Creating Innovative Solutions for a Sustainable Future

Environmental assessment and tracking sustainability in Goa: Synopsis of TERI projects in Goa

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Regional & Global TERI centers

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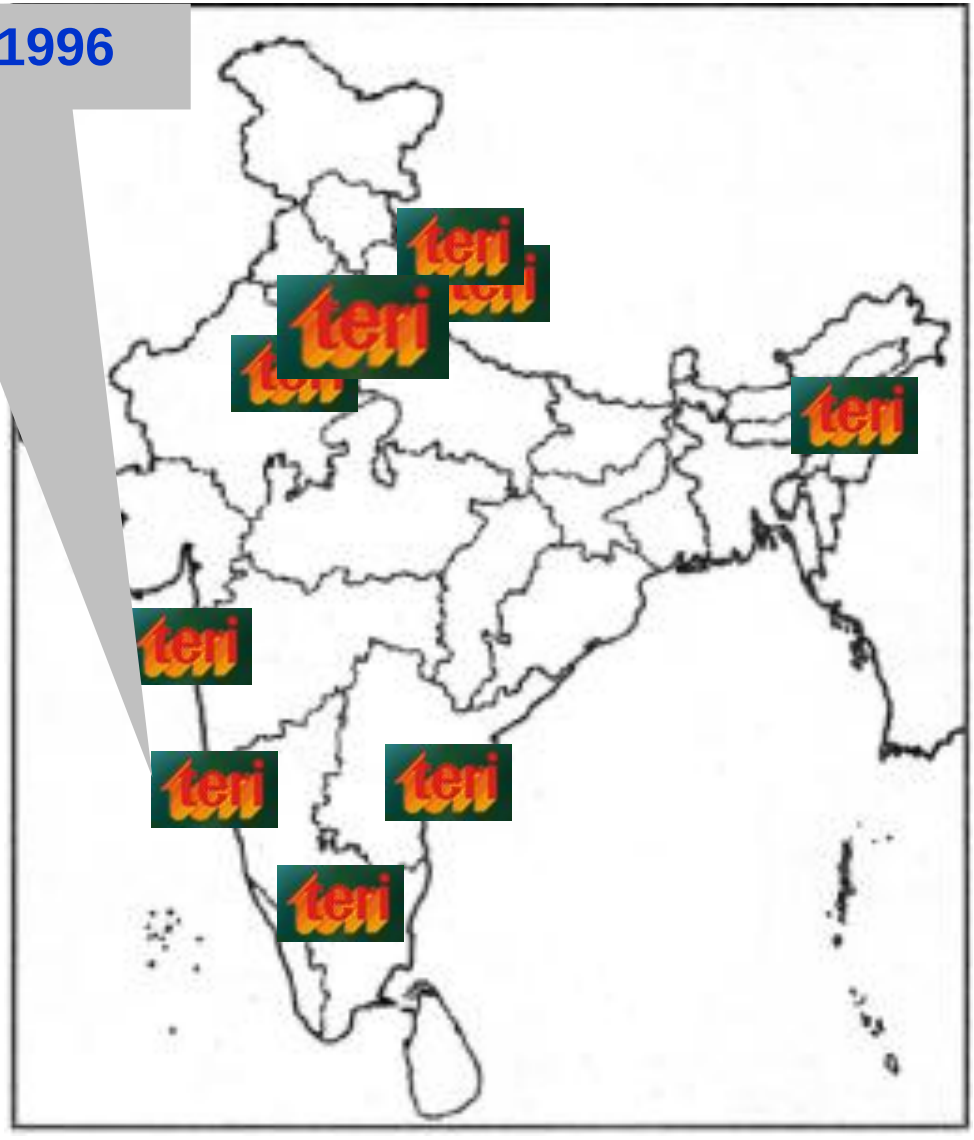
TERI - Goa since 1996



Major research areas at TERI

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- Energy
- Environment policies and resources management
- Environmental Governance and Green Growth
- Climate change
- Environmental Biotechnology
- Agriculture, forestry & water resources
- Sustainable Habitat
- Educating youth for sustainable development

Areas for TERI, Goa

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- Marine and Coastal Resources Management
- Environment-Development Interface Studies
- Energy for Rural Development
- Sustainable Habitat
- Educating Youth for Sustainable Development
- Natural Resources Management

Green mussels (Shinanyo) productivity in the estuaries of Goa

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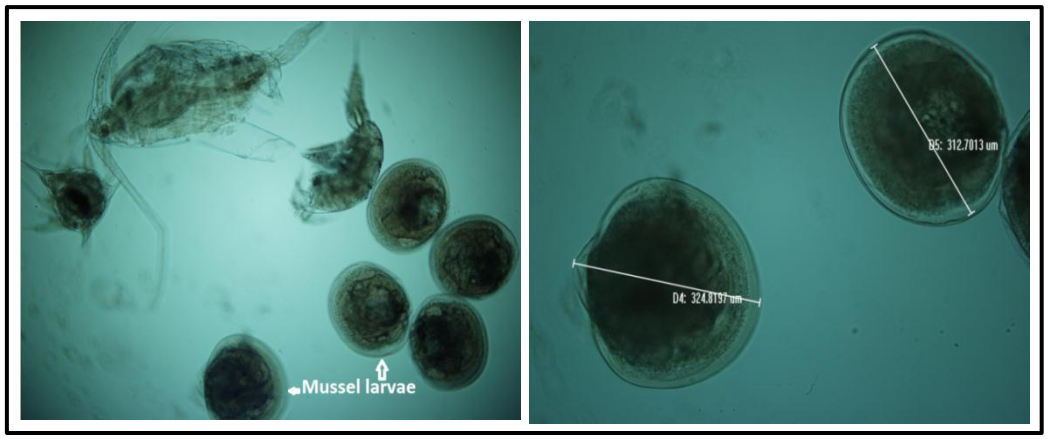
I) Assessment of Environmental Parameters

pH,
Salinity,
DO,
SPM &
Chl a

→ **Measured parameters were within the range**

II) Larval abundance and sizes



→ **The larvae biomass varied between 100 - 800 numbers per hundred cubic meter.**

Area: *Marine & Coastal Resource Management*

Green mussels (Shinanyo) productivity in the estuaries of Goa

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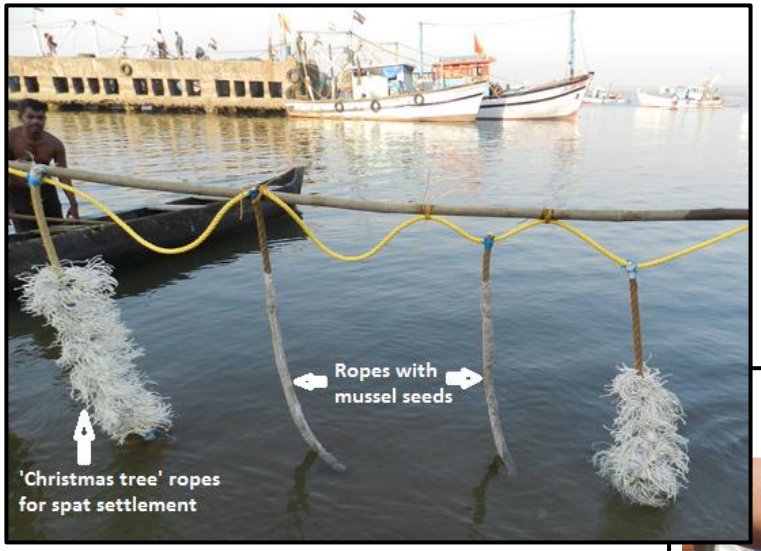
III) Mussel settlement and spat growth study



Very Low settlement – few numbers on Christmas tree ropes not on plain rope immersed for a period of 3 months

Area: *Marine & Coastal Resource Management*

Green mussels (Shinanyo) productivity in the estuaries of Goa

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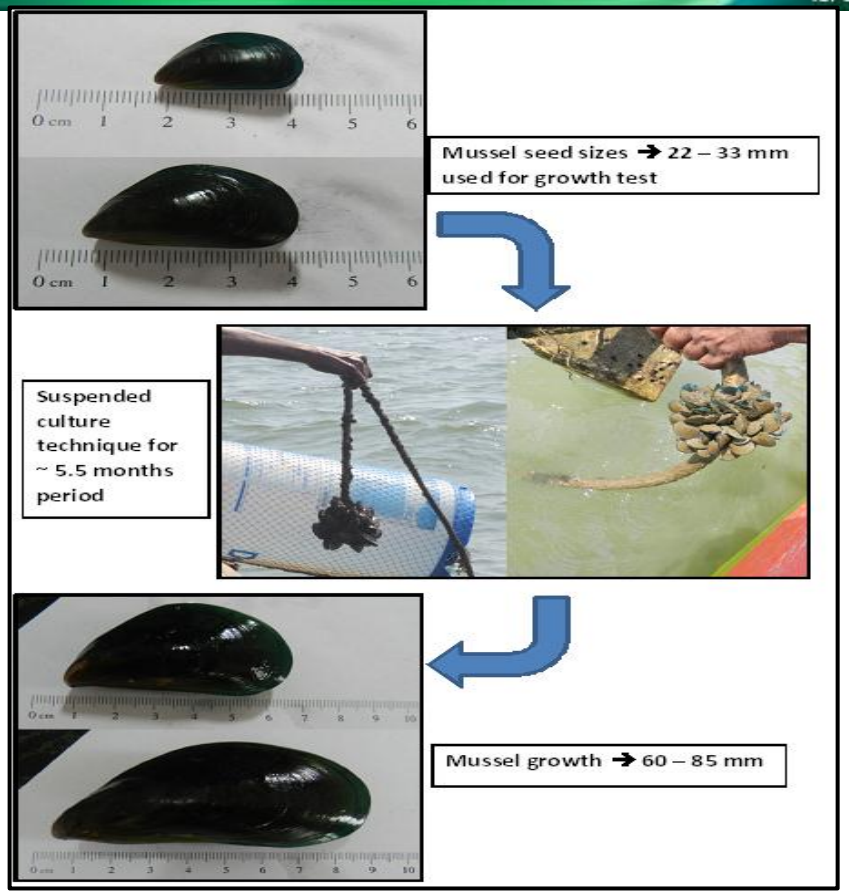
IV) Assessment of Mussel growth in-situ at Betul (River Sal estuary) and at Cacra (Zuari estuary)



Observed good growth in 5 months ➔ marketable size

Area: *Marine & Coastal Resource Management*

Demonstration and Training of Mussel Farming Technique to the Fishing Community of Betul

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Floating raft for mussel cultivation using rope technique

Tying of seed mussel rope vertically for mussel cultivation using rope technique

Area: *Marine & Coastal Resource Management*

Bioaccumulation study of organo pesticides in the *Khazan* ecosystem of Goa

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AIM: To study extent of pesticide pollution in terms of bioaccumulation in fishes and molluscs of a Khazan ecosystem

OBSERVATIONS:

- **Three organochlorine pesticides Lindane, DDT and Endosulfan were detected in water, sediment, and biota**
- **Concentration were below permissible limit**
- **High concentrations of pesticides were found during monsoon season in the water column through run-off and fresh application**

Area: *Marine & Coastal Resource Management*

Making the Plant Tissue Culture (PTC) Laboratory at Valpoi Functional for the Forest Department of Goa

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AIM OF THE PROJECT:

- To assist in operationalizing the existing defunct laboratory by reproducing the standardized PTC protocols
- To shortlist significant and endangered plant species present in Goa

OUTCOME:

- Laboratory is now functional
- Single native species of woody tree i.e. *Dendrocalamus asper* (Bamboo species) was tissue cultured
- The PTC protocols were handed over to officials through regular training program

Area: Environment-Development Interface

Developing a Sustainable, Collaborative Agri-business Ecosystem for Small Farmers

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OBJECTIVE OF THE PROJECT:

- To enhance the income generation from agriculture
- Establish a farmer- market linkages
- Uninterrupted supply chain
- Adopt systematic farming practices
- Encourage organic farming

ACHIEVED THROUGH:

Experiments

Workshops

Collaborating

Networking

Promoting

Branding & Marketing

CHORAO ISLAND FARMERS CLUB

Area: Environment-Development Interface

Transitioning India Towards Sustainable Energy Pathways: Analyzing Rural Energy Transitions and Inequities

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OBJECTIVES

- Understanding rural household energy consumption patterns with a particular focus on domestic cooking and lighting
- To identify the regional drivers and barriers to household energy transitions
- Understanding inequities in rural household energy consumption patterns across different social and income groups
- To examine the role of gender in household energy choices

Area: Energy for Rural Development

Transitioning India Towards Sustainable Energy Pathways: Analyzing Rural Energy Transitions and Inequities

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SURVEYS TO FIND:

Energy Use Characteristics

- Fuel Mix (Type of Fuels for cooking, lighting and space conditioning)
- Quantities consumed (market and non-market)
- Cooking and lighting technologies (type and number) & other appliances
- Source of fuels (freely available, PDS, market, distance)
- Substitutability between fuels
- Affordability

Transitions

- If switched, when, why and how?
- Impact on lifestyle, health and income
- If not switched, then why?

GRIHA: Green Rating for Integrated Habitat Assessment

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- Awareness workshops on green buildings
- Training & capacity building workshops for architects, engineers and professionals from construction fraternity
- Six upcoming government buildings registered for GRIHA
- To promote GRIHA, an incentive has been announced. Finalization of its institutional mechanism and the MoU between TERI and Govt of Goa is in process

Area: *Sustainable Habitat*

Environmental Awareness

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- **Environmental education, capacity building and training programmes are undertaken in the domain of climate change, water and sanitation, waste management and health and hygiene issues.**

Area: *Educating Youth for Sustainable Development*

Assessing the impacts of mining on Salaulim watershed

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AIM:

- To map the existing mines in Salualim watershed
- To assess the impact on surface water by field experiments and computing the sediment load
- To assess the impact on groundwater quantity
- Undertake sampling and monitoring of surface and groundwater quality

Stream gauging to examine to impact of mining activities

Area: *Natural Resource Management*

Assessing the impacts of mining on Salaulim watershed

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KEY FINDINGS:

- **During study period (2011-12) there were 4 active, 5 abandoned,17 very old mines and 5 laterite quarries in Salaulim watershed**
- **Annual sediment load of 33993 tonnes was estimated. It was a cumulative effect of erosion due to natural topography and silt runoff from the mining dumps**
- **The groundwater availability was estimated to be 192 hectare meter per annum and the stage of groundwater development was 38.84%**
- **The iron and manganese concentrations exceed the limit in surface water during monsoon and vary on daily basis. Increase in TSS during monsoon in the wells located near the active mines**
- **Remedial measures and management strategies were suggested**

Area: *Natural Resource Management*

Studies related to Mining

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I. Villages around Sonshi and Codli mines: a survey report
Sponsor: Sesa Goa Pvt. Limited
Duration: October 1996 to September 1997

II. Areawide environmental quality management (AEQM) plan for the mining belt of Goa
Sponsor: Directorate of Planning and Statistics, Government of Goa
Duration: September 1996 to November 1997

III. Environmental/social performance indicators (ESPIs) and sustainability markers in minerals development: reporting progress towards improved health and human well-being: Phase I
Sponsor: International Development Research Centre, Ottawa, Canada
Duration: February 1998 to June 1999

IV. A frame work for a minerals foundation
Sponsor: Goa Mineral Ore Exporters Association, Goa, India
Duration: February 2000 to June 2000

Area: *Natural Resource Management*

Studies related to Mining

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- **V. Environmental/social performance indicators (ESPIs) and sustainability markers in minerals development: reporting progress towards improved health and human well-being: Phase II**
  Sponsor: International Development Research Centre, Ottawa, Canada
  Duration: March 2000 to February 2002

- **VI. Planning of sustainable regeneration in mining areas using tri-sector partnerships**
  Sponsor: DFID, UK
  Duration: October 2002 to September 2005

- **VII. Environmental and social performance indicators and sustainability markers in minerals development: addressing issues of health and well-being (Phase III)**
  Sponsor: International Development Research Centre, Ottawa, Canada
  Duration: April 2003 to October 2006

Area: *Natural Resource Management*

River Bank Filtration (RBF)

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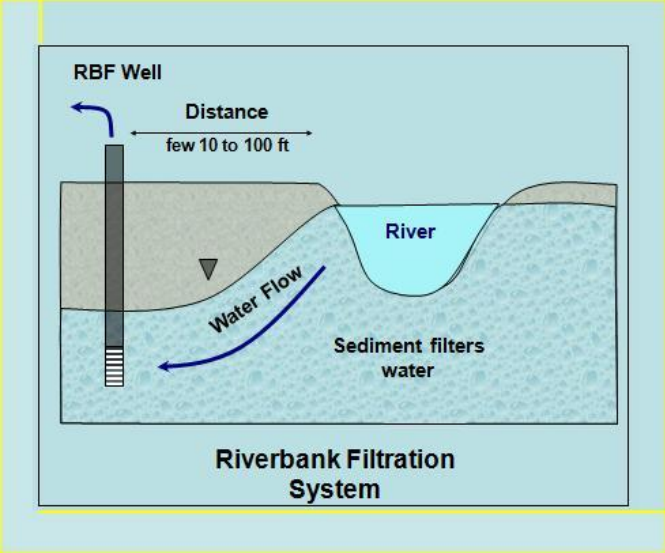
Study Area: Along river Kali in Dandeli , Karnataka

Objective: Demonstrate and then transfer the knowledge of RBF which is a safe, reliable, affordable, easily installed and maintained technology for producing drinking water by treating polluted river water.

Hydrogeological principle:



Achievement: About 5000 liters/day of water was served from the RBF well

Average reduction in Total coliform - 93.25%; *E coli* – 98%. Improvement in removal efficiency of metals such as Lead upto 99% and Copper – upto 98%

Area: *Natural Resource Management*

Projects related to climate change

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- **Assessing the impact of climate change on surface runoff in Zuari sub-basin**
  - **Supported by DSTE, Government of Goa**

- **Climate resilient infrastructure services: Case study of Panjim, Goa**
  - **Supported by USAID**

- **Policy Engagement with State Government on Urban Climate Resilience**
  - **Supported by Rockefeller Foundation**

Area: *Natural Resource Management*

THANK YOU