WGEEP Report: Executive Summary

Western Ghats constitute a practically unbroken hill chain (with the exception of the Palakkad Gap) or escarpment running roughly in a north-south direction, for about 1500 km parallel to the Arabian sea coast, from the river Tapi (about 21^0 16' N) down to just short of Kanyakumari (about $8^0$19' N) at the tip of the Indian peninsula; a hill chain that is extremely rich in biodiversity and crucial for the security of water resources of Peninsular India.

1. *Mandate*

In view of the environmental sensitivity and ecological significance of the Western Ghats region and the complex interstate nature of its geography, as well as possible impacts of climate change on this region, the Ministry of Environment & Forests Government of India has constituted, by an order dated # March 2010, a Western Ghats Ecology Expert Panel (WGEEP).

The Panel has been asked to perform the following functions:

(i) To assess the current status of ecology of the Western Ghats region.

(ii) To demarcate areas within the Western Ghats Region which need to be notified as ecologically sensitive and to recommend for notification of such areas as ecologically sensitive zones under the Environment (Protection) Act, 1986. In doing so, the Panel shall review the existing reports such as the Mohan Ram Committee Report, Hon'ble Supreme Court's decisions, recommendations of the National Board for Wildlife and consult all concerned State Governments.

(iii) To make recommendations for the conservation, protection and rejuvenation of the Western Ghats Region following a comprehensive consultation process involving people and Governments of all the concerned States.

(iv) To suggest measures for effective implementation of the notifications issued by the Government of India in the Ministry of Environment and Forests declaring specific areas in the Western Ghats Region as eco-sensitive zones under the Environment (Protection) Act, 1986.

(v) To recommend the modalities for the establishment of Western Ghats Ecology Authority under the Environment (Protection) Act, 1986 which will be a professional body to manage the ecology of the region and to ensure its sustainable development with the support of

all concerned states.

(vi) To deal with any other relevant environment and ecological issues pertaining to Western Ghats Region, including those which may be referred to it by the Central Government in the Ministry of Environment and Forests.

The Ministry has subsequently asked the Panel to include in its mandate the entire stretch of Ratnagiri and Sindhudurg districts, including the coastal region, and to specifically examine the Gundia and Athirappilly Hydroelectric projects.

2. *Boundaries*

For the purpose of defining the boundary of the Western Ghats, WGEEP has used altitude and forest area or vegetation as drivers defining the boundaries. Our operational definition for the `Ghats' therefore is forest area above a certain altitude. Accordingly we demarcated the eastern edge by identifying the forested areas that are above 500 m; the rationale for this cutoff followed from the digital data which showed that, in general, 500m constitutes the elevation at which the Western Ghats rise discreetly from the plains of the Deccan plateau. For the western edge, we used a cutoff of forested areas at 150 m and above as the ghats fall more steeply down to the coastline as compared to the eastern side of the ghats. We also found that whenever the forested areas at elevations of more than 150m drop directly into the ocean or within a distance of 1km of the coastline, it was difficult to define the coast. Hence, in such situations (as in parts of Maharashtra), the coastline itself was considered as the western edge of the ghats. One further issue that has to be resolved is the eastern boundary of the Western Ghats at the region of its geographical connection with the Eastern Ghats. It is generally agreed upon in the scientific literature that the southern-most and western-most extent of the Eastern Ghats is the hill range in Karnataka and Tamilnadu known as the Biligirirangans. The region between the Nilgiris and the Biligirirangans thus constitutes important habitat contiguity for several floral and faunal elements and, hence, it would be prudent to include the latter hill range within the ambit of the proposed Western Ghats Authority that aims to conserve the ecology of the ghats.

As per the new boundaries, the WG stretches to a length of 1490 km from Tapi Valley in the north to Kanyakumari in south. With an area of 174,700 km^2, it stretches to a width of 210 km in Tamilnadu and narrows to as low as 48 km in Maharashtra (leaving the Palghat gap). Thus defined, Western Ghats do not correspond exactly to particular administrative units such as districts and talukas. The district boundaries do not, by and large, coincide with limits of

Western Ghats, except in a few cases such as Kodagu, Nilgiris, Wynaad and Idikki. The majority of districts include either West Coast or Western Peninsular tract regions along with Western Ghats areas. Western Ghats as an administrative entity was therefore first visualized only in the context of Regional Planning exercises, beginning with a report prepared by the Town and Country Planning Organization, Delhi in 1960's#(Ref). This report delineated Western Ghats at Taluka level, and became the basis of the Planning Commission's Western Ghats Development Programme initiated in #. This serves as the basis of disbursement of Central Government assistance, but has no implications in terms of environmental regulation. Since talukas do constitute a reasonable administrative unit for defining the Western Ghats, WGEEP proposes that the talukas will be the focus of our recommendations.

3. *Strengths*

Western Ghats are a treasure trove of biodiversity, surpassed only by the Eastern Himalayas. However, they score over the latter region in harbouring a larger number of species confined within Indian limits. The Western Ghats also constitute the water tower of Peninsular India. The region has some of the highest levels of literacy in the country, and a high level of environmental awareness. The democratic institutions are well entrenched, and Kerala leads the country in capacity building and empowering of Panchayat Raj Institutions. Goa has recently concluded a very interesting exercise, Regional Plan 2021, of taking inputs from Gram Sabhas in deciding on the land use policies. Evidently, Western Ghats are an appropriate region of the country to attempt to make the transition towards an inclusive, caring and environment friendly mode of development.

4. *Develop thoughtfully - conserve thoughtfully*

Many stakeholders have suggested that, apart from the context of provision of Central financial assistance for plan schemes, definition of Western Ghats should have a regulatory content of a go- no go nature; that certain activities would be banned within limits of Western Ghats, but fully permitted outside these limits. WGEEP would like to submit that we should move away from such formulas that impart inflexibility to development processes. WGEEP would like to stress that development plans should not be cast in a rigid framework, but ought to be tailored to prevalent locality and time specific conditions with full participation of local communities; a process that has been termed *adaptive co-management*. What should be 'go' and what should be 'no go' ought then to be decided on a case by case basis, in tune with the

specific environmental and socio-economic context, and aspirations of the local communities. Such a system of adaptive co-management would marry conservation to development, and not treat them as separate, incompatible objectives.

Yet we are today stuck in a system that forcibly divorces conservation from development. It ends up creating a dichotomy so that our policies at once promote reckless development in certain areas, and thoughtless conservation in other areas. In the process we constitute islands of biodiversity (and social exclusion) - the so-called Protected Areas- in an ocean of ecological devastation outside of these PA's. WGEEP believes that the insistence on "not a blade of grass shall be removed from PA's" is as inappropriate as the on-going comprehensive violation of pollution control laws outside of PA's. This has led to a situation such that the majority of people are excluded from fruits of, and decisions relating to, both development and conservation. Indeed, both development and conservation programmes are being imposed on them against their wishes. WGEEP would like to propose that we should instead attempt to develop a model of conservation and development compatible with each other encompassing the whole of the Western Ghats region, to replace the prevailing "Develop recklessly – conserve thoughtlessly" pattern with one of "Develop thoughtfully - conserve thoughtfully". The fine-tuning of development- conservation practices to local context that this calls for would require full involvement of local communities. To sum up, WGEEP advocates a layered, nuanced, participatory approach, so that boundaries will not be discontinuities and therefore will not be of undue significance. Hence, while we will, of course, talk of the boundaries of Western Ghats, we plead that the pattern of adaptive co-management that we propose may also be applied to regions beyond these boundaries.

5. *Ecologically Sensitive Zones*

Section 3 of the Environment (Protection) Act 1986 (EPA) gives power to the Union Ministry of Environment and Forests to take all measures that it feels are necessary for protecting and improving the quality of the environment and to prevent and control environmental pollution. To meet this objective the Central Government can restrict areas in which any industries, operations or processes or class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards. [Sec. 3(2) (v)]

Section 5(I) of the Environment (Protection) Rules 1986 (EPR) states that the Central Government can prohibit or restrict the location of industries and carrying on certain operations or processes on the basis of considerations like the biological diversity of an area (clause v),

maximum allowable limits of concentration of pollutants for an area (clause ii), environmentally compatible land use (clause vi), or proximity to Protected Areas (clause viii).

These provisions were invoked in 1989 in the context of Murud-Janjira, a coastal village of Maharashtra. Subsequently, the term 'Ecologically Fragile Area' was used for the first time in 1991 in the context of Dahanu Taluka in coastal Maharashtra. This has been followed by declaration of a number of other areas such as the Mahabaleshwar- Panchgani and Matheran hills in Maharashtra Western Ghats as Ecologically Sensitive Zones / Areas. So far, these Ecologically Sensitive Zones / Areas have been established either as a result of initiatives of some civil society organizations wishing to protect a particularly vulnerable and significant area, or as a consequence of a resolution of Indian Board for Wildlife in 2002 to protect areas up to ten kilometers from the boundaries of Protected Areas, namely, Wildlife Sanctuaries and National Parks.

Over the years, a variety of terms such as Ecologically Sensitive/ Ecologically fragile/ Ecosensitive/ Ecofragile Zones/ Areas have been used in the context of programmes relating to Ecologically Sensitive Zones and Areas. It is obviously useful to introduce some standard terminology and definitions. WGEEP will therefore use the term 'Ecologically Sensitive Area' while referring to extensive tracts and 'Ecologically Sensitive Zone' while referring to specific zones within the extended 'Ecologically Sensitive Area' for which a particular set of regulatory/ promotional activities have been proposed. Following the Pranob Sen committee's criteria, WGEEP proposes that the entire Western Ghats region be declared as an Ecologically Sensitive Area (ESA). Within this Western Ghats ESA, WGEEP proposes to assign different regions, other than those covered by Wildlife Sanctuaries or National Parks to one of the following three zones; Ecologically Sensitive Zone 1 (ESZ1), Ecologically Sensitive Zone 2 (ESZ2), and Ecologically Sensitive Zone 3 (ESZ3). Thus, WGEEP has come up with four colour maps spanning the entire Western Ghats depicting PAs, and ESZ1, ESZ2 and ESZ3.

The Ministry of Environment & Forests had set up a committee under the chairmanship of Shri Pronab Sen in 2000 to identify parameters for designating ecologically sensitive areas in India. This committee proposed a series of species, ecosystem and geo-morphology based parameters. Sen Committee's foremost criterion for identification of ESA is endemism, and the Committee proposes that the area of occurrence of every endemic species needs to be protected in its entirety. Western Ghats harbours well over a thousand endemic species of flowering plants, fish, frogs, birds and mammals amongst the better known groups of organisms, and no doubt thousands more amongst less studied groups including insects. Amongst

themselves these would cover the entire geographical extent of the Western Ghats and all conceivable habitats, including many disturbed ones such as roadsides. The Western Ghats region also qualifies as an ESA under several other, primary as also auxiliary, criteria proposed by the Pranob Sen committee. WGEEP fully endorses the conclusion that follows that the entire Western Ghats tract should be considered as an Ecologically Sensitive Area.

However, a uniform set of regulations cannot, obviously, be promulgated under EPA for this entire region. Hence, WGEEP recommends the adoption of a graded or layered approach, and suggests that entire Western Ghats be characterized as comprising (1) Regions of highest sensitivity or Ecologically Sensitive Zone 1 (ESZ1), (2) Regions of high sensitivity or ESZ2, and the remaining (3) Regions of moderate sensitivity or ESZ3. Such a characterization can be done on two bases; namely (1) Existing Protected Area network and (2) systematic mapping and recording of base-line data as recommended by Sen Committee.

6. *WGEEP Western Ghats Database*

WGEEP has made considerable progress in the exercise of development of a spatial database, for over 2200 #[exact number needed] grids of 5'x5' or roughly 9 km x 9 km through compilation of all readily available information on topography, land cover and occurrence of biodiversity elements. The rationale and methodology followed has been widely exposed to scientific scrutiny through publication of a detailed exposition in Current Science, India's leading scientific journal, in January 2011(Gadgil, M. et al 2011). The WGEEP database is complemented by development of similar, more detailed, information bases by BVIEER, Pune and DEVRAAI, Kolhapur (# specific references needed).

Admittedly there still are serious lacunae. In particular, our database is yet to incorporate considerations of habitat continuity. It is also weak in terms of information on streams, rivers and other wetlands, as well as ground water and further careful work is needed to identify, protect and sustainably manage aquatic habitats and water resources. Since our focus is on hill areas, this database also leaves out of consideration issues of significance for the West Coast and coastal plains, such as mangrove forests and khajan lands. Nevertheless, we now have, for the first time in the country, a comprehensive, spatially referenced database on a series of important ecological parameters, transparently available in the public domain that can serve as the basis of a systematic delineation of different levels of ecological significance/ sensitivity for a sizeable region.

WGEEP, of course, realizes that ecological sensitivity is not merely a scientific, but very

much a human concern. In particular, a great deal of locality specific understanding of what has been happening and what is desirable, is simply not part of any scientific databases and resides with local communities. WGEEP therefore invited all concerned people and institutions to share their own perceptions as to what specific areas on the Western Ghats should be identified as being 'Ecologically Sensitive Areas', why they feel so, and what set of regulations tailored to the needs of the locality should be put in place if the area were to be formally declared as being ecologically sensitive. In response, we have received a number of specific proposals from individual Gram Panchayats as well as NGOs from different parts of the Western Ghats. Two of these are particularly noteworthy, (a) Gramsabha resolutions from a single cluster of 25 villages from Savantwadi and Dodamarg talukas of Sindhudurg district that they wish their areas to be constituted as ESAs, and (b) careful proposal for a "Maharashtra Sahyadri Ecologically Sensitive Area" by DEVRAAI, an NGO from Kolhapur drawing on extensive research conducted at Shivaji University.

7. *ESZ assignment*

WGEEP proposes that the 2200 odd grids spanning the entire Western Ghats be assigned to (1) Protected Areas, namely, Wild Life Sanctuaries and National Parks, and (2) ESZ1 (3) ESZ2 and (4) ESZ3 on the basis of composite scores of ecological significance derived from the database generated by WGEEP. Since a long standing effort has gone into identification of Protected Areas and they represent both social and ecological values, we propose that grids with scores at the level of Protected Areas and above within the same state be assigned to ESZ1 category, with the proviso that the total area under PAs and ESZ1 will be limited to ~60%. We propose that ~25% of grids with scores at the lower end be assigned to ESZ3 category, and the balance to ESZ2. This implies a decision to treat ~75% of the grids as belonging to PAs, ESZ1 or ESZ2. Our national goal is to maintain 66% of area under forest cover in all hill tracts. Given that Western Ghats are a hill region of special significance, we decided that it was appropriate to aim at 75% being treated as areas of high or highest significance. In view of the strong north- south ecological gradient over Western Ghats, one cannot really treat Gujarath Dangs and Kerala Ashambu hills on the same footing. Hence, this exercise has been undertaken separately for each state. In states where the boundary of the Western Ghats coincides or is very close to coastal areas, the Panel has left out a width of 1.5 km from the coast from the delimitation exercise to acknowledge the fact that the scoring exercise did not reflect coastal ecological values and sensitivities.

To sum up:

1. We will treat Western Ghats regions of each state separately
2. Existing Protected Areas will be treated as a fourth separate category
3. We will be assigning ESZ1, ESZ2 and ESZ3 status only to grids outside existing Protected Areas
4. ESZ1 status will be assigned only to such grids as have a score at least equaling, or higher than the lowest scoring grids falling within existing Protected Areas
5. In addition, other detailed information such as localities of origin of rivers, laterite plateaus, localities critical for maintenance of habitat continuity, and localities where local communities have expressed a strong interest in conservation will be used to decide on demarcation of ESZ1 and ESZ2.
6. The extent of existing Protected Areas plus ESZ1will not normally exceed 60% of the total area
7. Extent of area covered by existing Protected Areas plus ESZ1 and ESZ2 together will be around 75%.
8. The extent of ESZ3 will normally be around 25% of the total area

The database employs square grids of ~9km x 9 km that do not correspond either to natural features such as watersheds, or administrative units such as village or taluka boundaries. It will clearly be desirable to put in place a system of zonation that jointly considers micro-watersheds and village boundaries to decide on specific limits of ESZ1, ESZ2 and ESZ3, as well as to arrive at locality specific management plans. This would be a task that will have to be initiated by the Western Ghats Ecology Authority when it is put in place. However, as a first step, we suggest that the Ministry of Environment and Forests provisionally notify the initial limits of ESZ1, ESZ2 and ESZ3 based on WGEEP analysis. This may be most appropriately done at Taluka/ Block level. With this in view, we have gone ahead and assigned ESZ1, ESZ2 and ESZ3 levels to all the ## talukas of Western Ghats.

Table : Proposed assignment of various Western Ghats districts to ESZ1, ESZ2				

and ESZ3				
State	District	Talukas assigned to ESZ1	Talukas assigned to ESZ2	Talukas assigned to ESZ3
Maharashtra	Pune	Wadaon, Paud, Bhor		Sasvad
	Satara	Patan, Mahabaleshwar, Medha	Koregaon	Vaduj
Dr S N Prasad is requested to provide the complete table along these lines				

8. *ESZ management*

The Pronab Sen Committee did not evolve any methodology for regulating the nature and extent of human activity that can be permitted in designated Ecologically Sensitive Zones/ Areas, a task that was addressed later by the Ministry of Environment & Forests itself. For this purpose, the MoEF has put in place a centralized system grounded in regulating land use employing the provisions of Section 5 of the Environment Protection Act 1986. The MoEF prepares the notification and calls for responses from the public and the concerned state Government. Since land is a state subject, the state government is then asked to prepare a Regional Development Plan that will provide for appropriate use of land as visualized in the Ecologically Sensitive Zone/ Area notification. The state governments, in turn, finalize the Regional Development Plan after calling for public inputs. To oversee the implementation, MoEF constitutes a High Level Monitoring Committee, in most cases without any local representation.

While the constitution of such ESZ /ESAs has had many positive consequences, there are also serious flaws in the system. The most serious problem is that the system depends heavily on bureaucratic regulation. With no meaningful participation by local community, and given the absence of bureaucratic transparency and lack of accountability, this breeds corruption. The result is that the weaker sections suffer harassment and extortion, while the wealthy and the powerful successfully flout the regulations, leading to tremendous local resentment. People at Mahabaleshwar have complained in writing of very old roads to their villages being disrupted by trenches dug by Forest Department, and Madhav Gadgil has personally inspected some of these. They allege that the trenches are then filled on payment of

bribes, to be dug again some time later. They also allege that farmers have pay revenue officials a bribe of Rs 20,000 if they are to be permitted to dig a bore well on their farmland. Large scale illegal tree cutting seems to be taking place in some hotels such as Brightland, and in a number of construction sites under cover of very tall metal sheets erected all along the compound walls. Furthermore, no effective mechanisms have been developed to promote good natural resource management, such as protection of streams or conservation of habitats rich in biodiversity, for instance, the laterite plateaus of northern Western Ghats.

ESZs surrounding Protected Areas

A 2002 resolution of Indian Board for Wildlife has called for constitution of Ecologically Sensitive Zones up to a distance of 10 km surrounding all National Parks and Wildlife Sanctuaries. The implementation by state Forest Departments has been very tardy, with some action being taken only when prodded by two court decisions, one in 2005 and the second in 2010. WGEEP could obtain no clear information on follow up in any state other than Maharashtra; while some fragmentary information was obtained in Mharashtra only after much effort. Notably, most of the information obtained for Maharashtra, too, derives from documents obtained under RTI by activists opposing a wind energy project close to Bhimashankar Wildlife Sanctuary. In contrast, Bharati Vidyapeeth Institute of Environmental Research and Education promptly sponsored a Master's thesis on possible problems that might arise in implementation in case of PAs in Maharashtra, a thesis that was completed in 2004 (Kurne, ###). Although the Maharashtra PCCF referred to this thesis in a letter dated ## to his subordinate officers, the thesis has been completely ignored in the unsatisfactory follow up that has taken place on Maharashtra Western Ghats. As an example, minutes of meetings relating to potential ESZs surrounding Radhanagari, ### WLS record that some Forest Officials expressed the view that the steep escarpments of Western Ghats should not be considered ecologically sensitive, in stark contradiction to Pranob Sen Committee recommendations. As of now no maps or complete records have been made available pertaining to these PAs.

The hill range of Bhimashankar is the origin of Krishna's major tributary, Bhima, and just like Mahabaleshwar- Panchgani ESZ region, site of origin of Krishna river to the south, is an area of high rainfall and biodiversity-rich evergreen forest. However, no steps have been taken to constitute this Bhimashankar Ecologically Sensitive Zone, despite repeated requests both from Centre and by head of Forest Department in Maharashtra. During visits to areas adjoining Bhimashankar Wildlife Sanctuary, WGEEP came across several instances of grave

misgovernance:

[1] A major wind mill project has been cleared close to Bhimashankar WLS and a large number of wind mills have come up within the stipulated ten km zone on the periphery. This project should not have been cleared at all without completing the constitution of the Ecologically Sensitive Zone.

[2] This region has large populations of Scheduled Tribes and traditional forest dwellers. Hence, it was imperative that Forest Rights Act should have been implemented in this area in its true spirit five years ago. Nothing is done, and local people claim that this results in continued harassment of and extortion from local people.

[3] WGEEP Chairman Madhav Gadgil and member Prof Renee Borges visited this area around Bhimashankar. In fact, Prof Renee Borges has been engaged in scientific studies in this area for over two decades. It is clear that the hills where wind mills have come up are tracts of high rainfall and biodiversity-rich evergreen forest, contiguous with that in the Bhimashankar WLS, and home to Maharashtra's state animal, Giant Squirrel. The local Range Forest Officer had also clearly recorded these facts and recommended that the wind mill project should not be sanctioned. He was overruled by his superior officers who have cleared the project by patently misrepresenting the facts on ground.

[4] Apart from substantive forest destruction, including by large roads cutting huge swathes through Reserve Forest, the wind mill project has triggered large scale erosion and landslides through poor construction of roads with steep gradients, and all this rubble is ending up on fertile farmland and in reservoirs of tributaries of Krishna.

[5] The Forest Department is colluding with wind mill project operators in illegally denying citizens access to these hills. Boards and check-post have been put up by the company, falsely claiming to be authorized by Forest Department. There are many traditional forest dwellers on these hills. Not only are their rights under FRA not being recognized, they are being illegally restrained in their movements on hills they have inhabited for centuries.

Grass-roots involvement

WGEEP therefore believes that it is inappropriate to depend exclusively on Government machinery for constitution and management of ESZs. Instead, WGEEP suggests that the final demarcation of the Zones (including those surrounding PAs, as also in context of the UNESCO Heritage Site proposal), and fine tuning of regulatory, as well as promotional regime, must be based on extensive inputs from local communities and local bodies, namely, Gram Panchayats,

Taluk Panchayats, Zill Parishats, and Nagar Palikas, under the overall supervision of the Western Ghats Ecology Authority (WGEA), State level Ecology Authorities and the District Ecology Committees. An interesting precedent for this process has been established during the preparation of Goa Regional Plan 2021. The first step in this GRP21 planning was compilation of a comprehensive, spatially referenced, database on land, water and other natural resources of Goa state; although, regrettably, unlike our Western Ghats database, this has not been, as yet, made available in the public domain. However, this information was selectively shared with all Gram Sabhas and their suggestions as to desired pattern of land use obtained, consolidated and used as one important basis for preparation of the final plan. Again, regrettably, the Government of Goa has not continued with the dialogue, failing to go back to the Gram Sabhas when it felt it appropriate to diverge from the Gram Sabha suggestions. Nevertheless, this is an excellent model that should be implemented in its true spirit, and WGEEP proposes that WGEA should follow it.

Another excellent model for WGEA is the formulation of 'Conservation of biodiversity rich areas of Udumbanchola taluk' project by Kerala State Biodiversity Board. The procedure followed has been grounded in the powers and functioning of Biodiversity Management Committees(BMC) in all local bodies, namely Gram Panchayats, Taluk Panchayats and Zilla Panchayats, as also Nagarpalikas and Mahanagarpalikas, linked to state level Biodiversity Boards and National Biodiversity Authority. This institutional structure of BMCs , mandated by India's Biological Diversity Act 2002 for the country as a whole, is available throughout the Western Ghats region and provides a sound basis for designing a transparent, participatory system for arriving at final decisions regarding (1) delineation of ESZ1, ESZ2 and ESZ3, and (2) the management regime to be followed in ESZ1, ESZ2 and ESZ3, fine-tuned to local ecological and social context wherever necessary. This highly desirable participatory process will obviously take some time. Nevertheless, WGEEP strongly commends its adoption. However, the Ministry of Environment and Forests, GoI must also take some immediate steps, to safeguard the precious natural heritage of the Western Ghats. Hence WGEEP strongly recommends that Min of En & F immediately notifies under EPA the limits of ESZ1, ESZ2 and ESZ3 as proposed by WGEEP at taluka level, along with an appropriate regulatory regime as suggested in Table 2.

9. *Sectoral guidelines*

Table 2:			

Proposed sector-wise guidelines			
Sector	ESZ1	ESZ2	ESZ3
Land use	No Special Economic Zones; no new hill stations		
	No new non-agricultural land use to be permitted, except extension of existing village settlement areas to accommodate increase in population of local residents, FSA ratio of ***		
Water use	***Decentralized water resources management plans*** at Local Self Government level are to be developed at least for the next 20 years ***Reschedule reservoir operations*** in such a way as to improve downstream flows and also act as conflict resolution strategy ***Revive traditional water harvesting systems*** such as recharging wells and *surangams* ***Protect high altitude valley swamps*** ***Participatory sand auditing*** and strict regulations to be put in place to control sand mining ***Declare "sand holidays"*** based on assessments and sand audit for mined		

	river stretches. ***Rehabilitation of mined areas*** to be taken up by the companies / agencies with special focus on reviving the water resources ***Eco – restoration of the forest fragments*** between the tea/coffee/cardamom estates and reviving the hill streams should be taken up as a major well coordinated initiatives among Planters, Local Self Governments and Forest Departments in high altitude areas ***Catchment area treatment plans*** of hydroelectric and major irrigation projects should be taken up to improve their life span. ***Improve river flows and water quality*** by scientific riparian management programmes involving community participation ***Water conservation measures*** should be adopted through suitable technology up-gradation and public awareness programmes ***Inter-basin diversions of rivers*** in the Western Ghats should not be allowed any more		

	River Basin Planning should be supported by suitable legal institutions that are capable of integrating different departments which are presently dealing with or impacting the rivers in a compartmentalized manner. ***Decommissioning of dams*** that have outlived their utility being underperforming, silted up beyond acceptable standards is to be considered.		
Agriculture	Promote organic agricultural practices, introduce incentive payments for sequestration of carbon in soils, introduce incentive payments for maintenance of select traditional cultivars, encourage participatory breeding programmes to improve productivity of traditional cultivars, encourage precision agricultural practices, No GMOs		
	Phase out all use of chemical pesticides/ weedicides and chemical fertilizers within five years	Phase out all use of chemical pesticides/ weedicides and chemical fertilizers within eight years	Phase out all use of chemical pesticides/ weedicides and chemical fertilizers within ten years
Animal Husbandry	Introduce incentive payments as “conservation service		

	charges" for maintenance of land races of livestock, Redeploy subsidies for chemical fertilizers towards maintenance of livestock and production of biogas and generation of organic manure		
Fishery	Strictly control use of dynamite and other explosives to kill fish, Provide fish ladders at all reservoirs, Introduce incentive payments as "conservation service charges" for maintenance of indigenous fish species in tanks under control of Biodiversity Management Committees or Fishermen's co-operatives, monitor and control trade in aquarium fishes with the help of Biodiversity Management Committees		
Forestry: Government lands	Forest Rights Act to be implemented in its true spirit by reaching out to people to facilitate their claims, Community Forest Resource provisions under FRA to replace all current Joint Forest Management programmes		
	No monoculture plantation of exotics like eucalyptus; No quarrying;	No monoculture plantation of exotics like eucalyptus; Encourage planting of	No monoculture plantation of exotics like eucalyptus; Encourage planting

	No pesticide/ weedicide application; Extraction of medicinal plants with strict regulations	endemic species; Quarrying with strict regulations; Phase out pesticide/ weedicide application; Extraction of medicinal plants with strict regulations	of endemic species; Quarrying with strict regulations; Phase out pesticide/ weedicide application; Extraction of medicinal plants with strict regulations
Forestry: private lands	Recognize rights of all small-scale, traditional private land holders under FRA, Introduce incentive payments as “conservation service charges” for maintenance of natural vegetation for small land holders; Introduce incentives such as tax breaks or renewal of leases as “conservation service charges” for maintenance of natural vegetation for large land holders/ plantation owners;		
Forestry: private lands	No monoculture plantation of exotics like eucalyptus; No quarrying; No pesticide/ weedicide application; Extraction of medicinal plants with strict regulations ; Encourage planting of endemic species	No monoculture plantation of exotics like eucalyptus; Encourage planting of endemic species; Quarrying with strict regulations; Phase out pesticide/ weedicide application;	No monoculture plantation of exotics like eucalyptus; Encourage planting of endemic species in private forests; Quarrying with strict regulations; Phase out pesticide/ weedicide application;
Biodiversity	Introduce incentive payments as “conservation service charges” for		

	maintenance of sacred groves; Introduce incentive payments as "conservation service charges" for maintenance of biodiversity elements on private lands, lands under control of Biodiversity Management Committees, JFM lands, lands assigned as Community Forest Resources; Make special funds available to Biodiversity Management Committees for disbursal in relation to wildlife related damage		
Mining	No mining in areas demarcated as ESZ1 Where mining exists, it should be phased out in 5 years, by 2016; Illegal mining to be stopped immediately	No new mining; Existing mining under strict regulation and social audit	New mining may be taken up under strict regulation and social audit
Industry (Red /Orange)	No new red and orange category industries; for existing industries switch to zero pollution by 2016 and be subject to strict regulation and social audit	No new red and orange category industries; for existing industries switch to zero pollution by 2016 and be subject to strict regulation and social audit	New industries may be set up under strict regulation and social audit
(Green/ Blue)	With strict regulation and social audit. Local bioresource based industry should be promoted. All should be strictly regulated and be subject to social audit.	Promote Green/ Blue industries. Local bioresource based industry should be promoted. All should be strictly regulated and be subject to social audit.	Promote Green/ Blue industries. Local bioresource based industry should be promoted. All should be strictly regulated and be subject to social

			audit.
Power/Energy	No large storage dams, small bandharas are permissible; No new large wind projects or thermal power plants; Promote biomass based and solar sources for decentralized energy needs; Promote small scale, micro and pico hydropower systems, that are people owned & managed and are off grid; Strict regulation of existing thermal power plants; the existing thermal plants should be obliged to actively promote alternate uses of fly ash - such as in road making in addition to the existing practices of manufacture of fly ash bricks Promote run of the river schemes. Promote biomass based /solar sources for decentralized energy needs. All should be strictly regulated and be subject to social audit.	No large storage dams, small bandharas are permissible; Promote run of the river hydropower projects but after cumulative impact study of the river basin is done; Regulated wind power projects but after cumulative impact study; Zero pollution to be required of existing Thermal Power Plants; Promote biomass based /solar sources for decentralized energy needs. All should be strictly regulated and be subject to social audit.	Power plants are allowed subject to strict environmental regulations and monitoring and after cumulative impact assessments are undertaken; Dams subject to strict regulation and social audit.
Transport	No new railway line. No national highway/state highway/expressways.	Upgradation possible/permitted subject to strict regulation and social audit; New roads	Essential new roads may be allowed subject to strict regulation and social audit.

		subject to strict regulation and social audit.	
Tourism	No ecotourism zones; Follow Ecotourism policy of MoEF; Strict regulation	Strict regulation on basis of a Tourism master plan and social audit	Strict regulation and social audit
Sewage disposal	Organize effective treatment of sewage under strict regulation and social audit		
Solid waste management	Ban all use of plastics; Enforce proper separation of degradable and non-degradable solid waste; Manage careful disposal of solid wastes subject to strict regulation and social audit; Introduce incentive payments for agreeing to host solid waste disposal sites within jurisdiction of any Panchayat		
Hazardous waste management	Strictly ban all activities producing hazardous wastes	Strictly ban all activities producing hazardous wastes	Manage careful disposal of hazardous wastes subject to strict regulation and social audit
Education	***Reconnect children and youth to local environment*** through education programmes focusing on local environmental issues. To achieve this, students' "River Clubs" should be encouraged in schools situated along the course of the		

	respective river ***Tailor Environmental Education*** projects to serve as an instrument of participatory environmental monitoring involving local community members; connect such exercises to preparation of "Peole's Biodiversity Registers" by the local Biodiversity Management Committees		
Science and Technology	***Cumulative impact assessment*** for all new projects such as dams, mines, tourism, and housing should be conducted and permission given only if they fall within the carrying capacity ***Environment river flow assessments / indicators*** should be worked out by Research institutions, NGOs along with local communities		
Information management	***Build on the Western Ghats database of WGEEP*** *to create an open, transparent, participatory system of environmental monitoring involving all citizens, in particular the student community* ***Update and upgrade hydrological data base*** of rivers and		

	consolidate the ecological data base and information at river basin level ***Assess downstream impacts of dams*** on river ecology, flood plains, fishing habitats, livelihoods, biodiversity and related aspects ***Map salinity intrusion*** so as to suggest improved flows in future ***Monitor reservoir operations*** involving downstream local self governments and departments		

10. *Western Ghats Ecology Authority*

The Western Ghats Ecology Authority (WGEA) should be a statutory authority appointed by the Ministry of Environment and Forest, Government of India enjoying powers under Section 3 of the Environment (Protection) Act 1986. Of course, the Western Ghats is an extensive region spanning over six states and 40 odd ## districts, and WGEA would need to function in a networked fashion with six constituent State Western Ghats Ecology Authorities, appointed jointly by the State Governments and the Central Ministry of Environment and Forest. The State Western Ghats Ecology Authorities should interact closely with the State Biodiversity Boards and Pollution Control Boards, as well as State Planning Departments administering the Western Ghats Development Programmes funded through Five Year Plans by the Planning Commission. It would be appropriate that all the Western Ghats Development Plan schemes are worked out by the State Governments with the help of the State Western Ghats Ecology Authorities and used to support sustainable development oriented schemes developed under guidance of Western Ghats Ecology Authority.

Currently, the Ecologically Sensitive Areas are administered with the help of High Level Monitoring Committees appointed by the Central Ministry of Environment and Forest. These are hampered by lack of regulatory powers, except in the case of Dahanu Taluka Ecology Authority

established through a judgment of the Supreme Court. They are also hampered by lack of financial and human resources. In some cases no HLMC has been in place for several years at a stretch. WGEEP proposes that they should be replaced by District Ecology Committees in all Western Ghats districts. These District Ecology Committees should work in collaboration with the district level Zilla Parishad/ Zilla Panchayat Biodiversity Management Committees, as well as District Planning Committees. Indeed, it may be appropriate that the district level Biodiversity Management Committees, which are statutory bodies established under Biological Diversity Act, and not ad-hoc committees which may cease to function for years at a stretch as has happened with HLMCs, may be asked to discharge the functions of WGEA District Ecology Committees by augmenting their membership by some experts appointed by Central Ministry of Environment and Forest and State Western Ghats Ecology Authorities.

WGEA should focus on promoting transparency, openness and participation in every way. An excellent tool for this could be the revival of the scheme of Paryavaran Vahinis, or committees of concerned citizens to serve as environmental watchdogs and undertake selective first hand monitoring of the environmental situation in the district. These Paryavaran Vahini volunteers could play a significant role in building capacity of people at the grass-roots for conservation, sustainable development and ecorestoration. WGEA could also undertake to appoint Environmental Ombudsmen in all districts. It should vigorously promote institution of a social audit process for all environmental issues on the model of that for Mahatma Gandhi National Rural Employment Guarantee Act in Andhra Pradesh.

WGEEP has made excellent progress in the development of a spatial database, for over 2200 grids of 5'x5' or roughly 9 km x 9 km through compilation of all readily available information on topography, land cover and occurrence of biodiversity elements for the Western Ghats. WGEA should pursue vigorously further development of this database by bringing on board many available databases such as that prepared in connection with Zonal Atlases for Siting of Industries, by sponsoring further scientific inputs, as also by linking Environmental Education activities at school and college level and the People's Biodiversity Register exercises to augment the database. WGEA should encourage citizen involvement in continual development of the Western Ghats database on the pattern of Australian River Watch schemes. In this context, WGEA should help overcome the entirely unjustifiable difficulties that researchers encounter today in working in forest areas. WGEA should pursue concerned Government agencies to make available all pertinent information pro-actively as provided in the Right to Information Act, and not wait for applications by citizens. For example the Ministry of

Environment and Forests should immediately make public all district level Zonal Atlases for Siting of Industries in a searchable form on the Ministry's website, which may then be linked to the Western Ghats database.

WGEA should lead a radical reform of Environmental Impact Analysis and Clearance process. It should revisit the list of projects that require Environmental Impact Analysis and Clearance and include certain items such as Wind Mills and small scale hydroelectric projects that are excluded today. It should ask all project proponents to deposit an appropriate fee with the Authority and then select competent agencies to carry out the EIAs in a transparent fashion. Furthermore, it should link the Environmental Education activities at school and college level and the People's Biodiversity Register exercises to the EIA process. Equally urgent is the need to promote a more holistic perspective and organize a process of Cumulative Impact Analysis in place of the current project-by-project clearances.

WGEA should strive to promote a participatory, bottom-up approach to conservation, sustainable development and ecorestoration of the Western Ghats. With this in view, it should encourage devolution of democratic processes as visualized in 73rd and 74th Amendments to the Indian Constitution. Kerala, one of the Western Ghats states has made substantial progress in this direction, and WGEA should promote the emulation of Kerala example in all the Western Ghats districts. Kerala has also taken the lead in meaningful implementation of Biological Diversity Act through Biodiversity Management Committees, and WGEA should take immediate steps to ensure establishment of Biodiversity Management Committees at all levels, namely, Gram Panchayats, Taluka Panchayats, Zilla Panchayats, as also Nagarpalikas and Mahanagarpalikas in all the Western Ghats districts. Furthermore, WGEA should ensure that BMCs are motivated through empowerment to levy 'collection charges' as provided in the Biological Diversity Act. These institutions may be involved in developing programmes on the model of 'Conservation of biodiversity rich areas of Udumbanchola taluk' in Kerala. These Biodiversity Management Committees are expected to take care of agro-biodiversity as well, and in this context the provisions of Protection of Plant Varieties and Farmers' Rights Act 2001are highly relevant. A National Gene Fund has been established under PPVFRA and has substantial amounts available. These funds can be utilized to build capacity at Panchayat level for *in situ* conservation of genetic diversity of indigenous crop varieties.

The Mahatma Gandhi National Rural Employment Guarantee Act has much potential for the task of ecorestoration. It also has the advantage that Gram Sabhas are expected to be involved in planning of the works to be undertaken. Other opportunities exist for capacity

building and empowerment of Gram Sabhas through Extension of Panchayat Raj to Scheduled Areas Act (PESA) and Forest Rights Act, and WGEA should promote pro-active and sympathetic implementation of PESA and of the provision of Community Forest Resources under the Forest Rights Act.

Finally, WGEA should strive to make a transition from regulations and negative incentives to promote nature conservation oriented activities to a system of use of positive incentives to encourage continued conservation-oriented action in the context of traditional practices such as sacred groves and to initiate other action in modern contexts. An example of the latter is the payment of conservation service charges by Kerala Biodiversity Board to a farmer who has maintained mangrove growth on his private land. WGEA should undertake a critical assessment of the efficacy of funds being deployed towards conservation efforts today in the form of salaries and perks of bureaucrats and technocrats, includ ing their jeeps and guns and buildings to house them. It would undoubtedly be found to be exceedingly low. These funds should then be redeployed over a period of time to provide positive incentives to local communities to maintain biodiversity elements of high value to conservation.

Technical inputs would be required to decide on a common system of assigning conservation value to spe cific elements of biodiversity and to organize a reliable, transparent system of monitoring biodiversity levels within the territories assigned to various local communities, in form of either Community Forest Resources assigned under FRA, or Panchayat areas assigned to Biodiversity Management Committees. Educational institutions at all levels, from village primary schools to universities, could play an important role in this effort. Indeed, these exercises could become very valuable components of environ mental education curricula. In the long run, only a very lean bureaucratic apparatus should be retained to play a coordinat ing, facilitative role and to ensure that local communities can effectively enforce a desired system of protection and management of the natural resource base. Such a system would create a very efficient market for conservation performance so that funds earmarked to promote biodiversity would flow to localities and local communities en dowed with capabilities of conserving high levels of biodiversity. This system would also channel rewards for conservation action to relatively poorer commu nities living close to the earth, thereby serving ends of social justice, and creating in the long range a situation far more favorable to the mainte nance of biodiversity on the earth.

11. *Ratnagiri and Sindhudurg*

The Panel has been asked to suggest an appropriate course of further development of mining, power production and polluting industries in Ratnagiri and Sindhudurg districts of Maharashtra. This entire region has been seriously impacted, both environmentally and socially by a number of mining and power projects, and polluting industries. The impacts are manifold; depletion and pollution of ground water, siltation of water bodies, increased flood frequencies, loss of fertile agricultural land, depletion of fisheries, deforestation, loss of unique biodiversity elements such as herbaceous plants of lateritic plateaus, air pollution, noise pollution, traffic congestion and accidents, increase in respiratory ailments, and so on. The situation clearly warrants a careful assessment and mid-course correction.

The problem is not just legal, but substantial levels of illegal activities. For instance, many farmers complain of miners muscling their way onto private land and digging pits. Pollution from many industries is also well above legally permissible limits. Consequently, there is much social discord, especially because people firmly believe that law and order machinery is being misused to protect illegal activities.

The Panel has been asked to suggest an appropriate course of further development of mining, power production and polluting industries in Ratnagiri and Sindhudurg districts of Maharashtra. Given the many problems facing these ecologically rich yet fragile districts, it is clear that we must proceed with great care. Only eastern portions of these districts are covered by the Western Ghats for which WGEEP has completed assignment of Ecologically Sensitive Zones and guidelines for further development projects. For these Western Ghats regions of the district, the Panel recommends:

a. An indefinite moratorium on new environmental clearances for mining in Ecologically Sensitive Zones 1 and 2,
b. A phasing out of mining from ESZ1 by 2015
c. Continuation of existing mining in Ecologically Sensitive Zone 2 under strict regulation with an effective system of social audit.
d. No new red and orange category industries, which would include coal based power plants, should be permitted to be established in Ecologically Sensitive Zones 1 and 2;
e. The existing red and orange category industries should be asked to switch to zero pollution in Ecologically Sensitive Zones 1 and 2 by 2015, and operated only under an effective system of social audit.

1. Cumulative impact analysis

WGEEP has not undertaken any extensive compilation of pertinent information and assignment of levels of ecological sensitivity to plains and coastal portions of the Ratnagiri and Sindhudurg districts falling outside the Western Ghats. Nevertheless, the limited investigations of the Panel in these plains and coastal tracts suggest that these are under severe environmental and social stress, and it is essential that a careful Cumulative Impact Analysis of various development activities in these tracts, ideally in conjunction with Raigad district of Maharashtra and the state of Goa, must be immediately undertaken, preferably under the leadership of National Institute of Oceanography, Goa.

This should not be a techno-centric study alone, but ensure that people's deep locality specific knowledge of environmental issues and their development aspirations are taken on board. To this end the Ministry of Environment and Forests should ask the state Forest Departments to proactively assist the Tribal Welfare Departments in implementation of the Scheduled Tribes and Other Traditional Forest Dwellers (Rights over Forests) Act. The implementation of the Community Forest Resources provisions of this act would greatly help create broad based stake for people in safeguarding the environment of the region. Furthermore, Ministry of Environment and Forests should ensure the establishment of Biological Diversity Management Committees in all local bodies in this region, motivate them through empowerment to levy 'collection charges' as provided in the Biological Diversity Act and fund the BMCs to document the local ecological setting and biodiversity resources in collaboration with local educational institutions. This would not only further encourage local community members to engage in taking good care of their own environment, but generate much detailed information of key relevance for the proposed cumulative environmental impact analysis.

Of course a strong scientific institution needs to take overall responsibility of such an exercise and ensure sound scientific and technical inputs. Therefore, WGEEP recommends that NIO, Goa be asked to play such a role. The Panel recommends that the current moratorium on new environmental clearances for mining, and red and orange category polluting industries and power plants in plains and coastal tracts of Ratnagiri and Sindhudurg districts should be extended till satisfactory completion of such an analysis of Carrying Capacity of these districts. The moratorium may then be reviewed in light of the findings of the study.

12. *Gundia Hydroelectric project*

The Gundia river basin is a 'hot hotspot' of biodiversity with a repository of biological wealth of rare kinds, both in its aquatic and terrestrial ecosystems. The premium should be on conservation of the remaining evergreen and semi-evergreen forests, which are vital for the water security (perennially of streams) and food security (sustenance of biodiversity).

Recommendations

The proposed project (GHEP) is ecologically unsound and economically unviable because of the following reasons[1]:

1. The construction of this project will cause large scale land cover changes in Gundia
2. The proposed project would have negative impacts on the biodiversity of the region
3. The proposed region is a part of an Elephant Reserve and forms a vital link between two Elephant Corridors.
4. The proposed project would cause habitat fragmentation and shrinkage resulting in enhanced human–wildilfie conflicts.
5. The forests are ecologically and economically beneficial to humans.
6. The project would alter the hydrological regime. Kumaradhara River, a perennial source of water to the important Subramanya temple, will lose water due to its diversion to the Bettakumri dam. This will affect the temple and revenue from ecotourism. Also, due to large scale land cover changes, the catchment yield will dwindle and current perennial streams will become seasonal (as in the Sharavathi river basin). This would affect local people.

Considering the above, the proposed hydro-electric project at Gundia river basin would be ecologically and economically unviable as it would weaken the food and water security of the region apart from enhancing human–wildlife conflicts. This project should not be granted Environmental Clearance.

13. *Athirappilly Hydroelectric project*

Considering the: (1) **b**iodiversity richness, the high conservation value, highly significant fish fauna with type locality of five new species and as many as 22 endemic and 9 critically endangered species, the bird fauna with 75% of the endemics of the Western Ghats, and the unique riverine ecosystem not seen in other areas in the State, (2) the impact of the project on the biodiversity and the ecosystem, some of which may be irreparable, (3) the impact on

downstream irrigation and drinking water, (4) the questionable technical feasibility of the project, (5) the meager amount of power that could be generated from the project, (6) impact on the habitats of the primitive tribes of the area, (7) the high cost of construction even without considering the ecosystem services and environmental cost, and (8) the judgment of the honourable High Court of Kerala made on 17 October 2001 directing the KSEB to " ***"take all necessary steps to repair and restore to full capacity , all the existing Hydro Electric Projects to ensure that the generation of power as envisaged is obtained and also to take steps to ensure that transmission losses are minimized and that theft of energy is prevented and to the extent possible eliminated altogether",*** the WGEEP recommends to the MoEF that the Athirapilly - Vazhachal area should be protected as such and the permission for the proposed hydro-electric project at Athirappilly should not be given. The WGEEP further recommends that the Chalakudy River should be declared as a fish diversity rich area, to be managed on the pattern of 'Conservation of biodiversity rich areas of Udumbanchola taluk' in Kerala.