	350,000	350,000	
		Exposure visit/travel (50 pax)	Round trip	50	10,000	500,000	500,000	
		Resource material	LS	1	300,000	300,000	300,000	
		Overheads / office running costs	Month	2	10,000	20,000	20,000	
	Total					1,470,000	1,470,000	-
BC-10	1.1.2.3 Baseline survey of bio-diversity in critical habitats prior to removal of Invasive Alien Species (IAS)	Travel	LS	1	100,000	100,000	100,000	
		Field allowance (for hiring student volunteers / researchers)	LS	1	250,000	250,000	250,000	
		Stationery & other consumables	LS	1	150,000	150,000	150,000	
		Field guide books	Set	26	6,000	156,000	156,000	
		Overhead	10%			65,600	65,600	
		Service Tax	10.3%			74,325	74,325	
	Total					795,925	721,600	74,325
BC-11	1.1.2.4 Manual on management of invasive and exotic species	Preparation of text	LS	1	100,000	100,000	100,000	
		Preparation of illustrations	LS	1	100,000	100,000	100,000	
		Design and Layout	LS	1	100,000	100,000	100,000	
		Typing, formatting, editing	LS	1	100,000	100,000	100,000	
		Translation to Tamil	LS	1	50,000	50,000	50,000	
		Printing 1000 copies	LS	1	200,000	200,000	200,000	
		Overhead	10%			65,000	65,000	
				Service Tax	10.3%			73,645
	Total					788,645	715,000	73,645
BC-12	1.1.2.5.a Phased removal of Lantana, Prosopis from dry forest	Protected Areas	ha	2,380	14,400	34,272,000	34,272,000	-
		Elephant Areas	ha	3,600	14,400	51,840,000	51,840,000	-
		Shola / grassland	ha	1,200	14,400	17,280,000	17,280,000	-
		Aquatic habitats	ha	20	14,400	288,000	288,000	-
	Total					103,680,000	103,680,000	-
BC-13	1.1.2.5.b Phased removal of wattle from shola ecosystem in the hills	Assisted regeneration of shola species in Kodaikanal and Nilgiris	ha	1,200	12,790	15,348,000	15,348,000	-
		1st year maintenance	ha	1,200	3,900	4,680,000	4,680,000	-
		2nd year maintenance	ha	1,200	3,260	3,912,000	3,912,000	-
		Enrichment planting in PAs	ha	2,360	6,048	14,273,280	14,273,280	-
		1st year maintenance	ha	2,360	624	1,472,640	1,472,640	-
		2nd year maintenance	ha	2,360	166	391,760	391,760	-
	Total					40,077,680	40,077,680	-
BC-14	1.1.2.5.c Remove invasive plants after field assessment and biodiversity baseline survey (supplement)	Monitoring impact of fencing and removal of exotics from shola / grassland habitats	ha	40	20,000	800,000	800,000	-
	Total					800,000	800,000	-
BC-15	1.1.2.6 Monitor biodiversity in critical habitats after removal of IAS	Travel	LS	1	100,000	100,000	100,000	-
		Field allowance (for hiring student volunteers / researchers)	LS	1	250,000	250,000	250,000	-
		Stationery & other consumables	LS	1	150,000	150,000	150,000	-
	Total					500,000	500,000	-
BC-16	1.1.2.7 Geo - referenced data maintained on biodiversity database /GIS Cell	Grant to GIS cell Chennai for additional infras	LS	1		-	-	-
	Total					-	-	-
BC-17	1.1.3.2 Undertake status and distribution surveys of 270 endemic species and CR/EN plants in wild	Survey	MM	36	50,000	1,800,000	1,800,000	-
		Report preparation & submission	LS	1	200,000	200,000	200,000	-
		Overhead	10%			200,000	200,000	-
		Service Tax	10.3%				226,600	226,600
	Total					2,426,600	2,200,000	226,600
BC-18	1.1.3.3a Develop species conservation plans for Dugong in Palk Bay (5 years)	Survey of dugong in Palk Bay	LS	1	2,500,000	2,500,000	2,500,000	-
		Survey of sea grassbeds	LS	1	1,000,000	1,000,000	1,000,000	-
		Assess threats faced by the species	LS	1	1,000,000	1,000,000	1,000,000	-
		Prepare status report and action plan	LS	1	100,000	100,000	100,000	-
		Overhead	10%			460,000	460,000	-
		Service Tax	10.3%				521,180	521,180
	Total					5,581,180	5,060,000	521,180

Annexure 8.1 Detailed Cost Estimation of Biodiversity Conservation Component

Ref	Activity	Item of work	Unit	Qty	Unit Cost (Rs.)		Cost of Activity (Rs.)		
BC-19	1.1.3.3b Develop species conservation plants for sea turtles in 8 coastal divisions/districts (5 years)	Survey of sea turtles along coast	LS	1	1,000,000		1,000,000	1,000,000	-
		Assess threats faced by the species	LS	1	1,000,000		1,000,000	1,000,000	-
		Prepare status report and action plan	LS	1	100,000		100,000	100,000	-
		Overhead	10%				210,000	210,000	
		Service Tax	10.3%				237,930		237,930
Total							2,547,930	2,310,000	237,930
BC-20	1.1.3.4 a Implement conservation plans (dugong) including ex-situ measures as appropriate (5 years)	Treatment of injured dugong	Location	15	100,000		1,500,000	1,500,000	-
		Awareness workshop on conservation of dugong	Numbers	25	500,000		12,500,000	12,500,000	-
		Exposure visit (national)	Numbers	50	30,000		1,500,000	1,500,000	-
		Engaging protection watchers	Numbers	500	30,000		15,000,000	15,000,000	-
		Construction of anti poaching sheds	Numbers	20	476,000		9,520,000	9,520,000	-
		Village level one day workshops	Numbers	75	15,000		1,125,000	1,125,000	-
		Marine biodiversity awareness to schools/colleges	Numbers	100	30,000		3,000,000	3,000,000	-
		Coastal ecosystem awareness programmes for children (9 to 15 years old)	Schools	500	5,000		2,500,000	2,500,000	-
		Sign boards	Numbers	250	15,000		3,750,000	3,750,000	-
		Support to local NGOs	Numbers	20	100,000		2,000,000	2,000,000	-
		Total							52,395,000
BC-21	1.1.3.4 b Implement conservation plans (seaturtles) including ex-situ measures as appropriate (5 years)	Clearing of weeds and man made made barriers to nesting	ha	250	10,000		2,500,000	2,500,000	-
		Establishing hatchery in 8 coastal districts	Numbers	200	100,000		20,000,000	20,000,000	-
		Egg collection / protection camps at 5km intervals throughout coast	Numbers	225	40,000		9,000,000	9,000,000	-
		Treatment of injured turtles	Locations	15	100,000		1,500,000	1,500,000	-
		Awareness workshop along entire coastline	Numbers	25	100,000		2,500,000	2,500,000	-
		Training of veterinary doctors	Numbers	10	50,000		500,000	500,000	-
		Exposure visits of FD (national)	Numbers	50	30,000		1,500,000	1,500,000	-
		Engaging protection watchers	Numbers	500	30,000		15,000,000	15,000,000	-
		Purchasing TED	Numbers	500	15,000		7,500,000	7,500,000	-
		Fixing TED to trawlers	Numbers	500	5,000		2,500,000	2,500,000	-
		Village level one day workshops	Numbers	75	15,000		1,125,000	1,125,000	-
		Marine biodiversity awareness to schools / colleges	Numbers	100	30,000		3,000,000	3,000,000	-
		Coastal ecosystem awareness programmes for children (9-15 years old)	Schools	500	5,000		2,500,000	2,500,000	-
		Sign boards	Numbers	250	15,000		3,750,000	3,750,000	-
		Support to local NGOs	Numbers	20	100,000		2,000,000	2,000,000	-
Total							74,875,000	74,875,000	-
BC-22	1.1.3.4 c Conserve ex situ priority endemic, rare and CR/EN plant species in gene pool garden at Nadugani	Collection and raising	Numbers	500	2,000		1,000,000	1,000,000	-
Total							1,000,000	1,000,000	-
BC-23	1.1.3.5 Immunize livestock in periphery of P.A.s and all elephant reserves	Cattle immunization camps / veterinary outpost	Numbers	18	497,000		8,946,000	8,946,000	-
		Immunization programme	Numbers	75	10,000		750,000	750,000	-
Total							9,696,000	9,696,000	-
BC-24	1.1.3.6 Establish database/GIS of threatened and endemic flora fauna based on previous and ongoing research	Review of publications / reports and compilation of information	LS	1	500,000		500,000	500,000	-
		Grant to GIS cell Chennai for additional infrastructure	LS	1			-	-	-
		Workshop to update information (one per year)	LS	5	200,000		1,000,000	1,000,000	-
		Regional GIS database/infra-structure at regional centers	LS	5			-	-	-
Total							1,500,000	1,500,000	-
BC-25	1.1.4 Improve management of water, habitat and herbivores in Guindy National Park	Assessment of carrying capacity of GNP	LS	1	500,000	51,500	551,500	500,000	51,500
		Overseas training for Warden	LS	1			-	-	-
		Remove invasive species	ha	10	14,000		140,000	140,000	-
		Create permanent waterholes	Numbers	1	1,100,685	48,613	1,149,298	1,100,685	48,613
		Improve water storage & supply	Numbers	1	206,750	4,200	210,950	206,750	4,200
Total							2,051,748	1,947,435	104,313

Annexure 8.1 Detailed Cost Estimation of Biodiversity Conservation Component

Ref	Activity	Item of work	Unit	Qty	Unit Cost (Rs.)		Cost of Activity (Rs.)		
BC-26	1.1.5 Improve management of water, habitat and herbivores in Vallanadu Blackbuck Sanctuary	Assessment of carrying capacity of sanctuary	LS	1	500,000	51,500	551,500	500,000	51,500
		Overseas traing for Warden / Field Staff on Black buck management (national)	LS	1			-	-	-
		Create perment waterholes	Numbers	2	1,100,685	48,613	2,298,596	2,201,370	97,226
		Improve water storage & supply	Numbers	2	206,750	4,200	421,900	413,500	8,400
		Clearing scrub to enhance grass cover	ha	40	14,400		576,000	576,000	-
	Total					3,847,996	3,690,870	157,126	
BC-27	1.1.6 Improve availability of water in PAs	Assessment of carrying capacity of sanctuary	LS	16	500,000	51,500	8,824,000	8,000,000	824,000
		Construction of perennial waterholes	Numbers	53	1,100,685	48,613	60,912,784	58,336,283	2,576,501
		Improve water storage and supply	Numbers	53	206,750	4,200	11,180,350	10,957,750	222,600
	Total					80,917,134	77,294,033	3,623,101	
BC-28	1.1.7 Monitor the Impact of Climate change on biodiversity	Marking research plots	LS	6	50,000		300,000	300,000	-
		Baseline survey of biodiversity	LS	6	500,000		3,000,000	3,000,000	-
		Preparation of methodology manual	LS	1	200,000		200,000	200,000	-
		Second survey of biodiversity	LS	6	500,000		3,000,000	3,000,000	-
		Overhead	10%				650,000	650,000	-
		Service Tax	10.3%				736,450		736,450
	Total					7,886,450	7,150,000	736,450	
1.2 Resource Protection									
BC-29	1.2.1 Strengthen resource protection	Supply of solar powered torches / head lamps	Numbers	140	2,000	174	304,360	280,000	24,360
		Train village volunteers (national) @5 training per PA (16 PAs)	Training	80	10,000		800,000	800,000	-
		Annual training fellowship as award	Numbers	70	100,000		7,000,000	7,000,000	-
		Constructing cairns	Numbers	80,000	1,538	117	132,410,000	123,050,000	9,360,000
			Total					140,514,360	131,130,000
BC-30	1.2.1.5 Monitor incidences of fire, poaching and encroachment in PAs	Purchase of GPS	Numbers	200	Included under "3.4.7 GIS gadgets & tools for geomatic center, DMUs and FMUs"				
		Anti-poaching camp building	Numbers	26	Included under "3.3.13 Antipoaching camp building"				
		Providing temporary camping facilities	Numbers	58	68,475	6,525	4,350,000	3,971,550	378,450
		Training & engaging anti-poaching watchers @ 16 PAs	PA	16	4,350,000		69,600,000	69,600,000	-
		Infrastructure and kit for fire extinguishing	Numbers	20	174,169	24,881	3,981,000	3,483,375	497,625
		Providing fire surveillance management information system	Numbers	20	200,000		4,000,000	4,000,000	-
		Construction of fire watch towers	Numbers	20	611,250	21,600	12,657,000	12,225,000	432,000
		Mobilizing local people to control fire	Events	160	100,000		16,000,000	16,000,000	-
		Fire control operations	Events	160	200,000		32,000,000	32,000,000	-
		Fire fighting equipment sets	Numbers	200	26,250	3,750	6,000,000	5,250,000	750,000
		Night vision binoculars	Numbers	200	18,260	1,740	4,000,000	3,652,000	348,000
		Fixed and mobile wireless sets	Numbers	200	18,260	1,740	4,000,000	3,652,000	348,000
		Walkie talkies	Numbers	110	7,304	696	880,000	803,440	76,560
		Cell phones	Numbers	380	3,652	348	1,520,000	1,387,760	132,240
	Total					158,988,000	156,025,125	2,962,875	
BC-31	1.2.1.7 Geo-referenced data maintained in biodiversity database /GIS cell	Grant to GIS cell Chennai for additional infras	LS	1	The cost is included under augmentation of office facility and equipment and project management				
1.3 Mitigate human-anumal Conflict									
BC-32	1.3.1 Training field staff and villagr volunteers in wildlife conflict management	Training	Annual	5	50,000		250,000	250,000	-
							250,000	250,000	-
BC-33	1.3.2.2 Review historic data and information on large mammal movement	Research	LS	1	500,000		500,000	500,000	-
		Preparation of Maps	LS	1	500,000		500,000	500,000	-
							1,000,000	1,000,000	-
BC-34	1.3.2.3 Monitor migratory movements of wildlife using GPS	Training and engaging watchers to monitor wildlife movement	LS	1	1,000,000		1,000,000	1,000,000	-
							1,000,000	1,000,000	-
BC-35	1.3.2.5 Driving elephants wildlife back to forest		Annual	8	225,000		1,800,000	1,800,000	-
							1,800,000	1,800,000	-
BC-36	1.3.2.6 Geo-referenced data maintained in biodiversity database /GIS cell	Grant to GIS cell Chennai for additional infras	LS	1	The cost is included under augmentation of office facility and equipment and project management				

Annexure 8.1 Detailed Cost Estimation of Biodiversity Conservation Component

Ref	Activity	Item of work	Unit	Qty	Unit Cost (Rs.)		Cost of Activity (Rs.)		
BC-37	1.3.3.1 & 1.3.3.2 Establish wildlife proof barricades around villages /cropland	Solar fencing	km	400	194,752	5,248	80,000,000	77,900,800	2,099,200
		Trenches	km	200	228,871		45,774,200	45,774,200	-
		Maintenance	km	600	50,000		30,000,000	30,000,000	-
		Total					155,774,200	153,675,000	2,099,200
BC-38	1.3.3.3 Monitor incidences of human- wildlife conflicts	Maintaining registers and GPS data	Month	60	30,000		1,800,000	1,800,000	-
		Total					1,800,000	1,800,000	-
BC-39	1.3.3.4 Monitor effectiveness of wildlife-proof barricades	Maintaining registers and photographs of damage / breaches	Month	60	30,000		1,800,000	1,800,000	-
		Total					1,800,000	1,800,000	-
BC-40	1.3.3.5 Translocation operations	Translocating wildlife	Events	180	10,000		1,800,000	1,800,000	-
		Total					1,800,000	1,800,000	-
BC-41	1.3.3.6 Establish and operate mobile veterinary clinics	Salary / perks to veterinary doctors	Year	5	500,000		2,500,000	2,500,000	-
		Salary to support staff	Year	5	500,000		2,500,000	2,500,000	-
		Purchase of equipment	LS	1	5,000,000		5,000,000	5,000,000	-
		Purchase of medicine (including tranquilizers)	Year	5	1,000,000		5,000,000	5,000,000	-
		Post mortem	LS	1	1,500,000		1,500,000	1,500,000	-
		Tranquilizing equipment	LS	1	2,500,000		2,500,000		2,500,000
		Rescue equipment	LS	1	2,500,000		2,500,000	2,500,000	-
		Jeep	Numbers	2	600,000		1,200,000	1,200,000	-
		Rental (2 buildings)	Month	120	15,000		1,800,000	1,800,000	-
	Total					24,500,000	22,000,000	2,500,000	
1.4	Ecologically Sustainable Development						-		
	1.4.1 Socio-economic and forest dependency surveys of village communities								
	1.4.1.1 Procure contractors	Workshop (three days)	LS	1	200,000		200,000	200,000	
	1.4.1.2 Survey socio-economic and forest dependence status at outset of Project	Village level field surveys on socio-economic and forest dependency	Village	63	50,000		3,150,000	3,150,000	
	1.4.1.3 Survey socio-economic and forest dependence status 5 years after initial survey	Village level field surveys on socio-economic and forest dependency	Village	63	20,000		1,260,000	1,260,000	
	1.4.1.4 Prepare and publish manual on survey and analysis protocols (Tamil and English)	Development of content, Review of Content, Design, Layout, Content and Copy Editing, Translation, Printing and Dissemination	Copy	500	750		375,000	375,000	
	1.4.1.5 Enter georeferenced data in 'peoples' database/GIS	Workshop (two days)	LS	1	100,000		100,000	100,000	
	1.4.1.6 Report on survey results (Tamil and English)	Recording of data, Creation of database	LS	1			-		
		Development of content, Review of Content, Design, Layout, Content and Copy Editing, Translation, Printing and Dissemination (5 copies/village)	Numbers	500	300		150,000	150,000	
		Overhead	10%				523,500	523,500	
		Service Tax	10.3%				593,126		593,126
	Total						6,351,626	5,758,500	593,126
	1.4.2 Community biodiversity registers						-		
	1.4.2.1 Procure contractors	Workshop (three days)	LS	1	200,000		200,000	200,000	
	1.4.2.2 Train field staff and village ecotourism guides in compiling biodiversity registers	DMU level workshops (three)	LS	3	75,000		225,000	225,000	
		Village level consultative meetings	Village	88	1,000		88,000	88,000	
		Development of local language resource material	LS	1	250,000		250,000	250,000	
		Hiring of technical expert	M	6	30,000		180,000	180,000	
	1.4.2.3 Provide communities with expertise in plant/animal identification, survey methods, oral history etc to record biodiversity	Training Workshops in four clusters	LS	4	200,000		800,000	800,000	
	1.4.2.4 Survey biodiversity in village revenue lands and ecotourism	Field survey	Village	88	50,000		4,400,000	4,400,000	
		Resource Persons/Local experts	Person	20	15,000		300,000	300,000	
	1.4.2.5 Enter georeferenced data in biodiversity database/GIS	Data upload / Development of Database	LS	1			-		
		Overhead	10%				644,300	644,300	
		Service Tax	10.3%				729,992		729,992
	Total						7,817,292	7,087,300	729,992
	1.4.2.6 Produce guide books, posters etc for ecotourists in 2 languages (Tamil and English)	Development of content, Review of Content, Design, Layout, Content and Copy Editing, Translation, Printing and Dissemination	LS	1	1,000,000		1,103,000	1,000,000	103,000

Annexure 8.1 Detailed Cost Estimation of Biodiversity Conservation Component

Ref	Activity	Item of work	Unit	Qty	Unit Cost (Rs.)	Cost of Activity (Rs.)		
	1.4.3 Eco-development activities in villages abutting PAs in 30 villages					-		
	1.4.3.1 Procure contractors	State level Workshop(one day)	LS	1	75,000	75,000	75,000	
	1.4.3.2 Orientate communities on scope and purpose of Project	Orientation field level meetings	Village	30	5,000	150,000	150,000	
		Preparation of poster/banner for disseminating the scope of the project	Village	30	1,000	30,000	30,000	
	1.4.3.3 Assess socio-economic and ecological infrastructure of villages and their periphery as necessary	Field surveys	Village	30	3,000	90,000	90,000	
	1.4.3.4 Establish and train mixed gender field staff teams to design and facilitate participatory processes using appropriate tools	Training Workshops in four clusters	LS	1	7,500	7,500	7,500	
		Constitution of field teams (2 member/village) for 30 villages for six months	MM	60	2,000	120,000	120,000	
	1.4.3.5 Facilitate participatory planning of eco-development plans	Field level microplanning exercises	LS	30	10,000	300,000	300,000	
	1.4.3.6 Facilitate study tours to expose EDCs to other successful	Tours for 60 members (2/EDC) Local	Person	60	800	48,000	48,000	
		Tour for 60 members (2/EDC) Other State	Person	60	1,200	72,000	72,000	
	1.4.3.7 Establish protocols and coordination mechanisms with appropriate village institutions (Panchayat and/or Grama Sabha)	Field level consultations	Village	30	2,000	60,000	60,000	
	1.4.3.8 Constitute EDCs and their Executive Committees	State level Workshop(one day)	LS	1	100,000	100,000	100,000	
		Cluster workshops for training (3 clusters) of 3 days duration	Cluster	3	25,000	75,000	75,000	
		Development of training material and printing	Village	30	2,000	60,000	60,000	
	1.4.3.9 Identify and prioritise viable livelihood options (linked to CBRs and socio-economic/forest dependancy surveys)	Feasibility Study	LS	1	300,000	300,000	300,000	
	1.4.3.10 Prepare eco-development plans, addressing socio-economic and ecological requirements and opportunities through series of business plans	Consultative workshops at the field level over a period of one month	Numbers	30	5,000	150,000	150,000	
		Overhead	10%			163,750	163,750	
		Service Tax	10.3%			185,529	185,529	
	Total					1,986,779	1,801,250	185,529
	1.4.3.11 Implement eco-development plans via series of business plans for eco-enterprises, including skills training programmes	Identification of infrastructure and implementation of the Business Plan to establish Eco Enterprises in 39 villages	Numbers	30	500,000	15,000,000	15,000,000	
	1.4.4 Ecologically sustainable development in villages peripheral to RFs in 33 villages					-		
	1.4.4.1 Procure contractors	State level workshop (one day)	LS	1	75,000	75,000	75,000	
	1.4.4.2 Orientate communities on scope and purpose of Project	Orientation field level meetings	village	33	5,000	165,000	165,000	
		Preparation of poster/banner for disseminating the scope of the project	village	33	1,000	33,000	33,000	
	1.4.4.3 Assess socio-economic and ecological infrastructure of villages and their periphery	Field surveys	village	33	3,000	99,000	99,000	
	1.4.4.4 Establish and train mixed gender field staff teams to design and facilitate participatory processes using	Training Workshops in four clusters	LS	1	7,500	7,500	7,500	
		Constitution of field teams (2 member/village) for 33 villages for six months	MM	66	2,000	132,000	132,000	
	1.4.4.5 Facilitate participatory planning of micro-plans	Field level microplanning exercises	Numbers	33	10,000	330,000	330,000	
	1.4.4.6 Facilitate study tours to expose VCFs/SHGs to other successful VCFs/EDCs/SHGs	Tours for 66 members (2/EDC) Local	Numbers	66	800	52,800	52,800	
	1.4.4.7 Establish protocols and coordination mechanisms with appropriate village institutions (Panchayat and/or Grama Sabha)	Field level consultations	Numbers	33	2,000	66,000	66,000	
	1.4.4.8 Constitute VCFs/SHGs and their Executive Committees	Cluster workshops for training (3 clusters) of 3 days duration	Numbers	3	25,000	75,000	75,000	
		Development of training material and printing	Numbers	33	2,000	66,000	66,000	
	1.4.4.9 Identify and prioritise viable livelihood options (linked to CBRs and socio-economic/forest dependancy surveys)	Feasibility Study	LS	1	300,000	300,000	300,000	
	1.4.4.10 Prepare eco-development plans, addressing socio-economic and ecological requirements and opportunities through series of business plans	Field level microplanning exercises and development of field level business plans	Numbers	33	15,000	495,000	495,000	
		Overhead	10%			189,630	189,630	
		Service Tax	10.3%			214,851	214,851	
	Total					2,300,781	2,085,930	214,851

Annexure 8.1 Detailed Cost Estimation of Biodiversity Conservation Component

Ref	Activity	Item of work	Unit	Qty	Unit Cost (Rs.)	Cost of Activity (Rs.)			
	1.4.4.11 Implement eco-development plans via series of business plans for eco-enterprises, including skills training programmes	Establishment of field enterprise units based on the results of the microplan, feasibility study and the business plans	Numbers	33	500,000		16,500,000	16,500,000	
	1.4.5 Community-based ecotourism in 25 sites						-		
	1.4.5.1 Procure contractors	State level workshop (one day)	LS	1	75,000		75,000	75,000	
	1.4.5.2 Assess socio-economic infrastructure of villages and opportunities for ecotourism based on natural and cultural heritage	Field studies by the contractor	LS	1	300,000		300,000	300,000	
	1.4.5.3 Visit candidate sites, assess potential ecotourism activities and identify opportunities for synergy within clusters of sites	Field assessment	LS	1	200,000		200,000	200,000	
	1.4.5.4 Develop ecotourism strategies for clusters of sites, with feasibility studies of target sites and synergies between sites	Feasibility Study	LS	1	300,000		300,000	300,000	
	1.4.5.5 Constitute ecotourism SHGs in the absence of EDCs or VFCs	Cluster workshops for training (3 clusters) of 3 days duration	Numbers	3	25,000		75,000	75,000	
		Development of training material and printing	Numbers	25	2,000		50,000	50,000	
	1.4.5.6 Develop Business Plans for ecotourism enterprises, including skills	Formulation of business plans	LS	1	250,000		250,000	250,000	
		Need based cluster level training workshops	Numbers	8	125,000		1,000,000	1,000,000	
		Overhead	10%				225,000	225,000	
		Service Tax	10.3%				254,925		254,925
	Total						2,729,925	2,475,000	254,925
	1.4.5.7 Implement Business Plans and establish ecotourism enterprises						-	-	
	a) Construction of tourism-related infrastructure	Construct ecolodge complexes, each comprising 5 cottages (4.5 lakhs/cottage) with common dining facility + water/solar power services (15 lakh)	Ecolodge complex	5	4,000,000		20,000,000	20,000,000	
		Outdoor camping facility (tents, etc)	numbers	25	160,000		4,000,000	4,000,000	
		dry type/eco-friendly toilets (like sulabh international)	numbers	25	200,000		5,000,000	5,000,000	
		Grants to home stay with toilet/bathroom (2/village)	Numbers	50	160,000		8,000,000	8,000,000	
							37,000,000	37,000,000	-
	b) Equipment (powered by renewable resources)	Purchase of binoculars (5/village)	Numbers	125	4,000		500,000	500,000	
		Coracles & rafts	numbers	25	10,000		250,000	250,000	
		Boats	Numbers	10	982,441		9,824,410	9,824,410	
		Life jackets (6/craft)	Numbers	150	2,000		300,000	300,000	
		Computers & accessories including webcams	sets	25	144,422		3,610,550	3,610,550	
						14,484,960	14,484,960	-	
	c) Training of community members (hospitality, catering, lodge management, nature and culture guiding, health & safety	Speciality training programmes for 40 persons from ecolodges and a further 100 persons from other ecotourism sites	LS	1	700,000		700,000	700,000	
	1.4.5.8 Develop Village Ecotourism Charters as benchmark for monitoring sustainability of interventions						-		

Annexure 8.2 Unit Cost of TCPL

	Activity	Unit	Quantity	Unit Cost INR	Comments
2.1.1	Village cluster Selection including Rapid Appraisal				
	2.1.1.1 Collection & analysis of secondary information for Multi-criteria based screening of villages	MM	4	25,000	JRF salary & TA/DA
	2.1.1.2 Preparing guidelines for Rapid Appraisal	MM	1	100,000	Expert fees
2.1.2	Procurement of Resource Organisations (Local NGOs)	Cluster	1,000	100,000	assuming 5 villages / cluster; 1000 clusters; engagement for total 12 months per cluster spread over 4 years
2.1.3	Village Entry & Formation of FIGs for TCPL				
	2.1.3.1 & 2.1.3.4 Village Entry/ Awareness /Base-line survey/Microplanning	Village	5,000	8,000	
	2.1.3.2 Preparation of guidelines for FIG formation and management	MM	1	100,000	Expert fees
2.1.4	Preparation of Village Microplan for TCPL				
	2.1.4.1 Manual on Micro-planning for TCPL	MM	1.0	100,000	Expert fees
2.1.5	Implementation of Micro-plan				
	2.1.5.3 Plantation Cost				
	<i>Seedling Raising</i>				
	Casuarina	Seedling	30,000,000	3.30	based on Model Estimates by FD
	Timber & Miscellaneous species (including MPTs / fruit trees / bamboo)	Seedling	70,000,000	6.80	based on Model Estimates by FD
	<i>Planting</i>				
	Casuarina	Seedling	30,000,000	5.00	based on Model Estimates by FD
	Timber & Miscellaneous species (including MPTs / fruit trees / bamboo)	Seedling	70,000,000	7.60	based on Model Estimates by FD
2.1.6	Participatory Monitoring & Evaluation (PME)				
	2.1.6.1 Manual for PME & survival surveys	MM	1	100,000	Expert fees
	2.1.6.5 Distribution of survival incentive				
	Casuarina Survival Incentive	Seedling	30,000,000	0.25	based on Model Estimates by FD
	Other tree species & bamboo survival Incentive	Seedling	70,000,000	5.00	based on Model Estimates by FD
2.1.7	Facilitating support institutions and mechanisms for sustainability				
	2.1.7.1 Designing and establishing Wood Market Information System	LS		1,000,000	
	2.1.7.2 Organising meetings of FIGs with wood-based industries	Meeting	150	50,000	District-level; assuming participation of 200 farmer
	2.1.7.3 Organising common meetings of FIG members at Taluk / Range level	Meeting	1,000	10,000	5 meeting (one per year) per taluk; assuming 200 taluks

Annexure 8.3 M&E Cost

	Unit	Quantity	Unit Rate	Yr.1	Yr.2	Yr.3	Yr.4	Yr.5	Yr.6	Yr.7	Yr.8	Total
1) Web-enabled Management Information System (MIS)				1,070,000	720,000	720,000	720,000	720,000	720,000	720,000	720,000	6,110,000
a) Software development cost (additional modules only)/1	modules	7	50,000	350,000								350,000
b) Maintenance of MIS software/2	person	4	15,000	720,000	720,000	720,000	720,000	720,000	720,000	720,000	720,000	5,760,000
2) Computerized Financial Management and Accounting System (FMAS)				200,000	-	-	-	-	-	-	-	200,000
a) Software development cost (additional modules only)/3	modules	4	50,000	200,000								200,000
b) Maintenance of FMAS software/4		0	-	-	-	-	-	-	-	-	-	-
3) Periodic Reviews and Assessments				888,000	888,000	888,000	888,000	888,000	888,000	888,000	888,000	7,104,000
a) Reviews /5	month	12	2,000	288,000	288,000	288,000	288,000	288,000	288,000	288,000	288,000	2,304,000
b) Annual Assessment /6	village	10	5,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	4,800,000
4) Studies				250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	2,000,000
a) Studies under Biodiversity Conservation/ 7												
b) Studies under TCPL/ 8												
c) Studies under Ecologically Sustainable development (ESD) /9												
d) Short studies /10	studies	8	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	2,000,000
5) Baseline and Socio-economic Impact Evaluation Surveys				2,440,000	120,000	120,000	120,000	3,600,000	120,000	120,000	3,600,000	10,240,000
a) Baseline survey /11	village	116	20,000	2,320,000								2,320,000
b) Mid-term/ End-term Evaluation /12	village	116	30,000					3,480,000			3,480,000	6,960,000
c) Quarterly Concurrent monitoring and reporting / 13	Quarter	4	2,500	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	960,000
6) Participatory M&E by community / 14	village	5,137	150	1,541,100				1,541,100				3,082,200
7) Social Audits including Grievance Redressal Mechanism /15	village	137	1,500	411,000	411,000	411,000	411,000	411,000	411,000	411,000	411,000	3,288,000
8) Video and photo documentation /16	village	5,137		-	-	-	-	-	-	-	-	-
Total Cost (Rs.)				6,800,100	2,389,000	2,389,000	2,389,000	7,410,100	2,389,000	2,389,000	5,869,000	32,024,200

Assumptions

- /1 Developing 7 modules: Biodiversity Conservation, TCPL, Ecocdevelopment, Capacity Building, Civil Works, Procurement (of Goods & Services), and Analytical Reports
- /2 Service engineer cost at Rs.15000 per month @ one person per three circles
- /3 Developing 4 modules: Advances and Payments, Budgets and Expenditures by Components, SOEs, Financial Reports
- /4 Service engineer cost is included in 1 (b)
- /5 Reviews at Circle level; every month one day exercise; all 12 circles to review component-wise progress; cost includes event and documentation cost
- /6 Annual Assessment at Circle level; 2 days exercise in 10 representative project villages selected randomly; all 12 circles to undertake assessment on pre-determined parameters approved by Governing Body; cost includes event and documentation cost
- /7 Biodiversity studies (xx nos.);
- /8 TCPL studies (xx nos.);
- /9 ESD studies (xx nos.);
- /10 Short studies @ one per year for developing understanding on generic issues coming across project implementation
- /11 Assuming representative sample villages (target and control) would be selected; 15 target and 5 control out of total 137 villages (39+42+56) planned for ESD interventions, and 72 target villages for TCPL @ 6 per circle and 24 control villages @ 2 per circle
- /12 Same villages with detailed scope of works at two stages - mid-term and end-term
- /13 Monitoring of activities at random being implemented during the year visiting sites, implementing units (DMU/ FMU and Circle); all 12 circles
- /14 Cost of providing printed Registers for community institutions/ FIG; 137 villages under ESD and around 5000 villages under TCPL; twice in project life
- /15 Social Audits every six-month in each ESD village based on the action plans drawn out of Micro-plans; cost towards organizing one-day event and refreshments
- /16 Cost of providing Handycam and Digital Camera has been mentioned under support activity

Annexure 8.4 Unit Cost of Equipment

				ServiceTax	4%				
				ELCOT-Service Charge	5%				
				ELCOT-Service Tax	10.30%				
Hardware									
Item	Specification	Unit	Unit Cost (Rs)	ServiceTax @ 4%	ELCOT-Service Charge @ 5%	Service Tax @10.3%	Total	Unit Cost (Rs. with Tax Tax	
Desktop computer including office software and accessories								60.6	5.9
Computer-Desktop	Intel Core 2 Duo E-7300, 500 GB HDD, 2 GB Memory, DVD writer, USB Ports-4, Serial Port-1, parallel Port-1, PS2 Port-2, 10/100/1000 mbps Ethernet Modem, Speaker, Membrane Keyboard, Optical Mouse, 19" TFT Monitor with pre loaded Windows XP	no.	30,000	1,200	1,500	3,090	35,790	35.8	5.8
MS-Office	MS-Office Professional 2010	no.	23,700				23,700	23.7	0.0
Anti Virus	Norton Anti-Virus, Single user, 1 year support	no.	1,050	42	53	5	1,150	1.1	0.1
Note Pad (Lap top) including office software and accessories								107.0	7.2
Note Pad (Lap top)	Sony Vaio VGN-SR56GG/B, Intel Centrino 2 Processor, 13.3 wide	no.	74,990	3,000	3,750	386	82,125	82.1	7.1
MS-Office	MS-Office Professional 2010	no.	23,700				23,700	23.7	0.0
Anti Virus	Norton Anti-Virus, Single user, 1 year support	no.	1,050	42	53	5	1,150	1.1	0.1
Printer (Laser) A4 Low end	HP Officejet J6488, Network printer	no.	15,458	618	773	80	16,929	16.9	1.5
Printer (Dot matrix)	Epson LX-1170 II, 136 Columns, 9 Pin	no.	8,500	340	425	44	9,309	9.3	0.8
Table & Chair		no.	7,300	292	365	38	7,995	8.0	0.7
Scanner A4	HP Scanjet 8270 Document Flatbed Scanner	no.	49,699	1,988	2,485	256	54,428	54.4	4.7
Copier / Fax	Canon L380S, 18 copies per mins, Laser type, Available functions - Fax, Copy, Print	no.	59,995	2,400	3,000	309	65,704	65.7	5.7
UPS-1KVA	Online UPS with 60 minutes SMF, battery backup	no.	25,000	1,000	1,250	129	27,379	27.4	2.4
Handycam	Canon DC420, 1.07 megapixel, 37x optical zoom, 2.7" wide screen LCD	no.	25,995	1,040	1,300	134	28,468	28.5	2.5
Digital camera	Canon Digital IXUS 120 IS, 12.1 million Pixels, 4x zoom, 2.7 inch type, colour LCD with wide viewing angle	no.	12,495	500	625	64	13,684	13.7	1.2
Computer-Workstation, monitor, office software & accessories								144.3	10.5
Computer-Workstation	Intel Xeon Processor,	no.	77,562	3,102	3,878	399	84,942	84.9	7.4
Monitors	1600 x 1200 resolutions, 800:1 high contrast ratio, and 178-degree viewing angles, Anti glare	no.	31,469	1,259	1,573	162	34,463	34.5	3.0
MS-Office	MS-Office Professional 2010	no.	23,700				23,700	23.7	0.0
Anti Virus	Norton Anti-Virus, Single user, 1 year support	no.	1,050	42	53	5	1,150	1.1	0.1
Arc GIS v 9.3	32016-Arc View ver 9.3, Single user software to run on windows 2000/XP	no.	144,231	5,769	7,212	743	157,955	158.0	13.7
Arc GIS v 9.3 (Arc Editor, Spatial Analyst, 3D Analyst) Windows		no.	1,175,000	47,000	58,750	6,051	1,286,801	1,286.8	111.8
Erdas 8.7		no.	950,000	38,000	47,500	4,893	1,040,393	1,040.4	90.4
Printer (Laser) A3	HP Color Laserjet 5550dtn Printer Q3716A	no.	442,399	17,696	22,120	2,278	484,493	484.5	42.1
Plotter A0	HP Designjet Z6100 Printer Series, 256 MB memory, Standard 40 GB HD, 8 ink	no.	1,000,537	40,021	50,027	5,153	1,095,738	1,095.7	95.2
UPS 10KVA			380,000	15,200	19,000	1,957	416,157	416.2	36.2
State level Land use/cover map									
LISS-III	One period	scenes	7,000	-	-	-	7,000	7.0	0.0
LISS-IV	25% of geographical area of the state.	scenes	6,000	-	-	-	6,000	6.0	0.0
Cartosat-1	25% of geographical area of the state.	scenes	8,000	-	-	-	8,000	8.0	0.0
Village Map	Village Boundary Database Unverified on ground-Vector (Multiple User) - OVLMF/J42	District	4,950				4,950	5.0	0.0
GPS (Handheld)	Handheld GPS, Model GW navigator, GPS with Bluetooth and software for processing GPS data	no.	9,990	400	500	51	10,941	10.9	1.0
GPS (Vehicle Mounted)	Garmin Navi 715	no.	18,500	925	925	95	20,445	20.4	1.9
PDA	HP IPAQ Pocket PC HX2490 Serier, Processor Intel PXA270 Processor, 520MHZ	no.	29,990	1,200	1,500	154	32,844	32.8	2.9

Annexure 8.5 Unit Cost of Research on Production Forestry / Agro-forestry / Farm Forestry

Ref	Activity	Item of work	Unit	Qty	Unit Cost (Rs.)		Cost of Activity (Rs.)		
					w/o Tax	Tax	with Tax	w/ot Tax	Tax
2.2 Research on Production Forestry / Agro-forestry / Farm Forestry									
	2.2.1.1 Second generation and First generation seed orchards, seed stands and seed production areas (SI.No. 4.1.2a (i))	Nursery works	LS	1	5,500		5,500	5,500	
		Planting works	LS	1	32,000		32,000	32,000	
		Maintenance I year	LS	1	6,600		6,600	6,600	
		Maintenance II year	LS	1	3,300		3,300	3,300	
		Maintenance III year	LS	1	3,300		3,300	3,300	
Total							50,700	50,700	-
	2.2.1.2 Hedge stool nursery for clones of species taken (SI.No. 4.1.2a (ii))	Nursery works	LS	1	13,000		13,000	13,000	
		Planting works	LS	1	42,000		42,000	42,000	
		Maintenance I year	LS	1	11,000		11,000	11,000	
		Maintenance II year	LS	1	11,000		11,000	11,000	
		Maintenance III year	LS	1	11,000		11,000	11,000	
Total							88,000	88,000	-
	2.2.1.3 Clonal evaluation trials and progeny trials (SI.No. 4.1.2a (iii))	Nursery works	LS	1	8,000		8,000	8,000	
		Planting works	LS	1	25,000		25,000	25,000	
		Maintenance I year	LS	1	6,600		6,600	6,600	
		Maintenance II year	LS	1	3,300		3,300	3,300	
		Maintenance III year	LS	1	3,300		3,300	3,300	
Total							46,200	46,200	-
	2.2.1.4 Production of clonal plants (SI.No. 4.1.2a (iv))	Nursery works	Nos	500	5		2,500	2,500	
							-	-	
							-	-	
							-	-	
Total							2,500	2,500	-
	2.2.2.1 Maximising fuel wood production in different tree species (SI.No. 4.1.2b (i))	Production works	LS	1	55,000		55,000	55,000	
		Maintenance I year	LS	1	11,000		11,000	11,000	
		Maintenance II year	LS	1	5,500		5,500	5,500	
		Total							71,500
					33,000				
	2.2.3.1 Evaluation of agriculture crops as inter crop - effect of irrigation on tree species and agri crop, growth rate of tree species, genetic Combing of Agro Forestry tree species cultural package for NTFP species (SI.No. 4.1.2d (i))	Nursery works	LS	1	2,011		2,011	2,011	
		Planting works	LS	1	15,986		15,986	15,986	
		Intercrop sowing operations	LS	1	15,003		15,003	15,003	
		Maintenance I year	LS	1	6,600		6,600	6,600	
		Maintenance II year	LS	1	3,300		3,300	3,300	
		Maintenance III year	LS	1	3,300		3,300	3,300	
Total							46,200	46,200	-
	2.2.3.2 Multiplication of clones through micro and macro propagation (SI.No. 4.1.2d (ii))	Multiplication	Nos	5,000	5		25,000	25,000	
		Total						25,000	25,000
	2.2.3.3 Fruit yield table for NTFP species in Agro Forestry		LS	1	55,000		55,000	55,000	
		Total						55,000	55,000
	2.2.3.4 Post harvest technology and timber testing and treatment for various immature timbers grown under Agro Forestry (SI.No. 4.1.2d (iv))	Treatment	LS	1	22,000		22,000	22,000	
		Total						22,000	22,000
	2.2.4.1 On farm trials and off farm trials of various bamboo species including introduction of bamboo species, reeds, canes in various forest types (SI.No. 4.1.2e (i))	Nursery works	LS	1	9,693		9,693	9,693	
		Planting works	LS	1	29,509		29,509	29,509	
		Intercrop sowing operations	LS	1	26,798		26,798	26,798	
		Maintenance I year	LS	1	11,000		11,000	11,000	
		Maintenance II year	LS	1	6,000		6,000	6,000	
		Maintenance III year	LS	1	6,000		6,000	6,000	
Total							89,000	89,000	-
	2.2.4.2 Standardization of protocol medium in tissue culture lab (SI.No. 4.1.2e (ii))	Standardization	LS	1	102,000		102,000	102,000	
							-	-	
Total							102,000	102,000	-

Annexure 8.5 Unit Cost of Research on Production Forestry / Agro-forestry / Farm Forestry

Ref	Activity	Item of work	Unit	Qty	Unit Cost (Rs.)	Cost of Activity (Rs.)		
2.2.4.3	Standardization of rooting technique for Macropropagation (SI.No. 4.1.2e (iii))	Standardization	LS	1	22,000	22,000	22,000	-
						-	-	-
	Total					22,000	22,000	-
2.2.4.4	Bamboo as reinforcement material - partially replacing steel (SI.No. 5.1.2.5.4)	Bamboo testing	LS	1	55,000	55,000	55,000	-
						-	-	-
	Total					55,000	55,000	-
2.2.4.5	Multiplication of 10 Bamboo varieties (SI.No. 4.1.2e (v))	Multiplication of Bamboo	Nos	5,000	7	35,000	35,000	-
						-	-	-
	Total					35,000	35,000	-
2.2.5.1	Isolation of phosphobacteria, rhizobium and VAM (SI.No. 4.1.2f (i))	Estimation	LS	1	5,500	5,500	5,500	-
						-	-	-
	Total					5,500	5,500	-
2.2.5.2	Establishment of Sandal seedlings with inoculation of Bio-fertilizer (SI.No. 4.1.2f (ii))	Nursery works	LS	1	5,257	5,257	5,257	-
		Planting works	LS	1	49,743	49,743	49,743	-
	Total					55,000	55,000	-
2.2.6.1	Growing vegetation on sheet rock, tree growing on bouldary site with different SMC measures	Growing vegetation	LS	1	22,500	22,500	22,500	-
		Maintenance I year	LS	1	11,000	11,000	11,000	-
		Maintenance II year	LS	1	6,000	6,000	6,000	-
		Maintenance III year	LS	1	6,000	6,000	6,000	-
	Total					45,500	45,500	-

Annexure 8.6 Proposed Assignment Schedule and Cost Estimation of the Consulting Services

	Rate	Man-Months							Amount (1,000)						
		2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	Total	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	Total
International Experts	Yen 1,000	3	4	2	2	2	0	13.0	7,890	10,520	5,260	5,260	5,260	0	34,190
1 Team Leader	2,630	3	4	2	2	2	0	13.0	7,890	10,520	5,260	5,260	5,260	0	34,190
Direct Expenses (Yen)									1,640	2,720	1,360	1,360	1,360	-	8,440
Per Diem (per day)	15								1,350	1,800	900	900	900	-	5,850
International Travel (round trip)	200	1	4	2	2	2		11	200	800	400	400	400	-	2,200
International Communication (month)	30								90	120	60	60	60	-	390
Total (1,000 Yen)									9,530	13,240	6,620	6,620	6,620	-	42,630
Exchange Rate (1.0Yen= INR)									0.53						
INR Equivalent (INR 1,000)									5,064	7,035	3,518	3,518	3,518	-	22,652
National Experts	INR 1,000	20	48	40	21	21	0	150.0	5,600	13,440	11,200	5,880	5,880	-	42,000
1 Biodiversity Conservation	280	4	11	11	6	6			38.0	1,120	3,080	1,680	1,680	-	10,640
2 Community Development	280	4	11	11	6	6			38.0	1,120	3,080	1,680	1,680	-	10,640
3 Monitoring and Evaluation	280	4	6	6	3	3			22.0	1,120	1,680	1,680	840	-	6,160
4 GIS/MIS	280	2	6	6	3	3			20.0	560	1,680	1,680	840	-	5,600
5 REDD+	280	3	6	3	3	3			18.0	840	1,680	840	840	-	5,040
6 Training Coordinator	280	3	8	3					14.0	840	2,240	840		-	3,920
Supporting Staff	INR 1,000	8	24	24	24	24	0	104.0	200	600	600	600	600	-	2,600
1 Administrative Officer/ Accountant	40	4	12	12	12	12			52.0	160	480	480	480	-	2,080
2 Utility man	10	4	12	12	12	12			52.0	40	120	120	120	-	520
Out-of-Pocket Expenses (INR 1,000)	INR 1,000	2							5,368	5,392	4,872	3,713	3,713	-	23,058
4x4 Vehicle (2 nos.)	900								2	1,800				-	1,800
Vehicle O&M (including fuel & drivers)	30	8	24	24	24	24			104	240	720	720	720	-	3,120
Rental Vehicle (unit cost per day)	2	69	156	126	69	69			489	138	312	252	138	-	978
Travel Expenses (Airfare & train)	10	23	52	42	23	23			163	230	520	420	230	-	1,630
Per diem (per day for national experts)	1	300	720	600	315	315			2,250	300	720	600	315	-	2,250
Accommodation (per day for national experts)	2	300	720	600	315	315			2,250	600	1,440	1,200	630	-	4,500
Office rental (per month)	70	4	12	12	12	12			52	280	840	840	840	-	3,640
Office Equipment	1,500									1,500				-	1,500
Communication (per month)	30	4.0	12.0	12.0	12.0	12.0			52.0	120	360	360	360	-	1,560
Office Stationary (per month)	30	4.0	12.0	12.0	12.0	12.0			52.0	120	360	360	360	-	1,560
Miscellaneous	10	4.0	12.0	12.0	12.0	12.0			52.0	40	120	120	120	-	520
TOTAL (1) -INR 1,000									16,232	26,467	20,190	13,711	13,711	-	90,310
- FC									5,064	7,035	3,518	3,518	3,518	-	22,652
- LC									11,168	19,432	16,672	10,193	10,193	-	67,658
Price Escalation									449	1,519	1,846	1,629	2,067	-	7,509
- FC (% per annum.)	1.8%								91	256	193	260	328	-	1,128
- LC (% per annum.)	3.2%								357	1,264	1,652	1,369	1,739	-	6,381
TOTAL (2) -INR 1,000									16,680	27,986	22,035	15,339	15,777	-	97,819
- FC									5,155	7,291	3,711	3,778	3,846	-	23,780
- LC									11,525	20,696	18,324	11,562	11,932	-	74,039
Physical Contingency (5%)									1,668	2,799	2,204	1,534	1,578	-	9,782
- FC	10%								515	729	371	378	385	-	2,378
- LC	10%								1,153	2,070	1,832	1,156	1,193	-	7,404
TOTAL (3) - INR 1,000									18,348	30,785	24,239	16,873	17,355	-	107,601
- FC									5,670	8,020	4,082	4,156	4,230	-	26,158
- LC									12,678	22,765	20,157	12,718	13,125	-	81,442
Service Tax (10.3%)									1,890	3,171	2,497	1,738	1,788	-	11,083
- FC	10.3%								584	826	420	428	436	-	2,694
- LC	10.3%								1,306	2,345	2,076	1,310	1,352	-	8,389
GRAND TOTAL (INR 1,000)									20,238	33,956	26,735	18,611	19,143	-	118,683
- FC									6,255	8,846	4,503	4,584	4,666	-	28,853
- LC									13,984	25,110	22,233	14,028	14,477	-	89,831

			1	2	3	4	5	6
Price escalation	FC	1.8%	0.018	0.036	0.055	0.074	0.093	0.113
	LC	3.2%	0.032	0.065	0.099	0.134	0.171	0.208

	Y-1 (2011/12)		Y-2 (2012/13)		Y-3 (2013/14)		Y-4 (2014/15)		Y-5 (2015/16)		Y-6 (2016/17)		Total
	LC	FC	LC	FC	LC	FC	LC	FC	LC	FC	LC	FC	
Base cost	11,168	5,064	19,432	7,035	16,672	3,518	10,193	3,518	10,193	3,518	0	0	90,310
Contingency	1,510	607	3,333	985	3,485	564	2,525	638	2,932	713	0	0	17,291
Sub-total	12,678	5,670	22,765	8,020	20,157	4,082	12,718	4,156	13,125	4,230	0	0	107,601
Service Tax	1,306	584	2,345	826	2,076	420	1,310	428	1,352	436	0	0	11,083
TOTAL	13,984	6,255	25,110	8,846	22,233	4,503	14,028	4,584	14,477	4,666	0	0	118,683

	Y-1 (2011/12)		Y-2 (2012/13)		Y-3 (2013/14)		Y-4 (2014/15)		Y-5 (2015/16)		Y-6 (2016/17)		Total
	JICA	TN	JICA	TN	JICA	TN	JICA	TN	JICA	TN	JICA	TN	
Base cost	16,232		26,467		20,190		13,711		13,711		0	0	90,310
Contingency	2,117		4,318		4,049		3,163		3,645		0	0	17,291
Sub-total	18,348	0	30,785	0	24,239	0	16,873	0	17,355	0	0	0	107,601
Service Tax		1,890		3,171		2,497		1,738		1,788		0	11,083
TOTAL	18,348	1,890	30,785	3,171	24,239	2,497	16,873	1,738	17,355	1,788	0	0	118,683

Annexure 8.7 Detailed Cost Estimation for Biodiversity Conservation (Construction for Habitat Restoration)

	Description of items	Specifications	Total numbers	Unit Rate	Labour	Materials	Services	Tax	Remarks
Improving availability of water in protected areas									
1	Creating perennial water holes	Concrete structure along with earthen embankments like check dam with gabion (stone with iron chain) structure.	26	1,149,298	447,107	653,578	0	48,613	
2	Providing water supply arrangements	RR masonry structure with cement concrete - a 'U' shaped drain from the water source to the new place	10	210,950	70,950	135,800	0	4,200	
3	Providing camping facilities (once in four years)		58	75,000					
4	Providing Infrastructure Kit for fire extinguishing in Protected Areas	List enclosed but need to be checked	20	199,050	0	174,169	0	24,881	
5	Providing fire surveillance/management information system		20	0					Need to Check with MIS
6	Fire fighting equipment sets	List enclosed but need to be checked	200	30,000	0	26,250	0	3,750	
7	Construction of firewatch towers	Cement concrete structure with cover like any bird sanctuary	20	632,850	212,850	398,400	0	21,600	
8	Consolidation of forest boundaries by construction of RF Cairns	RR stone masonry structure with cement concrete (0.75 x 0.75 x 1.5 mt.)	80,000	1,655	1,005	533	0	117	
9	Creating physical barrier solar power fencing	Solar fencing along with vegetative planting along the line	500	200,000	34,056	160,696	0	5,248	
10	Providing elephant proof trenching	Earthen trench of size 1.0 mt. at bottom and 2.5 mt. at top of 2.0 mt depth trench	200	228,871	228,871	0	0	0	
		TOTAL		2,727,674	994,839	1,549,426	0	108,409	

Annexure 8.8 Detailed Cost Estimation for Biodiversity Conservation (Construction for Socio-economic Development)

	Description of items	Specifications	Basis of Selection	Total numbers	Unit Rate	Labour	Materials	Services	Tax	Remarks
Socio-economic Development										
1	Construction of Percolation Tank	Concrete structure (Diversion Weir) along with earthen embankments both sides	according to the village and feasibility		378,685	218,260	153,870	0	6,555	
2	Construction of Check Dam	RR masonry structure with cement concrete	according to the village and feasibility		118,090	45,940	69,264	0	2,886	
3	Construction/ Digging of Bore well	Stone walling with platform at ground level	according to the village and feasibility		159,727	63,027	84,350	7,000	5,350	
4	Construction of Over Head Tank	Concrete structure above 6mt height	according to the village and feasibility		210,517	68,142	125,850	12,500	4,025	
5	Construction of Pisciculture Tank	Same as Percolation Tank	according to the village and feasibility		378,685	218,260	153,870	0	6,555	
6	Construction of Roads	WBM road for rural areas	according to the village and feasibility		228,083	218,195	8,790		1,098	
		TOTAL			1,473,787	831,824	595,994	19,500	26,469	

Annexure 8.9 Detailed Cost Estimation for Supporting Activities (Construction of Buildings)

	Description of items	Plinth Area (Sq. Mt.)	Total numbers	Unit Rate	Labour	Materials	Services	Tax	Remarks
Infrastructure Works									
1	Construction of PMU Office Building	6,000	1	130,000,000	39,000,000	80,100,000	7,000,000	3,900,000	
2	Construction of SFRI Building	4,500	1	90,000,000	46,000,000	36,000,000	5,000,000	3,000,000	
3	Construction of Inspection Bungalow	142	6	1,800,000	630,186	1,115,629	-	54,186	
4	Construction of Circle Offices	340	3	4,300,000	1,505,179	2,752,179	-	42,642	
5	Construction of District Offices	240	5	3,000,003	1,050,126	1,920,127	-	29,750	
6	Construction of Range Offices	85	58	1,100,000	385,046	704,046	-	10,908	
7	Construction of Forestry Extension centres at Tiruppur and Ariyalur districts	234	2	3,000,003	1,050,126	1,920,127	-	29,750	
8	Construction/ Renovation of Forestry Extension centres	100	26	1,300,000	455,054	832,054	-	12,892	
9	Construction of Van shed for Forestry Extension Centres		12	238,675	71,603	159,912		9,547	
10	Construction of modern interpretation centre at Nanmangalam of Kancheepuram Districts		1	9,733,000	2,919,900	6,472,445	-	340,655	
11	Construction of interpretation hass in the existing extension centre area - Trichy, Coimbatore, Tirunelveli, Madurai and Namakkal		1	5,758,000	1,727,400	3,829,070	-	201,530	
12	Construction of GIS cum Bio-diversity Laboratory training College, Vaigaidam	680	1	7,500,000	2,250,000	4,987,500	-	262,500	
13	Construction of Antipoaching camp building	60	26	528,271	205,529	308,680	-	14,062	

Annexure 8.10 Estimated Annual Cost of the Project Personnels

	No.	Annual Salary (Rs. 1,000)	Total (Rs. 1,000)	Percentage shouldered by the		Amount of Personnel Cost of the Project (Rs. 1,000)		
				Gov.	Contractual	Gov.	Contractual	
PMU	Chief Project Director	1	1,546	1,546	100%		1,546	0
	Project Director	5	1,390	6,950	100%		6,950	0
	Finance Controller	1	1,390	1,390	100%		1,390	0
	# Deputy Project Director	9	1,279	11,515	100%		11,515	0
	Superintendent	6	330	1,977	100%		1,977	0
	Accountant	3	228	683	100%		683	0
	# Computer Operator	17	228	3,871	80%	20%	3,097	774
	# Steno Typist	17	228	3,871	80%	20%	3,097	774
	# Personal Assistant	16	127	2,033	80%	20%	1,627	407
	75		33,836			31,881	1,955	
Circle	Field Director	12	1,279	15,354			0	0
	Deputy Field Director	12	409	4,907	30%		1,472	0
	Computer Operator	12	228	2,732	30%		820	0
	Steno Typist	12	228	2,732	30%		820	0
	Personal Assistant	12	127	1,525	30%		457	0
		60		27,250			3,569	0
DMU	DMU Officer	66	806	53,184			0	0
	# Assistant DMU Officer	132	409	53,975	25%	20%	13,494	10,795
	# Finance Officer	66	387	25,549	25%	20%	6,387	5,110
	# Accountant	66	228	15,028	25%	20%	3,757	3,006
	# Computer Operator	66	228	15,028	25%	20%	3,757	3,006
	# Steno Typist	66	228	15,028	25%	20%	3,757	3,006
	# Personal Assistant	132	127	16,775	25%	20%	4,194	3,355
		594		194,567			35,346	28,277
FMU	FMU Officer	202	409	82,598			0	0
	# AFMU Officer	202	330	66,563	50%		33,282	0
	# Computer Operator	202	387	78,196	50%		39,098	0
	# Utility Person	202	127	25,670	50%		12,835	0
		808		253,027			85,215	0
Annual Total	1,537		508,681			156,011	30,232	
							186,242	

#: It is assumed that some of the officers/staff would be contractual.

The project will shoulder the salary of all PMU staff (governmental and contractual) and contractual staff at field offices to be hired for the project.

Annexure 8.11 Detailed Breakdown of the Project Cost

Project activity	Total Project Cost (Rs. 1,000)			
	Total	JICA Loan	TN State Fund	
1 BIODIVERSITY CONSERVATION	1,053,716	16%	1,029,025	24,690
1.1 Habitat restoration, enhancement and management	422,796	6%	415,979	6,816
1.1.1 Strengthen Wetland Planning and Management	29,958		28,896	1,062
1.1.1.1 Procure contractors/partners				
1.1.1.2 Training on Wetland Management (FD staff)	1,693		1,535	158
1.1.1.3 Wetland Participatory Management Planning	3,622		3,284	338
1.1.1.4 Implement Wetland Action Plans	7,420		7,420	
a) Enhance aquatic habitats and aquatic species diversity/composition				
b) Enhance peripheral and nearby terrestrial habitats for birds				
1.1.1.5 Monitor water flows, water quality and aquatic vegetation	1,657		1,657	
1.1.1.6 Monitor fish and bird diversity and abundance	1,535		1,535	
1.1.1.7 Routinely survey birds for contagious diseases (e.g. bird flu)	467		467	
1.1.1.8 Interpret and display research findings in multi-media for benefit of visitors (Tamil & English)	13,566		13,000	566
1.1.1.9 Enter georeferenced data in biodiversity database/GIS				
1.1.2 Improve critical habitats (terrestrial and aquatic) by removing invasive and exotic species	148,112		147,964	148
1.1.2.1 Procure contractors/partners				
1.1.2.2 Training in management of alien species, with field review of species to remove (FD staff)	1,470		1,470	
1.1.2.3 Baseline survey of biodiversity in critical habitats prior to removal of alien species	796		722	74
1.1.2.4 Strategy and manual on management of invasive alien species (Tamil, English)	789		715	74
1.1.2.5 Remove invasive species after field assessment and biodiversity baseline survey				
a) Phased removal of Lantana, Prosopis from dry forest	103,680		103,680	
b) Phased removal of wattle from shola ecosystem in the hills	40,078		40,078	
c) Monitor impact of fencing and removal of exotics from shola / grassland habitats	800		800	
1.1.2.6 Monitor biodiversity in critical habitats after removal of invasive species	500		500	
1.1.2.7 Enter georeferenced data in biodiversity database/GIS				
1.1.3 Conserve critically endangered/endangered species of flora and fauna	150,022		149,036	986
1.1.3.1 Procure contractors/partners				
1.1.3.2 Undertake status and distribution surveys of selected CR/EN/DD taxa in wild	2,427		2,200	227
1.1.3.3 Develop species conservation plans (Tamil, English)				
a) Develop species conservation plans for Dugong in Palk Bay (5 years)	5,581		5,060	521
b) Develop species conservation plans for sea turtles in 8 coastal divisions/districts (5 years)	2,548		2,310	238
1.1.3.4 Implement conservation plans				
a) Implement conservation plans (dugong) including ex-situ measures as appropriate (5 years)	52,395		52,395	
b) Implement conservation plans (seaturtles) including ex-situ measures as appropriate (5 years)	74,875		74,875	
c) Implement species conservation plans for plants/other animals, including ex situ measures for priority CR plants in Nadugani gene-pool garden	1,000		1,000	
1.1.3.5 Immunise livestock in periphery of all PAs to prevent transmission of diseases to wildlife	9,696		9,696	
1.1.3.6 Create GIS database of threatened and endemic flora and fauna based on past and present research	1,500		1,500	
1.1.4 Improve management of water, habitat and herbivores in Guindy NP	2,052		1,947	104
1.1.4.1 Procure contractors/partners (NGO/consultant/university & civil work contractor)				
1.1.4.2 Assess water resources and develop Water Management Strategy and Action Plan to address biodiversity and supplementary supply needs	552		500	52
1.1.4.3 Assess capacity of present vegetation to support current herbivore population				
1.1.4.4 Strengthen Management Plan by adopting Water Management Strategy and Action Plan				
1.1.4.5 Remove invasive species to retain integrity of vegetation and provide grazing for herbivores	140		140	
1.1.4.6 Water storage and distribution interventions (including underground storage and invasive species removal)				
a) Create permanent waterholes	1,149		1,101	49
b) Improve water storage and supply	211		207	4
1.1.5 Improve management of water, habitat and herbivores in Vallanadu Black Buck Sanctuary	3,848		3,691	157
1.1.5.1 Procure contractors/partners				
1.1.5.2 Develop Water Management Strategy and Action Plan and strengthen management plan	552		500	52
1.1.5.3 Improve water retention capacity within seasonal water bodies				
a) Create permanent waterholes	2,299		2,201	97

Project activity	Total Project Cost (Rs. 1,000)		
	Total	JICA Loan	TN State Fund
b) Improve water storage & supply	422	414	8
1.1.5.4 Increase grasslands for blackbuck by removing previously introduced woody scrub	576	576	
1.1.6 Improve management of water in PAs and RFs	80,917	77,294	3,623
1.1.6.1 Procure contractors/partners			
1.1.6.2 Develop Water Management Strategy and Action Plan	8,824	8,000	824
1.1.6.3 Improve water retention capacity within seasonal water bodies			
a) Create permanent waterholes	60,913	58,337	2,576
b) Improve water storage and supply	11,180	10,958	223
1.1.6.4 Monitor biodiversity and socio-economic impacts of interventions			
1.1.7 Monitor impacts of climate change on biodiversity	7,886	7,150	736
1.1.7.1 Procure contractors/partners			
1.1.7.2 Identify vegetation types representing climatic/topographic gradients in Tamil Nadu			
1.1.7.3 Undertake baseline surveys of biodiversity distribution and status in vegetation types			
1.1.7.4 Manual on monitoring and analysis protocols (Tamil and English)			
1.1.7.5 Undertake second surveys of biodiversity following 5-year interval			
1.1.7.6 Enter georeferenced data in biodiversity database/GIS			
1.1.7.7 Report on survey results (Tamil and English)			
1.2 Resource protection	299,468 4%	287,121	12,347
1.2.1 Strengthen resource protection	299,468	287,121	12,347
1.2.1.1 Solar-powered torches for night protection staff	280	256	24
1.2.1.2 Train village volunteers in resource protection skills	800	800	
1.2.1.3 Augment FD protection units with anti-poaching squads (1 FD staff per squad of 4 villagers)			
1.2.1.4 Annual training fellowships awarded to meritorious anti-poaching staff	7,000	7,000	
1.2.1.5 Monitor incidences of fire, poaching and encroachment in PAs and RFs	158,988	156,025	2,963
1.2.1.6 Consolidation of forest boundaries by construction of RF Cairns	132,400	123,040	9,360
1.2.1.7 Enter georeferenced data in biodiversity database/GIS			
1.3 Mitigate human-wildlife conflict	214,724 3%	212,224	2,500
1.3.1 Train field staff and village volunteers in wildlife conflict management	250	250	
1.3.1.1 Procure contractors/partners			
1.3.1.2 Establish anti-depredation squads to help protect revenue lands from wildlife			
1.3.2 Identify and manage traditional migratory routes (elephant and gaur)	3,800	3,800	
1.3.2.1 Procure contractors/partners			
1.3.2.2 Review historic data and information on large mammal movements	1,000	1,000	
1.3.2.3 Monitor migratory movements of wildlife (elephant and gaur) using GPS	1,000	1,000	
1.3.2.4 Consolidate existing corridors and designate new ones, based on monitoring results			
1.3.2.5 Drive elephant back to forest and corridors	1,800	1,800	
1.3.2.6 Enter georeferenced data in biodiversity database/GIS			
1.3.3 Establish wildlife-proof barricades around villages	210,674	208,174	2,500
1.3.3.1 Provide and maintain for 5 years elephant-proof trenching where appropriate	100,000	100,000	
Maintenance	25,000	25,000	
1.3.3.2 Provide and maintain for 5 years solar-powered fencing where appropriate	45,774	45,774	
Maintenance	10,000	10,000	
1.3.3.3 Monitor incidences of human-wildlife conflict	1,800	1,800	
1.3.3.4 Monitor and report on effectiveness of wildlife-proof barricades around villages	1,800	1,800	
1.3.3.5 Translocate animals as required	1,800	1,800	
1.3.3.6 Establish and operate mobile veterinary facility	24,500	22,000	2,500
1.4 Ecologically sustainable development	116,728 2%	113,701	3,027
1.4.1 Socio-economic and forest dependency surveys of 63 village communities	6,352	5,759	593
1.4.1.1 Procure contractors/partners and hold state-level workshop	6,352	5,759	593
1.4.1.2 Survey socio-economic and forest dependence status at outset of Project			
1.4.1.3 Survey socio-economic and forest dependence status 5 years after initial survey			
1.4.1.4 Prepare and publish manual on survey and analysis protocols (Tamil and English)			
1.4.1.5 Enter georeferenced data in 'peoples' database/GIS			
1.4.1.6 Report on survey results (Tamil and English)			
1.4.2 Community biodiversity registers	19,044	17,266	1,778
1.4.2.1 Procure contractors/partners and hold state-level workshop	7,817	7,087	730

Project activity	Total Project Cost (Rs. 1,000)		
	Total	JICA Loan	TN State Fund
1.4.2.2 Train field staff and village ecotourism guides in compiling biodiversity registers			
1.4.2.3 Provide communities with expertise in plant/animal identification, survey methods, oral history etc to record biodiversity			
1.4.2.4 Survey biodiversity in village revenue lands and ecotourism sites/routes			
1.4.2.5 Enter georeferenced data in biodiversity database/GIS			
1.4.2.6 Produce guide books, posters etc for ecotourists in 3 languages (Tamil, Hindi, English)	11,227	10,178	1,048
1.4.3 Eco-development activities in villages abutting PAs in 30 villages	17,287	17,101	186
1.4.3.1 Procure contractors/partners and hold state-level workshop	1,987	1,801	186
1.4.3.2 Orientate communities on scope and purpose of Project			
1.4.3.3 Assess socio-economic and ecological infrastructure of villages and their periphery as needed			
1.4.3.4 Establish and train mixed gender field staff teams to design and facilitate participatory processes using appropriate tools			
1.4.3.5 Facilitate participatory planning of eco-development plans			
1.4.3.6 Facilitate study tours to expose EDCs to other successful VCFs/EDCs/SHGs			
1.4.3.7 Establish protocols and coordination mechanisms with appropriate village institutions (Panchayat and/or Grama Sabha)			
1.4.3.8 Constitute EDCs and their Executive Committees			
1.4.3.9 Identify and prioritise viable livelihood options (linked to CBRs and socio-economic/forest dependancy surveys)			
1.4.3.10 Prepare eco-development plans, addressing socio-economic and ecological requirements and opportunities through series of business plans			
1.4.3.11 Implement eco-development plans via series of business plans for eco-enterprises, including skills training programmes	15,000	15,000	
a) Basic amenities			
b) Protection and management of natural resources			
c) Water augmentation and agriculture and allied development			
d) Revolving funds			
1.4.3.12 Participatory assessment of impacts of interventions	300	300	
1.4.4 Ecologically sustainable development in 33 tribal villages peripheral to RFs	19,131	18,916	215
1.4.4.1 Procure contractors/partners and hold state-level workshop	2,301	2,086	215
1.4.4.2 Orientate communities on scope and purpose of Project			
1.4.4.3 Assess socio-economic and ecological infrastructure of villages and their periphery			
1.4.4.4 Establish and train mixed gender field staff teams to design and facilitate participatory processes using appropriate tools			
1.4.4.5 Facilitate participatory planning of micro-plans			
1.4.4.6 Facilitate study tours to expose VCFs/SHGs to other successful VCFs/EDCs/SHGs			
1.4.4.7 Establish protocols and coordination mechanisms with appropriate village institutions (Panchayat and/or Grama Sabha)			
1.4.4.8 Constitute VCFs/SHGs and their Executive Committees			
1.4.4.9 Identify and prioritise viable livelihood options (linked to CBRs and socio-economic/forest dependancy surveys)			
1.4.4.10 Prepare eco-development plans, addressing socio-economic and ecological requirements and opportunities through series of business plans			
1.4.4.11 Implement eco-development plans via series of business plans for eco-enterprises, including skills training programmes	16,500	16,500	
a) Basic amenities			
b) Protection and management of natural resources			
c) Water augmentation and agriculture and allied development			
1.4.4.12 Participatory assessment of impacts of interventions	330	330	
1.4.5 Community-based ecotourism in 25 sites	54,915	54,660	255
1.4.5.1 Procure contractors/partners and hold state-level workshop	2,730	2,475	255
1.4.5.2 Assess socio-economic infrastructure of villages and opportunities for ecotourism based on natural and cultural heritage			
1.4.5.3 Visit candidate sites, assess potential ecotourism activities and identify opportunities for synergy within clusters of sites			

Project activity	Total Project Cost (Rs. 1,000)		
	Total	JICA Loan	TN State Fund
1.4.5.4 Develop ecotourism strategies for clusters of sites, with feasibility studies of target sites and synergies between sites			
1.4.5.5 Constitute ecotourism SHGs in the absence of EDCs or VFCs			
1.4.5.6 Develop Business Plans for ecotourism enterprises, including skills training programmes			
1.4.5.7 Implement Business Plans and establish ecotourism enterprises			
a) Construction of tourism-related infrastructure	37,000	37,000	
b) Equipment (powered by renewable resources)	14,485	14,485	
c) Training of community members (hospitality, catering, lodge management, nature and culture guiding, health & safety etc.)	700	700	
d) Revolving funds			
1.4.5.8 Develop Village Ecotourism Charters as benchmark for participatory monitoring of sustainability of interventions			
2 INCREASING THE NATURAL RESOURCE BASE	1,853,867	27%	1,843,413
2.1 Tree Cultivation on Private Land	1,783,955	26%	1,773,500
2.1.1 Village Cluster Selection Including Rapid Appraisal	221	200	21
2.1.1.1 Multi-criteria based screening of villages	110	100	10
2.1.1.2 Preparing guidelines for Rapid Appraisal	110	100	10
2.1.1.3 Orientation of DMU / FMU staff in RA process and tools			
2.1.1.4 Rapid Appraisal of potential villages			
2.1.1.5 Village-wise Rapid Appraisal Reports			
2.1.1.6 Preparation of list of selected villages			
2.1.2 Procurement of Resource Organizations for each cluster	110,300	100,000	10,300
2.1.3 Village Entry & Formation of FIGs for TCPL	40,110	40,100	10
2.1.3.1 Awareness programmes on scope, purpose and protocols of TCPL	40,000	40,000	
2.1.3.2 Preparing guidelines for FIG	110	100	10
2.1.3.3 Formation of FIGs			
2.1.3.4 Exposure visit for FIG & SHG members			
2.1.4 Preparation of Village Microplan	110	100	10
2.1.4.1 Manual on Micro-planning for TCPL	110	100	10
2.1.4.2 Training of staff and FIG representatives in microplanning			
2.1.4.3 Baseline survey of farmers and potential land for TCPL			
2.1.4.4 Participatory Assessment & Planning			
2.1.4.5 Approval of Micro-plan and Annual Action Plan			
2.1.5 Implementation of Microplan (Annual Action Plan)	1,257,000	1,257,000	
2.1.5.1 Organizing farmer-industry meetings			
2.1.5.2 Establishing cluster nurseries			
2.1.5.3 Planting operations			
a) Timber & miscellaneous species			
Nursery operation	476,000	476,000	
Planting operation	532,000	532,000	
b) Casuarina			
Nursery operation	99,000	99,000	
Planting operation	150,000	150,000	
2.1.5.4 Training of FIG & SHG members related to maintenance & management			
2.1.6 Survival survey and distribution of survival incentives	357,610	357,600	10
2.1.6.1 Manual for Participatory Monitoring and Evaluation and Survival Survey	110	100	10
2.1.6.2 Training of FIG, SHG and FMU on PME			
2.1.6.3 Participatory Monitoring & Evaluation			
2.1.6.4 PME Report including Seedling Survival Survey			
2.1.6.5 Distribution of survival incentives			
a) Timber & miscellaneous species	350,000	350,000	
b) Casuarina	7,500	7,500	
2.1.7 Facilitating support infrastructure and mechanisms for marketing of farm-forestry products	18,603	18,500	103
2.1.7.1 Designing and establishing Wood Market Information System	1,103	1,000	103
2.1.7.2 Linking FIGs with wood-based & NWFP based industries	7,500	7,500	
2.1.7.3 Organising common meetings of FIG members at Taluk / Range level	10,000	10,000	

Project activity	Total Project Cost (Rs. 1,000)		
	Total	JICA Loan	TN State Fund
2.1.7.4 Facilitating formation and strengthening of TG(C)S			
2.1.7.5 Training and exposure for TG(C)S representatives/ farmers/ SHG members			
2.2 Research on Production Forestry / Agro-forestry / Farm Forestry	69,913	1%	69,913
2.2.1 Research on Timber Production	20,557		20,557
2.2.1.1 Second generation and First generation seed orchards, seed stands Seed Production area	7,909		7,909
2.2.1.2 Hedge stool nursery for clones of species taken	1,408		1,408
2.2.1.3 Clonal evaluation trials and progeny trials	9,240		9,240
2.2.1.4 Production of clonal plants	2,000		2,000
2.2.2 Research on Fuel Wood Production	5,363		5,363
2.2.2.1 Maximising fuel wood production in different tree species.	5,363		5,363
2.2.3 Research on Agro Forestry	4,278		4,278
2.2.3.1 Evaluation of agriculture crops as inter crop - effect of irrigation on tree species and agri crop, growth rate of tree species, Genetic Combing of Agro Forestry tree species, cultural package for NTFP Species.	2,310		2,310
2.2.3.2 Multiplication of clones through micro and macro propagation	1,000		1,000
2.2.3.3 Fruit yield table for NTFP species in Agro Forestry	440		440
2.2.3.4 Post harvest technology and timber testing and treatment for various immature timbers grown under Agro Forestry.	528		528
2.2.4 Research on Bamboo	5,865		5,865
2.2.4.1 On farm trials and off farm trials of various bamboo species including introduction of bamboo species, reeds, canes in various forest types	3,115		3,115
2.2.4.2 Standardization of protocol medium in tissue culture lab	510		510
2.2.4.3 Standardisation of rooting technique for Macropropagation	440		440
2.2.4.4 Bamboo as reinforcement material - Partially replacing steel	1,100		1,100
2.2.4.5 Multiplication of 10 Bamboo varieties.	700		700
2.2.5 Research on Bio-fertilizers	2,200		2,200
2.2.5.1 Isolation of Phosphobacteria, Rhizobium and VAM	1,650		1,650
2.2.5.2 Establishment of Sandal seedlings with inoculation of Bio-fertilizers	550		550
2.2.6 Research of Afforestation of problems sites.	4,550		4,550
2.2.6.1 Growing vegetation on sheet rock, tree growing on bouldary site with different SMC meas	4,550		4,550
2.2.7 Research on Wood Market (Assessment of wood market characteristics in Tamilnadu)	2,000		2,000
2.2.8 Research on <i>Prosopis juliflora</i> (Study on ecological and socio-economic impact of prosopis and <i>Lantana camara</i> infestation and their removal on Forest, common and fallow	5,200		5,200
2.2.9 Research on Multi-tier forest management	5,200		5,200
2.2.9.1 Introduction of understory and middlestorey crops in natural forest plots			
2.2.9.2 Silviculture and management of the multi-tier forest			
2.2.10 Research on NTFP management	14,700		14,700
2.2.10 Develop resource assessment methodologies			
2.2.11 Establishing Non-destructive harvesting regime for different NTFPs			
2.2.12 Grading, processing and value addition of different NTFPs			
3 SUPPORTING ACTIVITIES	2,333,663		945,067
3.1 Capacity Development	137,295		137,213
3.1.1 Training Needs Analysis	882	0%	800
3.1.2 Knowledge and Skill Development	75,647	1%	75,647
3.1.2.1 Preparatory Workshop	600		600
3.1.2.2 Project orientation	5,158		5,158
a) Project orientation to Forest Guards, Watchers	1,186		1,186
b) Project orientation to Foresters and Rangers	1,278		1,278
c) Project orientation to Assistant/Deputy Conservators of Forests	692		692
d) Project orientation two days workshop for senior officers 50 persons in the level of	284		284
e) Project orientation to ministerial and supporting staff	799		799
f) Project orientation to resource organizations	320		320
g) Orientation at Circle level (DMU FMU staff and ministerial staff)	600		600
3.1.2.3 Managerial Training	6,453		6,453
a) Training on Public Relations, stress management and communication to the Forest Guards and Foresters	1,540		1,540

Project activity	Total Project Cost (Rs. 1,000)		
	Total	JICA Loan	TN State Fund
b) Training on Interpersonal Relationship, Communication & Stress Management, accounting to Rangers	828	828	
c) Training on Interpersonal Relationship, Communication & Stress Management, project management and M&E to Assistant/Deputy Conservators of Forests.	921	921	
d) Training on Public Relations, Stress Management to the Conservators of Forests and Chief Conservators of Forests.	170	170	
e) Training on stress management, office Administration, district office manual & disciplinary proceeding to the Ministerial staff.	2,070	2,070	
f) Training on basics of vehicle maintenance & First Aid to the Drivers and Guard cum	924	924	
3.1.2.4 Thematic training for project staff (domestic)	<u>6,403</u>	<u>6,403</u>	
a) Participatory approach: RRA, RRA and Microplanning (Forester/ F.Guards)	828	828	
b) Refreshers training on participatory approach and practice (Forester/ F.Guards)	828	828	
c) Formation, strengthening, and management of CBOs / Gender mainstreaming and emerging development paradigms (Forester/ F.Guards)	1,035	1,035	
d) Revolving fund management, business development support (Forester/ F.Guards)	828	828	
e) Marine biodiversity conservation and monitoring	1,176	1,176	
f) Trainers training on Agroforestry and extension - outside the state (for staff of forest extension center)	750	750	
g) Trainers training for extension work- (within the state (for staff of forest extension	750	750	
h) Faculty training for TNFA & TNFTC (outside/within the state)	208	208	
3.1.2.5 Training on PC, GIS and MIS	<u>7,171</u>	<u>7,171</u>	
a) Training on basic Computer knowledge	4,554	4,554	
b) GPS based Survey and Mapping	584	584	
c) Training on Paper based 'Data Recording Registers' and 'Monthly Reporting Formats (local training by master trainers)	900	900	
d) Training on Web based MIS Software (in-situ training by master trainers)	180	180	
e) Training on GIS at National level institute	629	629	
f) Master's training for paper based MIS	115	115	
g) Master's training for software based MIS -1	120	120	
h) Master's training for software based MIS -2 (refreshers)	89	89	
3.1.2.6 Exposure visits related to project oriented subjects	<u>7,228</u>	<u>7,228</u>	
a) Exposure visit on successful FMIS system	188	188	
b) Farmers exposure visit to successful plantation area & Agroforestry models (within	7,040	7,040	
3.1.2.7 Overseas training and study tour for project staff	<u>36,693</u>	<u>36,693</u>	
a) Training on Sustainable Forest Management and Bio-diversity conservation	1,166	1,166	
b) Training on Sustainable Wildlife and habitat management for Guindy national park	1,199	1,199	
c) Training on Community based Eco tourism for conservation and developmen	2,943	2,943	
d) Training on biodiversity conservation and monitoring	2,943	2,943	
e) Training on Integrated land use planning & Environmental impact assessment	2,332	2,332	
f) Training on Remote sensing and GIS in Natural Resources Management	2,332	2,332	
g) Training on Participatory Action Research for Community based Natural Resource Management	2,332	2,332	
h) Training on Community based Integrated Watershed Management	2,943	2,943	
i) Training of trainers for faculty/staff of TNFA, SFRI, and Extension Centre	5,396	5,396	
j) Training on development of GIS & MIS overseas for GIS unit	2,398	2,398	
k) Training on Carbon sequestration training for 5 senior officers	2,014	2,014	
l) Participation of forest officers in International seminar /workshop	2,654	2,654	
m) Exposure visit inter-national centres for implement conservation plans (dugong)	6,043	6,043	
3.1.2.8 Need-based training	<u>5,940</u>	<u>5,940</u>	
a) Exposure visits related to project oriented subjects as required	940	940	
b) Livelihood enhancement and other related to project oriented subjects as required	5,000	5,000	
3.1.3 Workshops and Conference/ Seminars	<u>5,000</u> 0%	<u>5,000</u>	
3.1.3.1 Organising national seminar	2,000	2,000	
3.1.3.2 Organize international workshop	3,000	3,000	
3.1.4 Review Meetings	<u>10,400</u> 0%	<u>10,400</u>	
3.1.4.1 Annual consultative / review meetings at state level	800	800	
3.1.4.2 Biannual consultative / review meetings at circle level	9,600	9,600	

Project activity	Total Project Cost (Rs. 1,000)		
	Total	JICA Loan	TN State Fund
3.1.5 Enhanced Outreach and Environmental Education	45,366 1%	45,366	
3.1.5.1 Website creation	200	200	
a) Project website including Ecotourism website	200	200	
3.1.5.2 Publicity Activities	13,568	13,568	
a) Publicity through wall paintings	6,400	6,400	
b) Conducting exhibition at district level	6,400	6,400	
c) Writing publicity boards with messages of awareness creation	768	768	
3.1.5.3 Awareness Generation	22,298	22,298	
a) Eco education to teachers and school children of 10 schools in 25 Districts.	4,420	4,420	
b) Education to school children on marine biodiversity for 7 coastal districts	1,238	1,238	
c) Conducting street play / puppet show	6,400	6,400	
d) Rewards to farmers / NGOs / students / Schools and Extension Staff at district level	10,240	10,240	
3.1.5.4 Publication	9,300	9,300	
a) Newsletter	1,500	1,500	
b) Guidelines, Manuals, and Reports	2,800	2,800	
c) Poster/ Pamphlet	2,000	2,000	
d) Videography	3,000	3,000	
3.2 Monitoring & Evaluation	33,836 1%	32,024	1,812
3.2.1 Web-enabled management Information System (MIS)	6,739	6,110	629
3.2.1.1 Software development cost (additional module only)	386	350	36
3.2.1.2 Maintenance of MIS software	6,353	5,760	593
3.2.2 Computerized Financial Management and Accounting System (FMAS)	221	200	21
3.2.2.1 Software development cost (additional module only)	221	200	21
3.2.2.2 Maintenance of MIS software (the cost is included in Item 5.1.1.2)			
3.2.3 Periodic Reviews and Assessments	7,104	7,104	
3.2.3.1 Monthly Review at Circles level (12 Circle x 12 months x 8 year = 1,152 nos.)	2,304	2,304	
3.2.3.2 Annual assessment at Circle level (12 Circles x 8 years = 96 nos.)	4,800	4,800	
3.2.4 Studies	2,206	2,000	206
3.2.4.1 Studies under Biodiversity Conservation Component (including Ecological Sustainable			
3.2.4.2 Studies under TCPL			
3.2.4.3 Short Studies	2,206	2,000	206
3.2.5 Baseline and Socio-economic Impact Evaluation Surveys	11,196	10,240	956
3.2.5.1 Baseline survey	2,559	2,320	239
3.2.5.2 Mid-term/ End-term evaluation	7,677	6,960	717
3.2.5.3 Quarterly concurrent monitoring and reporting (4 times x 12 Circles x 8 years)	960	960	
3.2.6 Participatory M&E by community (twice in project life)	3,082	3,082	
3.2.7 Social audits including Grievance Redressal Mechanism (every 6 months in 137 EDC village)	3,288	3,288	
3.2.8 Video and photo documentation (the cost of equipment included in Items 3.4.1 - 3.4.3)			
3.3 Construction of Buildings	320,548 5%	313,540	7,008
3.3.1 Construction of PMU office building at Chennai (1)	130,000	126,100	3,900
3.3.2 Construction of Forest Inspection Bungalow (6)	9,000	8,729	271
3.3.3 Construction of Circle offices (2)	8,600	8,515	85
3.3.4 Construction of District offices (8)	24,000	23,762	238
3.3.5 Construction of Range offices (58)	63,800	63,167	633
3.3.6 Construction of Forestry Extension centres at Tiruppur and Ariyalur districts (2)	6,000	5,941	60
3.3.7 Construction of Forestry Extension Offices - office buildings (26)	33,800	33,465	335
3.3.8 Construction of Van shed for Forestry Extension Centres (12)	2,864	2,750	115
3.3.9 Construction of modern interpretation centre at Nanmangalam of Kancheepuram Districts (1)	9,733	9,392	341
3.3.10 Construction of interpretation hass in the existing extension centre area - Trichy, Coimbatore, Tirunelveli, Madurai and Namakkal (2)	11,516	11,113	403
3.3.11 Construction of GIS cum Bio-diversity Laboratory at training college, Vaigaidam (1)	7,500	7,238	263
3.3.12 Antipoaching camp building (26)	13,735	13,369	366
3.4 Augmentation of Office Facilities & Equipment	124,480 2%	113,807	10,672
3.4.1 At PMU	5,500	5,022	477
3.4.1.1 Desktop computer including office software and accessories	1,940	1,752	188
3.4.1.2 Notepads (Lap top) including office software and accessories	1,070	997	72

Project activity	Total Project Cost (Rs. 1,000)		
	Total	JICA Loan	TN State Fund
3.4.1.3 Printer (Laser)	339	309	29
3.4.1.4 Printer (Dot Matrix)	205	187	18
3.4.1.5 Table, Charis etc.	576	526	50
3.4.1.6 A4 size scanner	109	99	10
3.4.1.7 Copier/ Fax	131	120	11
3.4.1.8 UPS 1 KVA	876	800	76
3.4.1.9 Handycam	85	78	7
3.4.1.10 Digital camera	68	62	6
3.4.1.11 Upgradation of hardware and software	100	91	9
3.4.2 At Circle Offices (12 nos.)	8,001	7,339	662
3.4.2.1 Desktop computer including office software and accessories	1,455	1,314	141
3.4.2.2 Notepads (Lap top) including office software and accessories	2,567	2,393	174
3.4.2.3 Printer (Laser)	406	371	35
3.4.2.4 Printer (Dot Matrix)	223	204	19
3.4.2.5 Table, Charis etc.	480	438	42
3.4.2.6 A4 size scanner	653	596	57
3.4.2.7 Copier/ Fax	788	720	69
3.4.2.8 UPS 1 KVA	657	600	57
3.4.2.9 Handycam	342	312	30
3.4.2.10 Digital camera	328	300	29
3.4.2.11 Upgradation of hardware and software	100	91	9
3.4.3 At DMUs (66 nos)	32,476	29,704	2,773
3.4.3.1 Desktop computer including office software and accessories	8,004	7,227	777
3.4.3.2 Notepads (Lap top) including office software and accessories	7,059	6,582	478
3.4.3.3 Printer (Laser)	1,117	1,020	97
3.4.3.4 Printer (Dot Matrix)	614	561	53
3.4.3.5 Table, Charis etc.	1,056	964	92
3.4.3.6 A4 size scanner	3,592	3,276	316
3.4.3.7 Copier/ Fax	4,336	3,959	377
3.4.3.8 UPS 1 KVA	3,614	3,300	314
3.4.3.9 Handycam	1,879	1,716	163
3.4.3.10 Digital camera	903	825	78
3.4.3.11 Upgradation of hardware and software	300	274	26
3.4.4 At FMUs (202 nos.)	40,276	36,650	3,626
3.4.4.1 Desktop computer including office software and accessories	12,249	11,060	1,190
3.4.4.2 Printer (Dot Matrix)	1,881	1,717	164
3.4.4.3 Table, Charis etc.	1,616	1,475	141
3.4.4.4 Copier/ Fax	13,271	12,118	1,153
3.4.4.5 UPS 1 KVA	5,531	5,050	481
3.4.4.6 Digital camera	5,528	5,048	480
3.4.4.7 Upgradation of hardware and software	200	183	17
3.4.5 At Extension Centers (32 nos.)	6,449	5,868	580
3.4.5.1 Desktop computer including office software and accessories	1,940	1,752	188
3.4.5.2 Printer (Dot Matrix)	298	272	26
3.4.5.3 Table, Charis etc.	256	234	22
3.4.5.4 Copier/ Fax	2,102	1,920	183
3.4.5.5 UPS 1 KVA	876	800	76
3.4.5.6 Digital camera	876	800	76
3.4.5.7 Upgradation of hardware and software	100	91	9
3.4.6 Geomatic center	13,859	12,865	994
3.4.6.1 GIS window based work station including office software and accessories	1,154	1,070	84
3.4.6.2 Notepads (Lap top) including office software and accessories	214	199	14
3.4.6.3 GIS application software			
a) Arc GIS v 9.3 (Arc View) Windows	316	288	27
b) Arc GIS v 9.3 (Arc Editor, Spatial Analyst, 3D Analyst) Windows	2,574	2,350	224
c) Erdas 8.7 (for Windows)	2,081	1,900	181

Project activity	Total Project Cost (Rs. 1,000)		
	Total	JICA Loan	TN State Fund
3.4.6.4 A4 size scanner	54	50	5
3.4.6.5 A3 size Laser jet printer (Color)	484	442	42
3.4.6.6 A0 size plotter	1,096	1,001	95
3.4.6.7 UPS 10KVA	416	380	36
3.4.6.8 Upgradation of hardware and software	3,286	3,000	286
3.4.6.9 Acquisition of satellite images and FSI digital data for GIS analysis & interpretation			
a) LISS-III (2007-2011 for 2 seasons - 15 no. x 2 seasons X 2 Years AND during end of 3rd year after plantation - 15 no. x 2 seasons)	630	630	
b) LISS-IV (covering roughly 25% of geographical area of the state X 2 Years)	708	708	
c) Cartosat-1 (covering roughly 25% of geographical area of the state X 2 Years)	688	688	
d) Village map (from Survey of India- Open Map Series)	158	158	
3.4.7 GIS gadgets & tools for geomatic center, DMUs and FMUs	17,918	16,358	1,560
3.4.7.1 Hand held GPS	10,941	9,990	951
3.4.7.2 Mobile GPS (Vehicle mounted)	409	370	39
3.4.7.3 PDA	6,569	5,998	571
3.4.8 Equipment & tools for resource protection (the cost is included in Item 1.2.1 "Resource Prot			
3.5 Strengthening Mobility	116,790 2%	106,629	10,161
3.5.1 Staff car	14,250	13,010	1,240
3.5.2 Jeeps	79,200	72,310	6,890
3.5.3 Wildlife Safari van	18,840	17,201	1,639
3.5.4 35 Seater Bus for extension study and study tour purpose	4,500	4,109	392
3.6 Project management	1,600,714 24%	241,853	1,358,861
3.6.1 Preparatory Works			
3.6.1.1 Forming Empowered Committee			
3.6.1.2 Creation of Project Management Unit (PMU)			
3.6.1.3 Preparation of Operation Manual of PMU			
3.6.1.4 Posting additional staff for DMUs/FMUs			
3.6.1.5 Recruitment of project staff from the open market (PMU)			
3.6.2 Personnel Cost	1,333,928 20%	241,853	1,092,075
3.6.2.1 Governmental staff	<u>1,092,075</u>		<u>1,092,075</u>
a) PMU Staff	223,170		223,170
b) Staff at Circle	24,983		24,983
c) DMU Staff	247,420		247,420
d) FMU Staff	596,502		596,502
3.6.2.2 Contractual staff	<u>241,853</u>	<u>241,853</u>	
a) PMU Staff	15,640	15,640	
b) Staff at Circle			
c) DMU Staff	226,213	226,213	
d) FMU Staff			
3.6.3 Running and Maintenance Cost (20% of personnel cost)	266,786 4%		266,786
4 Sub-total (1~3)	5,241,245	3,817,505	1,423,740
5 Price Contingency	787,679	496,825	290,854
6 Sub-total (4 + 5)	6,028,925	4,314,330	1,714,595
7 Physical Contingency	602,892	431,433	171,459
8 Subtotal (6 + 7)	6,631,817	4,745,762	1,886,054
9 CONSULTING SERVICES (including price escalation and contingency)	118,683 2%	107,601	11,083
9.1 Base cost	90,310	90,310	
9.2 Contingency (price escalation + physical contingency)	17,291	17,291	
9.3 Service Tax	11,083		11,083
10 GRAND TOTAL (8 + 9)	6,750,500	4,853,363	1,897,137

72% 28%

Annexure 9.1 Environmental Checklist

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
1 Permits and Explanation	(1) EIA and Environmental Permits	① Have EIA reports been officially completed? ② Have EIA reports been approved by authorities of the host country's government? ③ Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? ④ In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	① EIA reports are not necessary for the project according to the EIA notification in India. ② Environmental clearance is not necessary. ③ Environmental clearance is not necessary. ④ None
	(2) Explanation to the Public	① Are contents of the project and the potential impacts adequately explained to the public based on appropriate procedures, including information disclosure? Is understanding obtained from the public? ② Are proper responses made to comments from the public and regulatory authorities?	① Trial public consultation meetings were held by TNFD on 6th and 7th August 2010. The result will be reported to the Environmental and Social Considerations Review Division of JICA. ② Not yet. The proper responses are made by TNFD.
2 Mitigation Measures	(1) Air Quality	① Do air pollutants, such as dust, soot and dust, sulfur oxides (SOx), nitrogen oxides (NOx), and organic chemical substances emitted from various sources, such as logging operations, forest products manufacturing processes, and incinerators comply with the country's emission standards and ambient air quality standards?	① No. Air pollutants will not be emitted.
	(2) Water Quality	① Is there a possibility that the use of chemicals, such as fertilizers, and agrochemicals will cause water pollution? ② Where facilities, such as forest products manufacturing facilities are installed, do effluents from the facilities comply with the country's effluent standards and ambient water quality standards?	① No. Agricultural chemicals will not be used. ② Facilities, such as forest products manufacturing facilities will not be installed. Small buildings will be constructed and wastewater will be discharged. However, the amount is little and the effluent satisfy the standards of Water Prevention and Control of Pollution Act.
	(3) Wastes	① Are wastes properly treated and disposed of in accordance with the country's standards?	① Wastes will be generated around ecotourism sites but the amount is small and will properly collected by the solid collection system of municipalities.
	(4) Soil Contamination	① Are adequate measures taken to prevent contamination of soil and groundwater by use of chemicals, such as agrochemicals?	① Agricultural chemicals will not be used in the project.
3 Natural Environment	(1) Protected Areas	① Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	① Yes. The target areas of the project include protected areas. However, the project is nature conservation and improvement project and mainly provides positive impacts.

Annexure 9.1 Environmental Checklist

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
3 Natural Environment	(2) Ecosystem	① Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? ② Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? ③ Is there a possibility that changes in localized micro-meteorological conditions, such as solar radiation, temperature, and humidity due to a large-scale timber harvesting will affect the surrounding vegetation? ④ Is there a possibility that a large-scale timber harvesting will result in loss of breeding and feeding grounds for wildlife? ⑤ In the case of reforestation projects, is there a possibility that mono-species plantations will adversely affect wildlife habitats? Is there a possibility that mono-species plantations will cause outbreaks of pests? ⑥ If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?	① Yes. The target areas of the project include ecological valuable habitats. However, the project is carried out to conserve the ecological valuable habitats and mainly provides positive impacts. ② Yes. The target areas of the project include the protected habitats of endangered species. However, the project is carried out to protect the endangered species and mainly provides positive impacts. ③ No. The project increase vegetation and act on maintaining the climate. ④ No. The project increase vegetation and habitats of wildlife. ⑤ The project is biodiversity conservation project, but afforestation is included. However, mixed-species will be planted in each afforestation area, the afforestation areas are scattered and possibility to affect wildlife is not expected. Monitoring will be conducted about outbreaks of pests. ⑥ Significant ecological impacts are not anticipated.
	(3) Hydrology	① Is there a possibility that alteration of rainwater runoff and runoff characteristics due to a large-scale timber harvesting and access road construction will cause impacts on the hydrology of the surrounding areas? ② Is there a possibility that decreased water retention capacity due to deforestation will affect the existing drainage patterns of the forest?	① No. There is no large-scale timber harvesting in the project and impacts on the hydrology is not expected. ② No. The project will increase the water retention capacity.
	(4) Topography and Geology	① Is there a possibility that loss of forest stability due to timber harvesting will cause slope failures or landslides?	① Yes with removal of exotic species. However, mitigation measures such as simultaneous planting and establishing water holes will be carried out, and slope failures and landslides will be minimal.
	(5) Management of Abandoned Sites	① Are adequate restoration and revegetation plans considered for the harvested areas? In particular, are adequate measures taken to prevent soil runoff from the harvested areas? ② Is a sustainable management system for the harvested areas established? ③ Are adequate financial provisions secured to manage the harvested areas?	① Yes. The project plans to continue planting. Simultaneous planting and establishing water holes will be carried out by TNFD. ② Yes. Training, education and compensation are provided to encourage sustainable management by TNFD. ③ Yes. Budget will be adequately allocated to manage the harvested areas by TNFD.

Annexure 9.1 Environmental Checklist

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
4 Social Environment	(1) Resettlement	① Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? ② Is adequate explanation on relocation and compensation given to affected persons prior to resettlement? ③ Is the resettlement plan, including proper compensation, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? ④ Does the resettlement plan pay particular attention to vulnerable groups or persons, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples? ⑤ Are agreements with the affected persons obtained prior to resettlement? ⑥ Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? ⑦ Is a plan developed to monitor the impacts of resettlement?	① No. Involuntary resettlement will not be caused by the project.
	(2) Living and Livelihood	① Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary? Is particular attention paid to the inhabitants whose livelihoods are based on primary industries, such as farming, raising livestock, or hunting and gathering in the forests? ② Are adequate measures taken to prevent illegal entry into the forestry resource areas from the outside through newly constructed access roads?	① No. Living conditions of inhabitants will not be affected. ② No. No road will be newly constructed.
	(3) Heritage	① Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage sites? Are adequate measures considered to protect these sites in accordance with the country's laws?	① The project will not directly affect religious, archaeological, and historical heritage site. The only point of concern would be cultural sites such as sacred tree, groves, etc. This would be identified and addressed during the surveys and micro planning exercise and ensure that no damage is made to them.
	(4) Landscape	① Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	① Yes, but the magnitude of negative impact is expected to be very little. Measures to use natural materials for ecotourism facilities will be taken.
	(5) Ethnic Minorities and Indigenous Peoples	① Does the project comply with the country's laws for rights of ethnic minorities and indigenous peoples? ② Are considerations given to reduce the impacts on culture and lifestyle of ethnic minorities and indigenous peoples?	① Yes. The project comply with the Scheduled Castes and Tribes (Prevention of Atrocities) Act, 1989. ② Yes. The project does not implement any work having negative impact to the cultural life style. Furthermore, microplan will be established under the discussion and agreement between the Scheduled Castes and Tribes at the beginning of implementation stage.

Annexure 9.1 Environmental Checklist

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
5 Others	(1) Impacts during Construction	① Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? ② If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? ③ If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts? ④ If necessary, is health and safety education (e.g., traffic safety, public health) provided for project personnel, including workers?	① Not yet. However, appropriate mitigation measures to address construction impacts have been developed by contractors. Basically the project does not include large construction and negative impact is expected to be little. ② Yes. Appropriate mitigation measures to address effects on the ecosystem will be developed. ③ Yes. Appropriate mitigation measures to address effects on the ecosystem will be developed. ④ Yes. Health and safety awareness will be provided.
	(2) Monitoring	① Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? ② Are the items, methods and frequencies included in the monitoring program judged to be appropriate? ③ Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? ④ Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	① Yes, An environmental monitoring plan for the identified negative impacts on environment will be developed by TNFD at the beginning of preparation stage referring to the other similar project and JICA's guideline. ② Not yet. However, appropriate environmental monitoring plan is expected to be prepared. ③ Yes. Appropriate monitoring organizations, personnel, equipment and budget shall be prepared in environmental monitoring plan. ④ No. It is not necessary to report from the proponent to the regulatory authorities.
6 Note	Reference to Checklist of Other Sectors	① Where necessary, pertinent items described in the Agriculture and Livestock Projects, and Irrigation Projects checklists should also be checked.	① Referring to checklist of other sectors, this checklist is enough to confirm of environmental and social consideration.
	Note on Using Environmental Checklist	① If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	① The proposed project will not involve any transboundary impacts or global environmental issues.

- 1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are mad, if necessary. In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan' experience).
- 2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which it is located.