UNITED NATIONS DEVELOPMENT PROGRAMME
Country: India

PROJECT DOCUMENT

Project Title: India High Range Landscape Project - Developing an effective multiple-use management framework for conserving biodiversity in the mountain landscape of the High Ranges, the Western Ghats, India.
UNDAF Outcome(s)/ Indicator(s): Inclusive and equitable growth policies and poverty reduction strategies of the Government are strengthened to ensure that most vulnerable and marginalized people in rural and urban areas have greater access to productive assets, decent employment, skill development, social protection and sustainable livelihoods.
UNDP Strategic Plan Primary Outcome: Mainstreaming biodiversity conservation and sustainable use into production landscapes.
Expected CPAP Outcome(s) /Output/Indicator(s): Sustainable management of biodiversity and land resource is enhanced.
Executing Entity/ Implementing Partner: UNDP India Country Office
Implementing Entity/ Responsible Partner: Department of Forests and Wildlife, Government of Kerala
Brief description: The project will put in place a cross-sectoral land use management framework, and compliance monitoring and enforcement system to ensure that development in production sectors such as tea, cardamom and tourism is congruent with biodiversity conservation needs – to achieve the long term goal of conserving globally significant biological diversity in the High Ranges of the Western Ghats. It will seek to establish a conservation compatible mosaic of land uses, anchored in a cluster of protected areas, by engineering a shift in governance approach towards a cross-sectoral, coordinated planning, implementation and compliance monitoring so that cumulative direct and indirect impacts of different production activities across economic sectors on biodiversity is managed, reduced and mitigated. The project will deliver three outcomes: Outcome 1: Effective governance framework for multiple-use mountain landscape management in place; Outcome 2: Multiple use mountain landscape management is applied securing the ecological integrity of HRML; Outcome 3. Strengthened capacities for community based sustainable use and management of wild resources. In addition to national and local benefits, the project will result in significant global benefits such as: (i) no net loss of major habitat blocks totalling 164,700 ha in the High Ranges of Western Ghats; (ii) improved management effectiveness of 8 existing PAs (37,100) and new PA covering unprotected areas (11,650) and at least 84,600 ha of high value biodiversity areas accorded higher protection status (iii) direct reduction in pressures from production sectors on biodiversity conservation; (iv) and maintaining stable populations of globally threatened species such as the Nilgiri tahr and Grizzled giant squirrel.

Programme Period: 2013-2018 **Atlas Award ID:** 00075746 **Atlas Project ID:** 00087493 **PIMS:** 4651 **Start date:** October 2013 **End Date:** September 2018 **Management Arrangements:** DIM	**Total budget:** US$ 36,275,000 **Total allocated resources (cash)**: US$ 6,275,000 **Partner-managed** o **Government** US$ 29,000,000 o **UNDP-managed** US$ 1,000,000

***Agreed by Implementing Partner (Government of India)**:*

NAME SIGNATURE
Date/Month/Year

Agreed by Responsible Partner (Government of Kerala):

NAME SIGNATURE
Date/Month/Year

Agreed by (UNDP):

NAME SIGNATURE
Date/Month/Year

Table of Contents

ACRONYMS

APR	Annual Project Review
ATLAS	UNDP's Enterprise Resources Platform
AWP	Annual Work Plan
BCPs	Biodiversity Conservation Plans
BDA	Biological Diversity Act
BSAP	Biodiversity Strategy and Action Plan
CB	Conservation Biologist
CBD	Convention on Biological Diversity
CBOs	Community Based Organisations
CEC	Centre for Education and Communication
CER	Corporate Environment Responsibility
CESS	Centre for Earth Science Studies
CDR	Combined Delivery Report
CHR	Cardamom Hill Reserve
CO	Country Office
COP	Conference of Parties
COS	Communication and Outreach Specialist
CP	(UNDP) Country Programme
CPAP	(UNDP) Country Programme Action Plan
CRC	Cardamom for Rainforest Conservation
CRS	Cardamom Research Station
CSO	Civil Society Organisation
CSR	Corporate Social Responsibility
CTCT	Community to Community Training
EB	Executive Body
EBA	Endemic Bird Area
EDC	Eco-Development Committee
EIA	Environmental Impact Assessment
EPA	Environmental (Protection) Act, 1986
FA	Financial Assistant
FAA	Financial and Administrative Assistant
FD	Forest Department
FDA	Forest Development Agency
FRA	Forest Right Act
GB	Governing Body
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Green House Gas
GoI	Government of India
GP	Grama Panchayat
HNL	Hindustan Newsprint Limited
HRML	High Range Mountain Landscape
HVBA	High Value Biodiversity Area
HRSDS	High Range Sustainable Development Society
HRWEPA	High Range Wildlife and Environment Preservation Association
IBA	Important Bird Area
IC	Incremental Cost
ICAR	Indian Council for Agricultural Research
IMG	Institute of Management in Government
INTACH	Indian National Trust for Art and Cultural Heritage
IP	Implementing Partner
IR	Inception Report
IUCN	World Conservation Union
IW	Inception Workshop
JFM	Joint Forest Management
JFMCs	Joint Forest Management Committees
KDH	Kanan Devan Hills
KDHP	Kanan Devan Hill Produce

KFD	Kerala Forest Department
KFDC	Kerala Forest Development Corporation
KFRI	Kerala Forest Research Institute
KILA	Kerala Institute of Local Administration
KITTS	Kerala Institute of Travel and Tourism Studies
KSBC	Kerala State Bamboo Corporation
KSEB	Kerala State Electricity Board
LLPMU	Landscape-Level Project Management Unit
LLLUP	Landscape Level Land Use Plan
LP	Landscape Plan
LPAC	Local Project Appraisal Committee
LSGs	Local Self Governments
M&E	Monitoring and Evaluation
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MoEF	Ministry of Environment and Forests
MSL	Mean Sea Level
NAPCC	National Action Plan on Climate Change
NBAP	National Biodiversity Action Plan
NCF	Nature Conservation Foundation
NFC	National Forest Commission
NGO	Non-government Organization
NIAS	National Institute of Advanced Studies
NPD	National Project Director
NPMU	National Project Management Unit
NTCA	National Tiger Conservation Authority
NTFP	Non Timber Forest Produce
PA	Project Associate
PAs	Protected Areas
PCCF	Principal Chief Conservator of Forests
PFM	Participatory Forest Management
PIMS	Project Information Management System
PIR	Project Implementation Review
PC	Project Coordinator
PM	Project Manager
PPG	Project Preparation Grant
PRIs	Panchayati Raj Institutions
PSC	Project Steering Committee
PWD	Public Works Department
RCU	Regional Coordination Unit
RGCB	Rajiv Gandhi Centre for Biotechnology
RKVY	Rashtriya Krishi Vignan Yojana
SBAA	Standard Basic Assistance Agreement
SC	Scheduled Caste
SE	Subject Expert
SELS	Socio-economic and Livelihoods Specialist
SHG	Self-Help Group
SO-2	(GEF's) Strategic Objective 2 (under the Biodiversity Focal Area)
SPD	State Project Director
SPMU	State Project Management Unit
SPSC	State Project Steering Committee
SRF	Strategic Results Framework
ST	Scheduled Tribe
TAG	Technical Advisory Group
TOR	Terms of Reference
TPR	Tri-partite Review
TTR	Terminal Tri-partite Review
ULOs	Unit Level Organisations
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNDP-CO	United Nations Development Programme – Country Office

UNDP-GEF	United Nations Development Programme – Global Environment Facility Unit
UPASI	United Planters Association of South India
USD	United States Dollar
VLI	Village Level Institutions
VSS	Van Samrakshana Samiti
WCMC	World Conservation Monitoring Centre
WTI	Wildlife Trust of India
WWF	World Wide Fund for Nature

I. Situation Analysis

A: CONTEXT

National context

1. Encompassing 27 percent of the Earth's land surface (across all continents, latitudes and principal biomes), mountains support a broad spectrum of biological diversity and provide diverse goods and services to well over half of the world's seven billion people (Price *et al.*, 2011[1] and ICIMOD, 2010[2]). They harbor a significant portion of distinct ethnic groups, remnants of cultural traditions, environmental knowledge, complex agro-cultural gene pools and traditional management practices and habitat adaptations (CBD, 2012).[3] Since the Rio Summit in 1992, there has been increasing global awareness of the importance of mountain areas. For instance, the Rio +20 Conference on Sustainable Development (2012) reiterated that the benefits derived from mountains are essential for sustainable development and called for greater efforts towards their conservation.[4]

2. In India, mountains account for a majority of its 4 (of 34 in the world) global 'biodiversity hotspots', namely the Himalayas; Indo-Burma; the Western Ghats and Sri Lanka; and Sundaland.[5] India's mountain regions cover an area close to 100 million ha (around 30 percent of India's landmass) (MoEF, 2009)[6,] that constitutes more than 90 percent of the 'biodiversity hotspots' in the country.

3. Running parallel to the west coast, the Western Ghats, also known as Sahyadris, form the fluted western edge of the Indian peninsular plateau, which are stable Archaean and Pre-Cambrian formations (Nair, 1991).[7] These mountains, making up around 4.8 percent of India's land area, pass through the Indian states of Gujarat, Maharashtra, Goa, Karnataka, Tamil Nadu and Kerala. The average elevation is 1,200 m above MSL, that increases to around 2000 msl towards the south (NFC, 2006).[8] The mountain ranges in the south also house the highest peaks south of Himalayas in India viz., Anaimudi (High Ranges), Misappuli Malai (High Ranges) and Doddabetta (Nilgiri Hills), at 2,695 m, 2,637 m and 2,634 m above MSL respectively (Daniel and Vencatesan, 2008).[9]

4. The Western Ghats harbor 27 percent of India's floral wealth in a number of vegetation types including tropical wet evergreen, montane evergreen, moist deciduous, dry thorn & scrub forests and high altitude shola-grasslands ecosystems. Nearly a third of all flowering plant species of India are found here with around 1,500 endemic species of Angiosperms. Of the 490 arborescent taxa reported from the Western Ghats, as many as 308 are endemic and there are 112 endemic orchids among the 245 species. Overall, around 38 percent of India's flowering plants and 63 percent of evergreen woody plant species are endemic to the Western Ghats. Many species are considered threatened, including 235 species of endemic flowering plants (NFC, 2006[10;] Daniel and Vencatesan, 2008[11;] MoEF, 2009[12]). The Western Ghats is rich in faunal wealth as well with 189 species of fishes, 111 reptiles, 161 amphibians, 34 butterflies, 16 birds and 14 mammals as endemics. The Western Ghats is

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[1] Price, Martin F, George Gratzer, Lalisa Alemayehu Duguma, Thomas Kohler, Daniel Maselli, and Rosalaura Romeo (editors), 2011.*Mountain Forests in a Changing World - Realizing Values, addressing challenges.* FAO/MPS and SDC, Rome.

[2] ICIMOD, 2010. International Expert Consultation Meeting: Mountain Initiative on Climate Change Convened by the Government of Nepal and ICIMOD 23 - 24 September 2010, Kathmandu, Nepal

[3]Available from http://www.cbd.int/mountain/importance.shtml. Accessed 28 January 2013

[4] The Future We Want, 2012: Outcome statement of the Rio +20 Conference

[5]Available from http://www.conservation.org/where/priority_areas/hotspots/asia- pacific/Sundaland/Pages/default.aspx. Accessed 28 January 2013.

[6]MoEF, 2009.*Fourth National Report to CBD*, MoEF, New Delhi.

[7]Satis Chandran Nair, 1991. *The Southern Western Ghats – A Biodiversity Conservation Plan*, INTACH, New Delhi

[8] National Forest Commission Report, 2006, Ministry of Environment and Forests

[9]Ranjit Daniels and Jayshree Vencatesan, 2008.*Western Ghats: Biodiversity, people and conservation*, Rupa Com.

[10]National Forest Commission Report, 2006. Ministry of Environment and Forests

[11]Ranjit Daniels and Jayshree Vencatesan, 2008.*Western Ghats: Biodiversity, people and conservation*, Rupa Com.

[12]MoEF, 2009.*Fourth National Report to CBD*, MoEF, New Delhi

an Endemic Bird Area (EBA). The World Conservation Monitoring Centre (WCMC) has identified the Western Ghats as an important area of freshwater biodiversity (MoEF, 2009[13] and Molur et al., 2011[14]) and has 39 biodiversity rich areas that are designated as a World Heritage site in 2012 (UNESCO, 2012).[15]

5. Over 45 million people depend directly on the Western Ghats for livelihoods. Moreover, around 245 million people living in peninsular India receive most of their water from rivers originating in the Western Ghats (NFC, 2006).[16] The density of population in the region varies from 100 to 300 inhabitants per km2.[17]

Geo-physical and geographical context

6. The High Range Mountain Landscape (hereafter referred as HRML), represents the Western Ghats in terms of its ecological attributes, socio-economic profile and development trajectory. It is characterized by extremely rich biological diversity, intricate human-ecological affinities, escalating developmental pressures, diminishing resources and high vulnerability to climate change. Though the 'High Ranges' extends over 600,000 ha, the area of direct focus of the project (HRML) is around 310,000 ha. The project area has been identified based on a) previously completed pioneering works on the prioritization of forest landscapes of the southern Western Ghats (Nair, 1991[18]; Nair, 1994[19]; French Institute, 2003[20]; Ramesh and Gurukkal, 2007[21]), b) several rounds of expert consultations, and c) administrative suitability.

7. The HRML is located in the state of Kerala between 9038' to 10021' N and 76033' to 77018' E (see Map 1). It is roughly a horseshoe-shaped region with a few high ridges, steep rugged terrain and highly dissected valleys forming the source of three major river systems (Periyar, Cauvery, and Chalakkudi). It is close to other prominent geographical entities of southern Western Ghats - Nelliampathy Hills, Anamalai Hills and the western portion of Palni Hills. It has high mountain peaks rising over 2,000 m above MSL including the two highest peaks south of Himalayas - Anaimudi (2,695 m) and Misappuli Malai (2,637 m).

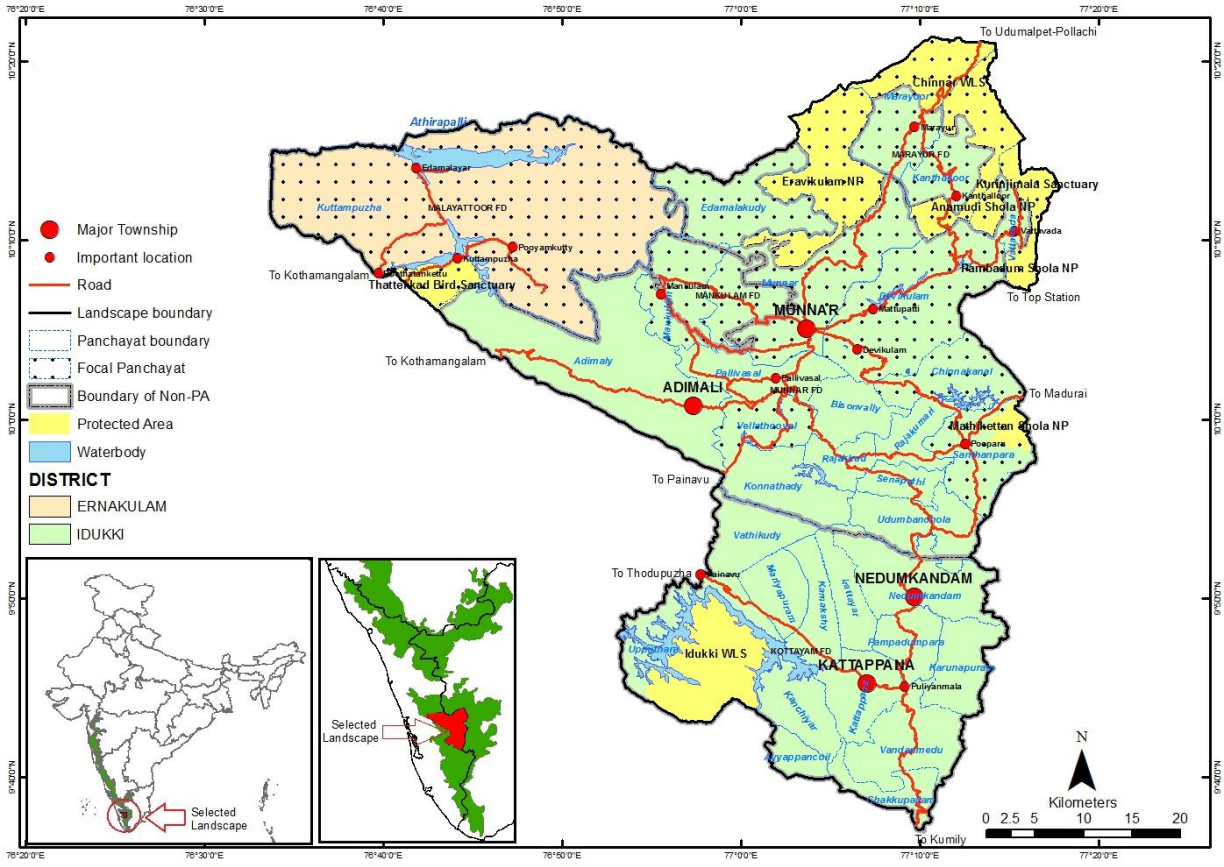
8. The northern part consisting of the Edamala and Pooyamkutti valleys is connected to Sholayar forests of Vazhachal Forest Division (buffer zone of Parambikulam Tiger Reserve). On the Tamil Nadu side, the HRML (for its most part) is connected to Anamalai Tiger Reserve and also to Palni Hills Reserve forests. The southern portion of the landscape abuts a tenuously forested slope of Theni Forest Division running right down to Periyar Tiger Reserve further south.

9. Most of the forests of HRML are on the western slopes drained by Idamalayar, Pooyamkuttiar and their valleys located mostly in Malayattoor Forest Division. The high Kannan Devan Hills (KDH) and plateau around Munnar straddles Eravikulam, Anaimudi shola and Pampadum shola National Parks. They contain a matrix of shola-grassland ecosystems, Eucalyptus plantations and tea estates. Its eastern extremity merges into the Palnis through Vattavada valley and Kurinjimala Wildlife Sanctuary. The drier tracts of Anchanad Valley with its river head in the KDH and the east facing sholas drain towards Amaravathi River (tributary of Cauvery River) through Chinnar. The Idukki-Cardamom Hills stretch of the High Ranges is one of the widest reaches (about 45 km) in the Western

[13]MoEF, 2009.*Fourth National Report to CBD*, MoEF, New Delhi
[14]S.Molur, K.G.Smith, B.A.Daniel and W.R.T. Darwall, 2011.*Status and Distribution of Freshwater Diversity in India*, IUCN
[15] Available from http://en.wikipedia.org/wiki/Western_Ghats#UNESCO_World_Heritage_Site Accessed on 23 February 2013
[16]National Forest Commission Report, 2006, MoEF.
[17] Census figures 2011, Government of India.
[18]Satis Chandran Nair, 1991.*The Southern Western Ghats – A Biodiversity Conservation Plan*, INTACH
[19]Satis Chandran Nair, 1994.*The High Ranges: Problems and potential of a hill region in the southern Western Ghats*, INTACH
[20] French Institute, 2003. *Conservation Review for Rationalization of Protected Area Network in Kerala*, Pondicherry.
[21]Ramesh and Gurukkal, 2007.*Forest Landscapes of the Southern Western Ghats, India – Biodiversity, Human Ecology and Management Strategies*, French Institute, Pondicherry.

Ghats and plays a crucial role in regulating weather and climate both within the landscape and also in an extensive area of Kerala and Tamil Nadu states. The 'Unreserves'[22] of Pallivasal and Chinnakanal have significant areas under shade cardamom and forest fragments harbouring an array of plant and animal species.

Map 1: The Project landscape



10. To the south, separated by the Chinnakanal valley, lies the Cardamom Hills. It is a plateau sloping from east to west and partly from north to south with a more or less uniform elevation of 900-1,200 m above MSL. The Cardamom Hill Reserve (CHR), with an area of 865 km2 was notified as a Reserved Forest in 1897, but has only a small portion under exclusive conservation regime (e.g. Mathikettan National Park). Together with the adjoining forests of Tamil Nadu and Kerala, contiguous forests in the region (embedding HRML) total around 4,800 km2.

11. Due to unique topographical features, the climate in HRML is highly variable. Average annual rainfall in the rain-fed regions ranges from 3,000 to 8,890 mm and in the Anjanad Valley it goes as low as 1,270 mm (Nair, 1994).[23] Temperature varies between sub-zero and 42° C and the dry season commences from January and lasts until May on the western side, and till July in the eastern valley. A total of nine river valley reservoirs including the Idukki mega hydel project dot the landscape.

[22] These are land at the disposal of the government under a special legal category.

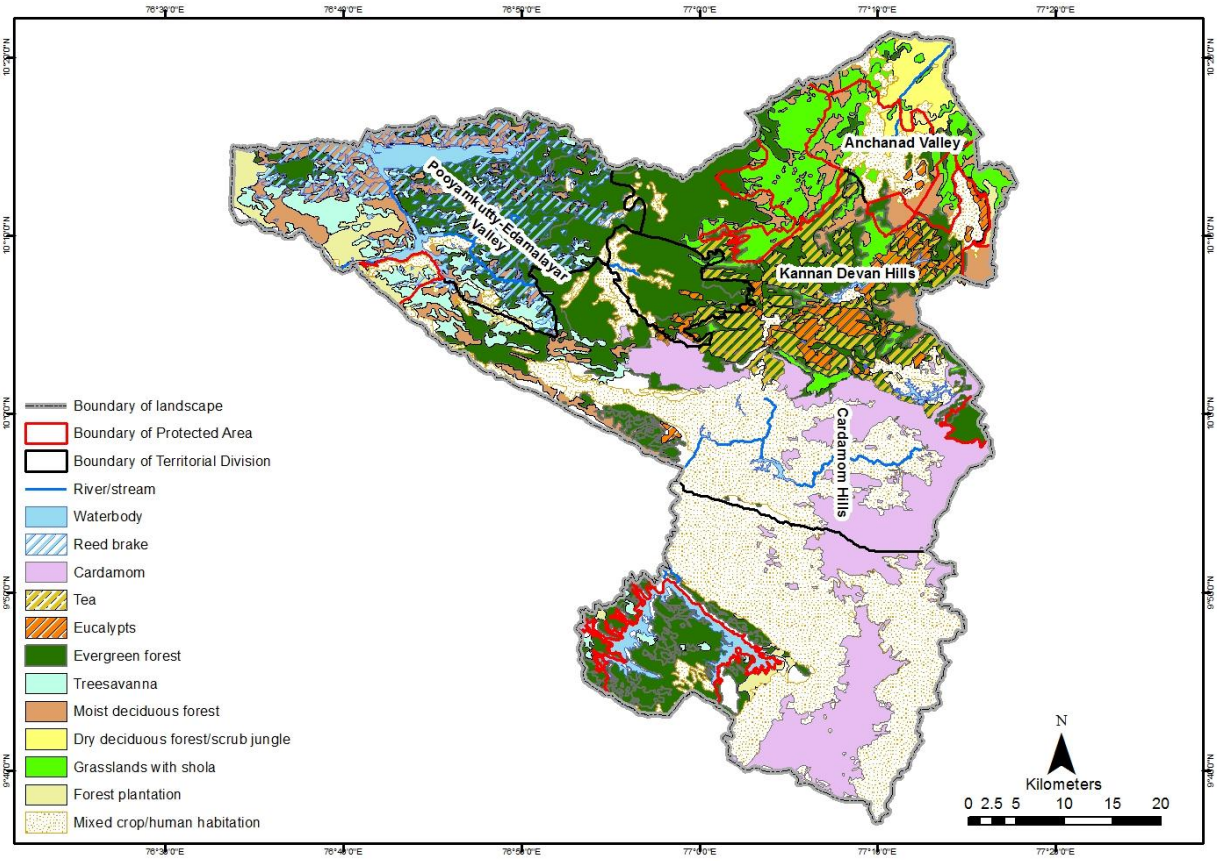
[23] Satis Chandran Nair, 1994. *The High Ranges:Problems and potential of a hill region in the southern Western Ghats*, INTACH.

Biodiversity and ecological context

Floristic attributes of HRML

12. The natural vegetation of HRML can be broadly divided into 5 types: 1) high elevation montane forests and grasslands, 2) humid high elevation forests, 3) humid mid elevation forests, 4) humid low elevation forests, and 5) dry forests (Map 2).

Map 2: Vegetation map of HRML



High elevation montane forests and grasslands

13. The higher reaches of HRML are dominated by high-elevation montane evergreen forests known as sholas found within sheltered valleys interspersed with grasslands. These attain a maximum height of 16-18 m and constitute the only temperate forests in south Indian tropics. The sholas are a relict vegetation harboring species that have survived the climatic and ecological changes since the last glacial and may possibly be among the most endangered ecosystems in the world (Nair, 1991).[24] The floral elements in the sholas comprise mostly of Myrtaceae, Simplococeae, Lauraceae, Styraceae, Ternstroemiaceae, Rubiaceae and Acanthaceae. During the early explorations of Barnes, several new species of plants such as *Habenaria flabelliformis, Impatiens anamudica, Impatiens coelotropis, Impatiens pandata, Impatiens platyadena, Impatiens chinensis var brevicornis, Impatiens johnii, Impatiens munnarensis, Ischane fisheri, Sonerilla nemakadensis, Anaphalis barnesii, Aresaema attenuatum, Aresaema peltatum, Aresaema psittacus, Begonia aliciae, Didymocarpus macrostachya, Ophiorriza barnesii, Ophiorriza caudata and Ophiorriza munnarensis* were discovered. Shetty and Vivekanandan (1971)[25] collected 182 taxa of flowering plants from the High Ranges, of which 82

[24]Satis Chandran Nair, 1991.*The Southern Western Ghats – A Biodiversity Conservation Plan*, INTACH
[25]Shetty B V and K Vivekanandan , 1971.*Studies on the vascular flora of Anamudi and the surrounding regions, Kottayam District, Kerala.* Bull. Bot. Surv. India, Vol. 13. Nos.1&2, pp 16-42

were found in the sholas. As per the Red Data Book of Indian Plants (Nayar and Sastry, 1990[26)], *Impatiens anamudica, Impatiens johnii* and *Impatiens macrocarpa* are endangered or possibly extinct.

14. In total there are 94 species of endemic plants with restricted distribution in the Anamalai-High Ranges. Some of the important endemic trees occurring in the Anamalai-High Ranges region are *Cryptocarya anamalayana, Neolitsea fischeri, Symplocos anamallayana, Symplocos pulchra sub-sp. villosa, Pittosporum anamallayense, Eugenia rottleriana, Syzygium chandrasekharanii, Syzygium chavaran, Homalium travancoricum, Pseudoglochidion anamalayanum, Amoora beddomei, Dysoxylum ficiforme, Valeriana beddomei, Vernonia anamudica, Vernonia recurva, Vernonia anamallica, Vernonia multibracteata, Vernonia pulneyensis, Vernonia fysonii, Pimpinella pulneyensis, Antistrophe glabra, Schefflera chandrasekharanii* and *Sonerilla puleyensis*. A noteworthy feature of the landscape is the occurrence of gregarious flowering ("outburst" once in 12 years) of the plant, kurinji (*Strobilanthes kunthianus*) that literally carpets the grasslands giving them a veritable blue hue.

Humid high elevation forests

15. The humid high elevation region of HRML comprises largely of tropical wet evergreen forests where cardamom (*Elettaria cardamomum*) is a natural under-storey crop. Despite a large part of the area being converted to cardamom plantations, a few patches of natural vegetation still exist. A recent study of floral diversity in this region recorded 1,044 species of flowering plants (Augustine, 2012)[27], of which, 395 are endemic to southern Western Ghats and 38 rare or threatened. At 39 percent, the degree of endemism is higher than any other forest areas in Kerala, signifying its ecological uniqueness. This study also recorded 20 species of Impatiens of which 16 are endemic to southern Western Ghats while also revealing the presence of 5 species of plants previously considered "Possibly Extinct" (Augustine, 2002).[28] Further, an epiphytic orchid *Taeniophyllum scaberulum*, yet another species considered as "Possibly Extinct" in the Red Data Book, is reported from nearby areas of Mankuthimedu.

16. The dominant tree species of the humid high elevation forests of HRML include *Palaquium ellipticum, Mesua ferrea, Prunus ceylanica, Myristica beddomei, Calophyllum polyanthum, Syzygium hemisphericum, Syzygium ceylanicum, Syzygium gardnerii, Syzygium cumini, Bhesa indica, Acrocarpus fraxinifolius* etc. while the riversides and stream banks have herbs such as *Impatiens maculata, Impatiens verticillata* and *Impatiens cordata*.

Humid mid elevation forests

17. At mid elevation (e.g. parts of Malayattoor, Munnar and Idukki Forest Divisions), the vegetation ranges from wet evergreen, semi evergreen to moist deciduous forests. In these areas, very high levels of species assemblage are noted. For example, in Malayattoor Forest Division alone, 215 species of flowering plants (Angiosperms) have been reported.[29] A survey of 1km2 area of Sulimudi in Idamalayar forests recorded 124 species of flowering plants belonging to 56 families and 114 genera. Among these, 34 species are endemic to the Western Ghats including species such as *Vateria indica* (Critically Endangered), *Euphorbia santapaui* (Endangered), *Belosynapsis vivipara*, *Bentinckia condapanna* and *Dalbergia latifolia* (Vulnerable) (Mahesh and Menon, 2011)[30].

[26]Nayar M. P and A. R. K Sastry. 1990.*Red Data Book of Indian Plants. Vol. 3*. pp. 54-61. Botanical Survey of India

[27] Augustine J. 2012. *Agricultural land use pattern and the flowering plant diversity in the Cardamom Hill Reserve (CHR), southern Western Ghats, Kera*la, India. Paper presented at Kerala Environment Science Congress, 2012, RGCB, Thiruvananthapuram

[28] Augustine J. 2002. *Mathikettan shola national park - a new attempt for the conservation of flowering plants in the Western Ghats, India*. Report submitted to the Forest and Wildlife Department, Government of Kerala

[29]Working Plan. Malayattoor Forest Division 2003-2012.

[30]Mahesh G and A.R.R.Menon, 2011.*Vegetation status, species diversity and endemism of Sulimudi forests of southern Western Ghats of Kerala, India*. Indian Forester, p.304-311

18. The humid evergreen forests of mid elevation have extensive area under reed breaks. Bamboo grows in moist deciduous and occasionally in semi-evergreen habitats. These forests also harbour the largest teak (Tectona grandis) trees in the world. For instance, one such tree at Ottakkallan (in Malayattoor Forest Division) measured 7.65 m girth at breast height (Nagaraj, 2012).[31]

Humid low elevation forests

19. These occur towards lower reaches of Malayattoor and Munnar Forest Divisions and Thattekkad, on the banks of the Periyar River. These forests were extensively worked in the past (including for commercial teak plantations) and had at many places degraded to semi evergreen/ moist deciduous types. The original wet evergreen forests are now confined to stream banks and between ridges in a few sheltered valleys. The main tree species include: *Dipterocarpus indicus, Dipterocarpus bourdillonii, Hopea parviflora, Vateria indica, Canarium strictum, Elaeocarpus tuberculatus and Palaquium ellipticum*. In a recent survey, 728 species of plants belonging to 109 families were reported from the humid low elevation forests of Thattekkad, including 125 species endemic to southern Western Ghats.[32]

20. Some of the endemics seen in these forests are: *Clematis munroniana, Desmos lawii, Goniothalamus wightii, Goniothalamus wyanaadensis, Stephania wightii, Calophyllum calaba, Calophyllum polyanthum, Garcinia wightii, Poeciloneuron indicum, Pterospermum reticulatum, Elaeocarpus munronii, Impatiens cordata, Impatiens herbicola, Impatiens leptura, Impatiens lucida, Impatiens scapiflora, Impatiens verticillata, Impatiens viscosa, Dysoxylum beddomei, Dysoxylum malabaricum, Holigarna ferruginea, Dialium travancoricum* and *Kunstleria keralensis*. The species *Vateria macrocarpa* is Critically Endangered and *Hydnocarpus macrocarpus* is found only in Neriyamangalam area of HRML (Augustine, 2013).[33]

Dry forests

21. In contrast to the rest of the landscape, the north-eastern extremity, known as the Anchanad valley, has very little rainfall and consequently the vegetation is of a drier type (Nair, 1988)[34]. The lower portions of the valley support dry thorn and scrub forests and some unique habitats (e.g. riverine forests, sandal tract etc.). The dry deciduous forests around Marayur provide ideal conditions for sandalwood trees. Major tree species found are: *Acacia leucophloea, Acacia ferruginea, Albizia odoratissima, Anogeissus latifolia, Atalantia racemosa, Salmalia malabarica, Careya arborea, Cassia fistula, Chloroxylon swietenia, Chukrasia tabularis, Cipadessa fruticosa, Clausena willdenowii, Dalbergia latifolia, Gmelina arborea, Grewia tiliifolia, Lannea grandis, Pterocarpus marsupium, Emblica officinalis, Phoenix sp, Santalum album, Shorea talura* etc. including the rate Diospyros ebenum (ebony).

22. The dry thorn and scrub forests in the Chinnar plains are well-known for the presence of medicinal plants. The noteworthy ones include: *Acacia* spp., *Euphorbia* spp., *Capparis* spp., *Opuntia* spp., *Zizyphus* spp., *Grewia* spp. etc. while a Critically Endangered tree (*Albizia lathamii*), is also found. The riparian forests characterized by evergreen and semi evergreen species are restricted to the fringes of streams and rivers. The dominant species are *Terminalia arjuna, Hopea parviflora, Bischofia javanica, Mangifera indica, Drypetes roxburghii, Vitex leucoxylon, Pongamia pinnata* and *Garcinia gummi-gutta.*

[31]Nagaraj, 2013. Personal communication
[32] Management Plan, 2013-2012, Thattekkad Bird Sanctuary, Kerala Forest Department
[33]Jomi Augustine, 2013. Personal communication.
[34]Satis Chandran Nair, 1988.Long Term Conservation Potential of Natural Forests in the Southern Western Ghats of Kerala, Part II. Report submitted to Department of Environment, Government of India

Faunal attributes of HRML

23. The HRML area also contain several globally significant fauna: Nilgiri tahr (*Hemitragus hylocrius (nilgiritragus)*), Indian elephant (*Elephas maximus*), Tiger (*Panthera tigris*), Gaur (*Bos gaurus*), Nilgiri langur (*Trachypithecus johnii*), Lion-tailed macaque (*Macaca silenus*), Slender loris (*Loris tardigradus*), Leopard (*Panthera pardus*), Jungle cat (*Felis chaus*), Sambar deer (*Cervus unicolor*), Grizzled giant squirrel (*Ratufa macroura*), Malabar giant squirrel (*Ratufa indica*), Dusky striped squirrel (*Funambulus sublineatus*), Nilgiri marten (*Martes gwatkinsi*), Travancore flying squirrel (*Petinomys fuscocapillus*), Stripe-necked mongoose (*Herpestes vitticollis*), Brown mongoose (*Herpestes brachyurus),* Brown palm civet (*Paradoxurus jerdoni*), Wild dog (*Cuon alpinus*). Some of the important bird species (15 endemic to the Western Ghats), are the Great Indian hornbill (*Buceros bicornis*) and Black and rufous flycatcher (*Ficedula nigrorufa*). Around 265 species of butterflies (22 endemic to the Western Ghats) are found together with 72 species of fishes (23 endemic to the Western Ghats, one Critically Endangered, 8 Endangered, 6 Vulnerable and 4 Near Threatened), 79 species of mammals (9 endemic to the Western Ghats), 122 species of reptiles (42 endemic to the Western Ghats), 50 species of amphibians (43 endemic to the Western Ghats) and 111 species of Odonata (44 endemic to the Western Ghats) are reported from HRML.[35]

24. Further, the HRML is 1 of the 5 viable breeding population centres of tigers in India (NTCA, 2012)[36], contains almost half the remaining global population of less than 2,000 individuals of Nilgiri tahr (mostly in Eravikulam National Park) and one of the last populations of Grizzled giant squirrel (mostly in Chinnar Wildlife Sanctuary). There are 11 endemic butterflies reported from the montane *shola* forests of Munnar (Mathew and Mohandas, 2001)[37]. In addition, Kelaart's long-clawed shrew (*Feroculus feroculus*) is a new record for Eravikulam National Park (Daniel and Vencatesan, 2008)[38] while unconfirmed local report indicate presence of a cat, presumably a new species known locally as *pukaiyan* (smoky).

25. In terms of avian species, 15 of the 16 endemic birds of the Western Ghats are found in the project landscape (see Table 1). Of these, Nilgiri wood-pigeon, Broad-tailed grass bird, Kerala laughing thrush, White bellied short wing, Black-and-rufous flycatcher, Nilgiri flycatcher, White-bellied blue-flycatcher, Crimson-backed sunbird and Nilgiri pipit are habitat specialists confined to the high altitudes of the High Ranges.

Table 1: Endemic birds of HRML

Common Name	Scientific Name	IUCN Status
Nilgiri wood-pigeon	*Columba elphinstonii*	VU
Malabar parakeet	*Psittacula columboides*	LC
Malabar grey hornbill	*Ocyceros griseus*	LC
White-bellied treepie	*Dendrocitta leucogastra*	LC
Grey-headed bulbul	*Pycnonotus priocephalus*	NT
Broad-tailed grass bird	*Schoenicola platyurus*	VU
Rufous babbler	*Turdoides subrufa*	LC
Wynad laughing thrush	*Garrulax delesserti*	LC
Kerala laughing thrush	*T. fairbanki fairbanki*	NT
White bellied shortwing	*Brachypteryx major*	NT
Black-and-rufous flycatcher	*Ficedula nigrorufa*	NT

[35] Compiled from various sources.
[36] Various reports of National Tiger Conservation Authority, MoEF, 2012
[37] Mathew, G. and Mohandas, K., 2001. *Insect fauna of the shola forests of Munnar and Wynad*. KFRI Research Report No.206: 38 pp (mimeo).
[38] Ranjit Daniels and Jayshree Vencatesan, 2008. *Western Ghats: Biodiversity, people and conservatio*n, Rupa Com.

Nilgiri flycatcher	*Eumyias albicaudatus*	NT
White-bellied blue-flycatcher	*Cyornis pallipes*	LC
Crimson-backed sunbird	*Nectarinia minima*	LC
Nilgiri pipit	*Anthus nilghiriensis*	VU

26. The three toed forest kingfisher and Ceylon frogmouth are two rare species found while Grey headed bulbul, another Western Ghats endemic (listed as Near Threatened by IUCN) has a good population in Thattekkad and Mankulam. The lowland evergreen forests of HRML are a known viable breeding ground for all the four species of hornbills (Great Indian, Malabar pied, Malabar grey and Indian grey hornbills) found in the Western Ghats (Bachan *et al.,* 2011).[39] There are also reports from Malayattoor of the occurrence of Malabar civet (*Viverra civettina)*, believed to be 'extinct'.

27. The higher elevations of HRML are interestingly also known for unique amphibian diversity with several new species of frogs discovered recently (e.g. *Raorchestes griet*, *Raorchestes resplendens*, *Raorchestes dubois*, *Raorchestes chlorosoma*, *Raorchestes kadalarensis*, and *Raorchestes theuerkaufi)* (Zachariah *et al.,* 2011).[40] One species, *Raorchestes resplendens* is confined to Eravikulam National Park alone (Biju *et al.,* 2010).[41] The Agamid lizard-*Salea anamallayana*, the Forest Gecko – *Hemidactylus anamallayana* and the Mountain wine snake – *Ahaetulla dispar* are rare endemic reptiles confined to these areas.

28. The recorded faunal wealth of HRML is summarized in Table 2 below and the details of fauna and the status of key species are available in a separate document.

Table 2: Faunal wealth of HRML[42]

Name of the Protected Area/ Forest Division	Number of species recorded*					
	Mammals	**Birds**	**Reptiles**	**Amphibians**	**Fishes**	**Butterflies**
Eravikulam National Park	48	133	13	21	3	101
Idukki Wildlife Sanctuary	28	172	55	28	30	76
Chinnar Wildlife Sanctuary	28	225	52	15	14	156
Thattekkad Wildlife Sanctuary	39	284	34	17	52	222
Mathikettan National Park	9	27	ND	ND	ND	52
Pampadum shola National Park	9	76	ND	ND	ND	100
Mannavan shola National Park	13	76	ND	ND	ND	100
Kurinjimala Wildlife Sanctuary	15	76	ND	ND	ND	100
Munnar Division	36	135	16	14	16	26
Marayur Division	31	165	13	14	14	26
Malayattoor Division	38	270	29	27	55	76
Mankulam Division	25	134	ND	18	28	87

***Note: ND = No Data**

Ecological attributes of HRML

29. Three factors give HRML its intrinsic high level of biodiversity. First, there is a large spectrum of ecological niches over a range of altitudes. For instance, from the Anaimudi peak (2,695 m above MSL), the altitude cascades along precipitous cliffs and valleys, down to about 40 m above MSL (at Pooyamkutti and Thattekkad). Second, the landscape experiences a highly varied climate regime and

[39] Bachan A.K.H, Kannan R.,Muraledharan S.,& Kumar S., 2011. *Participatory conservation and monitoring of great Indian hornbills and Malabar pied hornbills with the involvement of endemic Kadar tribe in the Anamalai Hills of southern Western Ghats, India*. The Raffles Bulletin of Zoology, Supplement No. 24: 37-43.

[40] Anil Zachariah, K.P. Dinesh, E. Kunhikrishnan, Sandeep Das, David V. Raju, C. Radhakrishnan, Muhamed Jafer Palot& S. Kalesh. 2011. *Nine new species of frogs of the genus Raorchestes (Amphibia: Anura: Rhacophoridae) from southern Western Ghats, India*. Biosystematica, 5 (1): 25-48

[41] Biju, S.D., Y. Shouche, A. Dubois, S. K. Dutta and F. Bossuyt. 2010. *A ground-dwelling rhacophorid frog from the highest mountain peak of the Western Ghats of India*. Current Science, 98 (8): 119-1125

[42] Compiled from Management Plans and Working Plans

third the constant interaction between human activities and natural processes has given rise to a varied set of bio-physical niches (ranging from montane evergreen forests to dry thorn and scrub forests).

30. The important HRML habitats also underpin key ecosystem functions such as water security of the plains (through Rivers Periyar, Chalakkudi and Cauvery), availability of water for hydel and irrigation projects (Table 9), raw material to industries (e.g. Hindustan News Print Ltd. and Kerala State Bamboo Corporation), provisioning food and livelihoods of local communities (e.g. NTFPs, artisanal crafts etc.) and also sites for tourism.

Administrative and governance context:

31. The project landscape spreads over two administrative districts in Kerala *viz.*, Idukki (82 percent of the landscape) and Ernakulam (18 percent)[43]. It has 5 territorial Forest Divisions (i.e. Malayattoor, Munnar, Mankulam, Marayur and Kottayam) that cover an area of 1,216 km^2 (39 percent) and 2 exclusive Wildlife Divisions (Munnar and Idukki) with an area of 371 km^2 (11.96 percent). Most of the HRML is located in the upper regions of Idukki district with the rest being in Kuttampuzha and Vengoor Grama Panchayats (Panchayati Raj Institutions – PRIs[44]) of Ernakulam district and a portion of Athirapilly Grama Panchayat.[45] Administratively, the area covers 34 GPs (31 from Idukki, two from Ernakulam and one in Thrissur districts), five Taluks (Devikulam, Udumpanchola, Kothamangalam, Kunnathunaduand Mukundapuram) and eight Block Panchayats. Of the 34 GPs, 11 are of critical biodiversity areas.

Socio-economic context

32. The HRML has diverse cultural (tribals and non-tribals) and linguistic affinities (Malayalam, Tamil and tribal dialects). According to 2001 figures, the region had 672,462 inhabitants (including 337,343 women) and 159,541 households[46]; Nedumkandom, Kattappana, Adimali, Upputhara, Vandanmedu and Konnathady being densely populated areas. Average family size in the landscape is four with a sex ratio (females per thousand males) that is lower than the state average.

33. There has been around 2 percent reduction in the rate of population growth in Idukki district (covering more than 80 percent of the project landscape) compared to 2001 but the number of individual households has increased during the same period by around 11,600. The population density is around 282 persons per km^2.

34. The literacy rate in the area is 88.69 percent, marginally lower than the state average (93.91 percent) but literacy among women (85.02 percent) is lower than those for men. This is significantly lower among tribal communities (62.78 percent). Likewise, health and education facilities are relatively poor in the tribal areas.

35. The major source of livelihood is agriculture and allied activities with the workforce[47] in the landscape broadly categorized into: a) cultivators; b) agricultural labour; c) industrial labour; and d) other categories which mostly include plantation workers in tea estates. In Munnar 96 percent of the work force is under the last (other) category[48] while at Pallivasal, it is 57 percent, Chinnakanal (53

[43] Though a small part of it falls in Thrissur district also, it is very negligible.
[44]PRIs are local-level institutions for self-governance in rural areas that are recognized by the Constitution of India. These are elected bodies and operate at three levels, at village, at the block (a cluster of villages) and at the district level. PRIs are responsible for the preparation of plans for economic development and social justice and also for the implementation of schemes as entrusted to them by the respective state governments and also by the GOI.
[45]Three tribal hamlets (Adichilithotti, Kappayam and Vettivittakadu) are included under Athirapilly GP for administrative reasons.
[46] Edamalakudy and Devikulam are the newly formed Panchayats by splitting the Munnar Panchayat. Therefore the 2001 population of Munnar Panchayat also includes the populations of the present Edamalakudy and Devikulam panchayats.
[47] As per the Census figures, workers are those who avail more than six months of employment opportunities in a year.
[48] These are based on Census figures of 2001. Since then there has been a clear trend of more people taking up tourism related employment

percent) and Mankulam (32 percent). Industrial units like tea processing units and micro-enterprises (e.g. processing *jaggery* (country-made sugar), lemon grass oil etc.) and tourism provide most of the employment in the industrial sector. The workforce mostly comprises of men although certain sectors (e.g. tea and cardamom) employ women in large numbers.

36. In terms of landholding[49], 86 percent are marginal holdings that are less than one ha. There are 310 large holdings with more than 10 ha. Apart from individual holdings, there are 1,944 institutional holdings (Table 3).

Table 3: Landholding Pattern in HRML[50]

Holding Size	Landholding Pattern (no)			
	Operational	Percentage	Institutional	Percentage
Up to 1 ha (Marginal)	163,898	86.49	1311	67.44
Between 1and 1.99 ha (Small holding)	18,970	10.01	239	12.29
Between 2 and 3.99 ha (Semi Medium)	4,885	2.58	170	8.75
Between 4 and 9.99 ha (Medium)	1,426	0.76	90	4.63
Above 10 ha (Large)	310	0.16	134	6.89
Total	189,489	100.00	1,944	100

37. It is estimated that the HRML has about 33,829 tribal persons in 9,029 families. Among the 13 different tribal communities (Table 5), Muthuvan, Mannan, Hill Pulaya, Oorali, Malavedan and Malayan have relatively longer association with HRML. They have distinct cultural practices, settlement patterns and livelihood strategies. The tribal hamlets are usually located either deep in the forests or along the fringes. The major livelihood source is subsistence farming supplemented by collection of forest produce, artisanal handicrafts and forest and agriculture labour.

Table 4: Details of tribal communities in HRML[51]

No.	Community	No of families	% among the Scheduled Tribes	No. of persons	% of Individuals
1	Hill Pulaya	960	10.63	3415	10.09
2	Mannan	1776	19.67	6688	19.77
3	Muthuvan	3334	36.93	12399	36.65
4	Paliyar	358	3.97	1281	3.79
5	Ulladar	609	6.74	2379	7.03
6	Oorali	823	9.12	3044	9.00
7	Malaipandaram	12	0.13	45	0.13
8	Malayarayar	957	10.60	3835	11.34
9	Malavedan	46	0.51	177	0.52
10	Malayan	151	1.67	551	1.63
11	Irular	1	0.01	5	0.01
12	Kanikkar	1	0.01	6	0.02
13	Kattunaikar	1	0.01	4	0.01
Total		9,029	100	33,829	100

38. NTFPs (collection and trade) account for a significant part of their livelihood. For instance, in Chinnar Wildlife Sanctuary alone, among the 141 species of plants recorded as ethno-botanically important[52], around 57 were used exclusively by Hill Pulayas and 27 by Muthuvans. Simialrly, cultivation of lemon grass (531 ha) is an important livelihood source for Muthuvans and Hill Pulayas in the drier tracts of HRML and depend on the forest for fuel wood to distill lemon grass oil. They also collect *Phoenix sylvestris* leaves for making house-hold utility items and especially in Kuttampuzha and Mankulam, artisanal mat weaving (reed) provides majority of their income.

[49] Landholding is considered as the possession of land document and one person can have more than one landholding

[50] Govt. of Kerala (2009) HD Data Series II, Agriculture. Kerala State Planning Board and Dept. of Economics and Statistics.

[51] Economics & Statistics Department, Government of Kerala

[52] Ramakrishnan, P. S (Eds.) 2000. Mountain Biodiversity, Land Use Dynamics and Traditional Ecological Knowledge, UNESCO. Oxford & IBH Publishers, New Delhi. P. 353

Land use and developmental context

Development history of HRML

39. Human presence in the High Ranges is believed to have begun some 7000-8000 years ago (Gurukkal, 1999).[53] There were two discernible streams of migration to HRML during the last two centuries - one centered on plantations and second for subsistence (Varghese, 2009).[54] During the second half of the 20th century, various government programmes such as 'Grow More Food', 'High Range Colonization Scheme' 'Co-operative Settlement Scheme' and 'Settlement of Agricultural Labourers', encouraged migration to HRML. A brief account of the patterns and impacts of human migration to different parts of HRML is given below.

40. **Kannan Devan Hills (KDH),** also known as the 'High Ranges proper', extend over 55,000 ha in the upper reaches of HRML. Planters from Europe and labour from eastern Tamil plains moved to KDH in the late 19th century and extensively converted forests and grasslands, initially for Cinchona and coffee, both giving way finally to tea. Around this time, the Kannan Devan Hills Produce Company was formed bringing together a number of small proprietary tea plantations. The Kannan Devan Hills (Resumption of Lands) Act of 1971 gave control of all the KDH lands to the government. Following this, the Forest Department set up the Eravikulam National Park while a portion of the pristine moist evergreen forests of Mankulam was identified for settlement by landless farmers while an Indian corporate house took over the management of tea estates. Some years later, Munnar became a bustling tourism destination paving the way for massive infrastructure development. The government concerned with this wave of forest conversions designated around 7,000 ha area of KDH and major portion of Mankulam as Reserve Forest in 2010.

41. **Cardamom Hills** is predominantly moist evergreen forests and endured small-scale extraction of wild cardamom from long time ago. However, following the state monopolization of the cardamom trade in the early 19th century, major cardamom growing areas were notified as Cardamom Hill Reserve (CHR). Cardamom cultivation expanded considerably and the region witnessed massive changes in land-use with complex landholding patterns. In 2003, a portion of CHR was also gazetted as a National Park (Mathikettan).

42. **Anchanad Valley** is the drier east facing tracts of HRML. It remained largely insular to developments until recently when settlers from the plains started migrating to Kanthalloor and Marayur. Following this, lemon grass cultivation became extensive with a proportionate increase in fuel wood collection from the forests. During this period large areas of the unique sandal bearing forests of Marayur were degraded by illegal felling while large areas of rice growing areas were converted to sugarcane plantations.

43. **Lower Valleys** of HRML drain into Periyar River. These areas were known for their valuable timber resources These forests were managed primarily for timber and a part for fuel wood production while large areas of reed breaks were allotted for commercial extraction. In 1895, the Malayattoor Forest Division was notified as a Forest Reserve.

Current land-use context:

44. **Protected Areas (PAs):** The history of conservation in the region began with the establishment of Eravikulam National Park (as a Game Reserve by early planters). At present there are a total of 8 PAs extending over 37,100 ha (11.96 percent of the project landscape as shown in Table 5). 5 of the PAs are physically connected of which Eravikulam National Park encompasses extensive areas of undisturbed *shola*-grassland ecosystems, Chinnar Wildlife Sanctuary, has predominantly drier

[53]R.Gurukkal, 1999.Cultural History of Kerala. Department of Cultural Publications, Govt. of Kerala
[54] Varghese, V.J., 2009. Land, Labour and Migration – Understanding Kerala's Economic Modernity. Working Paper, CDS, Trivandrum

vegetation types and scattered tribal settlements while Anaimudi shola and Pampadum shola National Parks are montane evergreen forests. The Kurinjimala Wildlife Sanctuary is a recently declared one. Mathikettan National Park and Idukki Wildlife Sanctuary are isolated PAs. The low-lying Thattekkad Wildlife Sanctuary is fairly well connected to the forests of the landscape.

Table 5: Protected Areas of HRML

Protected Area	Area (ha)	Vegetation Types
Eravikulam National Park	9,700	*Shola*-grasslands, wet evergreen forests
Chinnar Wildlife Sanctuary	9,040	Dry thorn and scrub forests, riverine forests
Kurinjimala Wildlife Sanctuary	3,200	*Shola*-grassland, deciduous forests, wattle plantations
Anaimudi National Park	750	*Shola*-grasslands, wattle and eucalyptus plantations
Pampadumshola National Park	130	*Shola*-grasslands, wattle and eucalyptus plantations
Mathikettanshola National Park	1,280	*Shola*, wet evergreen forests, abandoned cardamom
Thattekkad Wildlife Sanctuary	2,500	Low elevation evergreen forests, teak plantations
Idukki Wildlife Sanctuary	10,500	Mid elevation moist forests and savannas
TOTAL	**37,100**	

45. **High Value Biodiversity Areas (HVBAs)**: Outside the PA, there exist extensive tracts of High Value Biodiversity Areas (HVBAs), mostly in areas administered by the Forest Department and smaller fragments in Revenue and private lands. Extending over 84,600 ha, HVBAs cover about 27.29 percent of the project landscape. The HVBAs include most of Mankulam Division, areas resumed from KDH, areas adjoining PAs and natural forests of Munnar, Malayattoor, Marayur, and Kottayam Forest Divisions. Some of the *sholas* and grasslands under the control of the Revenue Department (e.g. Manthan shola) also come under this category (see table 6). The tea plantations of KDH have interspersed forests, grasslands and swamps within them; all crucial HVBAs. These areas are important for harbouring significant biological diversity (e.g. Nilgiri tahr, Nilgiri marten, Wood cock, Grizzled Giant Squirrel, Great Indian hornbill etc.), and ensure connectivity in the landscape between PAs.

Table 6: Extent and vegetation types of HVBAs in HRML

High Value Biodiversity Area	Area (ha)	Vegetation Types
Mankulam Forest Division	9,000	Evergreen, montane temperate forests and plantations
Munnar Division	23,800	*Shola*-grasslands, evergreen forests, plantations, moist deciduous forests, reed breaks
Marayur Division	5,200	*Shola*-grasslands, sandal tracts, plantations
Malayattoor Division	37,100	Reed breaks, evergreen forests, moist deciduous forests, plantations
Kottayam Division	3,500	Mid elevation forests and savanna grasslands
Revenue areas	2,000	*Shola*-grasslands, montane forests (fragments)
Tea estates	4,000	*Shola*-grasslands, swamps (interspersed)
TOTAL	**84,600**	

46. Commercial tree plantations: Commercial tree plantations such as those of teak[55], *Eucalyptus*, wattle and other miscellaneous species account for a large area in the project landscape (31,580 ha). These are mostly managed by the Forest Department.

47. **Tea industry:** The KDH and surrounding areas of HRML comprise the largest tea producing area in southern India (14,000 ha). The tea industry is a major employer providing jobs to more than 19,000 persons. Tea processing is an energy intensive operation. In the past tea processing was responsible for deforestation of large areas but at present rely heavily on biomass (197,836 m^3 annually) from captive fuel wood plantations (*Eucalyptus*). The tea gardens of HRML have retained several **interspersed** forest fragments (varying in extent from 0.1 ha to 1,000 ha), at currently are valuable as they act as stepping-stone corridors and store-houses of biodiversity.

48. **Cardamom farms:** Cardamom farming is the biggest employer (74,000 persons including 49,000 women in 35,000 families and at least 12,000 commuting workers from Tamil Nadu) with most cardamom grown under rainforest trees. The HRML produces around 13,000 metric tonnes of

[55] Teak plantations are extensive in Malayattoor and parts of Munnar Forest Divisions.

cardamom annually.[56] In recent times, there has **been** a perceptible shift towards more light-loving and drought-resistant varieties (e.g. *njallani*) that require intensive farming practices, greater tree canopy opening and heavy application of chemical fertilizers and pesticides. Like tea, cardamom also a lot of fuelwood for curing (around 6 kg of firewood for making one kg dry cardamom).

49. **Reed extraction:** Reed *(Ochlandra travancorica)* collection and associated craft is an important economic activity in the lower reaches of the landscape (e.g. Kuttampuzha, Neriamangalam, Adimali, Edamalayar and Mankulam). In many areas, reeds grow profusely and extraction at sustainable levels is not a worry. Reed extraction occurs through concessions given by the government for a) purely commercial purpose (Hindustan Newsprint Ltd. (HNL) for pulp industry), b) supporting commercial as well as artisanal use (Kerala State Bamboo Corporation (KSBC)), and c) for own use by communities. The area of reed collection extends over 70,000 ha in HRML and in terms of local communities it supports 3,700 families most of them belonging to Scheduled Castes (SCs) along the forest fringes and the Scheduled Tribes (STs) in Kuttampuzha and Edamalayar as the most important source of their livelihood. mostly areas.

50. **Other cultivated areas:** The colder and higher areas of the landscape lying towards the east (Vattavada and Kanthalloor) have vegetable farming (1,600 ha) and intensive *Eucalyptus grandis* plantations (owned mostly by absentee land owners) as dominant land uses. In recent times, tourism is picking up. A few farmers cultivate fruits such as apple, peach while many farmers maintain small home gardens of multi-purpose tree species. Animal husbandry is also a major livelihood activity.

51. **Tribal settlements:** The prominent tribes of HRML are Mannan, Muthuvan, Paliyan, Malaarayan, Oorali, Ulladan and Hill Pulaya (around 34,000 persons in 213 settlements (7,200 ha). The tribal hamlets are either scattered in the forests or located along its fringes. Smallholder farming (e.g. pepper and cardamom), collection of NTFPs (e.g. wild cardamom, honey, dammar, wild nutmeg, medicinal plants, *Garcinia* etc.) and small artisanal enterprises (e.g. lemon grass distillation, broom stick making, reed mat weaving etc.) are their major sources of their livelihoods. They also depend on the forests for NTFPs, fuel wood and other subsistence needs.

52. **River Valley Projects:** The HRML has nine river valley projects covering an area of 10,416 ha established to harness hydro-energy (e.g. Idukki mega dam) and/ or irrigation (e.g. Bhoothathankettu). See Table 8 for details. Some of these reservoirs (e.g. Mattupetti, Idukki, Kundala etc.) promote tourism and inland fisheries. The backwaters of some of these reservoirs are habitats for birds and aquatic life (e.g. Thattekkad)

Table 7: River valley projects in the project landscape

Sl.No.	Name	Extent of water body (ha)
1	Kundala	230
2	Mattupetti	324
3	Sengulam	33
4	Anayirangal	433
5	Ponmudi	260
6	Kallarkutty	58
7	Idukki	5,640
8	Bhoothathankettu	608
9	Edamalayar	2,830
Total		**10,416**

53. **Tourism:** During the last decade, the HRML (particularly Munnar) has become a mass tourism destination resulting in a flurry of infrastructure development and other environmental and social problems such as waste generation, pollution, land grab. The estimated annual visitation to Munnar exceeded 0.7 million in 2012 from just a few thousands in 1990s. There are currently around 250 resorts, hotels and homestays in and around Munnar. The tourism industry generates a revenue of

[56] Stakeholder consultation at Munnar on 12 March 2013

around US $ 50 million annually. The surrounding areas of Chinnakanal and Pallivasal are also undergoing land use changes as tourism expands to these areas.

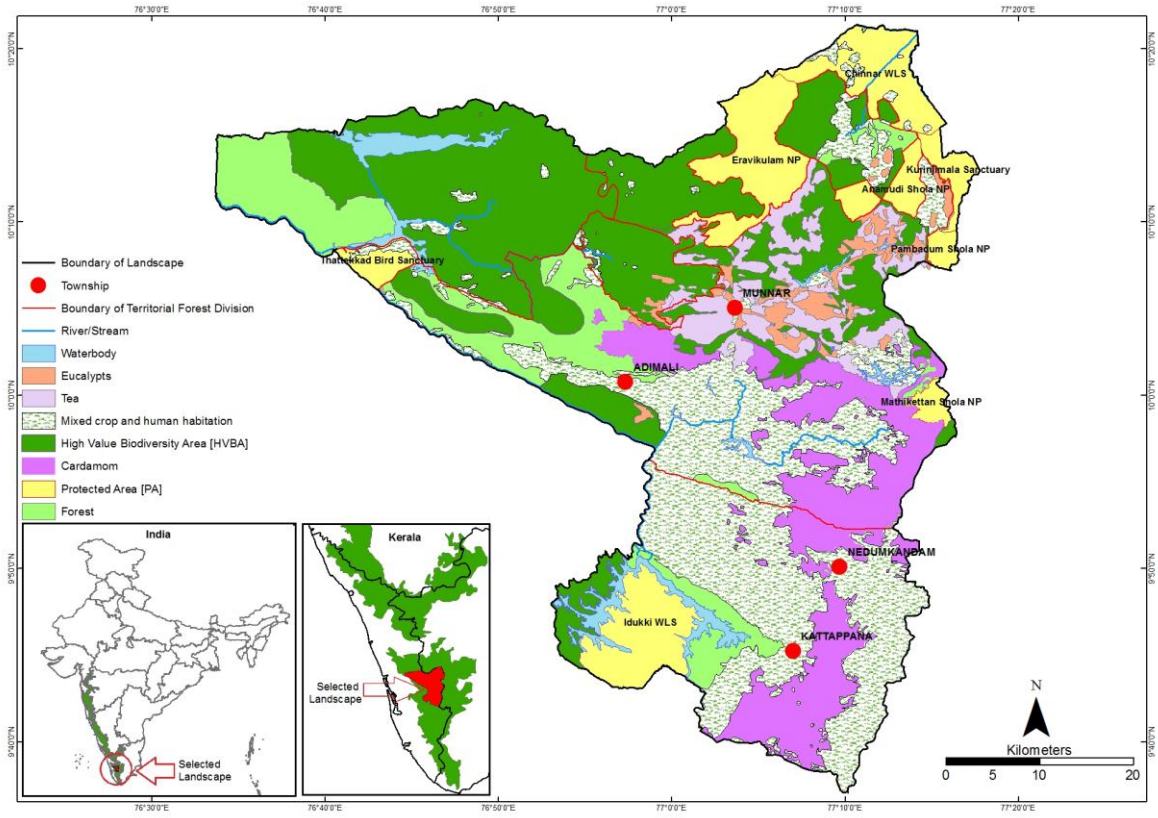
54. **Urban development:** The most prominent towns of the landscape are Munnar, Adimali, Nedumkandom and Kattappana. These towns act as nuclei of development and are expanding further with several peri-urban areas fast integrating with the core urban areas. An extensive network of roads (450 km as major roads) crisscrosses the project landscape, some even through ecologically fragile areas (e.g. Chinnar).

Table 8: Summary of current land use pattern in HRML*

Land Use	Area (ha)	Land Use Description
Protected Areas	37,100	The 8 PAs comprise of high elevation *shola*-grasslands, wet evergreen forests, moist deciduous forests, dry thorn and scrub forests, and riverine forests and cover about 12 percent of the landscape.
High Value Biodiversity Areas / forest fragments	84,600	Mostly managed by and under the jurisdiction of the Forest Department – they overlap natural forests, commercial plantations and allotted reed areas. They also include forest fragments of varying sizes under corporate tea management and other government departments.
Commercial tree plantations	31,580	Commercial tree plantations are mostly under the control of Forest Department (teak plantations in Malayattoor and wattle in the high altitude grasslands). HNL and KFDC have established short rotation *Eucalyptus* plantations for industrial raw material requirements. Extensive *Eucalyptus* plantations have also been established by large tea companies (for fuel wood for curing tea) and private farmers in Vattavada and Kanthalloor.
Tea industry	14,200	Extensive tea plantations belong to corporate sector and small farmers. There are several interspersed forest fragments amidst tea gardens that act as corridors and store-house of biodiversity. Tea industry heavily relies on *Eucalyptus* fuel lots for thermal energy.
Cardamom farms	42,000	Intensive cardamom cultivation with fast depleting canopy cover. In recent times, there is a shift towards more light-loving varieties that require intensive farming practices, more openings in the tree canopy and heavy application of chemical fertilizers and pesticides.
Reed extraction	70,000	An important economic activity in the forests of the lower reaches of the landscape. Reed extraction occurs for commercial purpose, artisanal use and own use by communities. Affected by factors such as shortage of labour, over harvesting, non-accessibility and remoteness of reed grown areas, invasive species, availability of alternate raw materials etc.
Heterogeneous cultivation	65,000	Colder higher areas lying towards the east have vegetable farming and intensive *Eucalyptus grandis* plantations. In Anchanad valley, cultivation of sugarcane and lemon grass is prevalent. Small homesteads generally practice multi-species and multi-tiered agroforestry (coffee, arecanut and pepper). Animal husbandry is a major subsidiary activity.
Tribal hamlets	7,200	The tribal hamlets are either scattered in the forests or located along its fringes. Smallholder farming, collection of NTFPs, forest and agriculture labour and small artisanal enterprises are major livelihood practices.
River valley projects	10,416	Water spread area used primarily for generating hydro-electricity. Some of these reservoirs promote tourism and inland fisheries. Backwaters of some of these reservoirs are habitats for birds and aquatic life.
Tourism	10,000	Munnar is the hub of tourism in the landscape. This has brought in a flurry of infrastructure development and other social and environmental problems.
Urban development	1,000	Prominent towns - Munnar, Adimali, Nedumkandom and Kattappana - act as nuclei of development and are expanding further. Extensive network of roads with some even through ecologically fragile areas.
Other forest areas	37,000	Under the jurisdiction of Forest Department.

*** There is considerable overlap between land uses.**

Map 3: Major land use practices in HRML



Climate change context

55. The HRML area is already experiencing climate change with temperature predicted to rise 2-2.5^0 C along the Western Ghats in the coming decades (Ravindranath and Sukumar, 1998)[57]. Recent aanalysis of climate data ranging from 31-73 years shows clear patterns of changing climate in HRML: rainfall decreasesed over most of the landscape with major reduction noticed in south west monsoon; total number of rainy days varying; rise in average temperature with higher increases in maximum temperature and the minimum temperature decreased. Such oscillations in climate have major impacts on the structure and composition of montane ecosystems. For instance, C3 and C4 plants are known to have differential ecological preferences and higher CO_2 levels would enhance photosynthetic rates in C3 plants to a greater extent than in C4 plants (Tieszen *et.al*., 1979).[58]

56. In discussions with inhabitants in the landscape[59] such changes are corroborated - increase in average and minimum temperature, reduction in humidity, increase in sunshine hours, erratic rainfall, increased soil temperature, loss of soil moisture and increase in evapo-transpiration. There are also reports of some parts of HRML experiencing more frequent occurrence of massive landslides induced by extreme weather events.

[57]N.H.Ravindranath and R.Sukumar, 1998, Climate change and tropical forests in India. Climate Change 39:563-581
[58]Tieszen, L.L., Senyimba,M.M., Imbamba,S.K. and Troughton, J.H, 1979, The distribution of C3 and C4 grasses and carbon isotope discrimination along an altitudinal and moisture gradient in Kenya. Oecologia 37, 337-350.
[59]Stakeholder consultations

Legislative, policy and institutional context

Policies and legislation

57. India has an extensive body of constitutional provisions, laws and policies to promote conservation and sustainable use of biodiversity and natural resources (see Annex 5). The Indian Constitution clearly assigns responsibilities between the Union and State governments (Part XI and article 246) on various subjects. India is also signatory to various international conventions and treaties related to environmental protection. The most relevant national policies and legislation are the Biological Diversity Act of 2002, National Forest Policy of 1988, National Water Policy of 2002, National Environmental Policy of 2006, Indian Forest Act of 1927 (and related state legislation), Forest (Conservation) Act of 1980, Wildlife (Protection) Act of 1972, Environmental (Protection) Act of 1986, Schedule Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act of 2006, Environmental Impact Assessment Notification of 2006, Factories Act of 1948, Mines and Minerals (Development and Regulation) Act of 1957, Energy Conservation Act of 2001, Air (Prevention & Control of pollution) Act of 1981,Water (Prevention & Control of pollution) Act of 1974, Cardamom Act of 1965, and Tea Act of 1953.

58. India's National Environment Policy (2006) seeks to achieve balance between conservation and development by mainstreaming environmental concerns in economic activities. Considering that the mountains are important but highly fragile ecosystems, National Biodiversity Action Plan (NBAP, 2008)[60] lays several measures. These *inter alia* include: i) adopting appropriate land-use planning and watershed management practices for sustainable development; ii) adopting "best practice" norms for infrastructure in mountain regions to avoid or minimize damage to sensitive ecosystems; iii) encouraging cultivation of traditional varieties by promotion of organic farming, enabling farmers to realize a price premium; iv) promoting sustainable tourism through adoption of "best practice" norms; and; v) considering unique mountain areas as entities of "Incomparable Values", in developing strategies for their protection. NBAP also specifically notes several action items (see Table 9 below) that are closely related to this project's objective.

Table 9: Relevant actions and key activities of the NBAP

Action		Activities
Action 2	Augmentation of natural resource base and its sustainable utilization: Ensuring inter and intra-generational equity	• Promote sustainable use concept and best practices for sustainable use of biodiversity in relevant economic sectors; Integrate biodiversity concerns into sectoral and inter-sectoral policies and programmes; Promote techniques for conservation and regeneration.
Action 5	Integration of biodiversity concerns in economic and social development	• Promote integrated approach to management of natural resources
Action 10	Use of economic instruments/ valuation in biodiversity related decision making processes	• Develop valuation models and a system for natural resource accounting (reflecting ecological and economic values of biodiversity); Develop valuation models and validate through pilot studies

59. India has launched the National Action Plan on Climate Change (NAPCC) in 2008 providing a comprehensive policy frame work for responding to climate change. The eight National Missions[61] forming the core of the NAPCC represent multi-pronged, long-term and integrated strategies to address climate change.

60. Besides, pursuant to the objectives of CBD, India enacted the Biological Diversity Act (BDA) in 2002. The Act gives effect to the provisions of the CBD including issues on access to biological resources and associated traditional knowledge to ensure equitable sharing of benefits arising out of

[60]National Biodiversity Action Plan, 2008, MoEF, New Delhi

[61]National Solar Mission, National Mission on Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining Himalayan Eco-System, National Mission for Green India, National Mission for Sustainable Agriculture and National Mission on Strategic Knowledge for Climate Change

their sustainable use. Other important Legal and Policy Instruments relevant in the context of the project are the National Wildlife Action Plan (2002-16), National Conservation Strategy and Policy Statement on Environment and Development (1992), Policy Statement on Abatement of Pollution (1992), National Tourism Policy (1998), National Agricultural Policy (2000), the Joint Forest Management orders and rules promulgated by both the national and state governments at various years.

61. There are several Legal Instruments enacted at the state level that have a bearing on the project. These include the Kerala Forest Act of 1961, Kannan Devan Hills (Resumption of Lands) Act of 1971, Kerala Preservation of Trees Act of 1986, Kerala Forests (Vesting and Management of Ecologically Fragile Lands) Act of 2003, Kerala Promotion of Tree Growth in Non-Forest Areas Act of 2005, Kerala Restriction on Cutting And Destruction of Valuable Trees Act of 1974, Kerala Land Conservancy Act of 1957, Kerala (Restriction on Transfer of Lands and Restoration of Alienated Lands) Act of 1975, Kerala Conservation of Paddy Land & Wetlands Act of 2008, Kerala Ground Water (Control and Regulation) Act of 2002, Cardamom Rules of 1935, Kerala Government Land Assignment Act of 1960, Kerala Assignment of Government Land to the Schedules Tribes Rules of 2001, Kerala Panchayats Building Rules of 2011, Kerala State Organic Farming Policy, Strategy and Action Plan, 2010 etc.

Institutional framework

62. The Ministry of Environment & Forests (MoEF) is the nodal agency in the administrative structure of the Central Government for planning, promoting, coordinating and overseeing implementation of India's environmental, forestry, land degradation, climate change related policies and programmes. While implementing these policies and programmes, the Ministry is guided by the principle of sustainable development and enhancement of human well-being. The Ministry also facilitates the GEF programming to leverage additional resources and strategically align it with national priorities and GEF thematic areas. Other union ministries whose mandate coincides with this project are the Ministry of Agriculture (National Agricultural Policy, 2000); Ministry of Rural Development and Land Resources (for implementation of Mahatma Gandhi National Rural Employment Guarantee Act, 2005 (MGNREGA)); Ministry of Tribal Affairs (the Schedule Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006); the Ministry of Panchayati Raj (issues related to Panchayat Raj Institutions (PRIs)[62]); Ministry of Power, Ministry of New and Renewable Energy (issues related to energy), Ministry of Commerce (trade related aspects particularly tea, coffee, cardamom and rubber), and the Ministry of Tourism (National Tourism Policy, 2002).

63. Kerala Forest Department (KFD) is mandated to protect, conserve and manage the state's forests and wildlife resources. There are a number of other Government Departments and agencies that regulate/ facilitate resource use in HRML. Departments such as Revenue, Tribal, Environment, Education, Agriculture, Animal Husbandry, Fisheries, Local Self Government (LSG), Tourism, Town & Country Planning, Public Works, Science & Technology, Planning, Water Resources, Irrigation, Kerala State Electricity Board, State Biodiversity Board, Pollution Control Board, Land Use Board, State Horticulture Mission etc. have key roles. District administration and PRIs are highly relevant in the context of the project.

64. Local research/ educational institutions such as Agricultural Universities, technical institutions and units of Indian Council for Agricultural Research (ICAR) etc. have their presence in HRML and shall play a crucial role in the project particularly in building capacities at the grassroots level. Private Sector, Chambers of Commerce and Industry, Financial Institutions, Political parties, *Kudumbashree*,

[62]PRIs are local-level institutions for self-governance in rural areas that are recognized by the Constitution of India. These are elected bodies and operate at three levels, at village, at the block (a cluster of villages) and at the district level. PRIs are responsible for the preparation of plans for economic development and social justice and also for the implementation of schemes as entrusted to them by the respective state governments and also by the GOI

Self Help Groups (SHGs), Tribal Cooperatives, Youth and Religious Groups, Joint Forest Management (JFM) Committees (Eco-development Committees (EDCs), and Vana Samrakshana Samities (VSS)), Biodiversity Management Committees (BMCs), Forest Development Agency (FDA), Non-Governmental Organizations (NGOs), Civil Society Organizations (CSOs) /Community Based organizations (CBOs), Cardamom for Rainforest Conservation (CRC) and their Unit Level Organizations (ULOs) etc. are other organizations or institutions of relevance in the project landscape.

B: THREATS, ROOT CAUSES AND IMPACTS

65. At present, HRML is a complex juxtaposition of land uses where conservation and economic production systems assume equal importance and profoundly influence each other. The project landscape has diverse and striking characteristics: striking range of biological diversity, contesting land-use assertions, ambitious developmental imperatives, contradictory sectoral directives, multitudes of actors and contrary aspirations. Despite several years of developmental interventions, the landscape still has substantial area under natural vegetation (both primeval and under varying degrees of degradation). However, the rapidly altering developmental context, demographic contours, resource use configurations, and other emerging challenges such as climate change is increasingly undermining the long-term ecological sustainability.

66. The diverse nature of ecosystems and habitats, land use patterns and administrative overlays is indicative of the level, distribution and intensity of threats to biodiversity, their root causes and impacts are uneven across the landscape. The following are threats to biodiversity conservation in the area: a) rapidly eroding biological diversity (at genetic, species and ecosystem level); b) key habitats getting degraded or fragmented; c) proliferation of invasive alien species; d) increasing human-animal conflicts; e) climate change impedes ecosystem functionality; e) over-exploitation of natural resources; f) un-favourable practices in economic production sectors adversely affecting biodiversity; g) weakening capacity for sustainable resource use particularly among tribal communities; h) diminishing livelihoods based on natural resources; and g) production imperatives overriding conservation considerations.

67. These threats to biodiversity can be broadly categorized into four: habitat loss and fragmentation, habitat degradation, over-exploitation, and adverse effects of climate change. The relationship between the threats to biodiversity and various land use practices are summarized in Table 10.

68. Considering the cross-cutting and intricate nature of threats to biodiversity, their root causes and causative factors that are often difficult to segregate, the results of the detailed threat-scape analysis carried out during the Project Preparatory Phase are categorized under the following four sub-headings: 1) threat to biodiversity in PAs and other High Value Biodiversity Areas (HVBAs); 2) threat to biodiversity from economic production sectors; 3) threat to biodiversity from climate change; and d) threat to biodiversity from changing socio-economic context. These are described in detail below.

Table 10: Land use practices and proximate threats to biodiversity of HRML

Sectors	Proximate threats to biodiversity			
	Habitat loss and fragmentation	**Habitat degradation**	**Over-exploitation**	**Adverse effects of climate change**
Protected Areas	Small size; incomplete representation of biota; connectivity issues; changes in land use in adjoining areas.	Proliferation of invasive species; uncontrolled fire; increasing human-wildlife conflict; grazing.	Focal areas for mass tourism; excessive resource harvesting in a few PAs.	Ecosystem and species shift in the higher altitudes; dying back of *shola* patches; limited ability of species for adaptation and depletion; proliferation of invasive species; increasing aridity; change in hydrology.
High Value Biodiversity Areas / forest	Infrastructure development; roads; canals with less focus	Proliferation of invasive species; uncontrolled fire;	Unscientific reed extraction, unsustainable	Ecosystem and species shift in the higher altitudes; dying back of *shola* patches; limited ability of species for

fragments	on conservation; changes in land use in adjoining areas.	increasing human-wildlife conflict; grazing	harvesting of NTFPs, excessive consumption of firewood in certain areas; unregulated tourism.	adaptation and depletion; proliferation of invasive species; increasing aridity; human-wildlife conflict; change in hydrology
Commercial tree plantations	Promotion of monoculture by conversion of natural vegetation; management practices incompatible with conservation concerns; loss of connectivity between habitat patches.	Soil fertility depletion; Site Quality deterioration; reduction in ecosystem networking and functionality; reduction in genetic, species and ecosystem diversity.	Water stress; nutrient loss and excessive biomass removal.	Extensive mono culture plantations disrupts the buffering influences of natural forests to climate change by changes in microclimatic conditions; rising temperature favours the proliferation of monoculture tree species (e.g. wattle) at the expense of native species especially the high altitude grasslands; increasing aridity and disruption in hydrological cycle.
Tea industry	Conversion of interspersed HVBAs and natural habitats for economic production.	Intensive management and heavy agro-chemical inputs; monoculture plantations (tea and *Eucalyptus*); reduction in overall biological diversity particularly soil biota and other lower life forms	Nutrient loss; water stress.	Changes in rainfall pattern; tiny fragments of HVBAs under increasing threat from desiccation; weakening resilience to changes in climate regime.
Cardamom farms	Reduction of over wood; opening up of canopy; poor regeneration and limited growth of understory species; reduction in biological diversity (e.g. sallying flycatchers, pollinators, Lion tailed macaque); disrupted ecosystem connectivity	Intensive pesticide and fertilizer application; soil fertility depletion; increasing soil erosion; loss of stepping stone corridors.	Excessive abstraction of nutrients and water by intensive agriculture particularly high yielding varieties; removal of over wood for fuel and more sun light.	Unfavourable conditions for biodiversity-friendly cardamom cultivation such as increase in average and minimum temperature, reduction in humidity, increase in sunshine hours, erratic rainfall, increased soil temperature, loss of soil moisture and increase in evapo-transpiration.
Reed extraction	Extensive construction of extraction roads in hitherto inaccessible ecologically rich areas; increasing road kills; prolonged presence of labour colonies within the forests.	Over harvesting in easily accessible areas; non-adherence of extraction cycles that impedes regeneration and quality of habitats; spread of invasive species.	Repeated and intensive extraction in easily accessible areas	Intensification of invasive species distribution; increasing aridity and changes in habitat quality; uncontrolled fire etc.
Heterogeneous cultivation	Loss of canopy continuity across the landscape; advent of monoculture farming practices lead to loss of agro-biodiversity.	Excessive use of pesticides and fertilizers; soil fertility depletion; deterioration in water quality.	Over use of water; rocks and minerals and sand; increasing quarrying.	Changes in cropping pattern; unsuitability of traditional crops; human-wildlife conflicts.
Tribal hamlets	Development of infrastructure; excessive and unsustainable use of natural resources; changes in lifestyles, aspirations and perception.	Reduction of farming cycles; adoption of intensive and intrusive farming methods.	Unsustainable NTFP harvesting; fuel wood collection.	Increasing aridity; sub-ambient conditions for cultivation; increasing vulnerability to the uncertainties of climate induced stressors; increasing human-wildlife conflicts.
River valley projects	Submergence and encroachments of prime habitats; increased infrastructural growth; habitat discontinuity.	Introduction of exotic fishes.	--	Climate change induced water scarcity spurs additional demands for water impounding facilities/ water diversion programmes.
Tourism &	New infrastructure and	Pollution of water	Over-crowding;	Increasing mass tourism; changes in

urban development	encroachments; increasing demands for land use change; demand for opening up more tourism destinations	and air (e.g. solid waste, vehicle movement etc.)	intensive resource use (water, energy); waste management	salubrious environment; demand for energy intensive lifestyle in the wake increasing aridity.

69. Fractioned and fragmented PAs and HVBAs: In some areas, though the PAs are physically connected, the intervening areas are not accorded enough conservation priorities – neither legal nor operational (e.g. Pettimudi, Kathumala, Idlimotta, Manthan shola). In particular, two PAs (Mathikettan and Idukki) in the project landscape have critical habitat connectivity issues. Moreover, gradually, such areas are witnessing alternate land use such as roads, transmission lines, tourism infrastructure, grazing, waste disposal, settlements, changes in cropping patters etc. that will cause further fractioning of habitats. Land-use changes in areas adjoining PAs/ HVBAs (e.g. degradation of forest fragments in tea estates, planting of grasslands in the higher reaches, mushrooming of tourism infrastructure etc.) have significant impacts on the biodiversity of PAs. For instance, Chinnakkanal have isolated populations of stranded elephants. Some of the critically fragmented habitats of HRML are KDH-Mathikettan region, Neriamangalam, Bhoothathankettu right bank etc. If the present trend continues, PAs like Pambadum shola, Kurinji mala, Anamudi shola etc. will also come under increasing fragmentation.

70. Proliferation of Invasive Alien Species: Proliferation of invasive species is a chronic problem in the landscape. Wattle (introduced three decades ago as part of a forest plantation programme in the high altitude grasslands) is occupying large portion of the landscape especially some of the vital ecological niches (Munnar Division). Further, three PAs (Anaimudishola, Pampadumshola and Kurinjimala) have significant area under *Eucalyptus* and wattle. Wattle and eucalyptus (both C3 plants) have high growth rates and coppice profusely. Wattle also invades grasslands and disturbed forests. In the coming years, rise in temperature and a reduction in the incidence of frost will enhance the photosynthetic rates in wattle and *Eucalyptus* that will enable them to spread to grasslands (where they are now absent) more rapidly than the slow growing forest tree and shrub species (Sukumar *et al.,* 1995).[63] Going by above, it is clear that high altitude grasslands ('the water towers' of the landscape) are among the most threatened ecosystems in HRML.

71. The project landscape is also witnessing the rapid proliferation of other invasive alien species such as *Mikania micrantha* and *Lantana camara* (low and mid-elevation forests) and *Eupatorium* glandulosis. They are more favourably adapted to live in new and narrow ecological niches created and have higher rates of survival and adaptability thereby forcing the ecological eviction of native 'specialist' species. For instance, in the Central Forest Circle (including Malayattoor Forest Division), 31 out of the 125 sites sampled had high (more than 1,000 stalks per ha) infestation of *Mikania* (Sreenivasan, 2003)[64] whereas in Idukki district, more than 8 out of the 12 sites were infested (Shankaran *et al.*, 2001).[65]*Mikania* and *Mimosa* are suppressing the regeneration of reed breaks in Malayattoor and Munnar Forest Division. *Parthenium sp*., *Prosopis juliflora* (in Anchanad valley), Scotch broom (*Cytisus scoparius*), and *Mimosa diplotricha* are other invasive species threatening to colonize the landscape.

72. Increasing human-animal conflicts: In the landscape, human–animal conflict is increasing largely involving elephants, wild boars, guars and bonnet macaques (10 human deaths in Chinnakanal region alone in last five years due to elephants). There is also a perception among local people that the increasing occurrence of human-animal conflict, at least partly, is related to climate change as increasing aridity, water scarcity, reduced availability of forage, proliferation of invasive species, shift

[63] R. Sukumar, H.S. Suresh, and R.Ramesh, 1995: Climate Change and its impact on tropical montane ecosystems in southern India, Journal of Biogeography 22, 533-536

[64]M.A.Sreenivasan, KFRI, 2003.Natural distribution and control of alien invasive weed *Mikania micrantha* in the Western Ghats, KFRI.Peechi, Thrissur

[65]K.V.Shankaran, P.K.Muraleedharan, V.Anitha, 2001.Integrated management of Alien invasive weed *Mikania micrantha* in the Western Ghats, KFRI, Peechi, Thrissur.

in floral elements etc. drive wild animals from their natural habitats. There are large numbers of road kills that often go unreported. Increased volume of vehicular movement due to tourism is the primary reason for this. For instance, the number of vehicles passing through the Chinnar –Munnar High Way crossed more than 223,000 in 2012. In future, human-animal conflict is only likely to increase as there are new proposals for expansion of tourism, roads, reservoirs and revival of abandoned infrastructure.

73. Inadequate enforcement capacities within the conservation sector: There are several enforcement related threats such as uncontrolled fire, poaching, illicit felling, grazing, over-harvesting of wild resources etc. that impinge on the integrity and management effectiveness of PAs and HVBAs. Illicit felling and poor regeneration of sandal trees are chronic problems in Marayur region. For instance, during 2000-2008, in Marayur Forest Division alone, 8,425 sandal trees were illegally felled which also caused serious collateral ecological damage such as poaching, clearing *sholas* for *gunja (Cannabis sativa)* cultivation etc. Similarly, the adjoining Chinnar Wildlife Sanctuary has pressure from grazing.

74. In the conservation sector (Forest Department), the capacities to effectively enforce conservation is not optimal (both in terms of manpower and technical know-how). Moreover unclear jurisdictional boundaries (e.g. Edamalakudy), incomplete consolidation of human settlements (e.g. Mankulam) and the complexities of production enclaves lying interspersed with HVBAs (e.g. tea estates in KDH), incompatible land use in adjoining areas (e.g. *Eucalyptus* plantations in proximity to Kurinjimala Wildlife Sanctuary), developmental pressure from tribal enclosures located within the PAs (e.g. Chinnar Wildlife Sanctuary), steep and unsustainable increase in tourist visitation levels (Eravikulam National Park) and liner intrusions like canals (Thattekkad wildlife Sanctuary) complicate the management challenges. Local communities utilize forest areas to collect firewood, to harvest NTFPs and for grazing. Such use is not being effectively managed, and is not always sustainable as currently practiced. For instance, in the Anchanad valley, biomass abstraction (about 494,361 kg per year) for lemon grass distillation is intensifying the stress on natural vegetation (in Chinnar and Marayur) as it is taking place in a region of low biomass productivity. Moreover, there are growing conflicts between community user groups, Forest Department and commercial interests over resource use rights. The major enforcement related threats to PAs and HVBAs are given in Table 11.

Table 11: Major threats to the PAs and HVBAs of HRML

Protected Area	Uncontrolled Fire	Poaching	Illicit felling	Grazing	Encroachment	Over harvest	Roads	Invasive species	WHC
Eravikulam NP	H	M	L	L	L	L	L	M	L
Chinnar WS	M	M	H	H	L	H	H	M	M
Anaimudishola NP	M	L	L	M	M	M	M	H	L
Kurinjimala WS	M	L	L	L	H	L	M	H	L
Pampadumshola NP	L	L	L	L	L	L	M	H	L
Mathikettan NP	L	L	L	L	L	L	L	L	H
Idukki WS	H	M	M	H	L	H	L	M	M
Thattekkad WS	M	L	L	L	L	L	L	M	M
Malayattoor FD	M	H	L	L	M	H	M	H	M
Mankulam FD	L	H	L	L	H	M	M	L	L
Munnar FD	H	H	M	M	M	M	M	H	H
Marayur FD	M	M	H	H	L	L	L	H	H
Kottayam FD	M	L	M	M	L	L	L	M	L
Fragments+	M	M	M	L	H	L	L	L	L

Notes: NP = National Park, WS = Wildlife Sanctuary, FD = Forest Division; HWC = Human-Wildlife Conflict, H = High, M = Medium, L = Low; + Fragments in Revenue, Tea Estates etc.

75. In addition, considerable knowledge deficit exists among the conservation sector staff to deal with complexities involved in managing biodiversity at a landscape level. These include participatory resource governance, implementation of Forest Rights Act, addressing man-animal conflict, climate change, invasive species, etc. Similarly, capacity for visitor management, both infrastructural and institutional, remains weak among PAs. Further, existing staff strength and infrastructure are often considered inadequate/ obsolete. The capacities of conservation sector is further constrained by persisting staff vacancies and high attrition rate among the newly recruited field staff.

76. Sub-optimal geographical coverage of PAs: While the individually, the eight PAs have performed an impressive role in preserving species diversity, management effectiveness and their role at the landscape level is sub-optimal due to a) small size; b) incomplete representation of biota; c) connectivity issues; and d) prevailing and emerging threats (including climate change). With an average size of only 4,600 ha and covering less than 12 percent of the project landscape, the PAs clearly are unable to encompass and sustain the representative biodiversity of the region. Vast tracts of high conservation significance are still lying outside the premises of PAs (see Table 14). For instance, the crucial calving-cover of Nilgiri tahr transcends the ecological boundaries of Eravikulam National Park and seep into the surrounding non-PA regions. In the current scenario, the existing PAs, already small in size and under considerable stress from various factors will lose their functional effectiveness with serious consequences. During the PPG phase, the conservation values of HRML were reprioritized [66] as given in Table 12.

77. Two things are discernible. First, even within the existing PAs (out of a total of 37,100 ha), only 20,750 ha falls under the high value conservation zone, the rest (16,350 ha) is already retrograded to low and medium value conservation zones due to various threats described in this section. At the same time, it is equally pertinent to note that around 84,600 ha of high value conservation areas are currently falling outside the purview of the PA system.

78. Weak conservation focus on High Value Biodiversity Areas (HVBAs): HVBAs consist of large and medium sized forested blocks and small fragments outside the PA system with the largest habitat blocks lying on state forestlands and smaller blocks on Revenue lands and plantations. Extending over 84,600 ha, HVBAs cover about 27.29 percent of the project landscape. In terms of ecological values, they are equally important as that of PAs and a key connecting link between PAs. As already mentioned, the HVBAs of HRML include most of Mankulam Division; areas resumed from tea estates; areas adjoining PAs; portions of Reserved Forests of Munnar, Malayattoor, Kottayam and

[66] Improved upon various studies of French Institute, Pondicherry.

Marayur Forest Divisions; the *sholas* and grasslands under the control of the Revenue Department (e.g. Manthan shola); interspersed forests, grasslands and swamps within tea gardens etc.

Table 12: Prioritization of conservation zones in HRML

Forest Administrative Units		Conservation value (km2)			
		Low	Medium	High	Total
Protected Areas	Chinnar WLS	6	34.5	50	90.5
	Eravikulam NP	1	2	94	97
	Idukki WLS	39	44	22	105
	Thattekkad WLS	9	2	14	25
	Mathikettan NP	0	3	10	13
	Pambadum shola NP	0	0	1	1
	Anaimudi shola NP	0	0	7.5	7.5
	Kurinjimala WLS	11	12	9	32
Total		66	97.5	207.5	371
Non-Protected Areas[67]	Malayattoor Forest Division	19	170	371	560
	Mankulam Forest Division	0	0	90	90
	Munnar Forest Division	51	121	238	410
	Marayur Forest Division	0	10	52	62
	Kottayam Forest Division	40	19	35	94
Others	Fragments in Revenue, Tea Estates etc.	0	0	60	60
Total		70	320	846	1,276
Grand total		136	417.5	1,053.5	1,647

79. However, in the existing resource management arrangements of HRML, HVBAs have not been given enough conservation priorities. For instance, the production practices employed in some of the HVBAs (e.g. reed extraction, teak and Eucalyptus plantations etc.) often overrides conservation priorities. In the absence of consistent conservation approaches, sustainable use regime and stronger governance framework, such areas will continue to be threatened leading to their eventual degradation and/ or even disappearance.

80. Delayed settlement of rights to tribals and other traditional forest dwellers hampers effective and inclusive biodiversity governance: Three PAs (Chinnar, Anaimudi shola and Idukki) have tribal settlements located within and demand for improved infrastructure is on the rise. At the same time, the mandatory settlement of rights under the Forest Rights Act, 2006 is yet to be completed. Further, unconsolidated boundaries still remain as threats in three PAs (Kurinjimala, Anaimudishola and Chinnar). Persistent enforcement related challenges (threat of encroachment, poaching, grazing and fire) and increasing human-animal conflict complicate the situation. In the case of HVBAs, threats primarily emanate from inadequate baseline information on HVBAs, their non-identification, ambiguous and intricate legal and policy implications, unclear mandates, developmental overshoot, misplaced notions on the Forest Rights Act and absence of a platform for appreciation of biodiversity concerns in matters of development.

81. Further, the scattered nature of settlements (both tribal and non-tribal) within HVBAs leads to increased demands for opening up or expanding infrastructural requirements like roads. In most cases, such aspirations are only genuine and necessary infrastructural services need to be provided to tribal communities living in remote areas (e.g. road to Edamalakudy Panchayat) for meeting their rightful developmental aspirations. However, in the absence of a holistic conservation strategy, the economic, social and ecological rationale of such demands and the possible trade-offs are not always worked out leaving the managers to go for *adhoc* decisions that often go against prudent use of resources making the existence of HVBAs more and more perilous.

[67] In the absence of adequate data, this has been arrived through broad approximations.

Threats to biodiversity from production sectors, their root causes and future trajectory:

82. The biodiversity extant in the PAs and HVBAs are intricately connected to the adjoining production land uses. Hence, the changing contours of production operations pose several threats to the biological resources of HRML. For instance, of late, the tea industry has become increasingly prone to structural destabilization due to global economic changes (fluctuations in tea price), and the shortage of skilled labour. This is likely to have significant ecological impacts (on account of change in land–use to less conservation compatible uses, and unsustainable land husbandry) and socio-economic impacts (deepening poverty and social unrest). Reckless use of chemical pesticides and change in cropping pattern to more sun-loving varieties (leading to loss of top canopy trees) are growing problems in the cardamom sector. Similarly, tourism industry has an unparalleled growth in HRML during the last one decade with significant bearing on the ecology of the region. The following section describes threats to biodiversity conservation from key economic production sectors, their root causes and trajectory.

Tea industry

83. Tea industry decisively influences the ecological stability of HRML. The emergence of tea industry had led to large-scale decimation of primeval habitats in the past. However, several original forest fragments/ swamps/ streams/ rocky patches and slips/ jungle were retained at the time of establishment of tea gardens on ecological and legal grounds. The KDH Company had also helped in the establishment of Eravikulam National Park during 1970s. At present, the Company has a Management Plan that *inter alia* prescribes activities such as *shola* regeneration and engaging local tribes for ecological monitoring and enforcement. However, the existing model of conservation-production partnership in the tea industry is governed largely by conventions that originated in the colonial era than by any consistent interventions from the state, either in the form of any policy formulation or through large-scale political and financial support. The altering developmental context is fast threatening this milieu. The relationship between tea industry and biodiversity conservation in HRML is described in the following sub-sections:

84. Incomplete consolidation of HVBAs/ forest fragments and worsening environmental conditions*:* The corporate tea gardens of HRML still retain innumerable interspersed forest fragments (varying in extent from 0.1 ha to more than 1,000 ha) that cover an approximate area of 4,000 ha. Irrespective of their size, these fragments play a vital role in the existence and diversity of life-forms (Vasudevan, 2003). [68] Besides, like spokes in a wheel, they ensure linkages ('patch and habitat matrix' configuration) in the landscape by acting as stepping-stone corridors for wildlife moving between large habitat patches (including tiger, leopard, gaur, elephant, amphibians and reptiles) and also as potential 'escape routes' and 'connecting circuits' in the context of climate change; thus facilitating gene flow across the whole landscape. These interspersed forest fragments that resemble island biogeography, is neither catalogued, inventoried, demarcated nor under any kind of active conservation management as on now. Proximate threats to such HVBAs in tea gardens have already been listed in Table 12.

85. In addition, there are other environmental concerns within the tea production estates. Although the number of tea plantations in HRML has remained fairly stable during the past fifty years, their environmental status has deteriorated. In earlier times, the total area of tea garden was small in relation to the large swathe of forests surrounding them and the buffering influence of forests safeguarded the agro-climatic regime and stabilized the hydrological cycle, soil etc. But over the years, the forest cover in the landscape has diminished considerably, exposing the tea gardens to extreme fluctuations in the local climate. Moreover, intensive agronomic practices such as use of chemical fertilizers, pesticides, weedicides, growth regulators, and other agrochemicals have caused deleterious environmental effects on soil and biota.

[68]Karthikeyan Vasudevan, 2003. A Report on the survey rainforest fragments in the Western Ghats for amphibian diversity (Chapter 19 of the Conservation of Rain forests in India, Envis, Wildlife Institute of India,

86. Instability in tea industry and its implications on biodiversity: Tea industry is increasingly prone to market fluctuations (CEC, 2003)[69], which will have serious bearing on the biodiversity of HRML. The labor-intensive tea industry is a major employer of HRML (with more than 19,000 workers on payrolls) and social implications of unviability in tea industry will be massive. Tea estates are not just economic production units, but rather stable social institutions. The enclave economy of tea estates are built on the principles of dependence and heightened vulnerability. The loss of employment for workers has serious social and environmental impacts. People will be forced to look for alternatives including encroaching on the wild resources of adjoining areas or illegal farming of forest land – with detrimental impacts on biodiversity. In a similar case, in the state of West Bengal, following the closure of tea estates, around 70,000 people became solely dependent on the forested slopes of lower Himalayan Mountains and decimated it (Sarkar, 2003).[70] A similar disaster awaits HRML if the tea industry collapses.

87. Dependence on biomass based thermal energy and carbon foot prints:Tea processing is an energy intensive process (constituting 30 percent of cost of production) and tea factories rely heavily on biomass from energy plantations (*Eucalyptus*) to meet thermal energy requirements. On an average, the energy mix for tea production is 50 percent thermal and 50 percent electrical. In the case of wood, the mean specific consumption is 1.89 kg of wood/ one kg of made tea while the mean specific cost is found to be Rs. 1.58. For electricity, the mean specific consumption is 0.66 kWh/ one kg of made tea and the mean specific cost is Rs. 1.97 (TIDE, 2012).[71] Adopting energy efficiency options in tea industry can bring down its dependency on mono culture plantations of *Eucalyptus* (that currently occupy 32 percent area of tea gardens) with significant co-benefits such as reduced Green House Gas (GHG) emissions. Preliminary Energy Audit assessment in the tea factories of HRML has revealed the scope for energy efficiency in three distinct areas, *viz.*, a) housekeeping and demand side management; b) energy conservation in electrical systems; and c) fuel conservation (firewood) on thermal side. Such savings in fuel wood in tea industry can reflect in the land use currently under *Eucalyptus* plantations in three ways: a) tea industry can strive for increasing tea production without putting additional pressure on biomass for energy requirements; b) such saved fuel wood can be distributed to other energy intensive economic production activities in the landscape that have heavy reliance on biomass and a cause of forest and tree cover depletion (e.g. cardamom curing and lemon grass distillation), and c) areas vacated by *Eucalyptus* woodlots could be allowed to re-grow into wilderness adding to the vegetal cover of the region. Either way, these options are highly promising from ecological, economic, livelihood and GHG emission reduction point of view.

88. Overall, in future (in the business-as-usual-scenario) tea industry will have important bearings on the trajectory of biodiversity conservation of HRML in three critical ways. Firstly and more proximately, by safeguarding the future of innumerable forest fragments interspersed in tea production areas. Secondly, by ensuring the viability of tea industry itself (while ensuring highest environmental standards) and providing livelihoods to large labour force, thus diverting pressure on natural resources. Thirdly, by proactively supporting the conservation-friendly production practices in the landscape (e.g. fuel wood support to other energy intensive economic production sectors).

Cardamom gardens

89. Cardamom Hill Reserve (CHR) is a crucial ecological entity in the project landscape. The high rising hills of CHR exert considerable effect on rainfall through orographic effect. They also influence wind and buffer climatic extremes both through incident solar energy and wind flow. The structure of the vegetation community, particularly the vertical profile of forests, has great influence on energy

[69] Centre for Education and Communication, 2003. *Crisis in Indian Tea Industry: A Report.* New Delhi: Centre for Education and Communication.

[70] Sarkar, D. 2003."Burdensome Load: Laid-Off Tea Workers Fall Back on Forests in West Bengal." *Down to Earth* 12 (2): 42.

[71] TIDE, 2012. Process Document on Energy Conservation in Small Sector Tea Processing Units in South India

and moisture flow. The Cardamom Hills is significant because it is an extensive, gently undulating tract located at a medium elevation, juxtaposed between the western slopes of the Western Ghats receiving the onslaught of the monsoon and the eastern scarp which is low enough to permit the retreat monsoon to move into it. Hence it functioned as the largest reservoir of water to be fed into the river systems of HRML (Nair, 2004).[72]

90. Small cardamom (*Elettaria cardamomum)* is native to the tropical rainforests of the Western Ghats at an altitude of 600-1600 m above MSL. HRML contributes to more than 70 percent of the annual small cardamom production in India. There are about 37,000 farmers involved in cardamom cultivation in the landscape.[73] Though the area under cardamom cultivation has reduced from 60,000 ha in 1980 to 42,000 ha in 2010, the number of small holdings of cardamom has increased significantly during the last few decades. The current average yield is around 300 kg/ha. During the last 35 years, cardamom production has increased by 15 fold, largely due to the adoption of intensified agronomic practices and the arrival of high-yielding varieties (e.g. *Njallani, Kalarikkal, Panikulangara* etc. which now account for around 80 percent of the cultivation). Cardamom sector is estimated to contribute around USD 120 million annually to local and regional economy. The PPG team has identified several issues pertaining to cardamom sector that have implications on the ecology of HRML and is outlined below:

91. Changes in cropping pattern and opening up of over wood canopy: There are drastic changes happening in the cropping pattern in cardamom gardens with shade-loving traditional cardamom varieties replaced by more sun-loving varieties leading to loss of top canopy, habitat fragmentation and a significant reduction in biodiversity. The estimated canopy density of intensely managed cardamom gardens have now been reduced to around 35-50 percent whereas in the original condition it was 80-90 percent.[74] In 1978, Kurup[75] had reported the presence of Lion tailed macaque in several locations of Cardamom Hills. However, by 1997, most of these populations had become locally extinct due to habitat fragmentation (Easa *et al.,* 1997).[76] Only a small portion of CHR region is currently under exclusive conservation (Mathikettan National Park). Further fractioning of forests in CHR will affect HRML and adjoining areas through changes is precipitation pattern, temperature and moisture regime, increasing desiccation apart from hampering the gene flow and disrupting other ecological processes. Accelerated depletion of vegetation that has already become patchy and stretched will significantly affect the spatial habitat complexity, a hall mark of HRML leading not only to species loss but a much more sinister form of degradation – the extinction of ecological interactions as well.

92. Intensive agriculture and increased chemical inputs impacts biodiversity*:* Reckless use of chemical pesticides aggravates the environmental issues of CHR. Pesticide use in cardamom plantations in CHR is reported to be one of the highest in the world and on an average, farmers use 27 kg/ ha of pesticides (NIAS, 2010).[77] High application of pesticides has health implications too with increased reports of diseases like dermatitis, asthma, cancer and reproductive disorders.[78] Besides, excess use of pesticides, changing agronomic practices, fragmentation and conversion of cardamom have serious impacts on pollinators as many of the original species have tenuous associations with

[72]Sathis Chandran Nair, 2004: The Ecology of Cardamom Hills: (in the Proceedings of the Workshop- conserving the biodiversity rich plantations of cardamom hills in the Western Ghats (edit. Easa P.S. and Unnikrishnan P.N).
[73] Spices Board data, 2010
[74]Murugan M., 2011. Factors and Patterns of Pesticide Usage and Sustainability of Cardamom in Indian Cardamom Hills, Unpublished PhD thesis submitted to National Institute of Advanced studies, Bangalore.
[75] Kurup G.U. (1978). Distribution of the lion tailed macaque, *Macaca silenus* (Linnaeus). J. Bombay Nat. Soc., 75, p. 312-340)
[76] Easa P.S., P.K.S.Asari, C.S.Basha.(1997) Status and distribution of the endangered lion tailed macaque *Macaca silenus* in Kerala, India. Biol.Conser 80 p 33-37
[77] National Institute of Advanced Studies (2010) Cross reference from Misra, S. S. (2011) Kerala gets cautious. *Down to Earth*, Feb. 2011
[78] Misra, S. S. (2011) Kerala gets cautious. *Down to Earth*, Feb. 2011

plants that may not sync well with sound ecological considerations (Murugan *et al.*, 2011).[79] It is observed that in cardamom growing areas, there is perceptible decline in the number of sallying insectivorous birds (from 10 species in 1933 to five in 2009) which is attributed to chemical pesticides and removal of middle-storey perching canopy (Sasikumar *et al.*, 2009).[80]

93. Climate change impacts on the biodiversity of cardamom gardens: Climate change has started impacting the cardamom cultivation in the landscape. Observations made during the PPG consultations corroborate this. For instance, cardamom farmers in the landscape observe that there is change in the average and minimum temperature over the last ten years. Reduction in humidity, increase in sunshine hours, erratic rainfall, increased soil temperature, loss of soil moisture and increase in evapo-transpiration have created sub-ambient conditions for cardamom cultivation in the region. The impacts of climate change is also critical in the pollination of cardamom on account of the intricate relationship between phenology and pollinator biology. In the wake of these changes the tendency has been to further resort to short-term intensified production practices that are inimical to biodiversity conservation (e.g. opening up of canopy for sun loving varieties, increased agro-chemical inputs etc.).

94. Increasing thermal energy consumption for cardamom curing and its impact on canopy cover: Like tea, cardamom also requires vast amount of thermal energy for curing. At present, most of the curing units procure fuel wood from trees grown/ existing in the cardamom gardens that is marginally supplemented by wood brought from outside. It is estimated that the total quantity of firewood used in CHR for cardamom curing is around 80,000 metric tonnes per annum. Most of these curing units are also operating below par in terms of energy efficiency. Improvements in technology can bring in significant reduction in firewood use that will have a big influence in retaining the top canopy tree cover in cardamom gardens. Even a modest 20 percent reduction in fire wood consumption (achieved through energy efficiency interventions) in cardamom curing units will save 16,000 metric tonnes of firewood every year which will have a corresponding CO_2 emission reduction to the tune of 27.84 million kg.

95. Unfavourable market conditions hinder adoption of conservation friendly farming practices: Cardamom industry is highly prone to persistent market risks and failures along with increasing cost of production (averaging around USD 3,000 per annum per ha). Markets show vast fluctuations that spread signals of distress and uncertainty in the sector. Cardamom markets are also plagued by the presence of intermediaries who form cartels and resort to illegal imports leading to low value realization and poor economic returns to farmers. In addition, cardamom sector is affected by pervasive and unfavourable trade regulations. Non availability labour is a recent issue. As a response measure, the tendency is to resort to more intensified non-conservation-friendly production practices to squeeze out the last elusive profit through short-term means.

96. Ambiguous landholding pattern in CHR impedes effective biodiversity management: Cardamom Hill Reserve (CHR**)** is a tenurial enigma with a multitude of landholding patterns, often nebulous and highly ambiguous land tenure systems and overlapping jurisdictions that have adversely affected effective management of biodiversity. For instance, here, Forest Department officially has the responsibility of protecting trees; Revenue Department presides over the land; and cultivators own the crop. The complex and unclear arrangements of land tenure and the weak governance framework for administering it have rendered sustainable management of CHR a daunting proposition. While the loss of forest canopy within cardamom industry is an immediate imminent threat, adoption of environmentally malign technological/ land-use options, often disregarding the local ecological

[79]Murugan M., Shetty P.K., Hiremath M.B., Ravi R. Subbiah A, 2011. Occurrence and activity of cardamom pests and honey bees as affected by pest management and climate change. International multi-disciplinary research journal.Vol 1/6 pp 3-12.

[80]C.Sasikumar, C.K.Vishnudas, S.Raju, S.Kannan and P.A.Vinayan, 2009. Along the Trail of Salim Ali – A study of avifauna and their habitats and ecological history. Kerala Forest Department p 247

considerations, could spell wide-spread disaster in the landscape (Murugan, 2011).[81] Changing canopy cover and increased incidence of pests and diseases due to intensification of production are threatening the sustainability of cardamom cultivation itself (Swaminathan, 2008).[82] This trend is only likely to aggravate unless decisive interventions are made.

Tourism and urban development

97. Tourism is growing exponentially in the project landscape and the tourism industry provides employment to around 8,000 individuals. Tourism boom was particularly evident during the last decade especially in and around Munnar. There are more than 250 identified resorts and hotels in and around Munnar. Annual visitation to Munnar now exceeds 0.7 million (in 2012) from just a few thousands in 1990s (see Table 13).

Table 13: Details of annual visitation to important tourist spots in Munnar

	Year						
Location	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**	**2012-13**
KFDC flower garden	56815	113061	221795	290125	358025	431316	461149
Rajamallay	452428	317843	378419	391151	384359	415019	449965
Hydel Tourism	429605	429658	405583	413122	382062	409607	392064

98. Impacts of tourism industry on biodiversity: Unparalleled growth in tourism has brought in associated infrastructure development (both planned and unplanned), generation of vast quantity of solid wastes and effluents (around 4,745 metric tonnes generated annually in Munnar alone)[83], increase in traffic (e.g. more than 200,000 vehicles passing through Chinnar Wildlife Sanctuary every year), water shortage etc. Unplanned expansion of tourism has a number of indirect impacts in the project landscape such as resource depletion, catalyzing growth in urban and peri-urban areas, mushrooming of high rise buildings, collection of curios form wild (e.g. sphagnum moss), expansion of roads and other infrastructure and associated land-use changes. The large 'floating population' of visitors with their relatively higher consumption requirements put additional stress on resources. Areas like Chinnakanal, Vattavada and Pallivasal have also undergone land-use changes due to expanding tourism. Infrastructural incursions on the periphery of Kannan Devan Hills (e.g. Chinnakanal, Pallivasal and Pothamedu) have a direct bearing on ecology as they come up mostly in cardamom areas interspersed with natural vegetation.

99. Other side-effects of tourism expansion include hike in land value, illegal land grab and rampant encroachment of public space; a trend that reached its peak during the last decade. Even the remote Vattavada valley which had a predominant land use of subsistence farming got in the wake of the tourism boom during 1990s. The influx of 'cash-surplus city-dwellers' has triggered significant land use change including extensive planting of *Eucalyptus* trees (mostly absentee cultivation) in such areas.

100. Mass tourism is placing heavy pressures on PA managers leaving them less time to deal with other pressures. For instance, annual visitation to Eravikulam National Park is around 450,000 per annum. The increasing influx of tourists into PAs is spurring new demands to open up more areas for commercial tourism operations and is also affecting animal behavior particularly as a result of disturbance from vehicular traffic (e.g. aggressive elephants on the Munnar-Udumalpet highway).

[81]Murugan M. *et al.,* 2011, Environmental impacts of intensive cardamom (small) cultivation in Indian cardamom hills: need for sustainable and efficient practices, *Recent Research in Science and Technology 2011, 3(2): 09-15*

[82] M.S.Swaminathan, 2008, Measures to mitigate agrarian distress in Idukki District of Kerala A study report by M.S.Swaminathan Research Foundation May 2008

[83]Department of Tourism, 2010. Tourism development plan for special tourism zone – Munnar of Idukki district Vol 1. Government of Kerala

Increased traffic is also leading to road kills, affecting wildlife movements (e.g. elephants) and other imperceptible changes (e.g. affecting the flight of bats).[84]

101. Projected trends in tourism industry and its impacts on biodiversity: Unplanned infrastructure development and climate change are likely to impact the tourism industry and demography of HRML in two ways in future. In the short-term, HRML will continue to attract tourists and people who seek a 'second home' in the ambient environs of the landscape. These neo-colonizers will bring in an element externality to the landscape both in terms of resource use, consumption pattern, life-style, and demographic profile. If not managed properly, such an upland migration will intensify the encumbrance on fragile resources which are already strained from multiple stressors.

102. However, in the long-run, the situation may change in the opposite direction. Irresponsible tourism and unregulated resource use along with climate change could spell doom for the innate characteristics of the region – especially the very salubrious climate and aesthetics. Such a retrogression will take the 'sheen off' the tourism industry and adversely impact the local economy. The massive economic and human infrastructure (both physical and service based) built around the leisure-industry may become economically unviable leading to livelihood disruptions in the region and the potential fall-out of such a disaster will be the accelerated dependence and depletion of biological resources.

Commercial forestry operations in established plantations

103. Around 20,000 ha of the project landscape is under commercial forestry in previously established plantations, mostly under the management of Forest Department (90 percent) and marginally with HNL and KFDC (10 percent). The following section analyzes commercial forestry operations in HRML from the perspective of biodiversity conservation.

104. Wattle and Eucalyptus plantations threatening the biodiversity of HRML: Wattle and *Eucalyptus* extensively occupy the high altitude grasslands of HRML. These were introduced at a time (1980s) when grasslands were considered as waste lands and commercial considerations were the focus of forest management. However, wattle has since lost its market demand (for tannin in leather industry). Besides, after the enunciation of the National Forest Policy in 1988, conservation priorities have overridden commercial considerations. Though wattle and *Eucalyptus* are being removed as a management practice in some areas (albeit in small-scale) (e.g. Anaimudi shola National Park), more concerted eco-restoration efforts (both technical and financial) are required to bring the original habitats back. There are also clear indications that the continued presence of these exotic plantations facilitates the expansion of woody vegetation at the expense of grasslands (the most threatened ecosystem in HRML).

105. The *Eucalyptus* plantations raised and managed by corporate tea companies are used exclusively for the fuel requirements of tea factories and labour lines. Next to the original forest fragments, these areas also perform ancillary ecological functions such as cover, corridor etc. As mentioned earlier, any potential reduction in fuel wood demand in tea industry and subsequent reduction in dependence on these plantations will have positive impacts on the vegetal cover of HRML. At the same time, the private *Eucalyptus* plantations in the high-altitude but low-rainfall areas of Vattavada and Kanthalloor are reportedly causing acute water shortage in the valley bottoms. There is also a recent tendency to convert the vegetable farms to *Eucalyptus* plantations which leads to disruption of local livelihoods, cultural drift, impoverishment of communities as well as ecosystem malfunctioning. This situation is only likely to worsen in future.

106. Reed industry and its implications on biodiversity conservation of HRML: Reed industry is beset with certain issues that hamper the adoption of sustainable practices. The cost of extraction of

[84]Victoria J. Bennet and Arthur A Zurcher, 2013. When corridors collide: Road related disturbance in commuting bats. The Journal of Wildlife Management, 77 (1).

reeds from the project landscape is increasing substantially. According to HNL, the average landing cost (rent, extraction and transportation) of reeds is currently around USD 100/MT. To reduce the cost of transportation, the contractors compete to get allocations along existing roads. Moreover, the prescribed extraction cycle of three years is often ignored and there are incidences where extraction resumes within a gap of 3-4 months. This impedes regeneration and affects the quality of reeds in preferred extraction areas. At the same time, the interior areas are often neglected, where the density of reed culms increases and subsequently affects the under-growth. As a result of labour scarcity, damage to resource base, over extraction in certain areas, suppression by invasive species and poor regeneration, both HNL and KSBC are collecting much less than what is allotted to them annually. Interestingly, most of the current reed cutters are of above 50 years and the younger generation is not keen in reed based occupations. Overall, due to unscientific collection, fire, suppression by weeds and lack of regeneration, there is substantial depletion of reed breaks (Amruth and Gurukkal, 2007).[85]

107. Teak plantations**:** Teak plantations occupy almost 50 percent of the area covered under commercial forestry plantations especially the lower valleys of the landscape. Most of the teak plantations are showing signs of declining productivity and 'second rotation decline'. At many places, the Site Quality in teak plantations has degraded from I to III.[86] High cost and limited availability of labour deter timely silvicultural operations (e.g. thinning and invasive species management) that further compromise effective management of these plantations. At the same time, intensively managed teak plantations are seem to be less biodiversity-rich while some of the failed and low yielding plantations have profuse regeneration of natural vegetation. In future, in the business-as-usual scenario, teak plantation management may traverse the following pathways: (1) adoption of intensive silvicultural practices for better productivity with mechanized support; and (2) conversion of these areas to other hardy fast growing species (e.g. *Acacia mangium*). Unless explicit conservation-friendly practices are factored in, both these prospects do not bode well for the overall ecological integrity of HRML.

Threats to biodiversity from climate change

108. Climate change exacerbates the vulnerability of HRML. Considering that high altitude ecosystems of HRML are delicately calibrated to the nuances of environmental parameters, even slight changes in the prevailing climate will unsettle the ecology of the region. Impacts of climate change have already started manifesting in the region and there are clear indications of alterations in ecosystem types, forest boundaries, species-assemblages, die-back of forests, species loss, migration, regeneration, pollination dynamics, spread of invasive species and disruption to ecosystem networking and functionality. The Project Preparatory Team has undertaken a preliminary climate vulnerability assessment of HRML and the findings do not augur well for the ecological integrity of the project landscape in the business-as-usual scenario. Important observations in this regard are as below:

109. First, Thuiller (2007)[87] postulated that every 1^0Celsius rise in temperature will result in shifting the zone of occurrence of several specialist species by 160 m vertically and 160 km horizontally (to reach similar ecosystem conditions). At several locations in HRML, shift in vegetation boundaries has been observed with species adapted to the warmer, lower elevations migrating to higher altitudes. Generalist birds (e.g. Red-vented bulbul) have started moving up into the high altitude habitats of HRML causing severe competition for endemic and specialist forms (Sasikumar *et al.,* 2009).[88] Besides, there are indicative reports of certain species (e.g. Black and rufous flycatcher) shifting their lower limits of distribution to higher reaches and sporadic dying of patches of *shola* forests with the

[85]Amruth, M. and Rajan Gurukkal, 2007. Spatiality of subsistence and human ecology of landscape: towards self-regulatory Forest Communities

[86] Various research Reports of Kerala Forest Research Institute, Kerala

[87]Thuiller,W, 2007. Biodiversity: Climate Change and the Ecologist, Nature 448, 550-552 (2 August 2007)

[88]C.Sasikumar, C.K.Vishnudas, S.Raju, S.Kannan, and P.A.Vinayan, 2009. Along the Trail of Salim Ali – A study of avifauna and their habitats and ecological history. Kerala Forest Department p 247

rise in surface temperatures.[89] Some pioneering studies conducted in the project landscape also show that endemic mammals like Nilgiri tahr face increased risk of extinction due to climate change (Sukumar *et al.*, 1995).[90] Ambient temperature regime is a critical factor in determining the sex ratio in many reptilian and amphibian species. HRML being a region of significant reptilian and amphibian diversity, climate change will have serious deleterious impacts on them.

110. Second, oscillations in climate have major impacts on the structure and composition of montane ecosystems. For instance, C3 and C4 plants are known to have differential ecological preferences and higher CO_2 levels would enhance photosynthetic rates in C3 plants to a greater extent than in C4 plants (Tieszen *et.al*., 1979).[91] As a result, the montane evergreen forests dominated by Lauraceae and Rubiaceae are expected to expand into the grasslands in the higher reaches of HRML (e.g. Eravikulam National Park), while C3 grasses and herbs could potentially replace C4 grasses. Species which are pioneer colonizers of the grasslands and ecotones include *Rhododendron arboream, Rhodomyrtus tomentosus, Strobilanthes spp., Dodonea viscosa, Wendlandia notoniana, Hedyotis stylosa, Mahonia leschenaultii, Berberis tinctoria* and *Gaultheria fragrentissima*. These could be the first to respond to a warmer climate followed by other species with more tropical affinities which are otherwise limited by cool temperature and frost.

111. Third, wattle and *Eucalyptus* (both C3 plants) have high growth rates and coppice profusely. A reduction in the incidence of frost combined with enhanced photosynthetic rates (from elevated CO_2 levels) in wattles (an invasive alien species) could enable them to spread to highly threatened high altitude grasslands more rapidly than the slow growing forest tree and shrub species (Sukumar *et al.*, 1995).[92] Climate change is already causing the proliferation of other invasive species such as *Mikania micrantha*, *Mimosa inervis* and *Eupatorium spp., Lantana camara* in HRML. Species with better dispersal abilities (animal-dispersed, such as *Syzygium spp*. and *Cinnamomum spp*.) could also be favoured over those with poor dispersal abilities (*ibid*). Anthropogenic factors, (prevailing as well as emerging) may, however, compound or confound the effect of climate change induced vegetation alterations in HRML. Fourth, increase in dry season length will place some forest types such as dry and moist deciduous forests at increased risk from dry season fires (Ravindranath and Sukumar, 1996)[93], which will be particularly relevant in the low and mid elevation forests of HRML.

112. Fifth, cardamom farmers in the landscape observe[94] that changes in climatic parameters over the years (increase in average and minimum temperature, reduction in humidity, increase in sunshine hours, erratic rainfall, increased soil temperature, loss of soil moisture and increase in evapo-transpiration) have created sub-optimal conditions for cardamom cultivation. At the same time, with rise in temperature, crops like rubber (normally a midland crop) are increasingly planted in areas that were hitherto unsuitable for them.

113. Sixth, the tribal communities in the landscape have developed tenuous livelihood strategies based on natural resource base – both at species and ecosystem level. Climate change induced changes in ecosystem and species dynamics will have significant impact on such livelihood options (e.g. the availability and seasonality of NTFPs). There is also a perception among the local people that the causative factor for the increasing occurrence of human-animal conflict, at least partly, is related to climate change as increasing aridity, water scarcity, reduced availability of forage, proliferation of invasive species, shift in floral elements etc. drive wild animals from their natural habitats.

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[89] Stakeholder consultations

[90] R. Sukumar, H.S. Suresh, and R.Ramesh, 1995: Climate Change and its impact on tropical montane ecosystems in southern India, Journal of Biogeography 22, 533-536

[91] Tieszen, L.L., Senyimba,M.M., Imbamba,S.K. and Troughton, J.H, 1979, The distribution of C3 and C4 frasses and carbon isotope discrimination along an altitudinal and moisture gradient in Kenya. Oecologia 37, 337-350.

[92] R. Sukumar, H.S. Suresh, and R.Ramesh, 1995: Climate Change and its impact on tropical montane ecosystems in southern India, Journal of Biogeography 22, 533-536

[93] N.H.Ravindranath and R.Sukumar, 1996, Impacts of climate change on forest cover in India. Commonwealth Forestry Review 75(1), 1996.

[94] Stakeholder consultations

Threats to biodiversity from social and cultural changes

114. The project landscape is witnessing rapid changes in the socio-economic context. During the PPG phase, the project preparatory team analyzed these changes in the context of threats to biodiversity. Some of the sector-specific socio-economic changes and its impact on biodiversity have already been dealt in the previous sections. The following section details other related changes.

Weakening sustainable natural resource based livelihoods

115. Though NTFPs form the primary source of income to only a relatively small number of families, collection of small wood and other resources for own-consumption and also as supplementary income is crucial to tribal life in the region. Major items collected/ sold by tribal communities for income are reed, cardamom, bamboo, honey, dammar, gooseberry, lemon grass oil, medicinal plants etc. The marketing of NTFPs are mostly through Scheduled Tribe Development Cooperative Societies that often function below par efficiency. Though JFMCs have also stepped in to the marketing scene, these are yet to gain the confidence of communities as an efficient marketing channel. In the absence of any efficient, trustworthy marketing mechanism, tribal communities depend on private intermediaries who procure NTFPs from collectors by advancing pittance. These intermediaries who have scant regard for ecological considerations form a major threat to sustainable NTFP use in the region. Besides, local communities have limited capacities for value addition and upscaling natural resource based livelihoods to economically viable sustainable enterprises. In addition, in the absence of appropriate tenurial and usufruct security (dealt in previous sections), most of the resource use practices of tribal communities continue to be 'extra-legal dependency' that offer little incentives for sustainable use. Cumulatively, these lead to a vicious circle of continuing exploitation, poverty and unsustainable use of natural resources.

Disintegration of traditional lifestyles and their impacts on biodiversity

116. The rapid transformations in the landscape, spurred primarily by tourism, have mystified and alienated the marginalized communities especially the tribes. This is manifested through changes in traditional life styles and loss of cultural cohesion. The changing mindscapes of tribals directly lead to biodiversity depletion. Erosion of traditional knowledge due to non-codification, non-transfer and non-application disrupts the continuity of sustainable resource management. Changes in culinary habits portend depletion of agro-biodiversity, reduced dependence on wild varieties and consequent knowledge loss. Changes in perception about 'nature' also disrupt the foundations of sustainable use (e.g. destructive collection of black dammar, fishing using dynamite and electric shock etc.). In the existing scenario, such issues are only likely to intensify. The limited experience of communities to cope with the rapid developments occurring in the landscape is a serious factor threatening the biodiversity of HRML. The growing disconnect between conventional and non-conventional livelihoods is quite true for non-tribal communities too. For instance, among the younger generation of tea plantation workers, there is a trend to engage in tourism related ancillary occupations such as guiding, vendoring etc.

Changes in aspirations and differential access to social mobility among tribal communities impacting conservation prospects

117. Triggered by increased exposure to market, influences of media, cellular connectivity and increased reach of modern education, the tribal communities of HRML are undergoing accelerated social change. These changes are highly relevant in HRML as natural resources still form the resource base for most of them. Some of the discernible biodiversity related impacts associated with this change include the inter-generational inability to transfer traditional knowledge on natural resource management; changing patterns of resource dependence and over exploitation of natural resources. Though access to modern education is considered as an important factor for social mobility, in the case of tribal communities education alone cannot be considered as a driver of social change. Debt

trap is rampant among tribal communities and the landholding pattern varies widely with Malaaraya and Muthuvan communities being relatively better off than others. Though the process of implementation of the Schedule Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 has been initiated in the state of Kerala, owing to a number of factors, the settlement of Community Forest Rights (CFR) are yet to be implemented in the landscape. In addition, the physical remoteness of some of the tribal hamlets (e.g. Edamalakudy) leads to poor implementation of even the regular welfare measures of government and other agencies. Such differential positioning of tribal communities (geographical, economic and social) and the strategies devised to reach out to them will be very crucial in deciding the ecological trajectory of HRML.

Increasing trend in resource consumption and its impacts on biodiversity

118. The region embedding HRML has been identified as the most vulnerable eco-region among the global biodiversity hotspots due to high population density (Cincotta *et al.*, 2000).[95] It is now widely accepted that irrespective of absolute changes in population, increase in households have more impact on biodiversity as it leads to higher per capita resource use even when the overall population declines (Jianguo, 2003).[96] This trend is quite significant in the context of HRML. According to 2011 provisional census figures, even though there was a reduction in the population of the project district by 1.93 percent (compared to the previous decade), the number of households on the other hand increased during the period by around 11,600. In view of this, it is clear that resource use planning in HRML needs to conjointly consider this trend in demography as well as the requirements of the 'floating population' of tourists and its impacts on biodiversity. In short, HRML needs to do resource planning for more people than its resident population/ households. However, this approach is currently not practiced in any of the planning frameworks of HRML.

C. BASELINE ANALYSIS

119. Different agencies, institutions, sectors and communities make significant financial, social, cultural and intellectual investments in the landscape but typically with varied objectives and sometimes at cross purposes. These investments are mostly confined to their own stated sectoral objectives and are not necessarily attuned to the objective of conservation of biodiversity. These investments form the baseline for the project as described below:

Investments by the national government:

120. India's National Environment Policy (2006) seeks to achieve balance between conservation and development by mainstreaming environmental concerns in developmental activities. Considering that the mountains are important but highly fragile ecosystems, National Biodiversity Action Plan (NBAP, 2008)[97] envisages major measures for conserving the mountain ecosystems. This project will align with India's ongoing 'strategy for conservation and sustainable utilization of biodiversity that evolve mostly from various programmes formulated by the Ministry of Environment and Forests; and complement the efforts of other related Ministries/Departments and affiliated agencies dealing with Agriculture, Water Resources, Rural Development, Commerce, Power, Industry, New and Renewable Energy, Tourism, Urban Development, and Science & Technology. These flagship programmes along with other complementary programmes (both at the union and federal level) have an approximate annual financial outlay of USD 10 billion (at the national level). One striking aspect to note at this juncture is that the scope, reach, and role of these programmes in designing landscape level resource management initiatives especially in mountain landscapes are rather weak and not well-defined. The project would fill up this void by piloting a landscape approach to biodiversity conservation.

[95] Cincotta, R.P., Wisnewski, J, Engelman, R, 200. Nature 404: 990-992

[96] Jianguo Liu, Gretchen C. Daily, Paul R. Ehrlich, 2003. Effects of household dynamics on resource consumption and biodiversity, NATURE, VOL 421, 30 JANUARY 2003

[97] National Biodiversity Action Plan, 2008, MoEF, New Delhi

121. The Central government provides technical and financial support for the establishment and conservation of Protected Areas, Biosphere Reserves, Tiger Reserves, Elephant Reserves and Reserve Forests in the mountain areas. On an average, the Government of India spends USD 100 million per annum specifically for the conservation of mountain areas under various centrally funded schemes (out of the total outlay of), *viz. Integrated Development of Wildlife Habitats (USD 15 million), Project Tiger (USD 50 million), Intensification of Forest Protection (USD 22 million), Project Elephant (USD five million)* and *National Afforestation & Ecodevelopment Programme (USD 200 million)*. Annual support from national government for protection, conservation and management of the eight PAs and five territorial Divisions in HRML amounts to USD 1.5 million. In PAs, funds are mostly directed towards strengthening protection and infrastructure, fire management etc. and to a limited extent, towards habitat improvement, ecorestoration, nature education etc. The funds for territorial divisions are mostly oriented towards consolidation, staff deployment, fortifying enforcement, reforestation through participatory forest management (PFM) and fire protection.

122. The national government also invests approximately USD 0.5 million per annum in HRML through the National Agriculture Development Programme (RKVY). Apart from direct support to agriculture through sustainable land management, improving productivity and enhancing market opportunities, RKVY also supports fisheries development, animal husbandry, popularization of temperate fruit crops, cool season vegetables, water harvesting and cardamom processing. More specifically, the National Horticulture Mission (USD two million) supports vegetable seed production, organic farming, creation of water sources, vermi-compost units, and integrated pest management. The Spices Board (USD one million) subsidizes replanting and rejuvenating small cardamom holdings, improving curing technologies, organic certification, quality control measures and market information and promotion to support the cardamom industry. The Coffee Board is marginally investing in replanting, quality upgradation, water quality management and pollution abatement, coffee processing etc. for small farmers; and the Tea Board is providing financial (USD one million) and technical assistance for tea cultivation under the Special Purpose Tea Fund Scheme for replanting and rejuvenation of old tea areas. Rubber Board invests USD 0.25 million per year for providing subsidies to new planting. Special Central Assistance (around USD 0.25 million) through Western Ghats Development Programme funds integrated development of water sheds in the landscape.

123. The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) has an annual outlay of around USD 17 million in the HRML and supports enhanced livelihood security by guaranteeing wage employment for unskilled laborers comprising mostly of women. Water conservation, water harvesting, renovation of traditional water bodies, land development and rural sanitation are some of the major activities undertaken under this scheme.

124. A special assistance programme from the Central government based on the Report- *Measures to Mitigate Agrarian Distress in Idukki District of Kerala* has earmarked around USD 10 million per annum for HRML for sustainable livelihoods and ecological security. The recommended activities include common infrastructure and service facilities, strengthening forest and tree cover, pisci-culture in reservoirs, promotion of rural marketing, water conservation, sustainable cardamom production, improved and community curing devices and revamping traditional farming systems. The funding for the activities outlined in the above Report are accessed from central and state agencies, commodity boards and other national programmes and missions.

Investments from the state government:

125. The state government provides an outlay of around USD 1.5 million per annum for the management of PAs in HRML. In addition, it invests USD four million annually in managing the forests lying outside the PA system and the forest production sector (e.g. planting, timber operations, protection, infrastructure development etc.). Similarly, the State Agriculture Department invests approximately USD one million in HRML on various agricultural schemes aimed at development of vegetables and spices, market stabilization, soil conservation and strengthening agricultural extension. The Tourism Department has an annual budget of USD 1million that is largely spent on planning and

sprucing up tourism infrastructure in the landscape. The Scheduled Tribe Development Department has an annual outlay of about USD 0.5 million for various schemes such as housing, agriculture improvement, livestock rearing, drinking water and self employment schemes. Apart from this, Edamalakudy Tribal Panchayat has a special package of about USD 2 million mostly for housing and other infrastructure facilities. The state government also provides manpower and infrastructure for the implementation of the above-mentioned baseline projects.

Investments from Local self-governments and communities:

126. Local self-governments (*Panchayats*) have a strong presence in the landscape and carry out grass root level planning for economic development. They also implement various production sector programmes (e.g. agriculture, animal husbandry, fisheries, soil and water conservation, minor irrigation and small scale industries). The spending of local self-government that is relevant in the context of the project (on resource management) amounts to USD 4 million per annum. In addition, to enhance and strengthen the institutional capacity of local government system to deliver services and undertake basic administrative and governance functions more effectively and in a sustainable manner, the state government is implementing a Kerala Local Government Service Delivery Project. This has an outlay of around USD one million for the PRIs in the project landscape.

127. SHGs bring in important baselines related to this project's priority areas of intervention. They are engaged in helping communities recover socially and economically by promoting micro enterprises, linking to banks through kinship based institutions to access credit at the local level, helping people restore and improve their livelihoods through training and skill development, introduction of low cost, easy to adapt technologies, introducing business model approaches (links to markets), capacity development and trainings of the community members. Some of the baseline project initiatives brought in by these agencies include: bio-gas; renewable energy; solar applications for energy efficiency; livestock based fodder systems; promoting business models for milk production; livelihood improvement through training and skill development for microenterprises based on local biodiversity (e.g. NTFPs and medicinal plants); agricultural productivity restoration; etc. *Kudumbasree*, a flagship poverty eradication mission of the State Government with its ubiquitous presence in the landscape and linkages with various central and state government projects, has an investment of about USD five million through various microenterprises. Overall, community institutions like NHGs, JFMCs etc. bring in complementary contributions of around USD one million per annum through participation in forest protection, social mobilization, community welfare etc.

Investments from the production sectors:

128. The major production sectors in the landscape are cardamom, tea and tourism. Together they have significant investment in the landscape. The annual investment in tea industry comes to USD 25 million for activities like planting, soil and water conservation, fuel plantation management, weed management, disease and pest management, plucking and processing. Cardamom farmers invest around USD 50 million on activities like weed eradication, soil working, moisture conservation, shade management, harvesting and curing. The reed based industries and forest corporations together invest around USD two million for soft wood plantation management and reed extraction. The tourism industry which is a relatively new entrant into the landscape invests around USD five million annually for services and maintenance of infrastructure.

Investments from research institutions:

129. There are a few research institutions located in HRML conducting basic and applied research. They are: a) the Indian Cardamom Research Institute (ICRI), Myladumpara under the Indian Spices Board (the Union Ministry of Commerce and Industry): b) the Cardamom Research Station (CRS), Pampadumpara under the Kerala Agricultural University; and c) Research and Development Department of the Kannan Devan Hills Plantation Company (P) Ltd. Other research institutions that have a stake in the region are Centre for Earth Science Studies (CESS) and KFRI who take up specific

projects related to natural resource management. These institutions look at crop improvement, sustainability, biotechnology, weather data, soil studies etc. The investments by these institutions would come to around USD one million per year.

D. LONG-TERM SOLUTION AND BARRIERS TO ACHIEVING THE SOLUTION

130. While there are several initiatives (across different sectors and actors) pertaining to resource governance in HRML, they are not sufficiently coordinated to lessen pressure on biological diversity. The operations of individual agencies are very much sector-focused and the region lacks a comprehensive planning and governance framework that specifically integrates biodiversity conservation needs in production sector planning and operations. Further, as is the case elsewhere in the country, the existing conservation framework in HRML is still 'Protected Area' centric. As PAs alone will not be able to secure the ecological future of HRML (due to their sub-optimal coverage and existing and emerging threats), it is imperative to adopt a broader integrated approach to biodiversity conservation.

131. To repair and maintain the ecological integrity of HRML will thus require a radical shift in the governance approach that is currently being pursued towards one that is underpinned by cross-sectoral coordinated planning, execution and compliance monitoring so that ecosystem integrity and life-support functions of the region are restored/ maintained for posterity. The aim is to broaden the constituency of conservation beyond the conservation sector and mainstream biodiversity considerations as central to the operations of economic production sectors. It is expected that this will enable them to minimize adverse impacts on biological diversity, manage potential trade-offs and promote win-win opportunities. The *long-term solution* proposed by the project is thus to build the know-how and put in place a collaborative governance mechanism for multiple-use management of HRML based on landscape approach that secures PAs and outlying HVBAs, mainstreams biodiversity management into production sector operations and promote conservation-compatible livelihoods. However, there are several barriers that encumber the attainment of this long-term objective:

Barrier 1: Institutional and policy framework for collaborative governance and know-how and capacities for multiple use mountain landscape management is inadequate

132. Sustainable resource use practices require robust scientific information supported by enabling policy framework. Such a 'science-policy-practice' interphase is currently weak in HRML. While there exists some knowledge base related to resource governance, it is largely fragmentary and scattered. Further, even when such knowledge exists, it is not readily available to policy makers, programme implementers and local communities in a user-friendly and easily retrievable manner for taking informed decisions related to land and resource use. As a result, planning and decision making (among various sectors, agencies and communities) in HRML take place based on limited/ fragmented information. This impedes effective appreciation of environmental impact assessment and management—in particular efforts to avoid impacts in the most sensitive areas and reduce and mitigate impacts in other localities. In the broader production arena, the lack of information on sustainable practices (e.g. carrying capacity assessments for sustainable tourism; energy efficient curing/ processing technology in cardamom and tea industry etc.) hamper their prospective adoption into production practices. It was further noticed that there are limited attempts to document or utilize traditional knowledge about sustainable utilization of resources.

133. Similarly while there is a fairly good knowledge base on some flagship species, information on lower life-forms are clearly lacking. Likewise some PAs have been relatively well inventoried (e.g. *Thattekkad*), but no at all PAs have been covered with such efforts and not at all in the HVBAs, particularly the interspersed areas of tea gardens. Further, the exact impact of climate change on the ecosystems of HRML has not been studied in detail. Similar knowledge gaps exist in key production sectors too. For instance, the long term impacts of canopy opening in CHR is still not understood and translated for local guidance for land use planning. Some of the specific knowledge barriers that limit

informed decision making in the tea industry include: energy efficiency options for for thermal energy conservation; branding for premium marketing etc).

134. The existing governance framework (policy, institutional, operational and legal) is insufficient for facilitating a comprehensive and science based land use management system in the landscape. The National Capacity Self-Assessment-Thematic Report on Biodiversity has given the Western Ghats (where HRML is located) a score of only 73.3 percent based on existing capacity status/ strength of different institutions/thematic areas to handle biodiversity-related issues as articulated in CBD Articles 05 to 20. The problem starts with the planning process itself which is mostly driven by short-term sectoral considerations (maximum of five years in production sector and ten years in the conservation sector) and not coordinated across sectors. HRML has a multiple sectoral mandates ranging from exclusive conservation considerations (e.g. protected areas) to upfront economic production (e.g. tourism and tea production); all operating in an increasingly resource-scarce environment. Further, these sectoral frameworks are characterized by overlapping mandates and often mutually exclusive objectives that deepen conflicts between development goals and biodiversity concerns. For instance, the tourism sector, mandated with maximizing visitor growth, does not always take into account the impacts of unregulated tourism on biodiversity. In addition, there is a perception among development sectors and local self-governments that biodiversity conservation is more of an obstacle to development. As a result, most of the developmental activities come into conflict with conservation priorities in the landscape (e.g. road construction by PWD and GPs; distribution of goats and cows in forested areas by Tribal Welfare Department; introduction of exotic fishes in water bodies by Fisheries Department; expansion of power transmission lines by KSEB, canal construction by Water Resources Department; sand mining by LSGs etc.).

135. There also exists incongruity among various sectoral legislation and polices. While the policies and legal instruments governing the conservation sector (e.g. Forest Policy, Forest Conservation Act, Wildlife Act, etc.) have strong conservation provisions, other production sectors (e.g. Agriculture, Tourism, etc) have a weak focus on such aspects, creating conflicts over land-use. Further, policies and guidelines governing the operations of different production sectors do *not* provide effective guidance on minimizing adverse impacts on the ecologically sensitive environment in which they operate. Even when the production sector legislation and policies have at least some provisions for environmental safeguards (e.g. Cardamom Rules, KDH Act etc.), there are challenges like: a) weak enforcement of the existing provisions related to environmental management; b) integrating more focused biodiversity conservation principles into the production sector laws, policies and practices; c) ensuring harmony among the various sectoral laws and policies; and d) capacities to implement the same on a landscape perspective.

136. Similarly, the project landscape has several programmes that have a bearing on natural resources. While there exists some guidance in terms of pre-programme planning (albeit *sectoral* in nature), the institutional capacity for concurrent and post-programme monitoring and compliance monitoring is incipient. There are no formal institutions mandated to perform this at present. Sectoral capacities to gauge the gains and paybacks of ‘unsustained cumulative growth’ v/s ‘sustained optimized growth’ paradigms and also to maintain institutional memory and continuity of good practices are critically constrained. Other related institutional and policy barriers include inability to deal with ‘uncertainties’ such as market fluctuations (e.g. tea, cardamom), climate uncertainties etc.

137. Currently, HRML lacks a comprehensive land use plan that would have guided all land use decisions in the landscape. Similarly, barring the conservation sector, other prodcution sectors do not have the know-how and precedence of preparing and implementing biodiversity-friendly sector plans. Even when these are available, the production sector development *plans* do not always take into account the long-term impacts on the environmental health and integrity of the HRML. For instance, the exisitng tourism sector plan is weak in articulating a case for biodiversity mainstreaming and more-over it is a non-starter in implementaion. On similar lines, the tea garden sector plan falls short of recommending concrete prescriptions regarding biodiveristy mainstreaming.

Barrier 2: Limited application of landscape level land use planning and management that would maximize biodiversity conservation prospects

138. Lack of adequate capacity for integrated management within different institutions that have a mandate and jurisdiction over different aspects of resource governance adversely impact the HRML. For instance, production sector staff has limited technical capacity and skills to incorporate and implement biodiversity considerations in plans and activities (e.g., appreciation and consolidation of forest fragments lying outside the PA system, integrating green development options including energy efficiency in the operations of tea, cardamom and tourism establishments etc.). Similarly, even in the conservation sector, capacities for effective management of the PAs to deal with existing and emerging threats (e.g. invasive species, visitor management and climate change) are weak in terms of technical know–how, man power and finances.

139. In the absence of an institutional mechanism for coordinated planning, action and compliance monitoring, most of the sectoral agencies/ Departments in HRML operate in deeply segregated compartments with limited interaction among each other. At a fundamental level, this inability of resource users to move out of 'sectoral comfort zones' and 'mutually exclusive growth paradigms', is one of the crucial barriers to the long term sustainable development of HRML. For instance, conservation of natural resources is almost exclusively perceived as a domain of the Forest Department whereas substantial part of the biological resources lies in areas outside their control and in production areas.

140. At present, the focus of conservaton management in the project landscape consists of PAs. However, large swathe of high value biodiversity areas are lying outside the premises of PAs where production sectors such as tea, cardamom and tourism also operate and interact significantly. As a result, the PA system alone cannot sufficiently address threats to biodiversity posed by the development in the economic production sectors– both spatially and in terms of management jurisdiction. Even in the conservation sector, a related impediment is that funding for existing conservation initiatives are inadequate to cover all management costs. There are sizeable fiscal deficits for undertaking large-scale eco-restoration programmes including invasive species management. While the situation is slightly better off in PAs, it is acute in the case of areas lying outside the PA system. In addition, several HVBAs that are outside the PA system have weak governance arrangements to secure biodiversity both within these areas and to also preserve connectivity between different PAs. There is an urgent unmet need to consolidate such key HVBAs and forest fragments to secure vital corridors and ecological niches in the landscape.

141. In the project landscape, capacities and prospects of conservation sector (anchored largely by the Forest Department) indicate a mixed scenario with strong programmatic baselines in a few areas and weak baselines in some other. On a positive note, for instance, the Forest Department has already notified several high priority conservation zones as PAs and has also endeavored community mobilization for participatory resource management (e.g. JFMCs); though with varying results. Similarly, the PAs in the landscape are managed under Management Plans (with exclusive focus on conservation) and other Forest Divisions under Forest Working Plans (with management objectives varying between commercial and conservation considerations). However, the current capacities of conservation sector are constrained by a horde of factors - limited orientation to deal with issues like community oriented resource management, human-animal conflict, climate change, invasive species, high attrition rate among the newly recruited field staff etc. Overall, the enormity and complexity of challenges confronting the project landscape surpass the existing stakeholder capacities of the conservation sector and require significant scaling up.

142. In addition to strengthening PA management, addressing threats to biodiversity in such a setting requires implementation of a landscape approach that considers among others allocation of land to different land uses according to biodiversity conservation needs and application of appropriate management practices congruent with biodiversity conservation in production areas. There is however

limited practical experience with such a system of moving away from site / sector based management approach to a landscape based one. In addition there is a need to put in place monitoring and enforcement mechanisms that ensure that sector strategies are in line with the landscape level planning priorities and as agreed for each sector. Further, there is a need to integrate biodiversity conservation principles into production sector practices to reduce pressures on biodiversity. Incentives and "niche markets" also need to be designed and implemented to move production practices from currently unsustainable (harmful) practices to sustainable (biodiversity-friendly) practices. However, even when there is appetite for green interventions, there is lack of adequate finances or where it is available, not channelized properly. Sometimes the cost of new technology is high with inadequate data on return on investment thus creating barriers for financial decision making for acquiring new technology. Further, there are also cultural barriers in adopting new technology (e.g. lemon grass distillation in tribal settlements) even when alternate and seemingly feasible technological options available. Knowledge and capacity constraints also limit production sectors from pursuing alternate ecologically benign options.

143. Routine interventions/ investments from the government have been clearly unable to build sufficient capacities to develop business models based on sustainable use of natural resources. This is especially true of collection and marketing of NTFPs. Markets for commodities from the primary sector do not differentiate between produce that is sustainably harvested and produce that is not. Such markets do not send positive signals to those involved in sustainable management of natural resources (e.g. failure of organic farming models both in corporate and individual farms). This inability coupled with limited alternative livelihood options and insufficient support provided to local communities engaged in conservation and management of natural resources has led to poor implementation of conservation policies at the grassroots.

Barrier 3: Community level barriers constrain the adoption of biodiversity conservation objectives in community-level land and resource use decisions:

144. There are various barriers that encumber communities from adopting sound land-use practices and sustainable resource-based livelihoods in HRML. One of the prominent challenges is the disintegration of the traditional knowledge base and customary resource-use practices due to market forces and the changing aspirations of local communities. At present, community level land use and natural resource planning and management in HRML is undertaken mostly through a) Panchayats; and b) JFMCs. However, in view of the increasingly diminishing resource base and competing land use assertions, capacities of these institutions are insufficient to ensure sustainable utilization. For instance, communities harvest a number of wild resources—poles, lianas, NTFPs, fuel wood, reeds, medicinal plants, and wild fruits amongst others. This is critical for their subsistence (nutrition) and overall welfare. However, in many cases off-takes are higher than the amount that can be sustained, and production practices may be deleterious. For instance the practice of collecting honey by indiscriminate use of fire damages entire bee colonies and cause forest fire.

145. Community-based institutions provide a strong programmatic baseline for mobilizing communities for sustainable natural resource management. But often, limited management capacity and narrow representation hamper mobilization of broad-based support from villagers. In addition, lack of access to technology and knowledge limit their ability to take effective action. The level of participatory decision making in most communities regarding the use of natural resources is inadequate and negatively affects their ability to serve as an effective forum for community feedback on land-use issues and conflict resolution. Further, such institutions lack the economic and financial incentives to switch from short-term resource exploitation to long-term stewardship. Community-based natural resource management models are also threatened by insecure and unclear land tenure and disintegrating traditional knowledge systems. The changing perception of local communities towards human-wildlife conflict compound the problem.

146. The capacity of Panchayats, JFMCs and other community organizations to jointly plan and manage resource use to ensure sustainability are currently limited. In community level decision

making, sustainable use thresholds are not always established, management measures poorly designed, compliance monitoring systems non-existent and impacts are poorly monitored. For instance, some of the activities undertaken under the MGNREGA programme are found inimical to conservation objectives and needs course corrections (e.g. clearance of vegetal cover along roads and stream banks). Moreover, more attention needs to be given to addressing conflicts between user groups, and strengthening internal representation and governance within the management committees of these community institutions. There is a need to reorient baseline investments to support value addition and certification for sustainably produced resources at community level, and make catalytic investment in resource based livelihoods. There is a need to focus efforts in the predominantly tribal hamlets where wild resource use is crucial to the local economy (e.g. Edamalakudy). Further, the opportunity provided by the Forest Rights Act, 2006 for sustainable resource use has not made much headway in HRML.

E. STAKEHOLDER ANALYSIS

147. There is a multitude of stakeholders for the project ranging from central and state governments, sectoral agencies/ departments, private entrepreneurs, community organizations, and local communities. As the project is focusing on resource use over a fairly larger landscape, key stakeholders, stakeholder interests, priorities and capacities vary vastly. Broadly, stakeholder affinities in HRML revolve around aspects of exclusive conservation, participatory resource management, sustainable use, ecosystem based enterprises, resource apportions and appropriations, commercial considerations and access to markets. Climate change, decentralized planning, empowering the disadvantaged and balancing gender are cross-cutting interests.

148. In terms of government representatives, the Kerala Forest Department (KFD) is the key stakeholder (the principal anchor of the project) given its mandate for forest protection and biodiversity conservation. The main functions of KFD are to: a) conserve and expand the natural forests; b) increase the productivity of forest plantations through appropriate management interventions and modern technology; c) increase the tree cover both inside and outside the forests; d) meet the livelihood needs of tribals and other forest dependent communities; and e) sustainably manage biodiversity-rich and sensitive ecosystems such as mangroves, sacred groves, coastal areas, wetlands, homesteads, private plantations etc. that are outside the control of the Forest Department.[98] One of the main aims of the project is to capacitate KFD to deal with the existing and emerging threats in HRML.

149. Agriculture Department is another important entity as large area of the project landscape is under agriculture land use. Other government agencies that are important stakeholders include the Tourism, Revenue and Local Self Government (LSG) Departments who facilitate tourism, administration of revenue land and local bodies respectively. Animal Husbandry Department provides veterinary care and supports improving the production potential of livestock and poultry. The Fisheries Department is a stakeholder as they support inland fisheries. The Public Works Department has a role as infrastructure development have direct bearing on the landscape. Department of Science, Technology & Environment has prominent role on matters related to environment while Pollution Control and Biodiversity Boards are mandated to implement Environment Protection Act and Biological Diversity Act respectively. The Electricity Board is a major entity in the landscape and deal with dams and reservoirs.

150. At the field level, District administration is an important stakeholder and is headed by the District Collector and includes functionaries responsible for different aspects of governance. Of relevance to this project are officials responsible for administration (Revenue Divisional Officer), district planning (District Planning Officer), fisheries (Assistant Director of Fisheries), agriculture (Deputy Director, Agriculture), livestock (District Animal Husbandry Officer), tribal development (Project Officer, Integrated Tribal Development Programme), tourism (District Tourism Promotion

[98] Available from http://keralaforest.gov.in/ Accessed on February 8, 2013

Council). At the Divisional level, forest and wildlife units are headed by Deputy Conservator of Forests/ Assistant Conservator of Forests.

151. Local government institutions such as Gramsabhas and other PRIs are important stakeholders as they operate at the grassroots and decisively influence the land use in the project landscape and extensively interact with local communities. The key stakeholder group for the project is the local community who are highly vulnerable to resource depletion due to their dependency on natural resources. The primary entry-point for engaging communities in the project will be Community Based Organizations (CBOs) such as *Kudumbashree*, JFMCs, VSSs, EDCs, CRC, FDAs, BMCs and SHGs.

152. Private sector is another important stakeholder and partner for the project as they have tenuous dependence on natural resources and sustainable use is vital for their own existence in the long-run. Right at an early stage, the project will develop collaboration and promote proactive engagement with the private sector. Partnerships can be built with institutions like United Planters Association of South India (UPASI-plantation sector), Kerala Travel Mart and tour operators (tourism sector), cardamom growers and Kannan Devan Plantation Ltd. for imparting biodiversity and sustainability concerns into their production practices. Linkages can also be established with entrepreneurs willing to invest in green technologies like renewable energy, waste management, organic value added products etc.

153. Research Institutions – national, regional and local, need to be involved in the project for research, innovation, education and implementation. Wildlife Institute of India, National Centre for Biological Sciences, College of Forestry, Kerala Agriculture University, Indian Cardamom Research Institute, Kerala Forest Research Institute, School of Social Sciences, Mahatma Gandhi University, Centre for Earth Science Studies (CESS), IMG, Periyar Foundation, Institute of Management in Government (IMG) and Kerala Institute of Travel and Tourism Studies (KITTS) are institutions of excellence in research and capacity building relevant to the project. Kerala Institute of Local Administration (KILA) is an important institution for strengthening capacity of the Panchayats. The project will develop a network of these organizations for mobilizing knowledge, technology and expertise for various project activities.

154. NGOs like High Range Environment and Wildlife Preservation Association (HRWEPA), World Wide Fund for Nature (WWF), Wildlife Trust of India (WTI), Nature Conservation Foundation (NCF), Hornbill Foundation, Vattakanal Conservation Trust, Gurukula Botanical Garden etc. have important stakeholder roles in promoting awareness on conservation and sustainable resource use. Representatives from political class and audio-visual and print media are important partners in highlighting the need to mainstream biodiversity conservation and also project achievements during its implementation.

155. Stakeholders at the national level bring requisite information, knowledge, skills and practices relevant for the project. As mentioned above, MoEF is the central Ministry for planning, promoting, coordinating and overseeing implementation of India's environmental, forestry, land degradation, climate change related policies and programmes. Other union ministries who will be important stakeholders of the project are the Ministry of Agriculture (National Agricultural Policy, 2000); Ministry of Rural Development and Land Resources (Mahatma Gandhi National Rural Employment Guarantee Act, 2005 (MGNREGA); Ministry of Tribal Affairs (Schedule Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006*);* the Ministry of Panchayati Raj (issues related to PRIs*);* Ministry of Power, Ministry of New and Renewable Energy (issues related to energy conservation and energy efficiency), Ministry of commerce (Commodity Boards of tea, cardamom and rubber) and the Ministry of Tourism (National Tourism Policy, 2002). The project will link with the programmes of these Ministries and seek and leverage collateral support, and also promote upstream policy engagement for mainstreaming environmental considerations into their sectoral operations for deriving local/global environment benefits.

156. For over a decade, UNDP India has been leveraging funds from GEF for the national government for fortifying its biodiversity conservation programmes. The landscape approach (adopted

in this project) is already being piloted in two ongoing GEF funded UNDP managed projects (*India: Coastal and Marine Programme*) and links have been made with MoEF for facilitating actions with other Union Ministries and State Governments for allocating resources for scaling up, and solving issues around policy on replication and mainstreaming. The present project intends to upscale the reach and scope of these interventions and initiatives. Annexure 14 provides a more detailed analysis of stakeholders and their role in the project.

II: Strategy

A. PROJECT RATIONALE, POLICY CONFORMITY AND DESIGN PRINCIPLES

Rationale:

157. The project will conserve globally significant biological diversity in the High Ranges of the Western Ghats. It will put in place a cross-sectoral land-use management framework, compliance monitoring and enforcement system to ensure that development in production sectors such as tea, cardamom and tourism is congruent with biodiversity conservation needs. The project will seek to establish a conservation compatible mosaic of land uses, anchored in a cluster of protected areas, managed to protect wildlife refugia and corridor areas on production lands. It will catalyze a shift from the current sector-focused land use planning system, which is deficient because it does not account for the adverse cumulative direct and indirect impacts of different production activities across economic sectors on biodiversity. Unless tackled, this situation is likely to lead to the loss of globally significant biodiversity in a key biodiversity area. Furthermore, the land use management system will seek to avoid, reduce and mitigate the impacts of physical infrastructure in biodiversity rich areas. In this regard, it will ensure that the indirect impacts of development are taken into account in decision making. In parallel, the project will seek to engineer a paradigm shift towards sustainable use of wild resources by local communities, where such use is currently unsustainable or is projected to become so as a result of changes in population and consumption.

158. In taking a landscape approach to conservation—the project will work both within and outside of protected areas. It is designed to realize GEF Biodiversity Focal Area Strategic Objective One: *Improve sustainability of Protected Area (PA) systems* by seeking to expand coverage (by 11,650 ha) and strengthen the management effectiveness of a cluster of PAs (37,100 ha). The project is developing a new paradigm for the management of mountain landscapes, building on existing PAs. In doing so it will reduce pressures on PAs and establish a replicable model that will improve the security of other PAs in mountain areas. It will also improve conservation and management of forest fragments and other High Value Biodiversity Areas (HVBAs) in around 84,600 ha of adjacent production lands, thus advancing Biodiversity Strategic Objective Two: *Mainstream biodiversity, conservation and sustainable use into production landscapes, seascapes and sectors*. The foci production activities include tea and cardamom estates, forest plantations, private tree plantations, homestead agro-forestry, tourism, and urban and peri-urban development. These production lands provide habitats vital to the survival of threatened wide ranging fauna, including tiger, leopard, wild dogs and elephants amongst others.

Project conformity:

159. This project is consistent with the Convention on Biological Diversity (CBD) and its guidance from the Conference of Parties. The project is designed to support the primary objectives of the CBD - conservation of biological diversity, sustainable use of its components and the equitable sharing of the benefits arising out of the utilization of these components. By mainstreaming biodiversity conservation with production sectors and sustainable livelihoods, the project will fulfill the requirements of Article 6: General measures for Conservation and Sustainable use. Article 8: In-situ conservation will be supported through the strengthening of park management and the targeted species and habitat management, research and monitoring programme. Article 10: Sustainable use of components of biological diversity will be furthered through development and demonstration of

alternative, sustainable livelihood options that avoid or minimize adverse impacts on biological diversity. The project also supports Article 12: Research on targeted priority issues related to biodiversity of HRML and provide training in technical and managerial areas and linking exchange of information. Article 13 which stresses education and awareness will also be a key component in the project.

160. The 10th Conference of the Parties (COP) to the CBD emphasized the need for a balanced approach to the programme of work on mountain biodiversity, as contained in COP 10 Decision X/30. It invited the Governments and parties to (a) enhance the effectiveness of management in existing mountain protected areas; (b) establish effectively and appropriately managed protected areas in line with the programme of work on protected areas to safeguard the highest priority key biodiversity areas in mountain ecosystems; (c) establish, *inter alia*, conservation corridors and connectivity, where appropriate and possible and taking into account in particular, endemic species, while avoiding the spread of invasive alien species, and trans-boundary mountain protected area systems, taking into account the need to integrate protected areas into wider landscapes. Further, it invited parties and other Governments to consider the development and implementation of national and regional targets, as well as the development of the related indicators for assessing progress towards these targets, within their respective national biodiversity strategies and action plans, taking into account the Strategic Plan for Biodiversity 2011-2020, which addresses the direct drivers of biodiversity loss, including mountain biological diversity, in an effort to reduce the pressures on biodiversity from habitat change, overexploitation, pollution, invasive alien species and climate change, and to safeguard and restore mountain biological diversity and related ecosystem services, given their potential to contribute to climate change mitigation and adaptation. The project also aligns with the relevant provisions of CBD including 'Aichi targets i.e., *Strategic goal C- To improve the status of biodiversity by safeguarding ecosystem, species and genetic diversity. Target 11- Trends in the connectivity of PAs and other area based approaches integrated into landscapes and seascapes*. Over all, the project is in line with the above mentioned decisions of CBD COP and shall further strengthen the national efforts on the conservation of mountain biodiversity.

Design principles

161. Taking into account the need to balance conservation, consumption, livelihoods and development aspirations and to utilize potential synergies and minimize negative trade-offs among baseline projects and multiple stakeholders, the project design underlines the following premises.

162. Premise 1: The project adopts a **'landscape approach'** to resource governance as against the 'exclusive protected area centric approach'. As the project landscape is a complex admixture of conservation and production systems, such an approach alone can effectively address the multi-dimensional nature of resource use challenges in the project area. As a result, the landscape is taken as the basic unit of resource governance and focus of the project. The underpinning objective here is to maintain the ecological integrity of the whole of HRML and its constituent parts. In this approach, the PAs will continue to be the 'territorial core' for the conservation strategy. However, the intervening land uses between existing PAs (HVBAs and commercial production systems) will be harmonized to: a) reduce negative impacts and maximize positives on biodiversity; b) ensure continuity in the landscape for sustaining vital ecological processes such as hydrological functions, climate amelioration, provisioning of ecosystem goods, gene flow etc.

163. Premise 2: The project promotes a **cross-sectoral approach**[99] in resource planning and use-execution as against the existing sectoral approaches. The aim is to convene all relevant sectors and stakeholders for taking informed land use decisions. The finer intent here is also to push the conservation agenda beyond the frontiers of conservation sector by mainstreaming biodiversity considerations into the livelihoods and other commercial production sectors. Such an approach will help gather knowledge and experience of different sectors and actors (government departments, public

[99] This approach is in consistent with the other programmes employing landscape approach to conservation (e.g. India Coastal and Marine Programme)

and private sectors, civil society, academia, community based and non-governmental organizations etc.) to reconcile diverse and often opposite stakeholder interests and necessities. Given the need to break down barriers between sectors and disciplines, the project focuses on building a cross-sectoral institutional mechanism to: a) appreciate the consequences of the degradation of natural resources in HRML; b) share knowledge and forge partnerships across sectors; c) develop a common planning framework for the management of biological resources; d) promote the development and adoption of locally-appropriate, community-based livelihoods that accentuate positive dependence on natural resources; and e) involve the productive sectors in actions to protect natural resources. Nonetheless, the cross-sectoral approach promoted by the project does not envisage doing away with sectoral institutions or duplicating sectoral efforts. While the cross-sectoral approach aims at better coordination of land-use decisions across administrative boundaries/ sectors within the landscape, the individual sectors will continue to perform their sectoral mandates - largely the production maximization goals of respective sectors.

164. Premise 3: The project will embrace an **'adaptive management approach'** for addressing threats to biological diversity and associated challenges. This approach is necessitated due to the dynamic nature of challenges, threats and issues related to ecological, demographical, market related, technological and economic factors in the landscape. To offer 'ready-mix' solutions to address all such challenges (as many may emerge in future too) are neither feasible nor desirable at this stage. Hence, the project will encourage a culture of adaptive management among sectoral and cross-sectoral processes. Towards this objective, the project will promote developing/ updating baselines on science-policy-practice interphase on resource use particularly in understanding biodiversity and ecosystem services, as well as the social, economic and political factors. This will lead to identification of appropriate technical, policy, legislative and institutional interventions required to overcome the barriers and to promote conservation and sustainable use of biodiversity. This approach will help in: (i) building a common diagnosis and shared vision; (ii) sharing information about past, on-going and planned development interventions; (iii) better coordinating and harmonizing existing interventions and investments; (iv) improving the design and alignment of future projects and programmes; and (v) identifying and addressing key barriers and bottlenecks to scale up approaches and interventions.

165. Premise 4: The project supports a **'demonstration approach'** as principal entry points of engagement with stakeholders. Considering the vastness of the project landscape, varied nature of challenges and the limited resources with the project, it would be unrealistic to attempt *en masse* coverage or alteration of all sectors and activities. Hence it is envisioned to channel the project resources to select biodiversity-friendly practices as 'demonstration packages' (e.g. thermal energy efficiency interventions in tea, cardamom and lemon grass distillation; garbage disposal in Munnar town; modernization of enforcement machinery in sandal forests; invasive species management; ecosystem monitoring plots; biodiversity-friendly farming practice plots; branding and premium marketing mechanism in tea, cardamom and tourism sectors etc.). Once such good practices are successfully demonstrated, with right incentives in place, there will be wider uptake by sectoral agencies and individuals.

166. Premise 5: The project will also facilitate a '**proactive engagement approach'** to mainstream biodiversity and create champions for biodiversity in the production sector. This is vital because getting production sectors to factor in biodiversity considerations into their operations is going to require a significant change in thinking and practice. It is partly about giving the appropriate 'push' by enshrining this thinking in the legal and policy framework, but it is equally about drawing the sectors into discussion, bringing individual actors to the table, changing mind-sets, providing training and tools, and providing technical and financial 'hand-holding' to demonstrate the new paradigm, and absorbing some of the perceived risks in changing current practices. Given that even this may require substantial efforts, a two-step process is adopted. Step 1 is to begin a concrete dialogue with stakeholders, and step 2 is to focus on specific changes in current practices.[100] During consultations it

[100] This approach is in line with the UNDP India Coastal and Marine programme

was felt that doing the latter without the former would antagonize the key production sector stakeholders and the project would be yet another conservation sector-led initiative that fails to obtain ownership from the production sectors. The PPG was successful in opening up lines of communication at the national and state-level and the time and resources were used to collect more background information for the project strategy, forge working relationships with key stakeholders, and get buy-in for the project strategy. This will be continued during the project implementation.

167. Premise 6: The project will **'climate proof"** its interventions. Climate change heightens the existing vulnerabilities (social, ecological, economic and cultural) of HRML. Climate related risks are only likely to go up in future and if not addressed, climate change can negate and hamper the developmental gains of HRML. In view of the above, the climate response strategy for HRML may include elements such as accelerating promoting sustainable development, inclusive growth, securing livelihoods and safeguarding ecosystem services. However, this strategy is not a stand-alone action; instead it is has to be integrated into the regular developmental planning (sectoral and community level). Similarly, considering the overall socio-economic and ecological contexts of HRML, adaptation options are given priority in this project design. However, most of the interventions proposed in the project will also have automatic mitigation benefits and result in GHG emission reduction (e.g. energy efficiency options in tea and cardamom sector etc.). Moreover, the project will strive to imbibe and incorporate the objectives and strategies contained in India's Green India Mission from time to time.

B. PROJECT GOAL, OBJECTIVE, OUTCOMES AND OUTPUTS/ACTIVITIES

168. The long-term goal to which the project will contribute is the sustainable governance of globally significant biological diversity of India by mainstreaming conservation considerations into production activities in the mountain landscapes, while also taking into account development imperatives, need for sustaining livelihoods and also addressing retrogressive factors including impacts of climate change. The immediate objective of the project is to conserve the biodiversity of High Ranges of the Western Ghats in peninsular India from existing and emerging threats through building an effective collaborative governance framework for multiple use management of mountain landscapes. This will be achieved through the following Outcomes and associated Outputs.

- Outcome 1: Effective governance framework for multiple-use mountain landscape management in place.
- Outcome 2: Multiple use mountain landscape management is applied securing the ecological integrity of HRML
- Outcome 3. Strengthened capacities for community based sustainable use and management of wild resources

Outcome 1: Effective governance framework for multiple-use mountain landscape management in place

169. This Outcome will put in place a cross-sectoral land-use management framework, compliance monitoring and enforcement system to ensure that developments in economic production sectors are congruent with biodiversity conservation needs. To begin with, it will help in improving the knowledge base and decision support systems for managing multiple-use mountain landscapes. This will be followed by the formulation of a Landscape Level Land Use Plan and other Environmental/ Biodiversity Friendly Sector Plans. These plans cumulatively shall seek to balance biodiversity needs and production objectives by: a) improving the management of existing PAs; b) identifying areas of high value biodiversity to be accorded higher protection status; and c) prescribe appropriate land uses and management practices in the adjacent production landscape. Further, this component will enable evolution of a dedicated multi-sector landscape level institutional mechanism for ensuring sectoral compliance with Landscape and Sector Plan prescriptions. Finally, this Outcome shall develop a replication strategy for piloting similar governance approaches in other mountainous areas of the

country including upstream policy engagements for harmonizing various legal and policy framework related to the management of mountain landscapes. The following outputs will deliver the outcome.

Output 1.1: Strengthened knowledge generation and dissemination system improves decision making related to sustainable land and resource use

170. Availability and access to appropriate user-friendly knowledge base and robust scientific baseline is a pre-requisite for emplacing an improved decision support system for multiple-use mountain landscape management. This Output shall support strengthening the knowledge base on HRML particularly the 'science-policy-practice' interphase that will provide guidance for taking informed decisions related to land and resource use. The main focus would be to generate information that empower programme planners and implementers to appreciate the environmental impacts of sectoral interventions (both conservation and production) with a view to analyze trade-offs while making choices about the use of natural resources and minimise adverse impacts of development in biodiversity rich areas and reduce/ mitigate impacts in other localities.

171. Primarily, this Output will provide support for several diagnostic studies that will help fill up the gaps related to knowledge base in HRML. It is envisioned that a detailed knowledge gap analysis will be carried out right at the early stages of the project involving all relevant stakeholders and sectoral agencies. This analysis will cover not only the conservation sector but would also include livelihood and other economic production sectors that have a bearing on the biodiversity of HRML. This process will help: a) collect, collate and synthesize the existing knowledge base (both formal and traditional); b) flag the knowledge gaps; and c) develop a strategy for research prioritization. Using an integrated and targeted approach, the focal areas of such diagnostic studies, would encompass biological wealth, ecological processes, sustainable use and livelihoods, innovative technological interventions, human-ecology, and economics and market mechanisms for enterprises based on natural resources.

172. This Output will provide support to undertake comprehensive and detailed assessment and inventory of biological resources of HRML. In the conservation sector, while there exists fairly adequate knowledge on flagship species (e.g. Nilgiri tahr, tiger etc.), information on less charismatic and lesser known life-forms (e.g amphibians) are clearly lacking. Further, information on larger ecological processes including ecosystem networking and functionality needs to be built up substantially. Similarly, while some PAs have been relatively well inventoried (e.g. Thattekkad Wildlife Sanctuary for avifauna), such an exercise needs to be completed in other PAs. HRML is also known for 'discoveries and rediscoveries' of species. More detailed and in-depth efforts are required to understand and unearth the whole range of biological richness of the project landscape. Promisingly, HRML has high potential to add new species to science, if detailed and exhaustive biological investigations are undertaken.

173. It is also proposed to survey and inventorize the HVBAs under the control of Forest Department (in the territorial Divisions of Malayattoor, Kottayam, Marayur, Mankulam and Munnar) and also with Revenue Department (e.g. Manthan shola). Further, HVBAs lying in areas outside government control (particularly interspersed areas of tea gardens), needs knowledge generation 'from scratch' and the diagnostic studies may begin with documentation of HVBAs/ fragments (extent, number and location), biological richness, range of ecosystem services provided, magnitude of livelihoods supported, threat perception etc. Similarly, this Output will also support consolidating the traditional knowledge particularly the ethno-botanical knowledge and traditional ecosystem management methods available with tribal communities. Of great interest in this regard would be to understand and explore the possibilities of codifying and adapting the indigenous fire management techniques employed by Muthuvan tribes in managing the highly threatened montane grassland ecosystems of HRML.

174. Knowledge gaps should also be addressed in key production sectors too. For instance, the long-term impacts and challenges of intensive agronomic practices (e.g. excessive use of chemical fertilizers and pesticides) in tea and cardamom sectors, canopy opening in CHR, market dynamics in

tea, cardamom, reed and NTFP sectors etc. need to be understood in detail and translated for local guidance for land use planning. Further, the feasibility of adopting emerging technological options for thermal energy conservation (e.g. energy efficiency options in tea curing, cardamom processing and lemon grass distillation) need to be studied with focus on its impacts on local ecology, improving the economic viability of production sectors, cultural sensitivity etc. Similarly, the tourism sector will require guidance on carrying capacity assessments for planning responsible tourism while reed industry needs a comprehensive assessement of sustianable use practices and its long term prospects including innovations at value addition and end-user markets to spur new demands and markets for reed based products. Another critical knowledge gap that needs to be met is the vulnerability of HRML to climate change particulalry its impacts on the proliferation of invasive species, man-animal conflicts, ecosystem alterations, resource availability and the socio-cultural fabric of the region. Diagnostic studies are also required for understanding the linkage between eucalyptus cultivation and water scarcity in the drier tracts of the landscape. This Output will suppport establishing long-term institional arrangements for the periodic monitoring of natural resources including participatory resource monitoring systems (e.g. similar to ecosystem monitoring by Kadar tribes in the neighboring Vazhachal Forest Division).

175. The PPG phase has identified several themes for conducting priority diagnostic studies and these include: 1) impacts of climate change (short, medium and long-term) on HRML – at species and ecosystem levels, on local livelihoods, production sector practices etc. 2) economic valuation of ecosystem services (e.g. hydrology, pollination services, atmospheric stability, NTFPs, etc.) and opportunity costs of externalities of deforestation and forest degradation. Two case study areas are proposed for this: a) Mankulam Division (a high biodiversity forest enclave); and b) Mathikettan National Park; 3) feasibility of adopting GIS mapping tools to inform physical development and placement of infrastructure across the landscape; 4) assessing carrying capacity of tourism sector including aspects on distribution of benefits and costs – social, economic and ecological; 5) hill area studies that throw light on the socio-cultural attributes of HRML; 6) collation and codification of existing good resource governance practices (e.g. traditional ecosystem management and ethno-botanical practices by tribal communities, reed collection etc.); 7) base line studies of lower life-forms (e.g. amphibians, balsam etc.); 8) detailed mapping and inventory of ecological resources, ecosystem types (scale and extent of fragmented *shola*s, swamps, rocky outcrops, isolated biodiversity rich areas, corridors etc.) and resource use patterns; and 9) feasibility studies on perception management for sustainable resource use management (e.g. on ecologically sound conservation practices, dealing with human-animal conflict etc.).

176. This Output will also support developing effective knowledge dissemination system for synthesizing research knowledge into user-friendly formats for easy application by field practitioners and policy makers. The approach for knowledge dissemination shall include online methods (e.g. expert referrals, expertise profiles and databases, electronic discussion forums, document repository, data warehousing, intranets and search engine), guidance materials, handbooks for sector staff and panchayat members, training manuals, media workshops, advocacy campaigns, and other outreach programmes. The knowledge products developed under the Output will increase awareness within the public and private sector on the economic and social values of ecosystems and on win-win opportunities for balancing conservation and economic development. Coordination across other similar projects adopting landscape approach (e.g. the GEF-UNDP: India coastal and marine programme) will help ensure a joint database, and joint outreach and communication activities (through MoEF). Research and technical institutions in both the public and private sectors will be engaged in these research efforts. Findings will be converted into various formats (such as print, audio and video documentation) and will be developed for different audiences. Materials will also be translated into vernacular languages.

177. The knowledge generation and dissemination under this Output will make use of the expertise available with local research institutions such as Periyar Foundation, KFRI, UPASI, NCBS, HRWEPA, R&D wing of KDHP, KILA, IMG, School of Social Sciences, Mahatma Gandhi University, Kottayam etc and institutions of national repute such as Botanical Survey of India (BSI),

Zoological Survey of India (ZSI) and Wildlife Institute of India (WII). Further, the project will support research scholars/ students from local colleges and universities for research studies of mutual interest. Apart from producing research outputs, the idea is also to build and retain capacities for knowledge generation and dissemination at the landscape level itself. This Output will also feed into necessary points of engagement with central government (MoEF) in developing replication strategies for piloting similar approaches in other regions in the country (see Output 1.5 for more on replication strategies).

Output 1.2 Landscape level land- use plan prepared and sustainable resource management systems in place

178. An integrated and cross-sectoral spatial planning process central to resource governance that balances the imperatives of conservation, economic production and livelihoods will provide opportunities for sectoral agencies to set common goals, engage in dialogues and manage trade-offs for resource use without engendering the efforts of other sectors and its own in the long run. Further, such a landscape-level planning in HRML will also prevent some threats to biodiversity before they actually manifest or locate them in a manner that minimizes their adversarial impact or give enough 'reaction time' to find ways and means to mitigate them appropriately.

179. To begin with, this Output will support the formulation of a Landscape Level Land Use Plan (henceforth referred to as the Landscape Plan or LP). This plan shall seek to balance the objectives of biodiversity conservation, livelihoods and economic production. The Landscape Plan will provide a broad strategic vision for mainstreaming biodiversity conservation in the various land uses of HRML. The Landscape Plan that will be developed for a longer time frame (e.g. 10 to 25 years) will look at current land use in the project area and will provide a basis for how existing practices of different sectors can be made more compatible with the conservation needs of HRML. Each major sector will form an integral part of the LP that will also give opportunity for stitching together/ aligning the multiple legal, policy and programme frameworks for the cogent use of resources of HRML. The LP will provide a road map for streamlining land use thus avoiding, reducing and/ or mitigating impacts from physical development in major production sectors. The objective is to make optimal allocation of natural resources to different uses based on ecological carrying capacity and socio-economic needs over the long-term. A major objective of the Landscape Plan would be to minimize the adverse impacts of production sectors on HRML including sectors that are currently having a major bearing on biodiversity (tea, cardamom), those that are a growing concern (tourism), those that have a medium impact (forest plantations, reed industry etc.), and those sectors that have a lesser impact at present but a precautionary approach is still warranted (agriculture/ horticulture, animal husbandry etc.).

180. Broadly, the Landscape Plan will give guidance on: a) improving the management effectiveness of existing PAs; b) identifying biodiversity rich areas to be accorded higher protection status; c) prescribe appropriate land uses and management practices in the adjacent production landscape; d) support interventions that require co-existence and sustainable resource use; and e) improved market opportunities for sustainable production systems and practices. For prioritizing the land use, the denominating criteria would be: 1) ecological priorities (e.g. ecosystem goods and services); b) economic imperatives; c) cultural attributes; d) trajectory of development; e) threats and limiting factors (waste, water, other resources, climate change); f) market dynamics; g) inclusion of marginalized communities; and h) sustainable use etc.

181. The Landscape Plan would also enshrine a mix of approaches such as re-alignment of existing government budgetary resources, instituting/ re-allocating/ recycling user fees generated within the conservation (e.g. entry fees to PAs) and production (promoting Corporate Social/ Environmental Responsibility) sectors to augment the conservation prospects of the resource base on which these sectors depend. Besides, the Landscape Plan will explore opportunities for mobilizing new resources (e.g. Panchayats collecting service cess from tourists visiting the landscape) to mainstream biodiversity conservation considerations in the region. The Landscape Plan would also strategically

align (incorporating elements/ influencing these) with other development plans like Idukki (M.S. Swaminathan) Package, Working Plans, Tourism Plan, Panchayat Plans, District Development Plans, Private Sector Plans etc.

182. The Landscape Plan will be a dynamic document that will be updated periodically in tune with the changes occurring in the landscape. The LP will also draw heavily from the outcomes of diagnostic studies and will incorporate lessons from national and international "best management practices" on environmental mainstreaming for minimizing adverse impacts of production practices on biodiversity. Towards this end, this Output will support the preparation of a "Compendium of best practices (national and international) in mainstreaming mountain biodiversity in production sectors". Based on this analysis, the most ecologically feasible, economically viable and socially acceptable measures will be identified. A time line for implementation of these measures as well as a financial strategy will also be indicated in the LP. The financial strategy could clearly include harmonizing/ re-directing of existing sectoral budgetary resources, and/ or mobilizing new resources.

183. The preparation of the LP will be anchored within the proposed High Range Sustainable Development Society (HRSDS) (to be established as part of Output 1.4). The technical backstopping for the preparation of the Plan will be through a multi-disciplinary team of experts on land-use, geology, GIS, conservation biology, forestry, social sciences, economics, developmental studies, governance issues, urban and country planning, legal issues etc. Landscape Plan will be prepared based on extensive consultations with government, research institutions and local communities so that a pragmatic and effective conservation strategy is prepared. Particular emphasis will be placed on strategies that do not compromise local livelihoods and economic production but rather support the rights of traditional communities and other sustainable production and consumption practices in the region. The Landscape Plan will be more 'enabling' rather than 'restrictive' in nature with clear short and long-term goals for the landscape. After obtaining the concurrence of the HRSDS, the Plan shall finally be placed before the State Government for its approval.

Output 1.3 Biodiversity considerations are mainstreamed into sector plans and practices

184. Under the umbrella of the Landscape Plan, conservation sector and key production sectors (e.g. tea, cardamom, tourism etc.) will develop/ revise Sector Plans (SPs) that outline sector-specific biodiversity-friendly practices for integration into respective sectoral operations. The SPs individually as well as collectively shall contribute towards the overarching principles entailed in the Landscape Plan. Identification of economically viable, cost effective, technologically feasible and pragmatic solutions shall be the key to the success of the Sector Plans.

185. Conservation sector will adopt the following strategies towards this: 1) Management Plans for PAs will be revisited for addressing new and emerging threats in the landscape (e.g. invasive species, climate change, regional developmental issues etc.); 2) Working Plans for territorial Forest Divisions will dovetail/ strengthen biodiversity-friendly practices on a landscape perspective; and 3) Biodiversity Conservation Plans (BCPs) shall be prepared for HVBAs and if these are already in existence shall be strengthened on the lines of Management/ Working Plans as mentioned above.

186. Though all the PAs in HRML have operational Management Plans, in the context of new and emerging challenges to PAs management, these plans need to be revisited from a landscape perspective. Towards this objective, this Output will invest in strengthening the PA management planning process. In order to capture the specificities of HRML which is a highly dynamic system, it is important to integrate more rigorous technical inputs into these plans. Besides, preparation of these plans needs to be made more participatory involving all stakeholders in the landscape. Interventions that need to be included in the revised Management Plans *inter alia* include eco-restoration options with focus on grassland management; invasive species removal; establishing long-term protocols for species and ecosystem monitoring; adaptive fire management strategies; prioritization of conservation zones within PAs; species specific conservation programmes; technological options in

monitoring and enforcement; strengthening of capacities of PA staff etc. The Working Plans and Biodiversity Conservation Plans will also need updation on similar lines.

187. This Output will support the preparation of Sector Plans for economic production sectors based on the principle of "avoid-offset-mitigate-compensate" strategies (in the descending order of priority for planning investment decisions). The intention of SPs is not to curtail sectoral growth and development mandates but the focus is rather on aligning sectoral operations with ecological imperatives that have minimal adverse impacts on ecosystems. Proactive response towards conservation considerations will be a highly desirable objective of the SPs (e.g. energy efficient options in tea and cardamom that have less reliance on biomass; MGNREGA activities congruent with conservation priorities like removal of exotics like wattle; promotion of wild tree growth and diversity in cardamom gardens; identification and consolidation of HVBAs in tea growing areas; market linkages for realization of better price for environmentally valued products; reduced pesticide use; Revenue Department recognizes and appreciates biodiversity rich habitats etc.). Sector plans for Panchayats could promote the idea of 'Green Development Cess' from economic production sectors that have ecological footprints in the area (e.g. tourists visiting HRML).Tourism Sector Plan (TSP) will need to assess the carrying capacity and promote 'responsible tourism' and may also indicate establishing and /or upgrading existing waste management/ effluent treatment mechanism and certification standards for tourism operations. Sector Plans shall promote Corporate Environment Responsibility (CER) and would also explore the involvement of Electricity Board (a major beneficiary of hydrological services) in upland ecosystem management/ eco-restoration. Green concepts would be built into the Sector Plans of infrastructure development agencies too (e.g. PWD) as most of them only absorb resources from the landscape and seldom release positives for conservation. This Output shall also support "greening the rural development" investments that is routed through sectoral agencies and Panchayats. During the project preparatory phase a lot of suggestions were received regarding the activities that need to form part of the Sector Plans from an environmental perspective that is summarized in Annexure 16.

188. The SPs will be prepared by technical experts after extensive consultations with respective stakeholders. Preparation of Sector Plans would follow a rigorous scientific process anchored strongly in participatory approaches. The HRSDS in close association with the respective sectors shall spearhead the preparation of the SPs. After obtaining the concurrence of the HRSDS, the SPs shall finally be placed before the concerned Sectoral Department for approval. Technical assistance shall be extended to other sectors that may have own resources and are interested in developing similar biodiversity- friendly plans.

Output 1.4 A dedicated cross - sectoral landscape level institutional platform ensures sectoral compliance with management prescriptions of Landscape and Sector Plans

189. Contrary to the existing sectoral growth paradigm, the project identifies landscape as the basic unit of management. While administrative boundaries are inevitable in the current governance framework in India, this also means that resource management happens in a fractured manner across ecologically contiguous landscapes. In the process, even for identical natural resources, management decisions vary significantly between administrative units that may not sync well with the overall ecological continuum. This brings in the need for harmonizing the resource management decisions transcending administrative boundaries. However, this transition from sector based to landscape based resource management has to be a highly nuanced and pragmatic exercise as there are multiplicity of actors and sectors accustomed to the current sectoral management approaches. The success of the project, to a large extent will depend on the active involvement of all sectors and actors in this process. The project proposes to establish an institutional mechanism in the form of High Range Sustainable Development Society (HRSDS) to convene all stakeholders on one platform to exchange information, discuss issues, plan and monitor activities on agreed principles (LPs and SPs) that ensure minimal adverse impact on the biodiversity of HRML.

190. The proposed HRSDS will have representation from relevant government agencies (Department of Forests, Revenue, Tourism, Agriculture, Industries, Electricity Board etc.); Local Self Governments; private sector (representatives of key production sectors – tea, cardamom etc.); communities (functionaries of traditional community institutions, *Kudumbasree*, EDCs, JFMCs, CRC, BMCs, agriculture associations, commerce and trade organizations); research institutions (e.g. KFRI, Periyar Foundation, Cardamom Research Station etc.) and representatives of NGOs (e.g. HRWEPA, WWF, WTI etc.). The primary mandate of HRSDS will be to provide for a formal institutional platform by which government policies, programs and resources, as well as non-government activities can be better mobilized/ channeled/ harmonized to ensure the long-term sustainable use of resources in HRML, even while individual sectors continue to pursue own sector objectives. The scope and representation of HRSDS is not the conservation sector alone but all actors and agencies in HRML that have a bearing on biodiversity. One model for this institutional mechanism to consider may be that of a Government owned Public Trust that combines the authority of the Government and flexibility of a good NGO.[101] It is not intended to replace, duplicate, suspend or supersede existing sectoral institutions, but will act as a supporting/ coordinating institution. The HRSDS is expected to take up a variety of functions requiring professional inputs and expertise. To that end, HRSDS will have a strong complement of technical subject specialists. A senior level officer (at least the rank of Chief Conservator of Forests/ Secretary to state government) may head this institution.

191. As a preparatory process to the formation of HRSDS, an assessment will be conducted of existing international and national experience with such institutional mechanisms to articulate issues such as mandate, operating principles, bye-laws, and rules. There are examples of similar functional institutional arrangements in the country (e.g. Periyar Foundation in one of the Tiger Reserves in southern India set up under another GEF funded – India Ecodevelopment Project; Gulf of Mannar Biosphere Reserve Trust established under the GEF-UNDP-Gulf of Mannar Project etc.). The lessons from these projects show that multi-stakeholder participation brought-in through such institutions can go a long way in supporting existing institutions in addressing current and new challenges facing the conservation sector. Similar approach is currently being pursued under another two GEF funded and UNDP supported Coastal and Marine Projects (Godavari and Sindhudurg).

192. The assessment will be followed by extensive consultations at various levels involving stakeholders (government, community, academia, civil society etc.) and the Society will be established through a Government Order within the 1st year of the project. HRSDS will be a cross-sectoral platform with enough convening power representing various stakeholders in the landscape. It should also give representation to hitherto not so well represented groups in decision making related to resource use (e.g. tribal communities). The Society will also have the mandate of compliance monitoring of sectoral operations that have a bearing on biodiversity. Towards this, HRSDS shall be vested with appropriate powers under the Environment Protection Act, 1986. Further, the Society will also develop a financial sustainability strategy for post-project functioning.

Output 1.5: Replication strategy developed for multiple use management of mountain landscapes

193. Facilitating replication in other mountainous areas of the country is an important intent of the project. This Output will support evolving a replication strategy towards this objective. First, it will earmark resources for identification of viable meso-level mountain landscapes for piloting similar approaches across the Himalayas, the Western and Eastern Ghats, Vindhyas, Aravallis, Central Indian High lands, and North-East. Under the aegis of the project and anchored within the National Project Management Unit (within MoEF), this exercise will be supported by technical agencies like Wildlife Institute of India, Periyar Foundation, GB Pant Institute etc.

194. This Output will also support developing HRML as a 'learning centre' for further replication of similar approaches in other areas and states (through technical backstopping), exposure visits and training to stakeholders from other regions. It is envisioned that by the project end this Output shall

[101] The precise structure, composition and authority of the Foundation will be determined after extensive stakeholder consultations.

result in well-informed replication strategies and hand holding support for incorporating biodiversity and ecosystem values into land use planning and management in at least 3,000,000 ha of mountain landscapes in the country.

Output 1.6: Policies and legal framework reviewed and harmonized for ensuring sustainable management of mountain landscapes

195. The existing policies, legislation and guidelines of key economic sectors (both at national and state level) will be reviewed to determine how they can be made more explicit on the special requirements of biologically rich mountain areas. Methodological recommendations/ strategies/ guidelines will be developed for each sector on the minimum standards that should be observed by different economic activities in order to maintain the integrity of mountain regions. To build on the existing national environmental regulatory framework that includes mandatory Environmental Impact Assessment (EIAs), the project will develop strategies on how to include a thorough assessment of biodiversity impacts in the context of developmental imperatives in mountain landscapes. Equally important is developing mechanisms for concurrent and post project compliance monitoring of developmental interventions. Sector policies and guidelines to be considered for this review shall be determined during the early stages of the project. The review of sectoral policies will be undertaken in close collaboration with line Ministries/ Departments, technical experts, and other stakeholders. International best practices will also be reviewed towards this end. The analytical review shall also include consultative dialogue involving government, non-government, communities and research institutions, in order to facilitate policy engagement and catalytic change. The outcomes of these reviews and strategies for harmonizing the policy and legal framework for the sustainable management of mountain landscapes shall be placed before the government for further policy processes.

Outcome 2 Multiple-use mountain landscape management is applied securing the ecological security of HRML

196. This Outcome will focus on translating/ implementing the provisions of the Landscape and Sector Plans into implementable actions on the ground by developing institutional capacities among respective sectoral institutions. Building these capacities will require a combination of methodological guidance, training, consultation, demonstration and implementation support. As the landscape is vast and sectoral activities are diverse, it is premised that the project will support select number of "demonstration programmes" as models (through Annual Work Plans) as identified in the LPs and SPs. Such demonstration models will later become replicable references for incorporation into the regular resource use programming in the region. The Outputs to be realized under this Outcome are described below.

Output 2.1: Capacities developed among conservation and production sector staff for applying landscape approaches to biodiversity conservation into sectoral operations

197. Capacity building envisioned in this Output is a cross-cutting activity that is applicable to conservation and production sector staff on equal measure. However, capacity issues related to communities have been dealt separately under Outcome 3 as they require a separate set of focus. Capacity assessment of sectoral institutions/ functions carried out as part of the PPG exercise has identified several key areas for capacity scaling up in HRML. Conservation sector requires capacity augmentation in: (a) PA/ HVBA management planning; (b) understanding the provisions of relevant sectoral legislation especially environmental laws and Rules; (c) specific habitat improvement techniques on mountain biodiversity (e.g. management of montane *shola*-grasslands, fire management, appreciation of lower life-forms, invasive species management, managing human-wildlife conflict, climate change response measures, innovative eco-restoration options, improved plantation technology etc.); (d) participatory resource governance; (e) multi-sectoral engagement and conflict resolution; (f) development of viable business models based on natural resources; (g)

monitoring and evaluation (including species and ecosystem processes, day to day reporting etc.); (h) adaptive management skills; (i) incorporation of community knowledge in resource governance etc.
198. Identified capacity needs in the economic production sector include: (a) appreciation of significance of biodiversity including the negative impacts of biodiversity loss on production sectors in the long-run (e.g. tea, cardamom and tourism); (b) specific know-how on applying simple and effective conservation practices into production operations (e.g. rational use of chemical inputs in tea and cardamom); (c) exposure to new and state-of-the-art technological innovations that will have positive impacts on biodiversity (e.g. use of renewable energy sources for curing in tea and cardamom); (d) knowledge about technical and financial options that maximize biodiversity gains without compromising on profits; (e) exposure to engage with market dynamics (e.g. market fluctuations in cardamom); (f) managing trade-offs in land use decisions; (g) marketing biodiversity friendly products etc.

199. This Output will earmark resources for undertaking detailed capacity needs assessments of the conservation and economic productions sector institutions/ staff right at the start of the project. The needs assessment will also include identification of all target groups that must form part of the capacity building/ training programmes. As a follow up, based on the identified requirements, and drawing extensively from the knowledge management and dissemination system (developed under Output 1.1), detailed training programmes will be chalked out by preparing customized technical materials / manuals and resource persons identified for effective delivery. Research institutions, universities, and other educational and training institutes and NGOs will be mobilized towards this. Training template will also include exposure to national and international best practices on related themes and practices. Further, in order to ensure that training support continues post-project, efforts will be made to locate the training curriculum and resource persons with relevant training institutions (KFRI, WII, Forest Academies, HRSDS, Periyar Foundation, KILA, KITTS, IMG etc.).

Output 2.2: Management effectiveness of PA system strengthened to address existing and emerging threats to PA systems

200. As mentioned in the Baseline Analysis, at individual level, the existing PAs in the landscape have performed an impressive role in conserving diversity. However, at the landscape level their effectiveness remains critically sub-optimal due to a) prevailing and emerging threats; b) small size; c) incomplete representation of biota; and d) connectivity issues. This Output will aim to improve the management effectiveness of the PA system by addressing the issues around the prevailing and emerging threats, issues of size, representation and connectivity. A four-pronged strategy is identified for strengthening the management effectiveness of existing PAs under this Output: 1) revisiting the Management Plans of PAs; 2) capacity building of PA managers and staff; 3) implementation support to select activities identified in the Management Plans; and 4) expansion of PA system. Since the former two are already covered under Output 1.3 and 2.1 respectively, this Output deals with the latter two aspects.

201. Under this Output, technical and financial support will be provided for implementing the activities identified through the Management Planning process. These may *inter alia* include eco-restoration (e.g. wattle and other invasive species, fire management); strengthening enforcement by deploying technology and manpower; participatory resource management arrangements; wildlife research; nature awareness and outreach; monitoring ecological parameters; wildlife veterinary care; staff welfare activities (providing field infrastructure and incentives for exemplary work); eco-development and community oriented activities; fostering eco-tourism, visitor management, settlement of rights; consolidation of PA boundaries (e.g. Kurinjimala, Anaimudishola and Chinnar) etc. Collateral financing leveraged from national and state governments will be used for implementation of the Management Plans. Eco-restoration of grasslands is a key priority for HRML and a focus of the project. The possibility of undertaking the removal of exotic species from the high altitude grasslands through the MGNREGA programme is a possibility that will yield considerable conservation and livelihood dividends on equal measure. Further, the prospects of utilizing the wattle and *Eucalyptus* (eradicated from the grasslands) for fuel wood in cardamom curing and lemon grass

distillation would also need to be explored. An indicative list of activities to be supported under this component is given in Annexure 16.

202. With an average size of only 4,600 ha and covering less than 12 percent of the project landscape, the PAs are unable to encompass and sustain the representative biodiversity of the region. Large tracts of high conservation significance are still located outside the premises of PAs. HVBAs (mostly under territorial Forest Divisions and partly with the Revenue Department) and also the forest fragments in tea estates are examples of this. Most of these areas are not accorded enough conservation priorities – neither legal nor operational (e.g. Pettimudi, Kathumala, Idlimotta, Manthan shola) and with increasing pressure from alternate land uses, these areas are under threat of further fractioning.

203. The Project Preparatory Team has assessed the extent and location of areas requiring augmented conservation status based on ecological considerations, socio-economic feasibility and administrative suitability. There is good scope for expanding the PA system in the project landscape by around 30 percent by upgrading the conservation status of some of the identified HVBAs (see Annexure 17). This is largely an administrative action as most of these areas are already under government control (with Forest and Revenue Departments) and bereft of any active commercial operations or subsistence reliance by local communities. This Output will earmark technical and financial resources for the identification and consolidation of such areas into the PA system (e.g. survey, demarcation, basic infrastructure development, staff deployment etc.).

Output 2.3: HVBAs secured through improved conservation focus and interventions

204. Improving the management effectiveness and expansion of PA system will need to be complemented by according enhanced conservation focus to the remaining HVBAs of HRML. As discussed earlier, extending over 84,600 ha, HVBAs currently cover about 27 percent of the project landscape. In terms of ecological attributes, they are equally important and crucial as that of PAs. HVBAs of HRML fall under two kinds of tenurial arrangements: a) under government control (e.g. the whole of Mankulam Division, areas resumed from tea estates, areas adjoining PAs and portions of natural forests of Munnar, Malayattoor and Marayur Forest Divisions and the *sholas* and grasslands under the control of the Revenue Department (e.g. Manthanshola)); b) under corporate control (e.g. interspersed forests, grasslands and swamps within tea plantations of KDH). Since such areas are increasingly threatened by alternate land use aspirations, it is important to put in place a focused conservation strategy, sustainable use and stronger governance framework for these areas. While a part of HVBAs will be upgraded to PA system (through Output 2.2 above), still an estimated extent of around 73,000 ha of HVBAs shall remain outside the PA network. However, in view of various practical considerations, it would not be feasible to convert most of these into PAs particularly where commercial operations are going on or where there is significant livelihood dependence by local communities.

205. In view of this, in order to magnify the conservation focus to HVBAs falling in tea gardens, this Output will support: a) inventorying, demarcating and consolidating such HVBAs (extent, number and location); b) rehabilitation/ eco-restoration of critically degraded areas; and c) incorporating HVBA management into the Sector Plan of tea industry. In the case of HVBAs under government control, the strategy would involve: a) identifying and inventorying such areas especially in terms of their ecological, corridor and dispersal values; b) preparing/ strengthening Biodiversity Conservation Plans (BCPs) for the management of such HVBAs (Output 1.3); and c) incorporation of HVBA management into the Working Plans of territorial Divisions (Output 1.3).

206. Capacity development of conservation sector staff manning the HVBAs has been detailed under Output 2.1. This Output will support the implementation of improved biodiversity management in HVBAs as identified in the Sector Plans (tea, Territorial Forest Divisions etc). These may include eco-restoration options (e.g. wattle and other invasive species removal, fire management); strengthening enforcement by deploying technology and manpower (e.g. Marayur); participatory

resource management arrangements; nature awareness and outreach; monitoring biological parameters; staff welfare activities (providing field infrastructure and incentives for exemplary work); visitor management, settlement of rights; consolidation of boundaries etc. An indicative list of activities to be supported under this Output is given in Annexure 16. By the year second of the project, a comprehensive proposal will be prepared under this Output for leveraging collateral financing for HVBAs of HRML under the national wildlife programme – *Integrated Development of Wildlife Habitats*.

Output 2.4: Biodiversity mainstreaming demonstrated in key production sectors

207. Under this Output, key economic production sectors will be supported to mainstream biodiversity into commercial operations. This requires a composite strategy involving a) demonstration of appropriate technology; b) incentivizing sustainable resource use through promoting branding/ certification for environmentally sustainable production operations (e.g. 'carbon neutral-tea', 'shade cardamom' and 'responsible mountain tourism') and other market mechanisms (e.g. premium sale of organic products); and c) continued and focused skill upliftment. In furtherance of this, this Output shall provide implementation support to select activities identified in the Landscape Plan and and Sector Plans concerning these sectors (e.g. regeneration of forest fragments, planting of native species as canopy trees in cardamom plantations, promotion of innovative technology (e.g. gasifiers, renewables etc.) for energy use in tea and cardamom plantations, etc). This Output will stress on reduction in pressure (both direct and indirect) from production sectors (e.g. tea, cardamom, tourism) as evidenced by a) no net loss of natural forest blocks/ fragments/ HVBAs in critical corridors; b) reduction in usage of chemical pesticides in tea and cardamom sectors; c) number of energy efficient processing/ curing units adopted by tea and cardamom sectors etc.

208. With regard to tea industry, environmental mainstreaming would entail the following approaches. First, conservation of HVBAs/ forest fragments within interspersed tea gardens (an activity already covered under Output 2.3). Second, energy efficiency options in tea industry that can bring down dependence on mono culture plantations of *Eucalyptus*. Key interventions in this regard would be on: a) housekeeping and demand side management; b) energy conservation in electrical systems; and c) fuel conservation (firewood) on thermal side. This Output will also leverage experiences and technology towards this including from a recently concluded GEF funded UNDP supported project in Tamil Nadu that can be customized and packaged for the specific requirements of tea industry.

209. Assessments made during the PPG phase show that the tea industry in HRML has the potential to bring energy efficiency (both electrical & thermal energy) improvements to the tune of 8–10 percent. Adapting the results from a recently concluded GEF funded and UNDP supported project - *Energy Conservation in small sector tea processing units in South India* (in the adjoining landscape of Nilgiris), it is estimated that energy efficiency in tea industry of HRML will have a CO_2 mitigation potential of 0.12 kg CO_2 / kg of made tea. The additional investment needed to mitigate 1 ton of CO_2 from the tea processing comes to around USD 30 only. Interestingly the investment for bringing in energy efficiency is not much too (≈ Rs 0.20 / kg of made tea). However, the tea industry require a large bouquet of technical solutions, continued availability of high quality technical support, strengthened supply chain of energy efficient equipment suppliers etc. to factor in such innovations.

210. Reduction in fuel wood use in tea industry can innovatively be channeled for better biodiversity gains in two ways – a) such saved fuel wood could be used for supplying to other energy intensive economic production activities in the landscapes that have heavy reliance on biomass and a cause of forest and tree cover depletion (e.g. cardamom curing and lemon grass distillation), and b) areas vacated by eucalyptus plantations could be allowed to grow into wilderness adding to the vegetal cover of the region. The project will facilitate bringing in necessary policy changes to achieve this. Further, energy efficiency improvements can conserve around 8–10 percent of both electrical & thermal energy with consequent mitigation of CO_2 emission. Besides, this Output will also look at energy efficiency options in the labour dwelling areas of tea estates to reduce their biomass

dependency on *shola* forests and other natural vegetation. In addition, this Output will also facilitate the transfer of technical know-how on fuelling some of the tea curing units from the garbage (a chronic problem in the landscape) collected from the Munnar town.

211. In the cardamom sector, primary interventions would be the following. First, most of the cardamom curing units is also operating at below par efficiency in terms of energy consumption. Improvements in technology could bring in significant reduction in firewood use that will have a big influence in retaining the tree growth and the canopy which is fast opening up. Even a modest 10 percent reduction in fire wood consumption in cardamom curing units will save around 8,000 MT of firewood annually with a corresponding CO_2 emission reduction to the tune of 14 million kg. This Output will support cardamom sector by: a) providing financial and technical support to pilot energy efficiency options; b) providing alternate sources of firewood (e.g. wattle removed from the high elevation grasslands of HRML); c) providing at least three years of support to select farmers who are volunteering to shift to more sustainable production practices; and d) revival of the Cardamom for Rainforest Conservation (a participatory resource governance institution established by the government).

212. Another critical area of intervention would be to work on the market risks (price fluctuations, presence of unsavory intermediaries, poor economic returns to farmers and pervasive and unfavourable trade regulations). In tandem with Output 1.6, this Output will develop opportunities of upstream policy engagements with Ministry of Commerce through MoEF at the national level. This Output will also promote interventions to remove the ambiguity regarding land use rules/ regulations; promotion of rational use of pesticides; better awareness among farmers and Panchayats about benefits of sustainable farming etc. Sectoral Plans for more sectors can be supported conditional to the successful definition and implementation of the Sectoral Plans that need to be taken up on priority as mentioned above. This Output will also establish linkages and partnership with respective commodity boards (Tea and Spices Board) for furthering the mainstreaming objectives envisaged.

Outcome 3: Strengthened capacities for community based sustainable use and management of wild resources

213. The presence of functioning local self-government institutions (PRIs) is an asset that if appropriately capacitated and effectively empowered, could become an effective vehicle for sustainable resource management. There are 34 PRIs in the project landscape that play a crucial role in land-use and development planning and implementation at the grass roots level. In addition, 118 Joint Forest Management Committees (JFMCs) involving local communities (mostly tribals) and with varying degrees of functional presence have been established by the Forest Department. The culture of women Self Help Groups (SHGs) are also strong in the project area (e.g. *Kudumbasree*). This Outcome intends to strengthen these institutions on sustainable resource management.

214. PRIs, JFMCs, SHGs, BMCs, Gramasabha (in the context of FRA) and other CBOs, are the key conduits for reaching out to the grassroots on account of their local presence, reach, flexibility of operations and rapport. A three pronged strategy will be adopted: a) community based organizations (PRIs, JFMCs, Gramasabhas and SHGs) will be capacitated on sustainable resource use; b) support to resource use practices that accentuate positive resource dependency; and c) demonstration of a holistic community-based natural resource governance model for the unique tribal local self-government at Edamalakudy. This Outcome will provide technical and financial assistance to tribal communities, Panchayats (with focus on 11 targeted GPs) and community institutions as relevant to adopt land use practices in consonance with sustainability principles and increase income from resource based enterprises. The effectiveness of these interventions will be evidenced by: a) reduction on pressure on biodiversity (e.g. illicit felling of sandal trees); b) population of key harvested species (e.g. reeds, medicinal plants etc.) remain stable or increase through-out project period; and c) 15–20 percent increase in the income of local communities attributed to biodiversity-friendly enterprises. This will be realized through the following Outputs. The lessons learnt from the implementation of Small

Grants Programme across the country will also be utilized while designing such community level interventions.

Output 3.1 Community based organizations (Panchayats, JFMCs, Self Help Groups (SHGs)) have adequate capacities to plan sustainable resource use

215. There is a need to scale up opportunities for providing higher incentives for conservation initiatives among local communities. The first for community engagement as stewards of the local ecosystem must necessarily be about securing the traditional, resource based livelihoods. This Output will provide technical and financial support to Panchayats to develop Panchayat level resource use plans for greening the land-use investments. It is envisioned that through this, the investments at Panchayat level will reinforce low-impact land use practices and manage their development efforts in tune with Landscape Plan developed under Output 1.2. The focal areas of intervention in Panchayat level plans would be code of conduct for green development; increased income generating opportunities through green options (e.g. tourism cess, leveraging CSR/ CER commitments from production sector); waste management etc. The preparation of these plans will take into account gender-segregated data as well. These plans will be founded on extensive interactions among the community through existing institutions such as Panchayats, *Kudumbasree*, SHGs, JFMCs, Self Help Groups and tribal groups. Strategies will be discussed and vetted among the communities, and channels of communication will also be maintained with community, cultural/ religious and political leaders, so as to ensure the acceptance and efficient implementation of livelihood strategies.

216. This Output will also earmark resources for revitalizing the functioning of existing JFMCs/ BMCs by building their capacities to enter into co-management agreements with Forest Department and other institutions as relevant for the management and use of forest resources and NTFPs. The existing micro plans of JFMCs/BMCs will be revised to specify clear roles and responsibilities of each party and define mechanisms for sustainable use. These micro plans shall prescribe: i) resource off-take limits; ii) zones where harvesting can take place; iii) mechanisms for monitoring and enforcement including community sanctions against defaulters; iv) marketing mechanism; and v) internal democratic and equitable benefit sharing mechanism.

217. Necessary follow up data collection, analysis and comprehensive feasibility studies will be undertaken, as required, for selecting the appropriate activities (ecosystem based) to be supported.
218. Women shall comprise more than 50 percent of the target beneficiaries. The women's self-help groups with good micro-credit system and micro enterprises are very strong in HRML and there is substantial social capital built up among women already. The project will target both men and women in defining and implementing livelihood-generation activities. The project will expend efforts in carrying out wherever possible gender analysis for the design and analysis of such interventions, and shall take steps to ensure that perceptions of both women and men are taken into consideration. Training, technical and financial support will be provided to Panchayats, JFMCs, SHGs and tribal associations (with a particular focus on women and youth). *Quid pro quo* commitments shall be dove-tailed into the plans regarding livelihood support provided under the project and improved biodiversity conservation practices to be followed by the communities.

219. The Panchayats, JFMCs, BMCs SHGs and other CBOs of HRML will be trained in conservation management practices so that they become effective partners in conservation actions. Training and financial support will be provided for field-level data collection on biodiversity impacts of land use decisions. Monitoring groups will be formed among the local communities and participants will be trained in collecting data on change realized as a result of project interventions. Communities will also be trained on habitat restoration techniques, participatory resource appraisal, NTFP based enterprises, value addition on artisanal operations (e.g. reeds) etc. This Output will establish institutional partnership with KILA (a key state level institution for training local self-governments) to develop training modules on sustainable resource use for Panchayat members. Customized training programmes will also be developed for tribals on resource use based on natural resources and on the effective implementation of the Forest Rights Act.

Output 3.2 Support to sustainable resource use practices accentuate positive resource dependency

220. This Output will support biodiversity-friendly businesses as identified in the micro-plans of JFMCs and Resource Plans of Panchayats/ Gramasabhas which will include artisanal enterprises (e.g. reed mat weaving), community based tourism, NTFP based enterprises etc. To ensure that these enterprises remain viable, the project will strengthen technical, financial, administrative and marketing capacities. In addition, to ensure that businesses with negative impacts on biodiversity are not promoted inadvertently, the project will put in place safeguards for financial and business management support. The project will support adoption of innovative technology for bringing in use efficiency (e.g. lemon grass distillation) and better value realization of products (e.g. NTFPs, artisanal reed products etc.). Support under this Output will be based on the principles of "demonstration approach". It is anticipated that the catalytic investments from the project will provide economic and financial incentives to switch over from short-term resource exploitation to long-term stewardship. It is to reiterate that this Output is intended to support only natural resource based livelihoods while developmental assistance for non-ecosystem based livelihoods need to be mobilized from other baseline projects.

221. During the project preparation phase, an initial list of potential income-generating opportunities has been identified (Annexure 16). External expertise and best practices will also be tapped towards this. Government co-financing that has been leveraged for the livelihoods sector (e.g. MGNREGA) will be directed to putting in place alternative livelihood and social welfare programs.

222. Currently, not much attention has been given to various aspects of reed management such as regeneration, weed control, biodiversity and livelihood issues. In many parts of the country, under the Schedule Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, the right to extract bamboo is being handed over to tribal communities as part of Community Forest Rights. This Output will explore options for creating new institutional mechanisms for the extraction and management of reeds through tribal communities under the Forest Rights Act.

Output 3.3 Community-based natural resource management governance model for the unique tribal local self-government (Edamalakudy Panchayat)

223. Edamalakudy Panchayat is a remotely located, biodiversity rich and exclusively tribal settlement (600 families and 3000 members) in the project landscape. The eastern portion of Edamalakudy envelops the richest areas of Eravikulam National Park and is very important in ensuring connectivity between Malayattoor and Mankulam Forest Divisions and Anamalai Tiger Reserve. It is an ideal habitat of the endangered Lion tailed macaque. Recently, Edamalakkudy was declared as a tribal Panchayat, the first of its kind in the Western Ghats. As already mentioned, the hamlet is inhabited by highly marginalized, and highly resource dependent tribal communities. They are less dependent on market interventions but are highly prone to intermediary exploitations. They have heightened vulnerabilities but also have potential for demonstrating resource based sustainable livelihoods on a settlement level. Considering these special circumstances, and the extremely rich biodiversity they are dependent on, this Output proposes to give a separate and targeted resource governance approach for this Panchayat. Particular focus would be given to holistic development interventions based on natural resources such as the effective implementation of the Community Forest Rights under the Forest Rights Act, developing resource models of scale such as NTFP based, reed based etc. It is anticipated that such a model will also serve as learning for other exclusive tribal Panchayats across the country in the context of implementation of the Forest Rights Act, 2006.

C. RISKS AND ASSUMPTIONS

224. The following list the project's risk and risk mitigation strategy. These will be visited at the inception workshop, annually during the planning meetings and at the time of two planned evaluations (mid-term and terminal).

Risk/ Assumption	Risk Ratings	Mitigation Strategy
Limited support from production sector due to apprehension that their economic interests would be jeopardized due to participation in the planned conservation interventions	M	The production sectors operating in the HRML (tea, cardamom and tourism) are critically dependent on natural resources. Depletion of natural resources shall inevitably act against the sustainability of these sectors in the long run; a fact that will be used as a spring board for engaging with enterprises. Necessary measures (including both technical and market based instruments) shall be undertaken by the project (under Outcome 2) to influence their production practices and choices. Further, production sector representatives will be key participants in the cross-sectoral institutional platform to be established by the project (under Outcome 1). Knowledge products will be developed highlighting the benefits of a well-governed mountain landscape. In addition, the project will identify appropriate technological options/ incentives that would be beneficial to these sectors and form part of the Landscape Level Land Use Plan (Outcome 1).
Policy amendments and regulations for addressing biodiversity conservation in sector practices may not receive government and political support	M	In amending policies and the regulatory framework, a highly consultative approach will be used drawing on reviews and inputs from various stakeholders (government, private sector, communities, local bodies and academicians) to ensure the feasibility and acceptability of the proposed changes. The proposed cross-sectoral multi-stakeholder institutional platform (HRSDS) to be set under the project shall lead this process in consultation with key ministries. Similarly, the knowledge products generated under the project shall be disseminated widely for lobbying for upstream policy uptakes of the project concepts.
Local communities may not be willing to participate in the project unless the project addresses their livelihood needs	L	The project will work closely with the local communities by providing technical and financial support for engendering sustainable use of natural wild resources. Planned interventions include skills upliftment, value addition to on-farm and forest produce shall result in income augmentation of communities. The project will also recognize the traditional knowledge of local communities and fully integrate this in designing management interventions. These interventions will be developed with the full participation of communities.
The benefits generated by the project may be offset by the impacts of climate change	M	Climate proofing is an important element in the project design. To start with, the project proposes to address this risk by building a better understanding on the impacts of climate change on HRML (Output 1.1). The findings of this study will give inputs into the process of landscape-level planning – a key focus being on maintaining functional connectivity across the landscape, and maintaining functional diversity (both key to enhancing the resilience of ecosystems to climate changes induced fire, drought and other perturbations). By reducing existing anthropogenic stressors to ecosystems, the project will enhance the capacity of ecosystems to recover following such climate changed induced perturbation.
Stakeholders may perceive the project as restrictive rather than enabling due to its focus on biodiversity.	M	The project aims to mainstream biodiversity as enabling element rather that counter pose it against development. The project approach is to balance conservation, development and livelihoods. Right at the beginning of the project this fact shall be disseminated widely among diverse stakeholder groups. Further, the capacity strengthening programmes and the demonstration approach envisaged in the project will lead to better appreciation of the benefits of sustainable development and biodiversity conservation. Project is also expected to unleash the potentials of new technology and marketing strategies that are anchored in biodiversity friendliness.
The history of the landscape is replete with efforts to establish rights over land and the idea of a landscape level plan may appear to be pitted against existing tenurial interests.	M	Project stresses on evolving clarity on land tenure and harmonization of Acts and policies which would, in fact, dispel the vagueness associated with the present compartmentalized way of dealing with land and resource related issues. The project will support efforts towards settling land rights and untangle the complex land related issues in the landscape. Further, one of the main thrust areas of the project is securing the rights of tribal communities as the Forest Rights Act.

D. INCREMENTAL REASONING AND EXPECTED GLOBAL, NATIONAL AND LOCAL BENEFITS

225. As already mentioned, India's mountain regions cover an area close to 100 million ha (around 30 percent of India's landmass) that constitutes more than 90 percent of the 'biodiversity hotspots' in the country. HRML, nestled in the Western Ghats Mountains of peninsular India is significant due to the following reasons: a) high levels of endemism and repository of presumably several new species; b) richest biome in the entire Western Ghats; c) presence of globally threatened species of fauna, flora and ecosystems; d) part of the World Heritage Site under UNESCO; e) an Important Bird Area; f) catchment of three major river systems in the southern Western Ghats; g) one of the five viable breeding centres of tiger in the entire country and form part of the largest habitat for elephants in the southern Western Ghats; h) harbor the largest global population of the highly threatened Nilgiri tahr and a significant population of Grizzled Giant Squirrel; i) strong eco-cultural affinities and presence of ethnic groups that depend heavily on natural resources for livelihoods; j) support important economic sectors like cardamom, tea and tourism; k) vegetal cover in the region acts as a shield against the impacts of climate change; l) high carbon sequestration potential; m) there has been no major project in this region for mainstreaming biodiversity. Further, HRML is a peep into the future for other mountain areas in the country in terms of the trajectory of development where there is complex interplay of ecological and anthropogenic factors.

226. Recognizing the biodiversity significance of HRML, the government has established eight PAs in the region. However, given the escalating development pressures and need for sustaining livelihoods, it is unlikely that the current approach of conserving biodiversity in "exclusive PAs" alone is going to be effective in safeguarding the biological opulence of HRML. The baseline investments in the project landscape comprise of diverse interventions undertaken by different sectors to further sectoral development objectives, but these interventions do not always integrate biodiversity conservation considerations. Further, these are not coordinated at the landscape level to provide a cross-sectoral strategic vision for balancing conservation, livelihood and production sector objectives. For instance, of the departmental budgets allocated to different sectors, some resources are set aside for conducting research, monitoring, training of sector staff, development of alternate livelihood opportunities and enhancement of existing opportunities to reduce the dependence on natural resources etc. while bulk of sectoral department budgets (agriculture, horticulture, animal husbandry, forests, and tourism) are allocated to pursuing sectoral objectives through activities at the village/ settlement level. These activities are largely for development of assets, but the development of institutional and individual capacities for balancing biodiversity conservation objectives with sector development objectives are not be addressed.

227. Under the baseline scenario, the trajectory of production activities in the project landscape and associated degradation trends are likely to continue as there remain persistent barriers to addressing the direct and indirect drivers of degradation. The existing planning and policy framework, as well as institutional arrangements in HRML are inadequate for addressing biodiversity conservation issues from a landscape perspective. In terms of making community resource use and livelihoods more sustainable, there is lack of robust community-based resource governance systems and alternatives. It is evident that far greater emphasis needs to be placed on mainstreaming biodiversity considerations into economic and livelihood activities in tandem with strengthening the management effectiveness of the existing PA system.

228. GEF support will be catalytic in mobilizing action by production sectors and other stakeholders to overcome existing barriers and introduce new strategies and technologies that will improve the condition of natural resources and increase the stability, integrity and productivity of HRML. More importantly, building on the opportunities for community-based or stakeholder based resource management, it will promote a participatory natural resource planning and management strategy,

involving large scale stakeholders such as production sectors, strengthening of village level institutions, and development of capacity to enable stakeholders to undertake micro level planning and management of natural resources. It will enhance the capacity of functionaries of different sectors, private agencies, and CBOs to promote sustainable resource management.

229. Even in the absence of this GEF project, there are certain baseline investments/ interventions that would take place in HRML in the next five years. These projects/ investments form the programmatic baselines for this project in the "business-as-usual" scenario. Most of the baseline investments will continue to be driven by the existing template (sectoral) of resource planning and implementation. Some of these investments will have some positive impacts on biodiversity conservation in the region. However, in the context of the complex inter-related challenges confronting the project landscape, the baseline projects alone are unlikely to reduce the major barriers identified above unless some key alterations are made in the governance approach. That is the space where GEF investment is trying to lock in. Nonetheless, the existing baseline projects provide a strong platform/ collateral funding/ support structures on which this project can anchor to influence the trajectory of development in the project landscape.

230. The GEF Alternative aims at making a change in natural resource management in the target project area. The aim is to engage and coordinate different sectors at the landscape level to promote sustainable resource management that balances ecological and livelihood needs as an integral part of the operation of these sectors. This mainstreaming approach would enhance the resource base and generate local as well as global benefits. The Departments of Forests, Agriculture, Tourism, Rural Development and many large scale production agencies will mobilize their resources in the target landscape for mainstreaming biodiversity conservation in sector development strategies. The IC matrix details the baseline expenditures, and the incremental cost of realizing each outcome, as well as how the incremental costs are to be shared by the GEF and different government departments. (Incremental Cost Matrix is in Annex 8).

231. The baseline projects comprise mostly of programmes of government agencies, private entrepreneurs, local self-government institutions, CBOs and research institutions in HRML relevant to biodiversity, poverty reduction and natural resource use. These programs form the bulk of this project's co-financing and GEF investment is designed to complement these baseline projects for creating a strategic shift in the development paradigm that is currently being pursued in HRML. GEF resources will enable baseline projects to more effectively focus upon and address key challenges to biodiversity governance and multiple use management in HRML.

232. GEF funding will incrementally leverage new skills, practices and technologies through building capacities and demonstration of environment-friendly production practices across identified stakeholders. GEF resources will also be channeled for creating an enabling governance environment for the sustainable management of biodiversity of HRML through upstream policy and legal engagement both national and state level. The GEF finance will be aligned in such a manner that the co-financing through baseline projects will be utilized in sectoral operations in a more biodiversity-friendly manner. GEF financing will provide additional assistance for cross-cutting capacity development and knowledge management that will fill a critical gap in the existing baseline project to enable the replication and scaling up of integrated approaches for biodiversity conservation. The baselines would help identify potential partners particularly the innovators, champions, early receptors, dissidents, early majority, late majority and the laggards in the projects and therefore help focus on developing clear strategies for project implementation. It will also identify areas where the GEF financing does not need to focus with a view to avoid duplication of efforts and resources.

233. In short, the project seeks to put in place collaborative governance and know-how for multiple-use management of mountain landscapes to conserve biological diversity. This will have wider replication potential for other mountainous regions across India. The project will engineer a paradigm shift from current sector based and unsustainable practices to integrated multiple use management of mountain landscapes to deliver global environmental benefits as described in Table below:

Current Practice	Alternatives to be put in place by the project	Expected Global Benefits
Inadequate management effectiveness of the PA system: a) PAs are too small and do not adequately cover representative biodiversity; and b) management measures in PAs are sub-optimal in terms of addressing the emerging threats.	1. Coverage of PAs in the project landscape expanded by approximately 11,600 ha over the baseline. 2. PA functions improved to account for existing and emerging threats including human-animal conflicts (covering 50,00 ha). 3. Wildlife populations ranging into PA's adjacent landscape (> 400,000 ha) secured—thus indirectly sustaining their ecological integrity.	1. PA systems cover more representative areas of global biodiveristy significance (e.g. *shola*-grasslands). 2. Population status of several globally significant species maintained or increased – e.g. *1. Nilgiri tahr; 2. Grizzled giant squirrel; 3. Tiger;4: Leopard 5: Nilgiri marten 6: Clawless otter 7: Asian elephant;8:Gaur* 3. The prospects of discovering species new to science particularly from lesser known life forms. 4. Production of knowledge about multiple use management of biodiversity rich areas. 5. Expansion of PA network and coverage of more globally significant biodiversity under PA systems. 6. Reduced forest degradation and improved vegetal cover contribute to significant carbon sequestration and improving ecosystem functions.
Limited protection accorded to biological diversity outside the PA systems: Extensive areas of HVBAs and forest fragments face growing threats from unsustainable use and land use change—threatening vital animal movement corridors, habitat loss and degradation.	1. Landscape Level Land-Use and Sectoral Plans developed and a functional cross-sectoral institutional mechanism established for the sustainable management of HRML. 2. Key HVBAs and forest fragments in the project landscape identified, mapped, conservation/ eco-restoration plan prepared and implementation support provided by reorienting baseline investments. 3. Conservation sector staff capacitated on improved conservation practices, collaborative governance, stakeholder engagement, eco-restoration, etc (applicable to PA staff too).	1. Extensive areas of HVBAs and forest fragments (totaling 84,600 hectares) brought under improved conservation management and function as stepping stone corridors/ 'escape routes' ensuring species and genetic flow across the whole of southern Western Ghats. This is particularly important to ensure the survival of high altitude species threatened by climate change (e.g. Black and rufous flycatcher). It is also critical to ensure the survival of species such as tiger and elephant which need large home ranges. 2. Restored HVBAs and forest fragments act the foci for the revival of lost habitats of several threatened and globally significant species (e.g. Great Indian hornbill, *Impatiens* spp). 3. Avoided forest cover loss and augmented ecorestoration contribute to significant carbon sequestration and improving ecosystem functions. 4. The prospects of discovering species new to science particularly from lesser known life-forms.
Production sectors do not adopt sustainable practices: a) economic production activities have limited focus, capacities and technologies that are less detrimental to ecology; b) production sectors have limited market opportunities for adopting ecologically sustainable activities.	1. Formulation of biodiversity-friendly Sector Plans for mainstreaming biodiversity considerations into production sector practices. 2. Production sector stakeholders capacitated on biodiversity mainstreaming concepts and approaches. 3. Focused implementation support and transfer of knowhow (e.g.energy efficiency options in curing operations) to key production sectors as in designing and implementing biodiversity-friendly production practices. 4. Business models, market mechanisms and branding developed to incentivize sustainable resource use.	1. Production sectors develop capacities for mainstreaming biodiversity considerations into their operations and practices across 200,000 ha area—reducing the negative ecological foot print on biodiversity and sustaining critical wildlife blocks. 2. Production sector operations have adverse minimal impacts on the regional ecology and functionality of key ecosystems improves. 3. Adoption of environmentally sound production practices (e.g. energy efficiency options, waste management etc.) leads to reduction in GHG emission. 4. Production of ecologically benign goods and services (e.g. tea, cardamom and tourism) for the consumption of global communities.

Community institutions fail to sustainably govern land and resource use: Community capacities for effective management of natural resources are weakening and livelihoods shrinking.	1. Local self governments and community institutions incorporate improved practices for managing wild resource use to ensure sustainability. 2. Market mechanisms developed (certification for sustainably produced farm products and NTFPs) for sustainable use of natural resources. 3. A holistic governance model based on natural resources developed for the tribal Panchayat at Edamalakkudy.	1. Community incomes augmented, socio-economic situation improved – providing a utilitarian incentive for conservation and improving conservation status and security. 2. Uptake, replication and mainstreaming of community models on improved resource management into legal, policy and programme framework. 3. Improved conservation status of heavily utilized species (i.e. medicinal plants) and conservation of local varieties. 4. Increasing the adaptive capacity and resilience and women and other marginalized communities.

E. COST-EFFECTIVENESS

234. In tune with the GEF Council's guidance on assessing project cost-effectiveness (Cost Effectiveness Analysis in GEF Projects, GEF/C.25/11, April 29, 2005), the PPG team has taken a qualitative approach to identify the most cost-effective strategy for achieving the project objective. Several scenarios for improving the long-term sustainable management of natural resources of HRML's unique biodiversity heritage have been considered, and the prominent three among these are described below.

235. One option would be to continue with the business as usual scenario of pursuing conservation objectives through the existing PA network. However, the current paradigm of resource management in HRML is complex with diverse baselines, disparate issues, multi-faceted challenges, divergent governance models, and varied stakeholder interests; most of which are emanating from outside the PA network. Notwithstanding several initiatives undertaken so far, mostly by the government, the natural resource governance in the region remains weak due to limited inter-sectoral coordination on developmental decisions, knowledge and capacity gaps, institutional barriers, limited technology support, poor realization of economic potential of natural resources, limited integration of policies and actions across line agencies on resource management, unclear mandate of community institutions on sustainable resource management, etc. Further, a major challenge in this regard is supporting/ mobilizing community institutions to take up effective resource management. This has been found to be a tough proposition in the conventional approach. In the business-as-usual scenario, this trend is likely to remain the same or may even worsen especially in the context of fast developments taking place in the landscape. Furthermore, even if this approach were to succeed, given the escalating threats from anthropogenic activities in the wider landscape, irreparable losses of existing values, option values and future use values could still result.

236. Moreover, the existing PA network provides only sub-optimal coverage of representative biodiversity in the region and does not encompass the entire range of ecological and biological values of HRML. Large chunks of biodiversity rich areas lie outside the purview of the PA system and often are embedded in economic production systems. As a result, efforts to strengthen the management effectiveness of existing PAs alone are unlikely to yield significant conservation dividends. Hence, to continue with the single-sector approach, wherein the conservation sector focuses solely on the existing PAs is considered less likely to succeed and critical biodiversity and ecosystem values will continue to erode.

237. A second option would be to expand the territorial extent of the PAs, which might provide greater security for biodiversity values. This approach surely has some potential, but may not be a complete solution in itself given the development pressures and competing economic and livelihood interests. It may be feasible to expand HRML's PA network to some extent, but a large extension of the PA system is unlikely to gain the necessary community and political support to succeed. Keeping this in mind, the project design proposes to expand the PA network to the extent possible in a

pragmatic way. However, this approach needs a strong compliment of engaging with economic production sectors on mainstreaming biodiversity into sectoral practices. The conventional approach to resource governance in HRML does not factor-in this aspect which is a critical lacuna.

238. It is in this context that a third option – 'the landscape approach' was considered and found most appropriate, feasible and cost effective. This approach will focus on a cogent and integrated planning framework for natural resource governance departing from the current sector based planning so that baseline policies and practices of economic production sectors related to resource use are influenced and aligned in tune with the ecological imperatives of HRML. This will demonstrate the possibilities for integrating biodiversity conservation into land use planning and decision making in production sectors located in HRML. *Inter alia*, these include adopting a landscape-level, biodiversity-friendly mainstreaming approach that will cover PAs, HVBAs, tea, cardamom, tourism, subsistence and other livelihood activities, as well as a more detailed sector-by-sector biodiversity-friendly planning approach for each of these sectors. Improved management effectiveness of the PA system (including expansion of PA system) will be embedded within the Landscape Plan in a manner that conservation, livelihoods, and production sectors are engaged on an equal footing and are co-partners of the process. Further, by adopting a demonstration approach, the project design promotes rational use of project resources and gives emphasis on influencing baseline investments in the landscape. Special care has been taken to identify the gaps in the baseline investments and project will try to support these deficient areas to further the project objectives. Besides, it is presumed that the project results will act as replicable reference points for adopting similar approaches in other parts of the country.

239. This third option is considered to be the most cost-effective deployment of GEF resources because it will ensure that investments in the conservation sector are not compromised by threats emanating outside. Furthermore, the cross-sectoral approach is considered more likely to succeed in bringing competing interests to the table and beginning the dialogue necessary to conserve the biodiversity values of HRML. In line with the precautionary principle, this option will avoid further degradation of ecosystem values and services, which once lost could be prohibitively costly to restore. Finally, in developing the project, lessons learned from similar initiatives (as noted earlier in the document) have been considered and incorporated into project design to ensure that GEF resources are efficiently deployed.

240. Since 1992, GEF has supported similar catalytic investments in India to improve its cost-effectiveness in generating global environmental benefits (GEB). This project will expand India's previous grant portfolio, leading to improved cost-effectiveness. This project will build upon cost-effective implementation and management practices and baselines already set in the country. The project will seek new efficiencies in the conservation sector's proven capacity to deliver positive environmental results in a cost-effective manner. This will be done in terms of grant review, disbursement and evaluation/monitoring.

F. COUNTRY OWNERSHIP: COUNTRY ELIGIBILITY AND COUNTRY DRIVEN-NESS

241. The project is directly relevant to, supportive of, and consistent with India's national priorities and policies related to global environmental issues and development priorities. To promote conservation and sustainable use of biodiversity and natural resources, India has an extensive body of constitutional provisions, laws and policies. India is signatory to various international conventions and treaties related to environmental protection and has also taken numerous initiatives towards implementation. India ratified the Convention on Biological Diversity on 18 February 1994. India is a recipient of UNDP technical assistance and notified its participation in the GEF on 12 May 1994. It is thus eligible according to Article 9 (b) of the GEF instrument to receive GEF funding.

242. The key elements of India's National Biodiversity Action Plan (2008) include: strengthening and integration of in situ and on-farm conservation; augmentation of natural resource base and its sustainable utilization; improved regulation of invasive species; assessment of vulnerability and

adaptation to climate change and desertification; integration of biodiversity concerns in economic and social development; development of biodiversity databases; strengthening implementation of policy, legislative and administrative measures for biodiversity conservation and management; building of national capacities for biodiversity conservation and appropriate use of new technologies; valuation of goods and services provided by biodiversity and use of economic instruments in decision making processes.

243. Similarly, the National Action Plan on Climate Change (2008) comprising of eight National Missions (National Solar Mission, National Mission on Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining Himalayan Eco-System, National Mission for Green India, National Mission for Sustainable Agriculture and National Mission on Strategic Knowledge for Climate Change) provides multi-pronged, long-term and integrated strategies for addressing climate change.

244. Other relevant national policies, legislation and guidelines relevant to this project are: the Biological Diversity Act of 2002, National Environmental Policy, 2006 National Forest Policy of 1988, Indian Forest Act of 1927 and related state legislation, Forest (Conservation) Act of 1980, Wildlife (Protection) Act of 1972, Environmental Act of 1986, The Environment Impact Assessment Notification of 2006, National Wildlife Action Plan (2002-16), National Water Policy (2002), National Conservation Strategy and Policy Statement on Environment and Development (1992), Policy Statement on Abatement of Pollution (1992), National Tourism Policy (1998), National Agricultural Policy (2000), The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, National and State Joint Forest Management orders and rules etc.

245. The project is in conformity with the national policy and legal framework and shall further support the implementation of these in the national and sub-national context. India is a signatory to the UN Convention on Biological Diversity (UNCBD), UN Framework Convention on Climate Change (UNFCCC) and also the UN Convention to Combat Desertification (UNCCD).

G. SUSTAINABILITY AND REPLICABILITY

Sustainability

246. The project is envisioning a radical shift in the biodiversity governance of HRML that has significant potential for influencing the natural resource paradigm across the country. Hence, great stress has been given to sustaining the project initiatives and outcomes and this is reflected in the project design as an integral element.

247. Ecological sustainability: The project initiatives will provide long-term security for the globally significant biodiversity of HRML by reinforcing the management effectiveness of PA system and other HVBAs, mainstreaming biodiversity considerations into the operations of economic production sector and supporting sustainable livelihoods in the subsistence sector. The project ensure ecological sustainability in HRML through the following key measures: (i) production of knowledge base on the biodiversity values of HRML that will provide guidance to policy and programme managers for taking informed decisions on resource use; (ii) facilitate the development of a landscape-level land use plan that will look at current land use in the project area and will then provide a road map for how land uses/ production practices by the different sectors can be made more compatible with the conservation needs of HRML; (iii) helping individual sectors to develop biodiversity-friendly sector plans to factor in biodiversity concern in sectoral operations; (iv) putting in place a cross-sectoral institutional mechanism to promote cross-sectoral dialogue and joint actions by different sectors that operate in the landscape for pre-programme planning and concurrent and post project monitoring; (v) develop capacities of conservation and key production sector institutions (tea, cardamom and tourism) to implement biodiversity-friendly sector plans; (vi) improve the management effectiveness of existing PA system; (vii) expansion of the PA system by 30 percent over the baseline; (viii) develop community based micro plans for sustainable natural resource use along with capacity building and

other technical assistance to implement these plans, (ix) develop markets and branding for produce from conservation-friendly production systems; (x) strengthen the management planning process in HRML and devise strategies for addressing new generation threats to biodiversity such as climate change, invasive species etc.

248. Financial sustainability: HRML has significant baseline investments related to the objectives of the project. One of the main aims of the project is to influence these investments and investment decisions so as to make them more conservation-friendly. This will be an 'inbuilt' financial sustainability strategy for the project. Further, in order to ensure that biodiversity mainstreaming approaches identified under the project can be financially sustained post project, financial sustainability strategy will be made part of the landscape-level land use plan. The financial strategy will look at a mix of approaches such as re-alignment of existing government budgetary resources, generation/ re-allocation of user fees generated within the conservation and production sectors, and/ or mobilizing new resources. In terms of the livelihoods/ subsistence sector, the project will promote sustainable resource use based on economic feasibility assessments to ensure that such livelihoods are sustained over the long-term.

249. Institutional sustainability: To ensure that prevailing structures and processes set in motion by the project have the capacity to continue to perform their functions over the long term, the project will devote significant resources to capacity development. Capacity development will be based on comprehensive needs assessments targeting all key stakeholders that directly or indirectly impact the biodiversity of HRML. To ensure that training support can continue post-project, efforts will be made to associate the training curriculum and resource persons with existing training institutions. Further, the project promotes developing Trainers at the local level so that capacities are retained at the landscape itself and will be available post project. For instance, training content related to the conservation sector could be integrated with the KFRI, School of Social Sciences, Periyar Foundation etc. Local NGOs and research institutions will also be included in project activities based on their comparative advantages and this will help build a broader constituency for conservation. Further, the most crucial factor for the institutional sustainability would be the formation of HRSDS (the multi-sectoral institutional platform) which will be capacitated adequately during the course of project implementation, to steer the processes initiated by the project even after the project comes to a close.

250. Social sustainability: The project gives maximum emphasis to building social capital among women and tribal groups. To ensure that social exclusion is minimized and social equity maximized, project activities targeting the livelihoods/ subsistence sector will be founded on extensive stakeholder participation. Existing networks of community organizations will be targeted towards this. The stress will be given to revitalize existing institutions rather than establishing new ones. The project will target the institutions operating at the community level to enable them to actively participate in developing and implementing activities to ensure continuity and replicability once the project is completed. A horizontal method of capacity building called Community to Community Training (CTCT) will be adopted to disseminate the lessons learnt during the project implementation. This involves organization and conduct of training programmes by the Task Teams of one village for other village communities. Further, the project shall promote community based economic enterprises of scale based on sustainable resource use that will augment the social security of marginalized communities. Of particular relevance in this regard is a separate Output (3.3) that aims at developing a holistic resource governance model for one of the remote and backward tribal Panchayat in the project landscape.

Replicability

251. There are various aspects of project design that facilitate replication. First, facilitating replication of similar landscape approaches for resource governance in other mountainous areas of the country is an important intent of the project. The project has a separate Output (1.5) towards realizing this. This Output will support identification of viable meso-level mountain landscapes for piloting

similar approaches across the Himalayas, the Western and Eastern Ghats, Vindhyas, Aravallis, Central Indian High lands, and North-East. It is also proposed to develop HRML as a 'learning centre' for further replication of similar approaches in other areas and states (through technical backstopping), exposure visits and training to stakeholders from other regions. It is envisioned that by the project end, there will be well-informed replication strategies for incorporating biodiversity and ecosystem values into land use planning and management in at least 3,000,000 ha of mountain landscapes in the country.

252. Second, the project will strengthen the enabling environment for biodiversity mainstreaming into production sectors by proposing amendments and methodological guidelines to complement existing policies so that they are more explicit on mainstreaming of biodiversity conservation considerations (Output 1.6). Third, the project will undertake research studies to address key knowledge gaps that impede mainstreaming of biodiversity conservation considerations in the activities of production sectors (Outputs 1.1). These studies as well as the lessons learned will be widely disseminated. Fourth, the project's capacity building efforts (under Outputs 2.1 and 3.1) will be internalized with identified training institutions so that this can become an accessible resource to other mountain areas where there is interest in replicating the project approach. Training programs will be accompanied by handbooks/ manuals/ compendiums. Towards the latter phase of the project, efforts will be made to replicate good practices in India's other mountainous areas by training stakeholders on various aspects of mainstreaming biodiversity conservation.

III: Strategic Results Framework

This project will contribute to achieving the following Country Programme Outcome as defined in the CPAP for India (2008-2012): Outcome 4.3 Progress towards meeting national commitments under multilateral environmental agreements; and Output 4.3.2 National efforts supported towards conservation and management of natural resources					
Country Programme Outcome Indicators: Output 4.3.2 Indicator: Number of new joint initiatives undertaken for integrated biodiversity conservation					
Primary applicable Key Environment and Sustainable Development Key Result Area: 1. Mainstreaming environment and energy					
Applicable GEF Strategic Objective and Program: Strategic Objective 2 – To mainstream biodiversity in production landscapes/ seascapes and sectors; Strategic Priority 4 – Strengthening the policy and regulatory frameworks for mainstreaming biodiversity					
Applicable GEF Expected Outcomes:					
Applicable GEF Outcome Indicators:					
Project Strategy	Indicator	Baseline	Targets[102]	Means of verification	Risks and Assumptions
The long-term goal to which the project will contribute is the sustainable management of the globally significant mountain biodiversity of India by mainstreaming biodiversity conservation considerations into production sectors, while also taking into account development imperatives, need for sustaining livelihoods and also addressing retrogressive factors including the anticipated impacts of climate change.					
Immediate Objective: To protect biodiversity of the High Range Mountain Landscape of the southern Western Ghats in peninsular India from existing and emergent threats through building an effective collaborative governance framework for multiple use management.	Extent brought under multiple use management planning framework	0 ha	300,000 ha	Mid-term and Final Technical Evaluation	Limited support from production sector due to apprehension that their economic interests would be jeopardized due to participation in the planned conservation interventions The population dynamics of flora and fauna may depend on various extraneous factors over which project may have little control.
	Population status of following critical species remain stable or increases: Nilgiri tahr Grizzled giant squirrel Tiger	 944 195 34	Remain stable or increases by project end	Monitoring reports, Population estimation reports, Publications of National Tiger Conservation Authority	
	Percentage increase in habitats categorized as high conservation value over the baseline.[103]	PA: 207.5 km^2 Non-PAs: 846 km^2	10% increase by mid-term and 20 % by project end. 10 % increase by mid-term and 15% by project end	Mid-term and Final Technical Evaluation	
	Improvements in water quality in the water bodies of the landscape	BOD -1.5 mg/l at Neriamangalamand 1.4 mg/l at Bhoothathankett	10% improvement by project end.	Monitoring reports, Administrative reports of Pollution Control Board, Kerala State Council for Science and Environment	

[102] The time frame for realizing project targets is project end (2018), unless otherwise specified.
[103] Baseline values of conservation zones are given in Table 14 of the Project Document.

Outcome 1: Effective governance framework for multiple-use mountain landscape management in place	Landscape Level Land use Plan (LLLUP) developed adhering to multiple use management decisions	0	1	Approved Plan document	Policy amendments and regulations for addressing biodiversity conservation in sector practices may not receive government and political support Stakeholders may perceive the project as restrictive rather than enabling due to its focus on biodiversity and a cautious approach towards normal development Non PA forest Divisions will have work on conservation plans outside the regular Working Plan system, for which a process is laid down. However this aspect is latent or non- existent. Local policies, processes and management decisions related to forest and production sectors may not lead to land/ resource-use change in favour of biodiversity conservation
	Sector-specific biodiversity-plans compatible with LLLUP developed leading to effective integration of biodiversity considerations into production practices	0	At least six Sector Plans (Forestry, Tourism, Tea, Cardamom, Agriculture and Tribal Development) and Biodiversity Conservation Plans (5) in place	Approved Sector Plan documents Approved Biodiversity Conservation Plans	
	Effective and functioning cross-sectoral, multi-stakeholder institution (including conservation, livelihood and production) established.	0	1	Government Orders or notifications, meeting records	
	Number of key policy and management framework/ decisions adopted at local and state level related to sustainable mountain landscape management	0	7 (Wildlife Protection Act, Forest Conservation Act, Environment Protection Act, Forest Rights Act, Cardamom Rules, KDH Act, Land Assignment Act, Commodities Act), National Working Plan Code and other Management decisions	Policy briefs Relevant GOs & notifications	

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<tr>
<td></td>
<td>Improvement in Systemic Level Indicators of <u>Capacity Development Scorecard</u> (Annex 19)</td>
<td colspan="2">
<table>
<tr><th>SYSTEMIC LEVEL</th><th>B/L</th><th>Tgt.</th></tr>
<tr><td>1. Capacity to conceptualize and formulate policies, legislations, strategies, programme</td><td>40%</td><td>80%</td></tr>
<tr><td>2. Capacity to implement policies, legislation, strategies and programmes</td><td>33%</td><td>80%</td></tr>
<tr><td>3. Capacity to engage and build consensus among all stakeholders</td><td>15%</td><td>80%</td></tr>
<tr><td>4. Capacity to mobilize information and knowledge</td><td>35%</td><td>80%</td></tr>
<tr><td>5. Capacity to monitor, evaluate and report and learn at the sector and project levels.</td><td>30%</td><td>80%</td></tr>
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<td>Mid-term and Final Evaluation</td>
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<tr>
<td rowspan="2">Outcome 2:
Multiple use mountain landscape management is applied securing the ecological integrity of HRML</td>
<td>Improved management effectiveness PAs as measured and recorded by Management Effectiveness Tracking Tool (METT)</td>
<td>168 out of 300</td>
<td>Increase in METT scores by 10 percent by year 3
By 20 percent by year 5</td>
<td>METT scorecard prepared annually.
Independent mid-term and final evaluations</td>
<td rowspan="2">The benefits generated by the project may be offset by the impacts of climate change

Resources of the project are insufficient for meeting the objectives over the large area of landscape</td>
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<tr>
<td>Increase in area under PA system</td>
<td>37,100 ha</td>
<td>Increase by 11,500 ha</td>
<td>Project Reports;
Independent mid-term and final evaluations</td>
</tr>
<tr>
<td></td>
<td>Areas of forest fragments/ HVBAs in tea gardens inventoried and secured</td>
<td>0</td>
<td>4,000 ha</td>
<td>Project Reports;
Independent mid-term and final evaluations</td>
<td></td>
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	% reduction in fuel wood consumption for processing in tea and cardamom using energy efficient technology and improved design (indicator, baselines and targets will have to be re-visited once the Sector Plans are prepared by mid-term)	Baseline to be measured in 1st 3 months of project	10% decline over baseline usage and 20% in cardamom	Survey reports, Administrative reports, Mid-term and Final Evaluation	
	Number of new demonstration programmes/ featuring biodiversity friendly production practices (e.g. curing units/ energy efficiency options/ farming practices) adopted	0	20	Administrative reports, Mid-term and Final Evaluation	
Outcome 3: Strengthened community capacities for community based sustainable use and management of wild resources	Number of development plans of PRIs/ CBOs that incorporate bio-diversity friendly practices	0	100	Number of Plan documents, Administrative records	Local communities may not be willing to participate in the project unless the project addresses their livelihood needs The history of the landscape is replete with efforts of farmers and settlers to establish rights over land and the idea of a landscape level plan may appear to be pitted against their tenurial interests.
	Number of community representatives/ PRIs trained in biodiversity mainstreaming activities	0	500	Administrative records, Mid-term and Final Evaluation	
	Number of new micro-enterprises at individual/SHG/ CBO/ and other local institution levels based sustainable resource use	0	Target to be defined after design of the micro-plans	Administrative reports and records	
	% reduction in biomass consumption in lemon grass enterprises through adoption of improved technology.	494,361 kg/ year	10 percent reduction by 3rd year and 20 percent by project end.	Administrative records, Mid-term and Final Evaluation	
	Appropriate model agreement between different agencies on the effective implementation of FRA as evidence through sustainable use and protection of biodiversity in Edamalakudy Panchayat	0	1	Agreement document, Mid-term and Final Evaluation	

Project Outputs	
Output 1.1	Strengthened knowledge generation and dissemination system improves decision making related to sustainable land and resource use
Output 1.2	Landscape level land- use plan prepared and sustainable resource management systems in place
Output 1.3	Biodiversity considerations are mainstreamed into sector plans and practices
Output 1.4	A dedicated cross sectoral landscape level institutional platform ensures sectoral compliance with management prescriptions of Landscape and Sector Plans
Output 1.5	Replication strategy developed for multiple use management of mountain landscapes
Output 1.6	Policies and legal framework reviewed and harmonized for ensuring sustainable management of mountain landscapes
Output 2.1	Capacities developed among conservation and production sector staff for applying landscape approaches to biodiversity conservation into sectoral operations
Output 2.2	Management effectiveness of PA system strengthened to address existing and emerging threats to PA systems
Output 2.3	HVBAs secured through improved conservation focus and interventions
Output 2.4	Biodiversity mainstreaming demonstrated in key production sectors
Output 3.1	Community based organizations (Panchayats, JFMCs, Self Help Groups (SHGs)) have adequate capacities to plan sustainable resource use
Output 3.2	Support to sustainable resource use practices accentuate positive resource dependency
Output 3.3	Community-based natural resource management governance model for the unique tribal local self-government (Edamalakudy Panchayat)

IV: TOTAL BUDGET AND WORK PLAN

Award ID:	**00087493**	Project ID:	**00075746**
Award Title:	**High Ranges Landscape Project**		
Business Unit:	**IND10**		
Project Title:	India High Range Landscape Project - Developing an effective multiple-use management framework for conserving biodiversity in the mountain landscapes of the High Ranges, Western Ghats, India.		
PIMS no.:	**4651**		
Implementing Partner (Executing Agency)/ Responsible partner	**UNDP India Country Office**		

GEF Outcome/Atlas Activity	Responsible Party/ Implementing Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	Atlas Budget Description	Total	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Budget Note
Outcome 1 Effective governance framework for multiple-use mountain landscape management in place	UNDP	62000	GEF	71300	Local consultants	517,100	51,710	108,591	113,762	118,933	124,104	1
				71200	International Consultants	35,000	3,500	7,350	7,700	8,050	8,400	2
				72100	Contractual Services-Companies	7,000	700	1,470	1,540	1,610	1,680	3
				71600	Travel	78,000	7,800	16,380	17,160	17,940	18,720	4
				75700	Meetings and Consultations	44,000	4,400	9,240	9,680	10,120	10,560	5
				72200	Material and goods	5,000	500	1,050	1,100	1,150	1,200	6
				74200	Audio-visual and printing production costs	59,000	5,900	12,390	12,980	13,570	14,160	7
				72200	Equipments	5,000	500	1,050	1,100	1,150	1,200	8
TOTAL OUTCOME 1						750,100	75,010	157,521	165,022	172,523	180,024	
Outcome 2 Multiple-use mountain landscape management is applied securing the ecological integrity of HRML	UNDP	62000	GEF	71300	Local consultants	13,000	1,300	2,730	2,860	2,990	3,120	9
				71200	International Consultants	0	0	0	0	0	0	-
				72100	Contractual Services-Companies	3,277,600	327,760	688,296	721,072	753,848	786,624	10
				71600	Travel	105,000	10,500	22,050	23,100	24,150	25,200	11
				75700	Meetings and Consultations	50,000	5,000	10,500	11,000	11,500	12,000	12
				74200	Audio-visual and printing production costs	55,000	5,500	11,550	12,100	12,650	13,200	13
TOTAL OUTCOME 2						3,500,600	350,060	735,126	770,132	805,138	840,144	
Outcome 3 Strengthened capacities for community based sustainable use and management of	UNDP	62000	GEF	71300	Local consultants	138,000	13,800	28,980	30,360	31,740	33,120	14
				72100	Contractual Services-Companies	1,340,700	134,070	281,547	294,954	308,361	321,768	15
				71600	Travel	100,000	10,000	21,000	22,000	23,000	24,000	16
				75700	Meetings and Consultations	50,000	5,000	10,500	11,000	11,500	12,000	17
				74200	Audio-visual and printing production costs	50,000	5,000	10,500	11,000	11,500	12,000	18

wild resources												
				72605	Grant	50,600	10,120	10,120	10,120	10,120	10,120	19
TOTAL OUTCOME 3						1,729,300	177,990	362,647	379,434	396,221	413,008	
Project Management	UNDP	62000	GEF	71400	Project Manager (NPMU)	82,700	5,740	17,620	18,700	19,780	20,860	20
				71400	Technical Coordinator (NPMU)	30,000	3,000	6,300	6,600	6,900	7,200	21
				71400	Project Coordinator (SPMU)	82,700	5,740	17,620	18,700	19,780	20,860	22
				71400	Finanical cum Admin Assistant (SPMU)	43,200	4,320	9,072	9,504	9,936	10,368	23
				71400	Office Assistants (SPMU)	32,400	3,240	6,804	7,128	7,452	7,776	24
				72400	Office facilities, equipment and communications (NPMU)	5,000	500	1,050	1,100	1,150	1,200	25
				72400	Office facilities, equipment and communications (SPMU)	10,000	1,000	2,100	2,200	2,300	2,400	26
				71600	Travel (SPMU)	9,000	900	1,890	1,980	2,070	2,160	27
TOTAL PROJECT MANAGEMENT						295,000	24,440	62,456	65,912	69,368	72,824	
TOTAL GEF ALLOCATION						**6,275,000**	**627,500**	**1,317,750**	**1,380,500**	**1,443,250**	**1,506,000**	

Budget Note	**Explanation**
1**	This include the cost of technical consultants (national) for undertaking research gap analysis (4 weeks @ USD 700 per week), carrying out various research programmes (430 weeks @ USD 700 per week), preparation of Landscape Plan (50 weeks @ USD 700 per week), preparation of Compendium on Best Practices in Mainstreaming (2 weeks @ USD 700 per week), various Sectoral Plans (30 weeks @ USD 700 per week), legal expert for drafting the constitution of HRSDS (5 weeks @ USD 700 per week), mid-term evaluation (6 weeks @USD 700 per week), final evaluation (6 weeks @ 700 per week) replication strategy (5 weeks @ USD 700 per week), legal expert for harmonizing various legal and policy framework (15 weeks @ USD 700 per week) and the engaging the Conservation Biologist (7 months @ USD 1000 per month), Socio-economic and Livelihood Specialist (7 months @ USD 1000 per month) and Communication and Outreach Expert (8 months @ USD 1000 per month) for undertaking various research programmes and activities through Output 1.1 to 1.6. , one Technical Coordinator at the national level to supervise the preparation and generation of knowledge products and guide the cross-sectoral planning process (54 months @approx. USD 2000 per month)
2	This include the cost of international technical consultants for undertaking mid-term evaluation (4 weeks @USD 3500 per week) and final evaluation (6 week @ USD 3500 per week), under Output 1.4.
3	This includes subcontracts to host the inception workshop (USD 7,000) under the Output 1.4.
4	This include the travel cost of technical consultants (national) for undertaking research gap analysis (2 trips @ USD 500 per trip), carrying out various research programmes (90 trips @ USD 500 per trip), preparation of Landscape Plan (8 trips @ USD 500 per trip), various Sectoral Plans (20 trips @ USD 500 per trip), legal expert for drafting the constitution of HRSDS (3 trips @ USD 500 per trip), mid-term evaluation (2 trips @ USD 3000 per trip), final evaluation (2 trips @ USD 3500 per trip), replication strategy (2 trips @ USD 500 per trip), legal expert for harmonizing various legal and policy framework (5 trips @ USD 500 per trip) under Output 1.1 to 1.6.
5**	This include the cost of conducting various meetings and consultations related to undertaking research gap analysis (4 meetings @ USD 500 per meeting), carrying out various research programmes (30 meetings @ USD 500 per meeting), preparation of Landscape Plan (8 meetings @ USD 500 per meeting), various Sectoral Plans (30 meetings @ USD 500 per meeting), legal expert for drafting the constitution of HRSDS (5 meetings @ USD 500 per meeting), replication strategy (1 meeting @ USD 500 per meeting), legal expert for harmonizing various legal and policy framework (10 meetings @ USD 500 per meeting) under Output 1.1 to 1.6.
6	This includes the cost of procuring necessary material and goods for the functioning of the HRSDS Office for five years under Output 1.4.
7	This include the cost of procuring audio-visual reproduction production and printing of the materials such as the research gap analysis (USD 1000), research Outcomes (USD 16300), preparation of knowledge products (USD 25,000), Landscape Plan and Compendium of Best Practices on Mainstreaming (USD 2000), various Sectoral Plans (USD 13,200), replication strategy (USD 500), harmonizing various legal and policy framework (USD 1000) under Output 1.1 to 1.6.
8	This includes the cost of procuring computers, printers and other accessories for the functioning of HRSDS for five years under Output 1.4.
9	This includes the cost of technical consultants (national) for mapping of HVBAs (USD 10,000) engaging the Conservation Biologist (1 month @ USD 1000 per month), Socio-economic and Livelihood Specialist (1 month @ USD 1000 per month) and Communication and Outreach Expert (1 month @ USD 1000 per month) for undertaking various activities under Output 2.1 to 2.4.
10**	This includes the cost of sub-contracting technical agencies for support to capacity building of conservation and production sector staff (100 programmes @ USD 1000 per programme), support to conservation sector for expansion of PA system (USD 200,000), support to conservation sector for improving PA Management Effectiveness (11,70,000), support to conservation sector for implementation

	support to HVBAs (USD 767,600), and implementation support to production sector activities (USD 1040,000) under Outputs 2.1 to 2.4. The details of the activities are given in project Output descriptions and also in Annexure 16.
11	This include the travel cost for sub-contracting technical agencies for support to capacity building of conservation and production sector staff (100 travel @ USD 1000 per trip) and for mapping of HVBAS (10 travel @ USD 500 per trip) under Outputs 2.1 and 2.3.
12	This includes the cost of conducting meetings and workshops as part of the capacity building of conservation and production sector staff (100 consultations @ USD 500 per meeting) under Outputs 2.1.
13	This includes the audio-visual and printing costs related to capacity building of conservation and production sector staff (USD 50,000) and for mapping of HVBAS (USD 5000) under Outputs 2.1 and 2.3.
14**	This include the cost of engaging Conservation Biologist (46 months @ USD 1000 per month), Socio-economic and Livelihood Specialist (46 months @ USD 1000 per month) and Communication and Outreach Expert (46 months @ USD 1000 per month) for undertaking capacity building of communities, support to sustainable resource use practices and support to Edamalakudy Panchayat on sustainable resource governance model through Output 3.1 to 3.3.
15	This include the cost of implementation support to community institutions for undertaking various activities identified through the micro-planning process, engaging expert agencies for impacting specific skills as part of undertaking capacity building of communities (100 programmes @ USD 500), implementation support to sustainable resource use practices (USD 912,000) and implementation support to Edamalakudy Panchayat on sustainable resource governance model (USD 378,700) through Output 3.1 to 3.3.
16	This includes the travel costs related to capacity building communities (100 travel @ USD 1000) under Output 3.1.
17	This includes the cost of organizing meetings and consultations related to capacity building communities (100 meetings @ USD 500) under Output 3.1.
18	This includes the costs of printing training materials and knowledge products related to capacity building communities (USD 50000) under Output 3.1.
19	Start up small grants 5 community based enterprises for alternative livelihoods. Support formation/ strengthening of community based associations.
20	Refer to annex 9
21	Refer to annex 9
22	Refer to annex 9
23	Refer to annex 9
24	Refer to annex 9
25	Facilities and communications (internet, landlines, cell phone service) for management purposes (estimated at approximately $80/ month)
26	Facilities and communications (internet, landlines, cell phone service) for management purposes (estimated at approximately $160/ month)
27	Management-related travel to project site for staff in the NPMU and SPMU

Note: * The exchange rate at the time of submission of the proposal to GEF has fluctuated considerably. The budget may require a revision under different heads if it changes further.
** This project is undertaking pioneering work. A significant part of the project aims at extending technical assistance to implement the main components of the project that would requires high quality professional service. The amounts mentioned in the budget are mere estimates. These figures may require upward revision to enable procurement of services at higher rates that will be commensurate with qualifications and experience. However, the overall budget of the project will remain same.

OUTCOME	OUTPUT NUMBER	OUTPUT	BUDGET ($)
Outcome 1: Effective governance framework for multiple-use mountain landscape management in place	Output 1.1	Strengthened knowledge generation and dissemination system improves decision making related to sustainable land and resource use	517,100
	Output 1.2	Landscape level land- use plan prepared and sustainable resource management systems in place	52,400
	Output 1.3	Biodiversity considerations are mainstreamed into sector plans and practices	65,200
	Output 1.4	A dedicated cross sectoral landscape level institutional platform ensures sectoral compliance with management prescriptions of Landscape and Sector Plans	83,900
	Output 1.5	Replication strategy developed for multiple use management of mountain landscapes	9,500
	Output 1.6	Policies and legal framework reviewed and harmonized for ensuring sustainable management of mountain landscapes	22,000
		Sub-total Outcome 1	**750,100**
Outcome 2: Multiple-use mountain landscape management is applied securing the ecological integrity of HRML	Output 2.1	Capacities developed among conservation and production sector staff for applying landscape approaches to biodiversity conservation into sectoral operations	303,000
	Output 2.2	Management effectiveness of PA system strengthened to address existing and emerging threats to PA systems	1,370,000
	Output 2.3	HVBAs secured through improved conservation focus and interventions	787,600
	Output 2.4	Biodiversity mainstreaming demonstrated in key production sectors	1,040,000
		Sub-total Outcome 2	**3,500,600**
Outcome 3: Strengthened capacities for community based sustainable use and management of wild resources	Output 3.1	Community based organizations (Panchayats, JFMCs, Self Help Groups (SHGs)) have adequate capacities to plan sustainable resource use	310,000
	Output 3.2	Support to sustainable resource use practices accentuate positive resource dependency	972,000
	Output 3.3	Community-based natural resource management governance model for the unique tribal local self-government (Edamalakudy Panchayat)	447,300
		Sub-total Outcome 3	**1,729,300**
		Sub Total NPMU	117,700
		Sub Total SPMU	177,300
		Sub Total Project Management	**295,000**
		GRAND TOTAL	**6,275,000**

V: Management Arrangements

Project Implementation Arrangements

253. The project will be executed under Direct Implementation Modality (DIM), according to the Standard Basic Assistance Agreement between UNDP and the Government of India, and the Country Programme Action Plan (CPAP). The project is financed with funding from the GEF co-financed by the Ministry of Environment and Forests and the Kerala State Government. UNDP acts as the GEF Executing Agency.

254. **Implementing Partner (IP):** The project will be directly implemented by UNDP in close cooperation with Ministry of Environment and Forests (MoEF). UNDP and the Ministry of Environment and Forests will be responsible for the effective use of resources and the achievement of the project outcomes and outputs as set forth in the document. The Ministry of Environment and Forests will designate a nodal officer for the project. UNDP will be responsible for all financial management, reporting, procurement and recruitment services. UNDP recruitment and procurement rules will apply.

255. **Project Steering Committees:** Oversight of project level activities will be provided by the Project Steering Committees (PSC). There will be two Steering Committees - one, at the national level and the other, at the State level.

256. **National Project Steering Committee (NPSC)** will be jointly chaired by a senior official from UNDP and the Additional Director General of Forests (Wildlife), Ministry of Environment and Forests. The NPSC will comprise the Inspector General of Forests (Wildlife), Operational Focal Point of Global Environment Facility (GEF – OFP), Joint Secretary (in charge of Biodiversity), Joint Secretary (in charge of Mountains), representatives from Ministry of Agriculture, Ministry of Commerce, Tourism, Ministry of Rural Development, Ministry of Tribal Affairs, Ministry of Panchayati Raj, Ministry of New and Renewable Energy, Chairman, National Biodiversity Authority, the Chief Wildlife Warden, Kerala; two representatives of UNDP; and two non-government representatives (including one from private sector/ industries) nominated jointly by the MoEF and UNDP. The Chairmen can also invite other officials and experts to the NPSC meetings on as-needed basis. The NPSC will be responsible for overall programme effectiveness and relevance for policy. The NPSC will also be responsible for approving the budgeted AWPs forwarded by the State and providing overall guidance and oversight on policy matters. NPSC meeting will be convened at least once a year. But efforts will be made to organise quarterly/half yearly meetings to ensure regular follow up.

257. **State Project Steering Committee (SPSC)** will be established in the state with representation from key state Departments/ Agencies to direct and oversee project implementation and management at the state level. SPSC will be jointly chaired by the Chief Secretary, Kerala and a senior official from UNDP. The Chief Wildlife Warden, Kerala shall be the ex-officio Secretary. Other members will include representatives of the relevant State Departments, Finance (Expenditure), Planning Board, Agencies, representatives of MOEF which include the GEF OFP and the JS- Mountains and other stakeholders including private sector/ industries nominated by the State Government. The SPSC shall meet at least twice a year to review the progress of project implementation and take corrective measures where required for the smooth implementation of the project. The SPSC shall ensure that key officials involved in the project will have sufficient tenure for effective functioning. Further, SPSC may also constitute a Working Committee under the chairmanship of Secretary; Forests take necessary administrative decisions on a regular basis. The SPSC should recommend to line departments specific actions in the form of administrative decisions and resource allocation which will compliment project activities to meet the broader developmental outcomes. The SPSC should monitor the co-financing commitments and should make efforts to ensure that developmental and scheme commitments of the state towards the project are meet.In addition, both the PSCs will be responsible for regular project reviews to ensure that the agreed deliverables are produced satisfactorily according to plans and timelines; assess and decide to proceed on project changes through appropriate revisions and arbitrate on any conflicts within the project or negotiate a solution to emerging problems.

258. In order to ensure UNDP's ultimate accountability, PSC decisions will be made in accordance with standards that shall ensure management for development results, best value for money, fairness, integrity,

transparency and effective international competition. In addition, the PSC plays a critical role in project evaluations are of a high quality and using evaluations for performance improvement. The developmental outcomes that the project seeks to achieve requires supportive action by related Ministries and Departments, so both the Project Steering Committees will be expected to advocate for these developmental initiatives.

259. **National Project Management Unit (NPMU)** will be the administrative hub for the project will be supported with one full-time Project Manager (PM). PM shall report to the MoEF Nodal Officer and UNDP Country Office on all matters related to project implementation. The Project Manager will assist in coordinating with the State Government of Kerala, UNDP, State Nodal Officer, LLPMU and other agencies and Stakeholders. The NPMU shall also coordinate exchange of information and also open channels of communication with other similar programmes/ projects in the country for ensuring synergy and initiating upstream policy engagements. The NPMU will also include a Technical Coordinator and a Financial cum Admin Assistant. See Annexure for Terms of Reference of local project management staff, as well as local and international consultants that will provide technical services.

260. **State Nodal Officer:** Government of Kerala will designate an appropriate officer above the rank of Chief Conservator of Forests (preferably who is in charge of the project landscape) as the State nodal officer. The State Nodal Officer will be responsible for overall implementation of the project at the State level, including adherence to the AWP and achievement of planned results as outlined in the Project Document, and for the use of project funds through effective management and well established project review and oversight mechanisms. The State Nodal officer will head the Landscape Level Project Management Unit (LLPMU) and ensure coordination with UNDP, MoEF, various Departments and Agencies; provide guidance to the project team; review reports and look after other administrative and financial arrangements related to the project.

261. **Landscape Level Project Management Unit (LLPMU):** The implementation of the project at the State and landscape level will be carried out through LLPMU. The implementation of the project at the State and landscape level will be carried out through LLPMU. The LLPMU will initially be located in the State Forest Department. Once the High Range Sustainable Development Society (HRSDS) is setup by the project as visualized in output 1.4 of the project document, the LLPMU will be hosted by this society. The HRSDS is envisaged as a cross-sectoral institutional platform and will be a registered body represented by all key stakeholders in the High Range Mountain Landscape (HRML) (including private sector/ industries) and may have a Governing Board, General Body and Advisory Committee. The HRSDS could be registered under the relevant State Act meant for the purpose. Apart from implementing the project, LLPMU may also: 1) develop general policy and overall programmes for the HRML, 2) receive, control, invest and disburse all funds provided for the project, 3) promote research into the scientific, sociological and economic aspects of landscape and integrate into landscape and sector plans, 4) coordinate with different production sectors and other agencies to develop an environmentally sustainable strategic plan for HRML, 5) promote programs for the sustainable livelihood options of the communities dependent on the HRML, and 6) provide a long-term institutional sustainability strategy for the project beyond project period, etc.

262. The LLPMU will engage Subject Specialists (SSs) to extend technical assistance to the project. The LLPMU will comprise of a State Project Coordinator (SPC), Conservation Biologist (1), Socio-Economic and Livelihood Specialist (1), Communication and Outreach specialist (1), and a Financial – cum - Administrative Assistant (FA). Under the direct supervision of State Nodal Officer, the SPC will lead the project team and ensure that the project activities are proceeding as per schedule and facilitate effective implementation of the project. The key responsibilities for the LLPMU will include: 1) coordinating project implementation with all stakeholders, State Government and central government agencies and UNDP-GEF; 2) organizing the project evaluations; 3) ensuring that there is adequate documentation by all implementing partners at all stages and in collating this documentation; and 4) facilitating the publication of project outputs. LLMPU will also have a Stakeholder Advisory Committee (SAC) comprising of elected representatives and other local stakeholders who shall provide regular guidance and feedback to the project activities.

263. SSs will provide technical leadership and support for the project implementation, monitoring & evaluation, and adaptive management. In addition, there will be support staff for performing the day to day administrative and financial functions of the LLPMU. The key responsibilities of the SSs will include: 1)

provide strong technical leadership and strategically important inputs to the project during its implementation 2) provide advice and guidance in the implementation of the project, 3) to ensure that the project achieves its overall objective and outcomes as identified in the project document, 4) provide high levels of coordination during project inception and implementation at landscape and sector levels, 5) ensure sharing and flow of information in a transparent manner among all project stakeholders as appropriate, 6) support the LLPMU in the overall management of the project and to ensure coherence between all components of the project and implementing partners, 7) provide advice and assistance to organize and conduct various consultations, workshops and trainings, 8) provide advice related to the AWPs, 9) participate in the recruitment of subcontractors and consultants, 10) ensure strong quality control and provide advisory support as required, 11) contribute to resource mobilization and development of partnerships to further the objectives of the project, and 12) contribute to the establishment of a monitoring and evaluation plan and system for the project.

264. The National Project Management Unit (NPMU) and Landscape level Project Management Unit (LLPMU) will prepare a budgeted Work Plan on an annual basis, as per UNDP rules and regulations, which will be shared with the Ministry of Environment and Forests for comments and inputs. Approved copy of the AWP will be provided to GEF – OFP India office as well. The AWP will programme both GEF grants and project co-finance approved by GEF CEO.

265. The project results will be reviewed at the Country Programme Management Board (CPMB) comprising DEA and UNDP. The oversight will consist, at a minimum, of a six monthly review (at the end of the second quarter) and an annual strategic review (in the last quarter of the year) between DEA and UNDP. The recommendations from the annual review will be used to update and adjust the annual work plan and budgets for the coming year, if required. UNDP will enter into agreement(s) with other organizations or entities for providing goods and services to the project, carry out project activities and produce project outputs. UNDP will designate an official from UNDP who will work in close consultation with nodal officers designated by the Ministry of Environment and Forests and the State Government. NPMU and LLPMU details are provided in a separate section below. The PM and the SPC will be responsible for the day-to-day management of the programme. They will coordinate the Project activities including the preparation of Annual and Quarterly Work Plans, Budget, Financial Reports, etc. and will interface on project management issues. The PM/ SPC will be responsible for:

- Managing the overall conduct of the project;
- Implementing activities by mobilizing goods and services;
- Checking on progress and watch for plan deviations;
- Regular progress reporting to the PSC;
- Ensuring that changes are controlled and problems addressed;
- Monitoring progress and risks;
- Reporting on progress including measures to address challenges and opportunities.
- Coordinate the Project activities including the preparation of Annual and Quarterly Work Plans, Budget, Financial Reports, etc;
- Capture lessons learnt during project implementation
- Prepare the annual review report, and submit the report to the PSC.

266. **Project Assurance** will be the responsibility of UNDP. The Assurance role will support the NPSC by carrying out objective and independent project oversight and monitoring functions. During the implementation of the project, this role ensures (through periodic monitoring, assessment and evaluations) that appropriate project management milestones are managed and completed. The assurance will:

- Ensure that funds are made available to the project;
- Ensure the project is making progress towards intended outputs;
- Perform regular monitoring activities, such as periodic monitoring visits and spot checks;
- Ensure that resources entrusted to UNDP are utilized appropriately;
- Ensure that critical project information is monitored and updated
- Ensure that financial reports are submitted to UNDP on time, and that combined delivery reports are prepared and submitted to the NPSC and SPSC;

- Ensure that risks are properly identified, managed, and monitored on regular basis.

267. An independent external review may be conducted through resource persons/groups to feed into this process. The UNDP official responsible for the Project Assurance and the PM will meet on a quarterly basis to assess progress of the decisions taken in the PSC.

268. **Agreement on the intellectual property rights and use of logo on the project's deliverables:** In order to accord proper acknowledgement to MoEF, GEF and UNDP for providing funding, logos should appear on all relevant project publications as applicable and adhere to the branding guidelines of the aforementioned agencies.

Funds Flow Arrangements and Financial Management:

269. The project follows DIM (Direct Implementation) modality and UNDP takes on the role of implementing partner.

a. The project will be directly implemented by UNDP in close cooperation and consultation of Ministry of Environment and Forests (MoEF).
b. In this case, UNDP assumes the responsibility for mobilizing and applying effectively the required inputs in order to reach the expected outputs. UNDP assumes overall management responsibility and accountability for project implementation. Accordingly UNDP would follow all policies and procedures established for its own operations and will be responsible for all financial management, reporting, procurement and recruitment services.
c. UNDP and MoEF will jointly prepare a budgeted Annual Work Plan on an Annual basis, as per UNDP rules and regulations.
d. UNDP may identify Responsible Parties to carry out activities within a DIM project. A Responsible Party is defined as an entity that has been selected to act on behalf of the UNDP on the basis of a written agreement or contract to purchase goods or provide services using the project budget. All Responsible Parties are directly accountable to UNDP in accordance with the terms of their agreement or contract with UNDP. The Responsible Party may follow its own procedures only to the extent that they do not contravene the principles of the Financial Regulations and Rules of UNDP. Where the financial governance of the responsible party, does not provide the required guidance to ensure best value for money, fairness, integrity, transparency, and effective international competition that of UNDP shall apply.

270. **Project Closure:** The project will be operationally and financially completed following closing procedures as per UNDP financial regulations, rules and UNDP Programme and Operations Policies and Procedures.

Coordination with related initiatives

271. India has implemented several programmes, over the past two decades that specifically sought to strengthen institutional structures at different levels (national and sub-national) to create an enabling environment for biodiversity conservation. An earlier GEF aided project – India Ecodevelopment Project (1996-2004) – has shown that providing sustainable livelihoods to communities is central to the success of conservation in India, and lessons from this project have resulted in upstream policy changes (e.g. amendment of the national wildlife legislation in 2006). The proposed GEF project shall add another layer to the existing framework of conservation in India by engaging production sectors and promoting integrated landscape management approaches to safeguard biodiversity in mountain landscapes.

272. The GEF-UNDP-Gulf of Mannar Biosphere Reserve project (currently nearing completion), wherein an integrated, multi-sectoral approach was adopted to secure the critical linkage between improved coastal and marine resources and the local livelihoods, is particularly relevant. UNDP is also currently implementing two projects under the *India: GEF-UNDP- Coastal and Marine Programme* that aims at mainstreaming biodiversity conservation into production sector operations in the critically vulnerable coastal and marine zones of Godavari, Andhra Pradesh (east-coast) and Sindhudurg, Maharashtra (west-coast). The project will

establish necessary communication and coordination mechanisms (through the Ministry of Environment and Forests) with this programme. Further, a GEF-UNDP Project- *Energy Conservation in Small Sector Tea processing Units in Southern India* has demonstrated that by adopting energy efficient options in tea curing units, there could be 20 percent savings in electrical and thermal energy. This learning would be dove-tailed into the proposed project in the tea and cardamom sector. Similarly, a couple of other initiatives – *Community Based Natural Resource Management* and the GEF- *Small Grants Programme* – have developed models of viable and ecologically sustainable "community owned ecosystem based enterprises" with high replication potential. The proposed project shall build on the lessons learned and experiences gained from these projects as well as the lessons learnt from the project shall be up-scaled, mainstreamed and replicated into relevant national programmes and policies. In addition, the project will coordinate actions with other government and non-government initiatives where similarities in the strategy of the proposed project open up an opportunity for cross fertilizing good practices.

VI. MONITORING FRAMEWORK AND EVALUATION

273. In accordance with the programming policies and procedures outlined in the UNDP User Guide and GEF M & E Policy (2010), the project will be monitored through the following:

a) Monthly Progress Report: The Implementing Partner, in consultation with the project teams, will provide brief monthly updates on progress against planned activities and budgets. These monthly reports will be provided in the format provided at Annex1. These monthly reports will be consolidated, as required, by UNDP's quality assurance team for progress review meetings.
b) One Time Risk Log: Based on the initial risk analysis, a risk log shall be activated in Atlas and regularly updated by reviewing the external environment that may affect the project implementation. This will be completed by UNDP project assurance team in consultation with the Implementing partner.
c) A Terminal Evaluation will be conducted to capture the progress, the results and the lernings. It is aimed to commission the study at least 4 to 6 months prior to the project closure. It is commissioned as per UNDP guidelines.
d) Annual Review Report: An Annual Review Report shall be prepared by the PMU and shared with the Project Board and the Outcome Board. The reporting format at Annex 2 will used to provide brief description of results achieved in the year against pre-defined annual targets.
e) Annual Project Review/ Project Implementation Report. Based on the above report, an annual project review shall be conducted during the fourth quarter of the year or soon after, to assess the performance of the project and appraise the Annual Work Plan (AWP) for the following year. In the last year, this review will be a final assessment. This review is driven by the Project Board and may involve other stakeholders as required. It shall focus on the extent to which progress is being made towards outputs, and that these remain aligned to appropriate outcomes. The first draft of the PIR will be prepared for the previous reporting period (30 June to 1 July) by the LLPMU and the NPMU and submitted to UNDP and MoEF. The PIR will be shared with the GEF OFP India also on an annual basis.

PROJECT START

274. A Project Inception Workshop will be held within the first three months of project start-up involving those with assigned roles in the project organization structure, UNDP country office, and, where appropriate/ feasible, regional technical policy and programme advisors, as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year's AWP. The Inception Workshop report will be a key reference document and will be prepared and shared with participants to formalize various agreements and plans decided during the meeting. The Inception Workshop will address a number of key issues including:

- Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis-à-vis the project

team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.

- Based on the project results framework and the GEF SO-2 Tracking Tool, finalize the first AWP. Review and agree on the indicators, targets and their means of verification, and re-check assumptions and risks.
- Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
- Discuss financial reporting procedures and obligations, and arrangements for annual audit.
- Plan and schedule Project Steering Committee meetings. Roles and responsibilities of all project organization structures should be clarified and meetings planned. The first PSC meeting should be held within the first six months following the Inception Workshop.

QUARTERLY MONITORING

275. The project quarterly monitoring will consist of the following:

- Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS.
- Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logs can be used to monitor issues, lessons learned etc. The use of these functions will be a key indicator in the UNDP Executive Balanced Scorecard.

ANNUAL MONITORING

276. Annual Project Review/ Project Implementation Reports (APR/PIR): This key report will be prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements. The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
- Project outputs delivered per project outcome (annual)
- Lessons learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS QPR
- Portfolio level indicators (i.e. SO-2 Tracking Tool)

PERIODIC MONITORING THROUGH SITE VISITS

277. UNDP CO and the UNDP RCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/ Annual Work Plan to assess first hand project progress. Other members of the Project Steering Committee may also join these visits. A Field Visit Report/ BTOR will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Steering Committee members.

MID-TERM OF PROJECT CYCLE

278. The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation. The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; highlight issues requiring decisions and actions; and present initial lessons learned about project design, implementation and management. Findings of this review will be

incorporated as recommendations for enhanced implementation during the final half of the project's term. The MTE will also be an opportune time to review and fine tune indicators based on the sector plans and micro plans that would have by then been developed and under implementation. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC). The GEF SO-2 Tracking Tool will also be completed during the mid-term evaluation cycle.

END OF PROJECT

279. An independent Final Evaluation will take place three months prior to the final Project Steering Committee meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/ goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to UNDP-GEF's Project Information Management System (PIMS) and to the UNDP Evaluation Office Evaluation Resource Center (ERC). The GEF SO-2 Tracking Tool will also be completed during the final evaluation.

280. During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

LEARNING AND KNOWLEDGE SHARING

281. Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/ or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects. Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

VII. LEGAL CONTEXT

282. This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together a Project Document as referred to in the SBAA and all CPAP provisions apply to this document.Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner. The implementing partner shall:

- put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
- assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

283. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

284. The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision will be included in all sub-contracts or sub-agreements entered into under this Project Document.

Table 14. Project Monitoring and Evaluation Plan and Budget

Type of M&E activity	Responsible Parties	Budget US$	Time frame
Inception Workshop (IW)	National Nodal Officer, State Nodal Officer, Project team, UNDP, UNDP GEF	7,000	Within first three months of project start up
Inception Report	Project Team PSC, UNDP CO	None	Immediately following IW
Measurement of Means of Verification for Project Purpose Indicators	Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members	To be finalized in Inception Phase and Workshop. Cost to be covered by targeted survey funds.	Start, mid and end of project
Measurement of Means of Verification for Project Progress and Performance (measured on an annual basis)	Oversight by Project GEF Technical Advisor and Programme Officer, UNDP Measurements by regional field officers and local IAs	TBD as part of the Annual Work Plan's preparation. Cost to be covered by field survey budget.	Annually prior to APR/PIR and to the definition of annual work plans
PIR	Project Team PSC UNDP-GEF	None	Annually
Project Steering Committee meetings	National Nodal Officer and State Nodal Officer	None	Following IW and annually thereafter.
Technical and periodic status reports	Project team Hired consultants as needed	6,000	TBD by Project team and UNDP-CO
Mid-term External Evaluation	Project team PSC UNDP-GEF RCU External Consultants (evaluation team)	24,200	At the mid-point of project implementation.
Final External Evaluation	Project team, PSC, UNDP-GEF RCU External Consultants (evaluation team)	32,200	At the end of project implementation
Terminal Report	Project team PSC External Consultant	None	At least one month before the end of the project
Audit	UNDP-CO Project team	10,000	Yearly
Visits to field sites (UNDP staff travel costs to be charged to IA fees)	UNDP-CO, UNDP-GEF RCU Government representatives	None	Yearly average one visit per year
TOTAL indicative COST Excluding project and UNDP staff time costs		79,400	

COMMUNICATIONS AND VISIBILITY REQUIREMENTS

285. Full compliance is required with UNDP's Branding Guidelines and guidance on the use of the UNDP logo. These can be accessed at http://web.undp.org/comtoolkit/reaching-the-outside-world/outside-world-core-concepts-visual.shtml. Full compliance is also required with the GEF Branding Guidelines and guidance on the use of the GEF logo. These can be accessed at http://www.thegef.org/gef/GEF_logo. The UNDP and GEF logos should be the same size. When both logs appear on a publication, the UNDP logo should be on the left top corner and the GEF logo on the right top corner. Further details are available from the UNDP-GEF team based in the region.

286. Full compliance is also required with the GEF's Communication and Visibility Guidelines (the "GEF Guidelines").[104] Amongst other things, the GEF Guidelines describe when and how the GEF logo needs to be used in project publications, vehicles, supplies and other project equipment. The GEF Guidelines also describe other GEF promotional requirements regarding press releases, press conferences, press visits, visits by Government officials, productions and other promotional items.

287. Where other agencies and project partners have provided support through co-financing, their branding policies and requirements should be similarly applied.

AUDIT CLAUSE

The project will be subject to standard DEX audit procedure as per UNDP financial regulations, rules and audit policies.

[104] The GEF Guidelines can be accessed at http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08_Branding_the_GEF%20final_0.pdf

IX: Annexures

Submitted as a separate document.