



The interaction of demand, distance, degradation, and deterrence: An analytical framework of villager- forest interaction



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Why is an analytical framework useful for impact evaluation?

- **Provides a structure** and conceptual framework to predict and evaluate the impact of new forest tenure regimes
 - Helps policy makers predict how villagers will respond to changes in forest laws/ property rights in ways often not anticipated
 - **Informs decisions over**
 - Where to place property rights enforcement
 - Predicting locations and amounts of leakage
 - Evaluating the effectiveness of protected areas
 - Explaining patterns of resource degradation
- => Improved design of new forest tenure rules and regulations

Many approaches to rural dependence on forests and protection of those forests through changes in forest governance/tenure

- Examples include:
 - Social forestry projects
 - Integrated conservation-development projects (ICDPs)
 - Participatory forest management (PFM), including JFM and CBFM
 - Ecotourism
 - Environmental service payment (ESP/PES) programs
- All aim to involve villagers in the protection of local forests and to enable villagers to capture some value from the protected forest
- Generally not as successful as hoped for
- **Why? Few have addressed explicitly or understood how villagers change their behaviour in response to changes in forest tenure and implications for success, conflict, costs, of new regimes**

Key elements of analytical framework/model

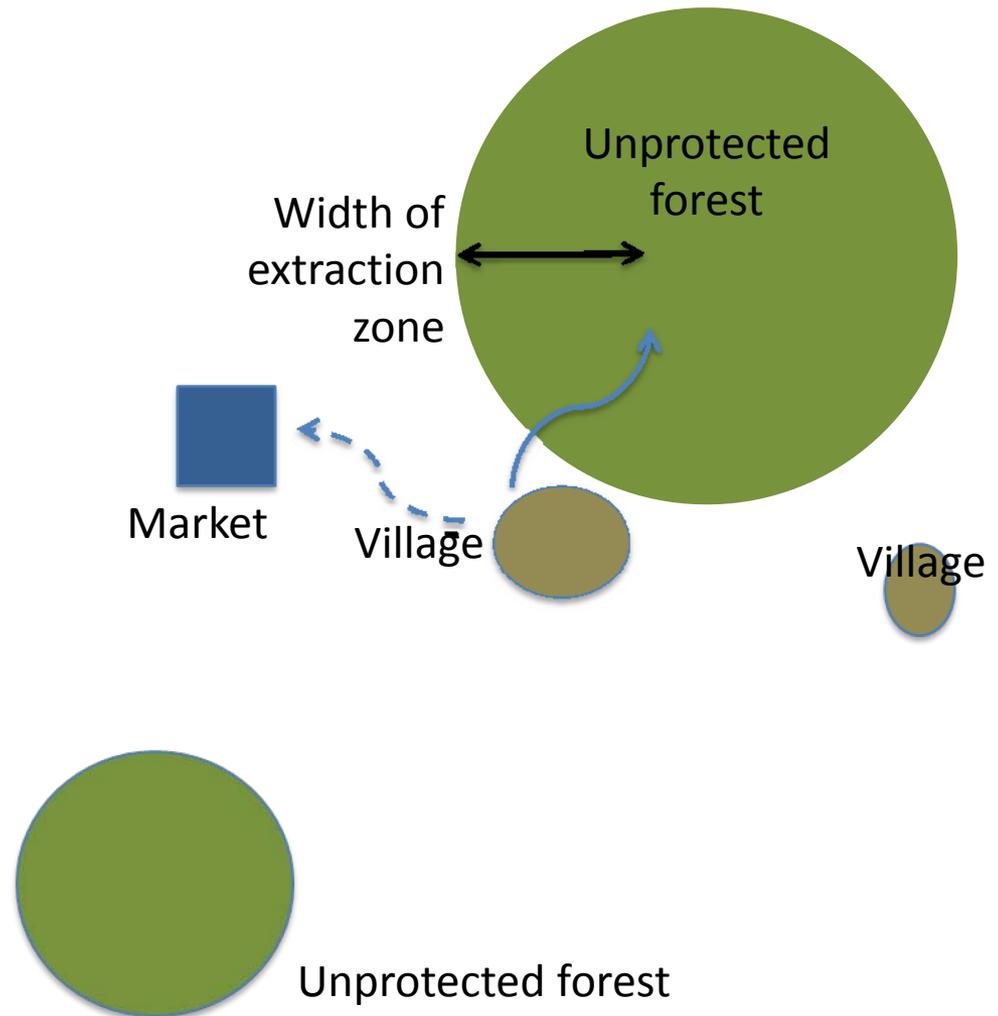
- **Spatial aspects**
 - Distance and degradation
- **Household behaviour**
 - Demand for forest products
 - Labour allocation
- **Deterrence**
 - Patterns of protection of tenure regulations
 - Deterrence of activities as a function of resource and location
- **Technologies and livelihood projects**

Why an explicitly spatial analytical framework?

- Many aspects of forests and forest management are spatial
 - Ecosystem services
 - Parks – sizing and siting
 - Size, shape, and fragmentation determine benefits and threats
 - Villagers' forest resource extraction
 - From which forests and where in a particular forest
 - Patterns of deforestation
 - Enforcement strategies
 - Decisions over where to patrol
 - Spillovers/displacement

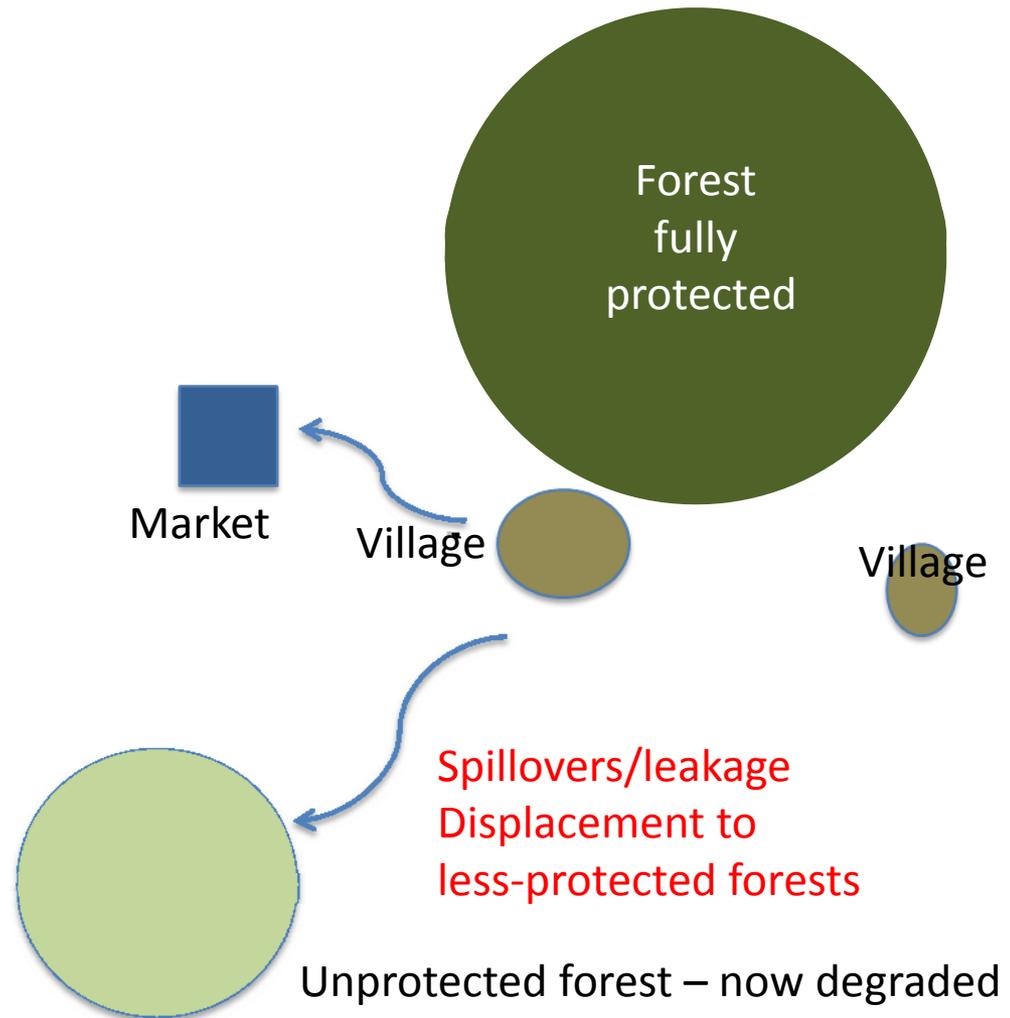
Spatial interactions

- Villagers choose distance throughout forests where they collect resources
- Typically we also therefore want to consider “intensity” of resource collection



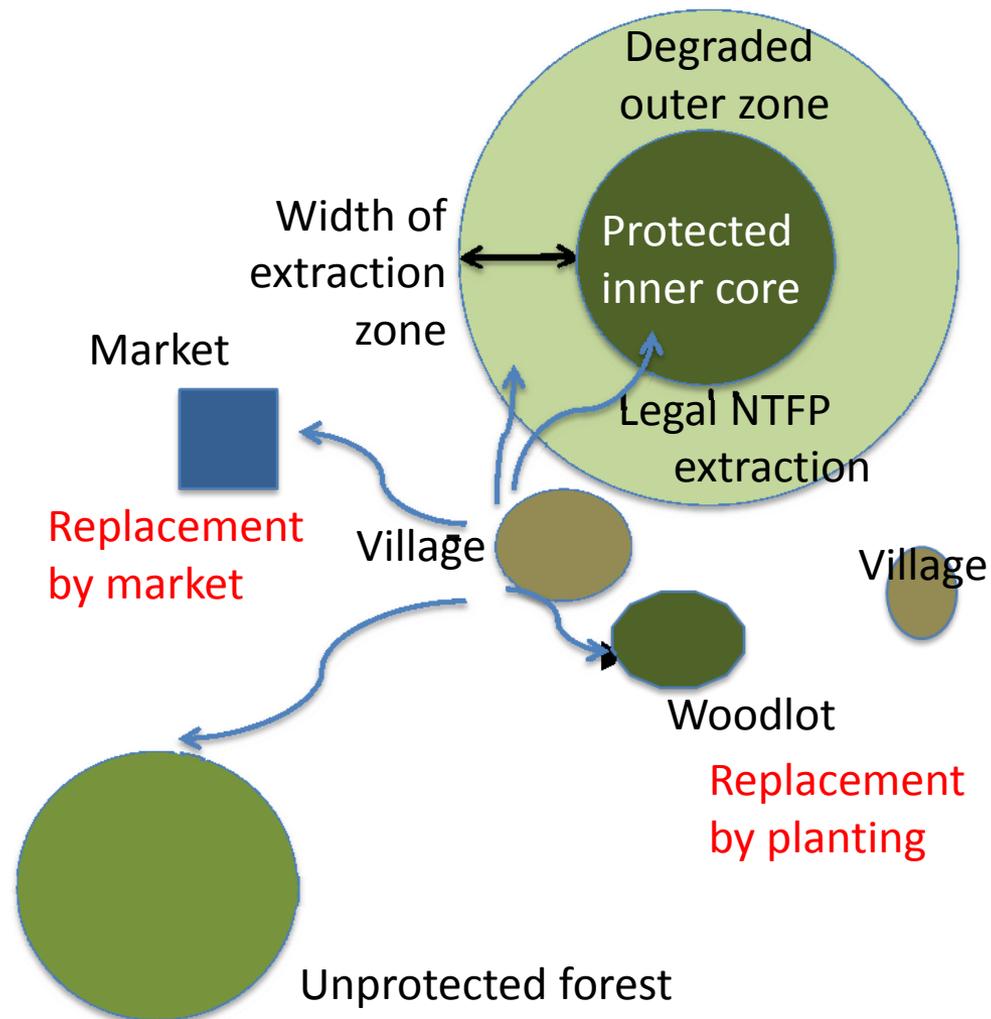
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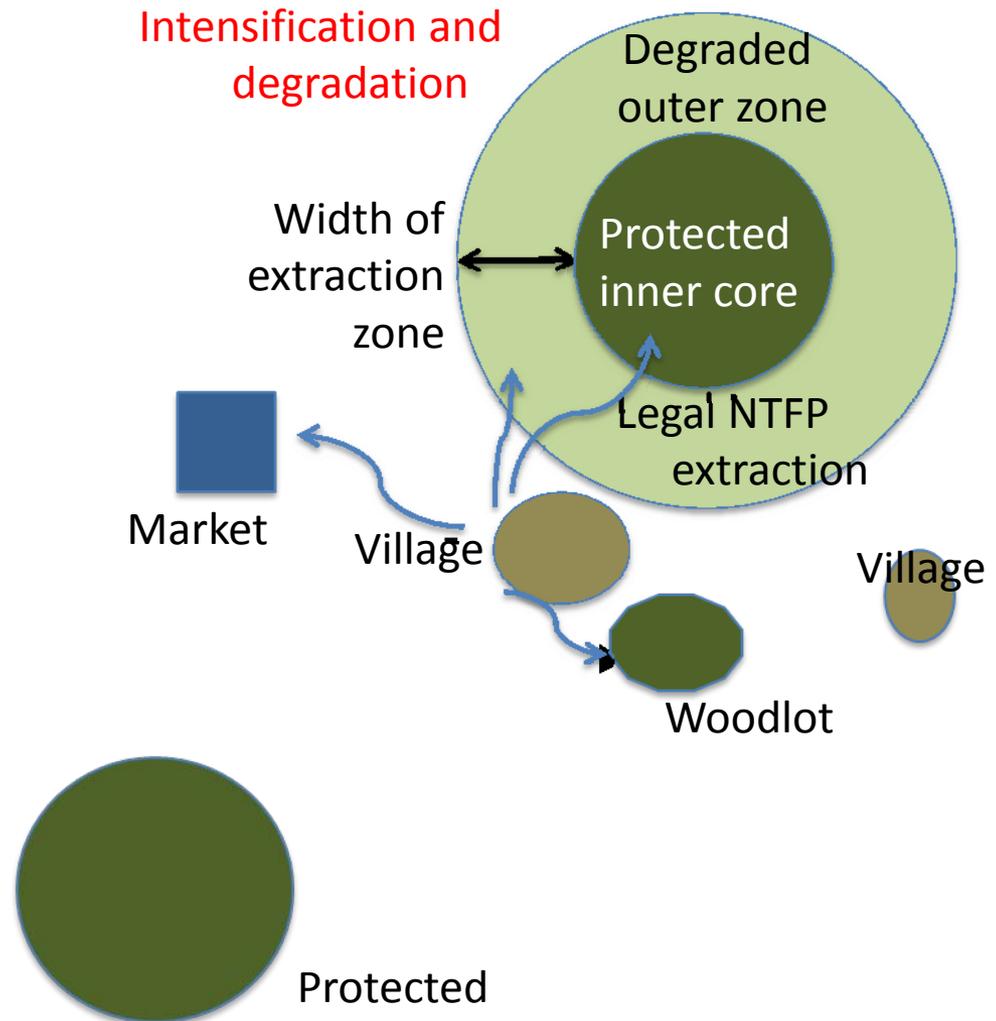
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Models we develop take explicit account of how villagers respond to changes in forest tenure (1)

- Change in forest tenure implies change in access to forest resources
- We develop models that takes account of villager optimisation (profits, utility) through labour allocation
- Villagers make distance and intensity decisions
 - From which area to collect NTFPs and whether to collect intensively in a smaller area or extensively in a larger area
 - These decisions affect the spatial pattern of degradation and therefore ecosystem services provided by the forest

Models we develop take explicit account of how villagers respond to changes in forest tenure (2)

- Quantity of resource demanded
 - Is there a “requirement” such as for fuelwood
 - Are NTFPs for home consumption or sale for cash
- Determine whether and how villagers change behaviour
 - Not at all if little or no enforcement
 - Concentrate collection into buffer zone
 - Switch collection to un/less-protected forests
 - Use fewer forest resources
 - Use markets for resource or substitute
 - Plant trees
 - Use resources more efficiently through new technologies

Patterns of protection

- Protection depends on governance structures
 - Government
 - Villagers
- Whatever the governance structure, in practice enforcement rarely has strategic basis
- Spatial models can accommodate spatial patterns of patrols
 - Patrol at periphery or throughout particular areas of forest
 - De facto or de jure buffer zones where collection of resources occurs without risk of being caught
- Distance creates deterrence, substitute for enforcement

Demand can be changed through technology and livelihood projects

- Technology
 - Where there is inelastic demand, such as for fuels
 - Improved stoves
 - More efficient charcoal production
- Livelihood projects
 - Are popular, but may not change villager incentives and therefore behaviour

Practical uses of such models (1): predictions

- Examples of predicted impact of changes in forest tenure
 - Unlikely to find tree planting as a response to increased forest access restrictions if there are nearby unprotected forests
 - Leakage is likely to be a particular problem where there is inelastic demand for forest resources and where markets for forest resources and labour function poorly
 - Important for REDD
 - Forest-dependent households most harmed by greater forest access restrictions where poorly functioning markets
 - Conditions under which villagers are likely to “cooperate” or “defect”

Practical uses of such models (2): Design and evaluation

- Designing protection strategies
 - Distance and deterrence are substitutes
 - Dual role of buffer zones providing resources and protecting inner core
 - Intensification of forest resource collection into buffer zones can cause greater ecological damage
- Designing impact evaluation
 - Researchers who are part of the process of designing forest tenure regimes can use models to
 - Improve design of choice experiments
 - Determine appropriate baseline data to collect

Practical uses of such models (3): REDD

Leakage is a particular challenge

- Spatial models can inform policies for enforcement and incentives to reduce the leakage; locations/socioeconomic situations where leakage likely to be small

The second “D”, degradation, is particularly important for Africa

- Monitoring degradation presents particular difficulties
- Statistical models proposed to predict locations of future degradation and locations of “avoided” degradation
- Do not reflect spatial aspects of resource extraction – degradation or interaction with market and socioeconomic setting

Key point

Forest management institutions are unlikely to be successful if policy makers do not understand how actual and potential forest users change their behaviour in response to changing incentives (carrots and sticks) as a result of changes in forest tenure

