Group: Land Management in India

Final project Presentation

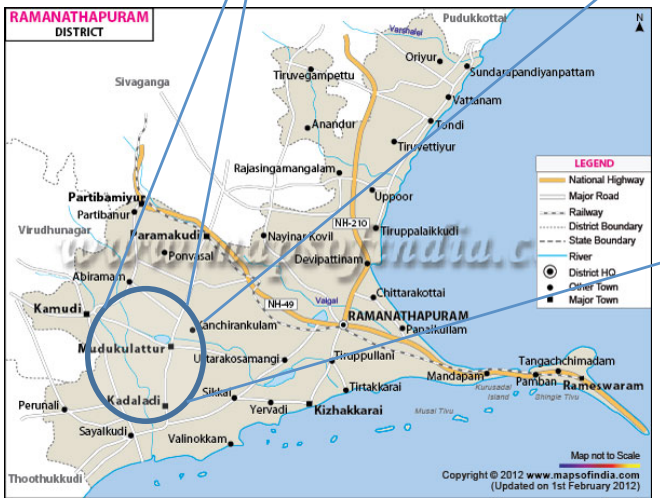
on

Cost-Benefit Analysis of Notorious Dry lands of Ramanathapuram District , Tamil Nadu, India

Contributors:

V.S.Balasubramanian, Dhananjaya, Anupriya Pande , Uma Gurumurthy, & Dr.Inkarsal

Location of Project



Study Area - Drylands of Ramanathapuram District – 2 highly degraded blocks of the district due to Prosopis invasion selected for project purpose.

Context of Project Area - Current Scenario

- **Majority of the cultivable Land is left fallow & Invasion by *Prosopis Juliflora***

- **Continuous degradation of Fertile land**

- **Poor Water Resources and Poor Management of existing Water Resources & related structures**

- **Less Non-Farm Sector activities / Industrializations**

- **Migration to nearby town in search of decent living as real alternative livelihood option not available in the villages**

Current Ecosystem Services

1) **Provisioning Services**
   (a) Food & Fiber – with low productivity
   (b) Fuel and Wood (Mainly Prosopis)
   (c) Saline Ground Water – Not useful for agriculture

(2) **Regulating Services**
   (a) Air Quality Maintenance
   (b) Water Regulation
   (c) Erosion Control – With prosopis coverage

(3) **Cultural Services -** Spiritual and Religious Institutions in the district and

(4) **Supporting Services -** nutrient recycling, Carbon sequestration

Externalities

Positive Externalities:

The invasion of Prosopis has created a mini-forest (social forest) like environment favouring prominent presence of Rabbits, Peacocks and other small birds and animals and Prosopis filled tanks serves as a breeding places for migratory birds during monsoon seasons

Negative Externalities:

Degradation effects of Prosopis - Loss of fertile Land, water bodies, agricultural production loss

Stakeholders of the Project

- Farmers and Landless laborers
- Financial Institutions
- Village/Gram/Town Panchayats (Local Institutions)/State Govt/Central Govt line Departments
- Charcoal Producers, Supplier, Traders on Charcoal & Brick Kiln Industries
- Biomass Power Producers/ Solar Power Producers
- Desalination Plant Operators/Companies
- Private Drinking Water Suppliers
- Insurance Companies

Future Scenario & Interventions proposed

Multipronged approach to Reversing, Controlling degradation due to Prosophis invasion and creation of alternate livelihood systems

- Use Part of Cultivable Land for Production Purpose
- Promotion of Livestock Management
- Preservation, Restoration, Renovation and Maintenance of Water Resources & Structures
- Installation of Mini-Desalination Plants at village level
- Promotion of Solar Farms
- Pricing the Brick kiln and Charcoal Industries
- Promotion of Biomass Power Plants

Research Methodology

Research Hypothesis: There is a positive net benefit from farm and non farm activities derived from the investment cost on proposed multipronged approach to reversing, controlling degradation due to Prosopis invasion and creation of alternate livelihood at the end of 10 years.

Methodology:

1) Non-Demand based Market Price Valuation Method
2) Willingness to pay -stated preference method- 'Choice Experiment (In various scenario discussed, we have taken "Part-Agriculture"/Part- Prosopis" System scenario, which was overwhelmingly supported by the village respondents during the survey stage for CBA).

Research Methodology .....

(1) **Selection of Study Area** - Two blocks in Ramanathapuram district Mudukulathur and Kadaladi blocks based on level (highest) of degradation and severity of the degradation on the livelihood.

(2) **Pilot Areas** : The two villages Keelasakkulam and Melasakkulam villages in Melamudukulathur revenue division acted as pilots to carry out our survey

(3) **Secondary Data Collection**

(4) **Primary data collection**

(5) **Data analysis** (Cost Benefit Analysis) on a time scale of 9 years with discount rate of 15 % for ERR

Research Methodology …..

Costs & Benefits Identification:

A. **Benefits from Prosopis Plantations** - Mainly provision services (Naturally grown, uncontrolled growth) - Fuelwood, Timber, Gum, Charcoal (after processing) - we can use market price

B. **Benefits & Costs from Agricultural Production Systems** - Mainly provision services- Easy as we can build farm model with current/future cropping pattern and related agri activities again using market prices

C. **Cost of Degradation on Agricultural Land and Productivity** - The major cost is to restore the land (cost of removal of Prospis), restoring nutrient status by Agronomical Measures, Soil Fertility and Water Management measures - Market prices are available.

Research Methodology …..

Costs & Benefits Identification …..:

D. **Cost & Benefits from Water bodies including In-situ Water harvesting structures (New and Existing) like Farm Ponds**: restoration, renovation, rehabilitation of water bodies (Pre-post scenario, these water bodies besides providing irrigation also acted as fish ponds, a supplementary food for the community) Market prices are available.

E. **Cost & Benefits from regulating & support services** such as water regulation, erosion control, carbon sequestration is little complex and difficult, we can refer existing literature on Dry land ecosystem evaluation to value this services. We can assess it by "Choice Experiment" and prepare a suitable survey questionnaire.

Basic Financial Factors for CBA …..

1. Discount Rate : 15% (as followed by Rural Infrastructure projects /PPP projects in India)
2. Project Period – 9 years, Major Investment spread over 2 years
3. Shadows factors for working out Shadow price/ Economical price is not available for all activities proposed in the project Scenario. Hence standard factor of 1 (means market price is equivalent to economical price – though not a realistic situation)
4. Sensitivity Analysis carried out for Investment cost & Agricultural Production area (reduction of area under Prosopis)

Basic Factors for CBA …..

1. Cost & Benefit from water bodies - Though cost is on common property, the cost is assumed to be shared by each parcel of land (both cultivated and uncultivated land)
2. Cost & Benefit from Other possible investment activity (Solar Farm) have not been factored in.
3. Cost & Benefits from other activities in the vicinity of the area such as Private water supply units, De-salination plants, Fishing/Sea-Marine economy, Brick kiln, Biomass power plants have not been considered to avoid complexity.

Cost Benefit Analysis - Results

Calculation of NPV, ERR and BCR (Amount in INR)

Financial Results	INR Lakhs
Present Value of Costs @ DF 15 %	32.66
Present Value of Benefits @ DF 15 %	53.15
Net Present Value	20.49
ERR	33%
BCR	1.63 : 1

The project economics is sensitive to (1) Investment cost (cost required to recover areas from prosopis & water resource area recovery) and (2) future area under proposes. Increase of investment cost beyond 14% (@15%) and area under prosopis reduction more than half (66%) makes project unviable…Net present value become negative

Limitations …..

1. Complex data requiring multi-level validation
2. Difficulty in getting data and authenticity of the data
3. Hesistation among participation during Scenario Survey & conducting statistical analysis.
4. Creation of suitable choice itself.
5. Difficulty in defining different attributes
6. The current & ongoing situation (recurrent droughts, prosopis based economy, comfort level at migrated working place) may pull the respondents to agree for a status quo scenario.
7. Strong Influence by the prosopis charcoal and brick kiln industries
8. Other vested interests (encroachers, labour contractors etc) may consider this as a threat and may influence the outcome.

References …..

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