Development and Climate Change Induced NRM Challenges in the Western Ghats Region of India

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Asia Region Biennial IASC Meeting on "Redefining Diversity and Dynamism of Natural Resource Management in Asia" July 13-16, 2018 | AIT, Bangkok Thailand







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Outline

- The context: economic growth and trade-off with natural resources and environment, inclusiveness and sustainability
- Following a brief profiling of the WGR, present an overview of the state of development in the region and its interface with the natural resources/ environment and livelihoods
- ➤The major challenges surfacing the NRM sub-sectors, specifically the agrarian landscape and the coastal regions within the WGR
- ➤The concerns of growing ecological sensitivity in the WG states, as revealed by the expert panels, constituted by the Ministry of Env., Forests and Climate Change (MoEFCC)
- Future perspectives: Approaching the Extant NRM policies, practices and restoration outcomes; implications for governance, inclusive growth and SDGs

The context: growth and natural resources: inclusiveness and sustainability

- > Dilemmas: (1) Making growth inclusive (2) protecting and sustaining the natural resources
- Need understanding the interface between 'economic and environmental dimensions' of the growth of economic sub-sectors across states
- Economic dimension to 'growth with sustainability': 'growth' is managed irrespective of what happens to natural resources and the targeted communities

Is the growth so achieved inclusive?; will that be economically and environmentally sustainable?
If current growth is inclusive and sustainable at least for next 1-2 decades, why bother about NRs, as ALL ARE DEAD in the long run?

- Environmental dimension to 'growth with sustainability': growth is not sustainable if it involves compromising on Natural Resources
- ➤To discuss and deliberate on this topical issue, I deliberately choose the Western Ghats Region (WGR) of India, as this region has been underway of serious environmental/ ecological crisis emanating from the 'growth' having implications for NRM, inclusive growth outcomes and sustainability

Growth and Environmental Linkages: The DPSIR Framework



Source: Modified based on Kristensen (2004); Viswanathan and Pathak, 2014.



km mountain chain that runs parallel to India's west coast. The region is home for over 4,000 flowering plants, more than 500 bird species, over 100 species of mammals and around 180 species of amphibians. The WGR traverses across six major coastal states,

ssam Nagaland

1,000

km

The WGR is well known for its richest biological diversity and harbour 38 east-and 27 west flowing rivers; it has rich aquatic wealth, including fishery resources.

viz., Tamilnadu through

Kerala, to Karnataka, Goa,

Maharashtra and Gujarat.

The entire WGR is ecologically sensitive to development and was declared as World Heritage Site by the **UNESCO**, Paris

Brief profiling of WGR states

			West		Rural		Industry	
	Total Geogr.	West Ghats	Ghat	No. of	House-	Agri. Share	share to	Share in goods &
WG states	<mark>Area (sq km)</mark>	Taluka area	taluka %	villages	holds (%)	to NSDP*	NSDP*	services exports
Goa	3702	1749	47.24	99	30.0	8.59	46.96	0.90
Gujarat	196024	5977	3.05	64	66.9	16.34	33.63	17.20
Karnataka	191791	44448	23.18	1576	54.8	10.82	23.48	12.70
Kerala	38863	29691	76.40	123	27.3	12.00	26.17	1.70
Maharashtra	307713	55345	17.99	2159	56.7	11.40	30.03	22.30
Tamilnadu	130058	27069	20.81	135	34.7	11.15	30.05	11.50

Note: * Share of agriculture and industry to NSDP are the averages for the period 2012-13 to 2015-16 *Source*: MoEF, 2011; Agristat, India; Economic Survey 2017-18

- WG talukas account for as high as 76% (Kerala) of the TGA to 3% (Gujarat) across states
- Share of rural households is of quite significant proportion across states, except Kerala and Goa
- Yet, the share of agriculture to Net State Domestic Product (NSDP) was the lowest across states (9-16%)
- Share of industrial sector to NSDP hovered in the range of 23-47%, highest in Goa
- The cumulative share of WG states in the total exports of goods and services in India was 66%

Some more indicators...

	TCA/TGA	Forest	Foodcrop	Irrigated	Groundwat
WGR states	(%)	area/TGA (%)	area/TCA (%)	Area (%)	er devt.
Goa	44.1	33.8	0.0	40.4	28.0
Gujarat	64.3	9.4	28.4	41.2	137.0
Karnataka	61.3	16.0	60.9	26.9	32.0
Kerala	66.7	27.8	7.7	22.2	64.0
Maharashtra	71.1	16.9	45.3	16.7	57.0
Tamilnadu	45.3	16.3	63.5	50.2	77.0
All India	59.1	21.3	62.8	47.2	62.0

Source: Agristat, India; Ministry of Agriculture, Government of India

Latest Coastal landuse scenario in the WGR states (%)

Major Landuse types	Gujarat	Maharashtra	Karnataka	Kerala	Tamilnadu	Goa
Agri land	42.67	46.64	19.98	26.92	37.10	12.08
Industrial area/ Ports/						
Harbour	0.59	0.51	0.16	0.09	0.27	0.22
Forest (non-tidal) plantation	2.50	23.20	39.05	0.01	1.06	51.01
Mangroves, including						
degraded mangroves	5.05	2.05	0.19	0.13	0.26	0.96
Inter tidal mudflat	7.94	1.50	0.06	0.39	0.39	0.40
Creek	5.46	4.94	0.14	0.04	0.25	0.46
Scrubs	10.33	0.07	18.40	0.09	4.24	10.36
Habitations	1.76	7.56	16.16	57.90	7.82	8.54
Saline area	3.76	0.00	0.00	0.00	0.00	0.00
Salt pans	3.42	0.48	0.04	0.00	1.18	0.00
Waterlogged area	0.74	0.00	0.22	1.64	0.11	0.16
Wasteland	0.00	3.30	0.00	0.00	0.00	6.24

Source: ISRO, 2012: Space Applications Centre, Coastal Zones of India (landuse mapping based on satellite images)

Coastal livelihood dependence

	Population in	Fish landing	Fishing	Fishermen	BPL families	Family size	Density per
WG States	(Million, 2011)	centres	villages (#)	families	(%)	(#)	village
Goa	1.46	33	39	2189	22.3	4.8	270
Gujarat	39.89	121	247	62231	25.4	5.4	1361
Kerala	27.46	187	222	118937	55.0	5.2	2748
Karnataka	4.7	96	144	30713	76.9	5.5	1163
Maharashtra	28.63	152	456	81492	19.0	4.7	847
Tamilnadu	33.38	407	573	192697	66.0	4.2	1401

Contribution of WG states to Marine Fish production in India

States	('000 tons)	% share
Gujarat	809.93	8.04
Maharashtra	548.75	5.45
Karnataka	613.24	6.09
Kerala	632.26	6.28
Tamil Nadu	697.61	6.93
Goa	117.85	1.17
WGR states	3419.64	33.95
All India	10072	100.00

Trends in Marine Fish Production ('000 tons) across the WGR States



Note: Figures are five-year moving averages of marine fish production *Source*: Indiastat data

Development and climate change induced impacts on the WGR

- One of the major drivers of economic growth in the WGR states has been the spurt in expansion of export oriented industries and processing facilities, which are prominently located in the coastal regions in view of the access to ports and such infrastructure for trade expansion.
- More particularly, the states, especially, Goa and Gujarat and Maharashtra had witnessed a dynamic growth in the marine fisheries sector on account of the significant infusion of investments by the private/ corporate sectors in enhancing the infrastructure capacities for processing and value addition within the sector, thus making the marine sector a vibrant export sector.
- At the same time, majority of the small-scale fishermen are facing the loss of livelihoods due to competition for coastal space and resources with industrial and agricultural development which, incidentally, pose a significant threat to their livelihoods and the coastal ecology

Development and climate change induced impacts on the WGR

- The WGR has been under serious pressure of development induced problems and climate change risks (both coastal and inland regions)
- Landuse land cover change (LULCC) caused by agricultural expansion (intensive cash crop cultivation), conversion to monoculture plantations (coffee, cardamom, rubber, tea, timber plantations) and infrastructure expansion resulted in loss of forests (reserve forests and wild life sanctuaries) and grass lands in the WG region
- Intensification of agriculture also resulted in indiscriminate use of land and agro-chemicals; besides industrial expansion as well as urban growth, all causing significant stress on the state of natural resources and environment
- As a result of development pressures of various kinds, ecologically fragile ecosystems including the mangroves, coral reefs, mudflats, salt marshes, sea grass beds, and nesting grounds of migratory birds and marine turtles are under pressure from industrial developments.

Increasing Ecological Sensitivity and vulnerability of the WGR

- In view of the conservation importance, the MoEF&CC set up the Western Ghats Ecology Expert Panel (WGEEP) under Prof. Madhav Gadgil (Eminent Ecologist on Western Ghats), to look into the development induced pressures and come out with suggestions for addressing the issues in 2011
- Under the guidelines and proviso of the Environment (Protection) Act, 1986, the expert panel was entrusted to demarcate areas within the WGR which need to be notified as ecologically sensitive and to recommend for notification of such zones as ecologically sensitive areas (ESA)
- The Panel identified an area of 1,29,037 sq.km of a total of 164,279 sq.km as eco-sensitive requiring conservation and ecological restoration on a priority basis.
- A High-Level Working Group (HLWG) under the Chairmanship of Dr. K. Kasturirangan, Member (Env.), (erstwhile) Planning Commission (Niti Aayog) was constituted in 2012, to review and make recommendations on the Madhav Gadgil Report

Prohibited/ regulated activities in the WGR

- The HLWG has recommended that the following activities which have maximum interventionist and destructive impacts on natural ecosystems, should not be permitted in ESA:
- 1. Phasing out of the existing Mining, quarrying and sand mining activities.
- 2. Thermal Power Plants
- 3. Building and construction projects of 20,000 sq. m. area and above
- 4. Township and area development projects with an area of 50 ha & above and/or with built up area of 1,50,000 sq. m. & above
- 5. Red category of industries (highly polluting industries).
- Regulated activities on Hydro-Power Projects (subject to some conditions specified in the Draft Notification).

THE ORIGINAL GREEN PLAN



Ecologically Sensitive Areas (ESA) in the WGR states (Area in sq. km.)

State	Number of Villages	Average Area of Village	Number of Villages with ESA	Village Sharpened ESA	Average ESA per Village
Goa	359	10.31	99	1461	14.76
Gujarat	18544	10.57	64	449	7.02
Maharashtra	43722	7.03	2159	17340	8.03
Karnataka	29483	6.51	1576	20668	13.11
Kerala	1364	28.49	123	13108	106.57
Tamil Nadu	16317	7.97	135	6914	51.21
Total	109789	7.91	4156	59940	14.42

Source: Extracted from the WEGP Report.

The size of a Kerala village is about four times the size of an average village of all the six states put together. The size of the ecologically sensitive villages too is relatively large in Kerala.

Future perspectives: Approaching the NRM policies, practices and Outcomes

- Addressing the issues of ecological sensitivity of the region and the livelihood risks of the communities need to get a wider recognition across the states leading to a unified strategy and action plan
- The specific aspects of the vulnerability of the farm households and coastal communities to development and climate change induced risks need a much more critical assessment based on indepth research and exploration from multi-stakeholder perspectives
- The NR governance scenario in the region seems to be much more complex with various legislations, policies and regulations, including EPA 1986 and Coastal Zone Management regulations, the working and outcomes of which, needed to be critically examined using the IAD framework proposed by Ostrom
- The need for networking between scholars under the OCeaN with possibilities of learnings from cross-country experiences of NRM governance



Thank you all...

Acts and notifications
Indian Fisheries Act, 1897
Indian Ports Act, 1908
Coast Guard Act, 1950
Merchant Shipping Act, 1858
The Indian Wildlife (Protection) Act, 1972
Water (Prevention & Control of Pollution) Act, 1974
Maritime Zones Act, 1976
Marine Fishing Regulation Act, 1978
Forest (Conservation) Act, 1980
Hazardous Waste Management Act, 1989 (under
Environmental Protection Act, 1986)
Coastal Regulation Zone Notification, 1991 (under
Environmental Protection Act, 1986)
Deep Sea Fishing Policy, 1991
Environmental Impact Assessment Notification, 1994 (under
Environmental Protection Act, 1986)
National Environment Tribunal Act, 1995
Biological Diversity Act, 2002

Institutional agencies
Ministry of Environment & Forests
Department of Ocean Development
Ministry of Agriculture
Ministry of Water Resources
Ministry of Defense (Indian Coast Guard)
Ministry of Surface Transport
Ministry of Petroleum and Natural Gas
Ministry of Tourism
Ministry of mines