

Evaluating the mangrove-fishery link for regenerated mangrove forests



Saudamini Das,
Institute of Economic Growth
University of Delhi
Enclave, Delhi

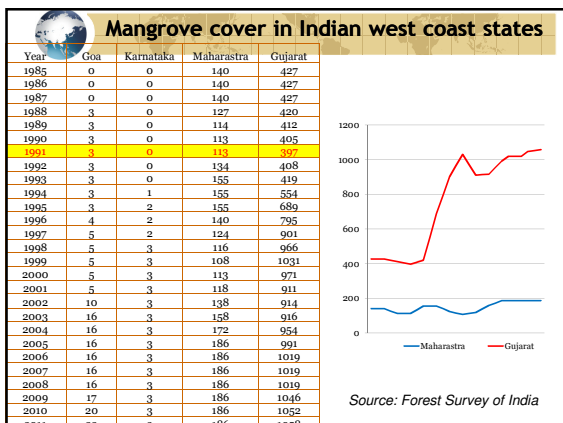
ACD-SANDEE-MFF Workshop on Ecosystem Services , Colombo, Sri Lanka, 24th Feb 2015

Background

- Ecological restoration is a world wide phenomenon
-- few research on flow of ES from these regenerated ecosystems compared to original forests
- Mixed results regarding flow of ES and ecological biodiversity from planted mangroves compared to natural mangroves (*Macintosh et al, 2002; Huxan et al, 2004; Crona and Romback, 2005, 2007; Ronnback et al, 2007; Roval, et al, 2012*).
- Is 1 hectare of regenerated forest equivalent to 1 hectare of natural forest ?? Or less (1/4th) as in other biomes (*Benayas et. al., 2009*) ??
- Is cost recovery possible? Is it possible to carry a cost-benefit analysis?

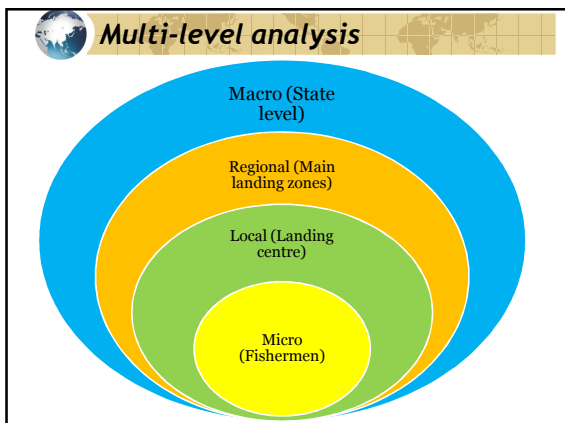
Objectives

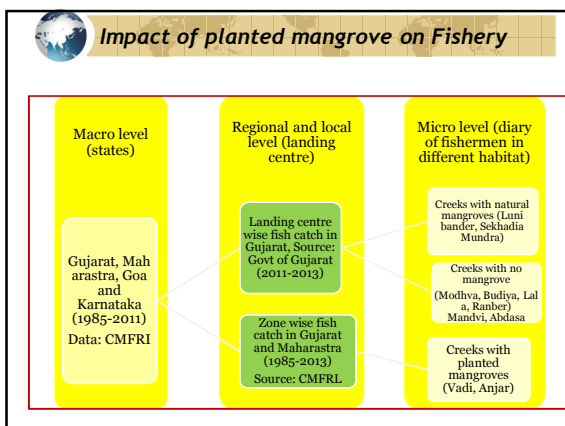
- How effective are regenerated mangroves as habitat and nursery ground for fishery compared to natural mangroves?
- How the mangrove-fishery linkage gets modified by
 - diversity of species,
 - forest growth
 - being in non-mangrove habitat



- ### Features of Mangrove plantation in Gujarat
- 3 types of plantation:
 - Existing forest,
 - Mud flats and
 - Degraded land
 - Societal direct dependency (provisioning services) is absent in Gulf of Kutch, Saurashtra but minimal to moderate (only fuel wood and fodder) in Gulf of Khambhat (South Gujarat)
 - Comparison of natural vs. planted is possible only through regulating services
 - Contribution to fishery
 - Coastal protection







Methodology: Difference-in-Difference

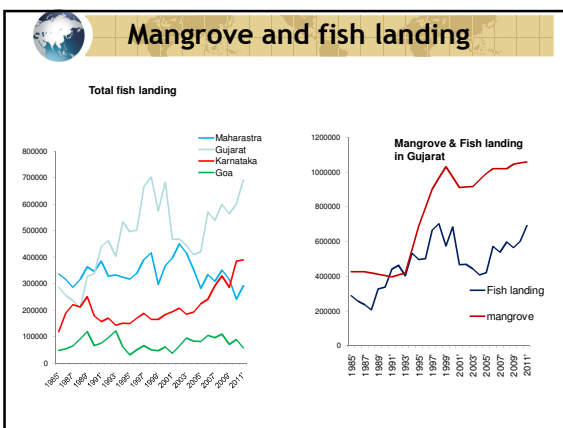
	Before	After	Difference
Treatment	750	450	300
Control	500	400	100
Difference	250	-50	200 (DID Estimate)

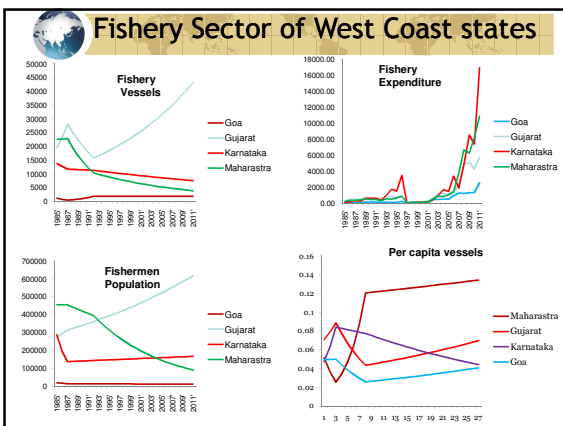
Modification: May have to use a bio-economic model as good data is not available

Some preliminary result from macro analysis

- Four west coast states: Gujarat, Maharashtra, Goa and Karnataka
- Data pd: 1985-2011
- Assemblage-wise fish landings: Total, pelagic, demersal, crustaceans and mollusks
- Gujarat: treated
- Others: controls
- 1985-1993: before
- 1994-2011: after
- Other variables:
 - number of fishing vessels,
 - fishermen population,
 - plan exp. on fishery sector,
 - time trend
- Other DID dummies

$$Y_{it} = \beta_0 + \beta_1 T + \beta_2 P + \beta_3 (T * P) + \beta_4 Z_{it} + \varepsilon_{it}$$





DID results: Treatment Period - 1994-2011

	Molluscs	Crustaceans	Demersal	Pelagic
Time_trend	0.086*** (4.6)	0.121* (1.9)	0.132* (1.7)	0.124 (1.2)
Treatment	----	----	----	----
Plantation_pd	-0.857*** (3.4)	-1.840** (2.1)	-0.365 (0.34)	-0.535 (0.4)
TreatmentXpd	1.997*** (7.4)	4.926*** (5.4)	4.278*** (3.8)	1.222 (0.89)
Expenditure	0.000 (0.07)	0.000 (1.07)	0.000 (0.52)	0.0004** (2.61)
Percapita_vessel	-0.272 (0.09)	-10.018 (0.98)	-41.028*** (3.2)	-32.587** (2.09)
Constant	0.382* (1.7)	5.502*** (7.5)	8.157*** (8.9)	12.371*** (11.05)
Nu of Observation, F value	108, 27.47	108, 8.0	108, 11.35	108, 7.49

- Broad Findings**
- Mangrove dependant fish catch has gone up in Gujarat compared to other states after 1994
 - No such effect on Pelagic catch
 - Total expenditure on fishery has significant effect on pelagic catch
 - Some indication of planted mangroves improving fishery, but more analysis needed