

# Integrating Multiple Stakeholders in the Ecological Restoration of an Iron Ore Mine in Odisha, India

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# Policy Context

## Iron Ore Mining in India

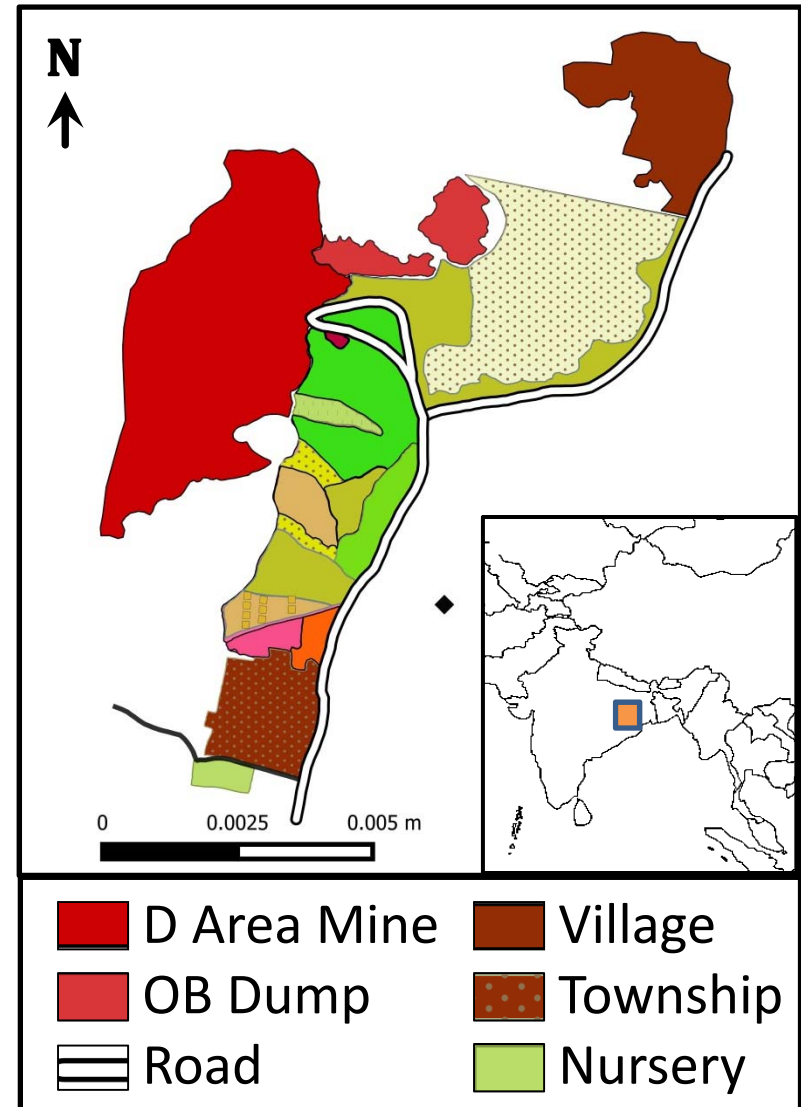
- federal structure of government and environmental clearances for mining
- Regulatory compliance



# Case Study: Ecological Restoration at SAIL Bolani Mines, Odisha, India

- SAIL has 12 sq. miles of Mine Leases for Iron and Manganese Ore in Bolani, Odisha, India
- 75 acre area near SAIL's Active open-cast Iron ore D Area Mines earmarked for restoration

*Plantation Map of Experimental Site (Right) in India (Inset)*





# *Tatiba Village*

- 985 people in 236 households (Census 2011)
- 82% Tribal: *Munda*, *Karva* & sub-tribes of *Birhor* community & Others: Hinduism & Christianity
- Livelihood strategies (vary across households):
  - Majority indirectly dependent on mining



# Ecological Restoration Workflow



## Site Surveys

- Degraded; lacking top soil
- Vegetated area heavily infested with aggressive invasive weeds
- Iron Oxide dust blow from OBDs



## Site preparation

- Weed removal by cut-root-stock method (Babu *et al* 2009) employing local people
- Check dams to improve soil moisture

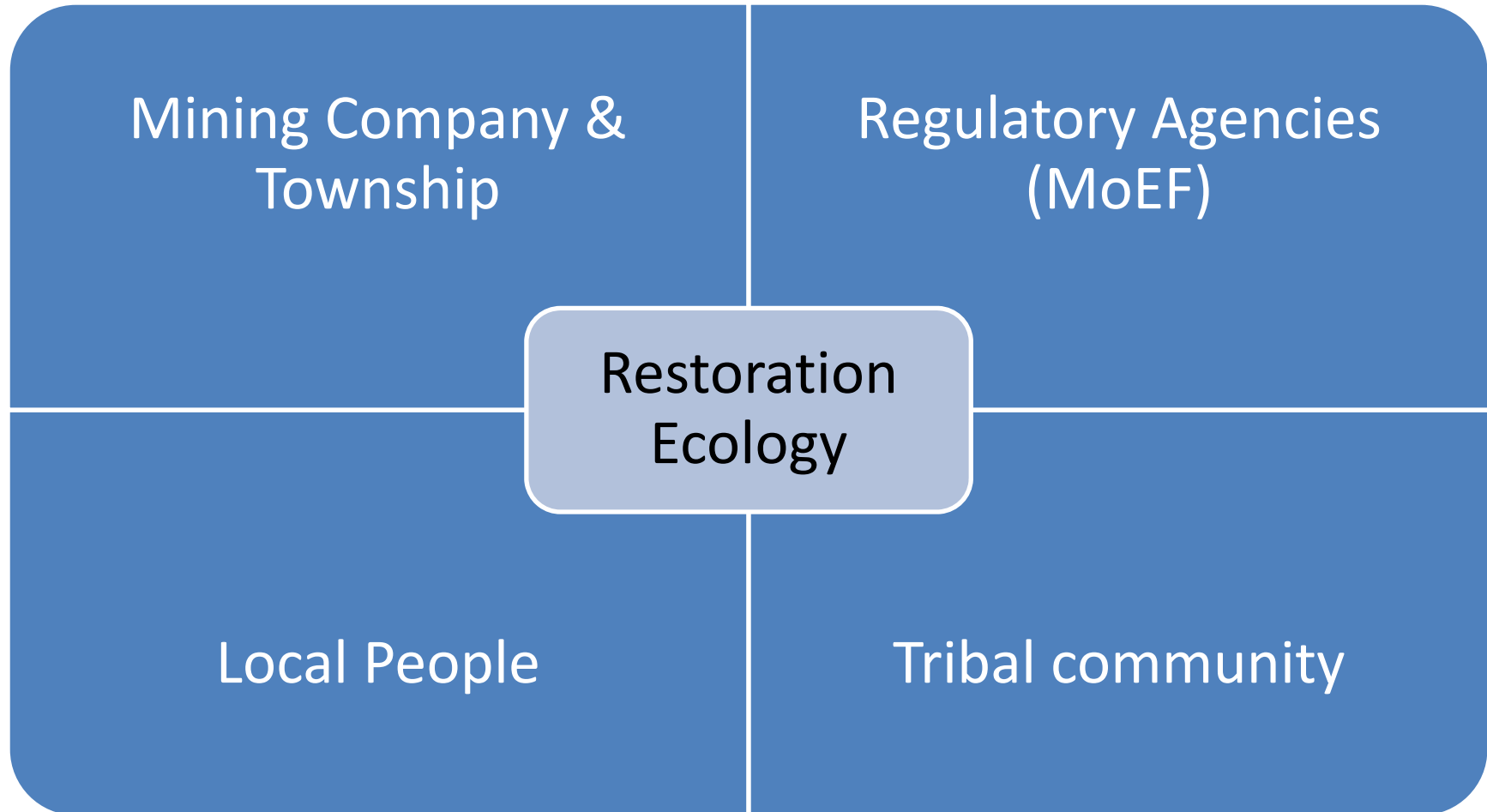


## Plantation

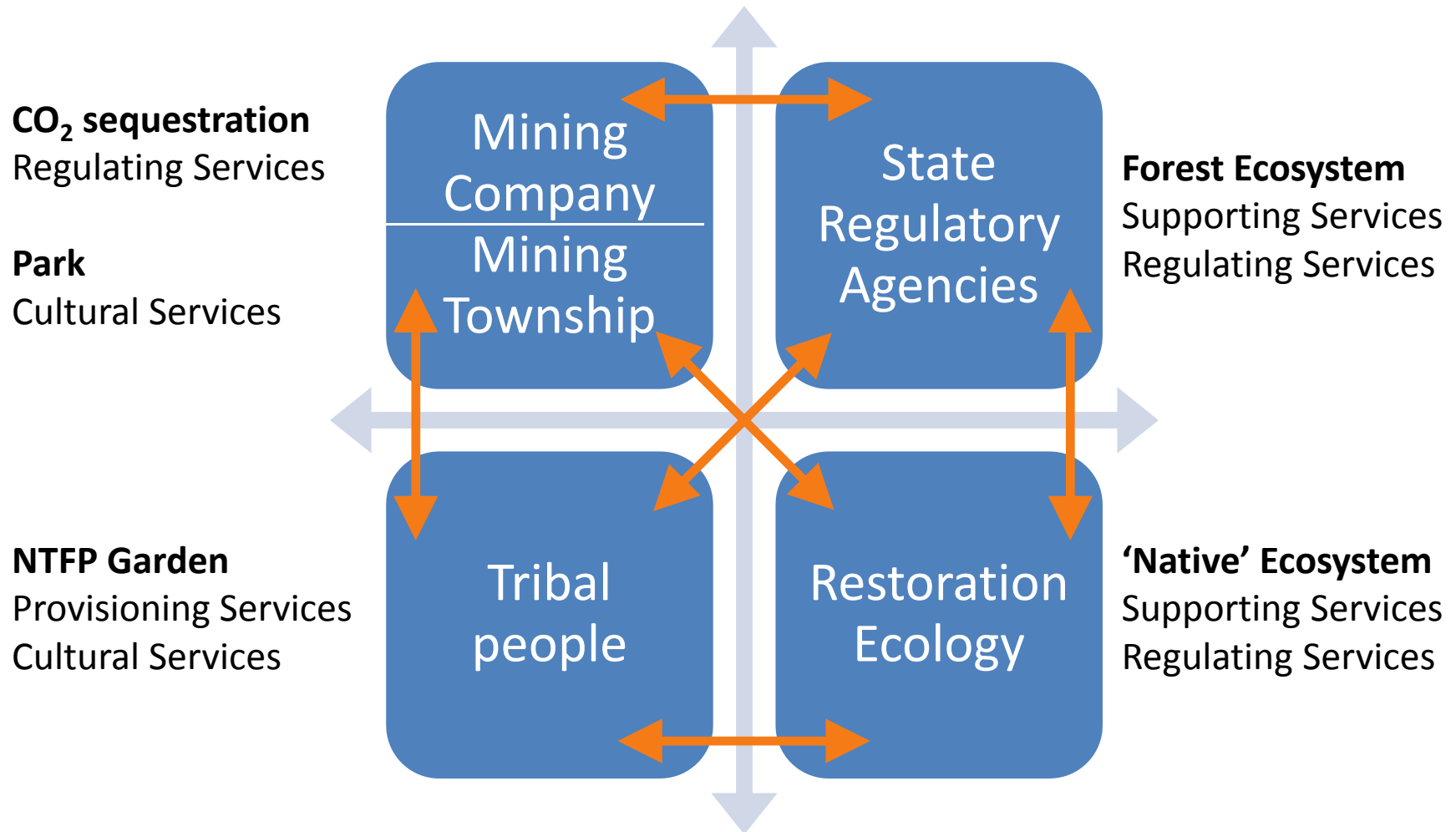
- Developing Field Nursery with the help of local people
- Introduction of early successional species and 8 species of grasses

(Adapted from SER 2004)

# Integrating Stakeholders



# Ecosystem Services *conflicts & paradoxes*





# Tribals & The Restoration Project

- Key uses: fuel wood and fodder
- NTFP Garden choice dominant
- Variation among & within households
- Restore to native Tropical Deciduous Forest Ecosystem
- Dominant climax vegetation: *Sal* trees (*Shorea robusta*)





# Conclusion

- Complex ecological and social settings of developmental projects in India pose a major challenge for conventional restoration approaches
- Stakeholders can have divergent ecosystem service requirements, in space and across time
- Divergence is made visible, and could be potentially offset, in a multidisciplinary setting (Kota & Shackleton 2014)
- Critical social, political and ethical challenges in Restoration when negotiating among different stakeholders with dynamic preferences

# References

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