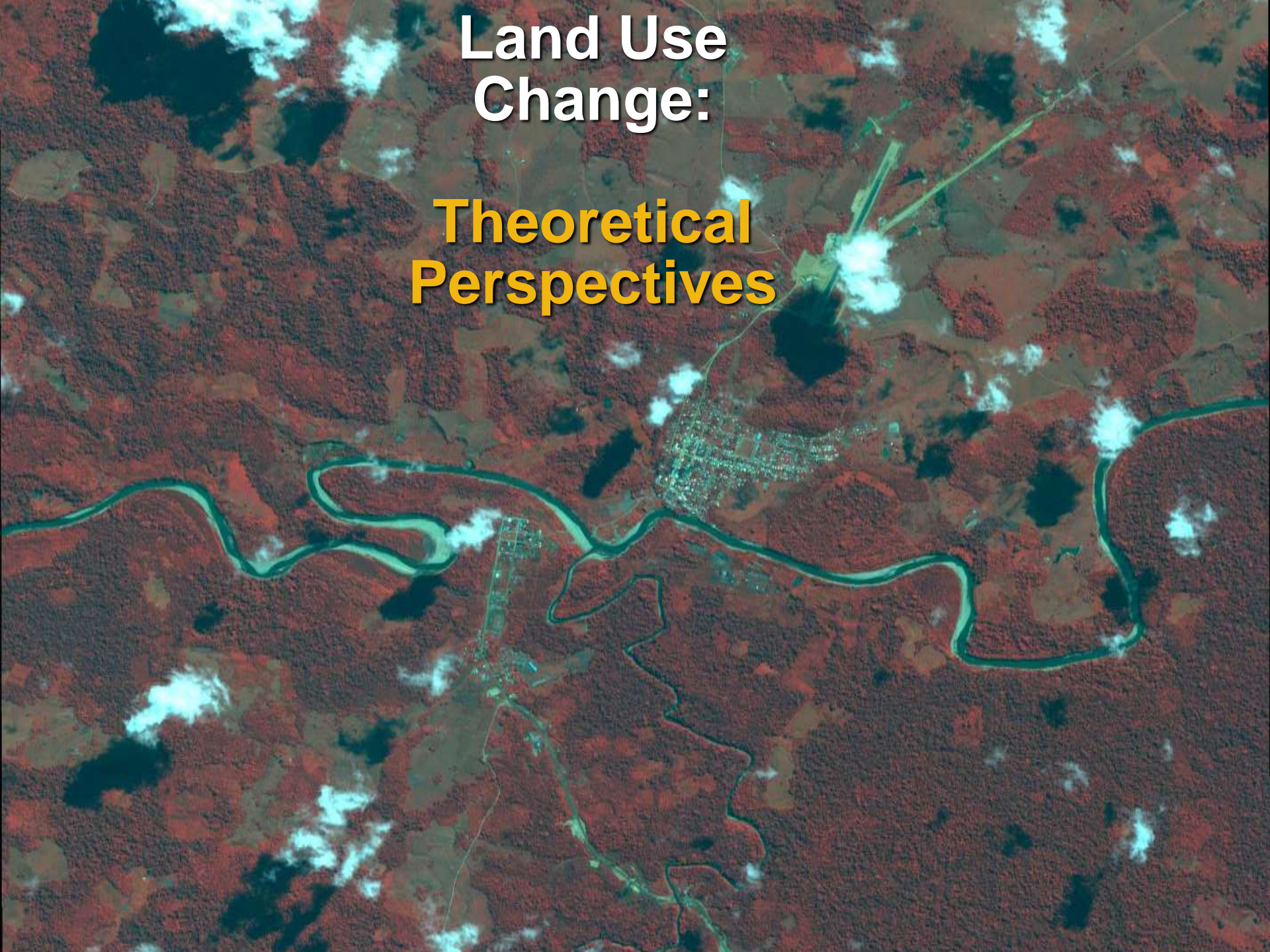


**Land Use  
Change:**

**Theoretical  
Perspectives**

**Land Use  
Change:**

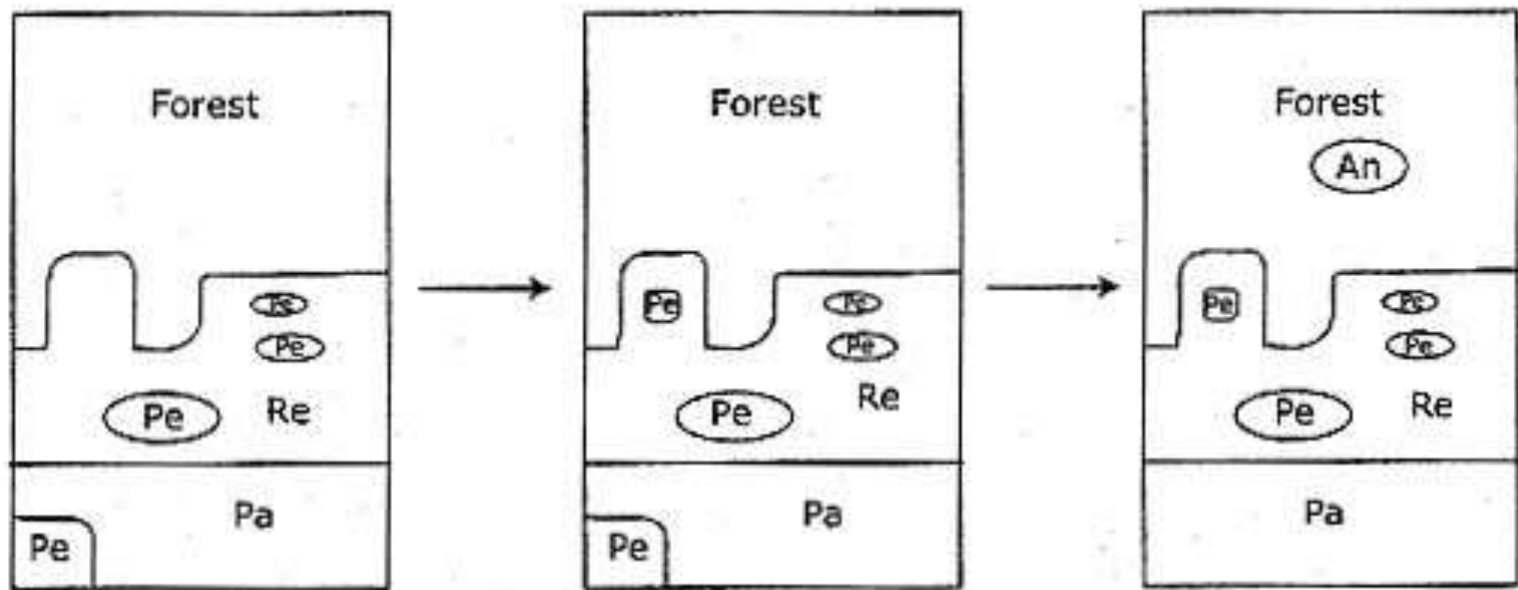
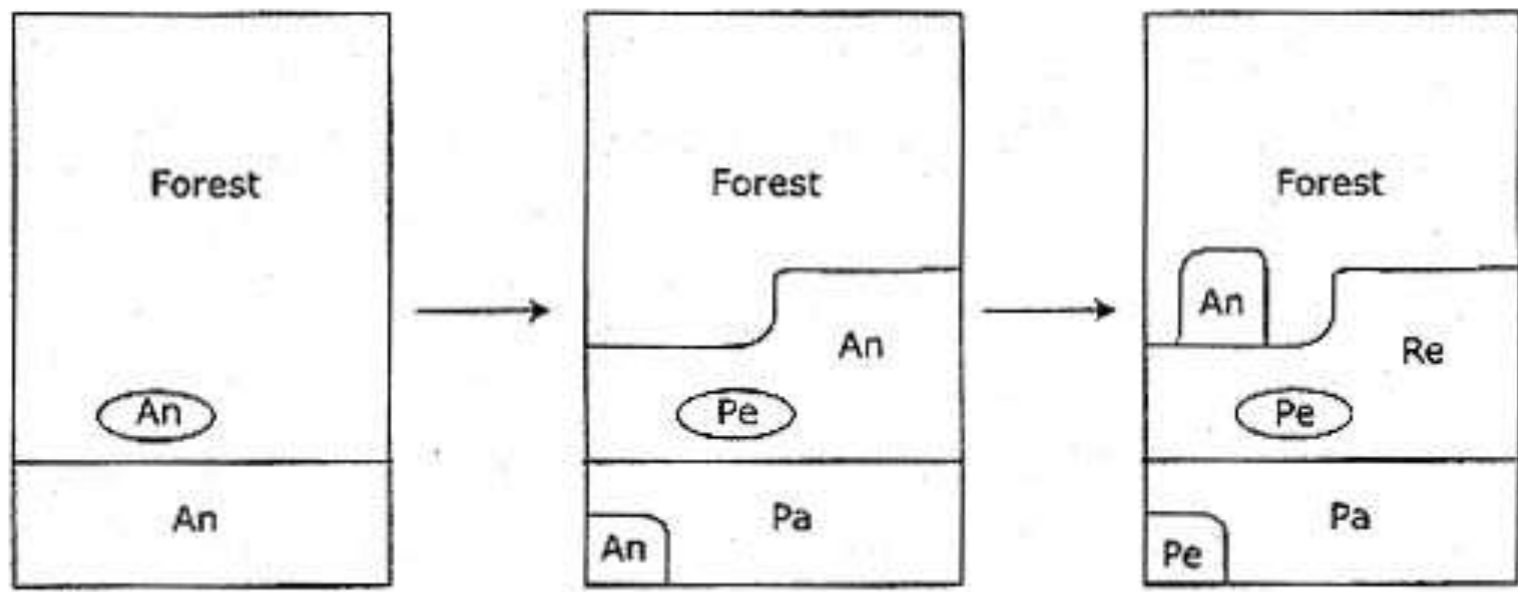
**Theoretical  
Perspectives**



# Land Use Change: Theoretical Perspectives

- Land Use Change
  - Changes in land use practices
    - Shifts in soil management, crop varieties grown, etc.
  - Changes in land use systems
    - Shifts in the logic and mix of agricultural practices





An = Annuals Pa = Pasture Pe = Perennials Re = Regrowth

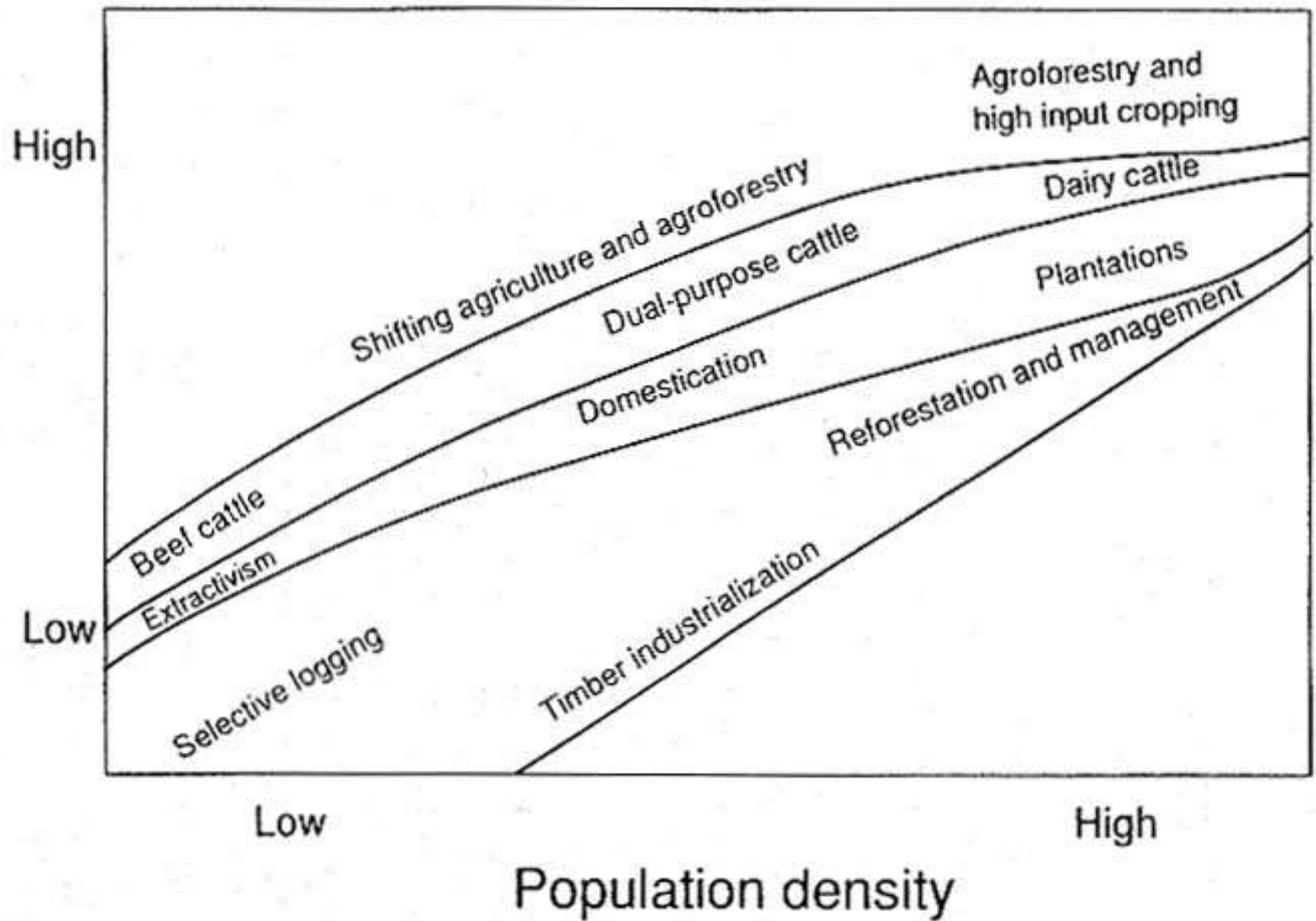
# Land Use Change: Theoretical Perspectives

- Paradigms of Land Use Change
  - There are many theoretical explanations for changes in systems of land use
  - Each has a specific emphasis and certain assumptions
  - Explanations may or may not agree
  - Here are a selection of perspectives...

# Land Use Change: Theoretical Perspectives

- Population-based Perspectives
  - Population size, growth, density changes land use
  - Emphasis on demographic impacts on demand for agricultural production
  - Malthus -- argument that population growth outstrips agricultural production; land degradation, famine
  - Boserup -- Argument that population growth leads to agricultural intensification; shorter fallows, longer land use

Land management intensity





# Land Use Change: Theoretical Perspectives

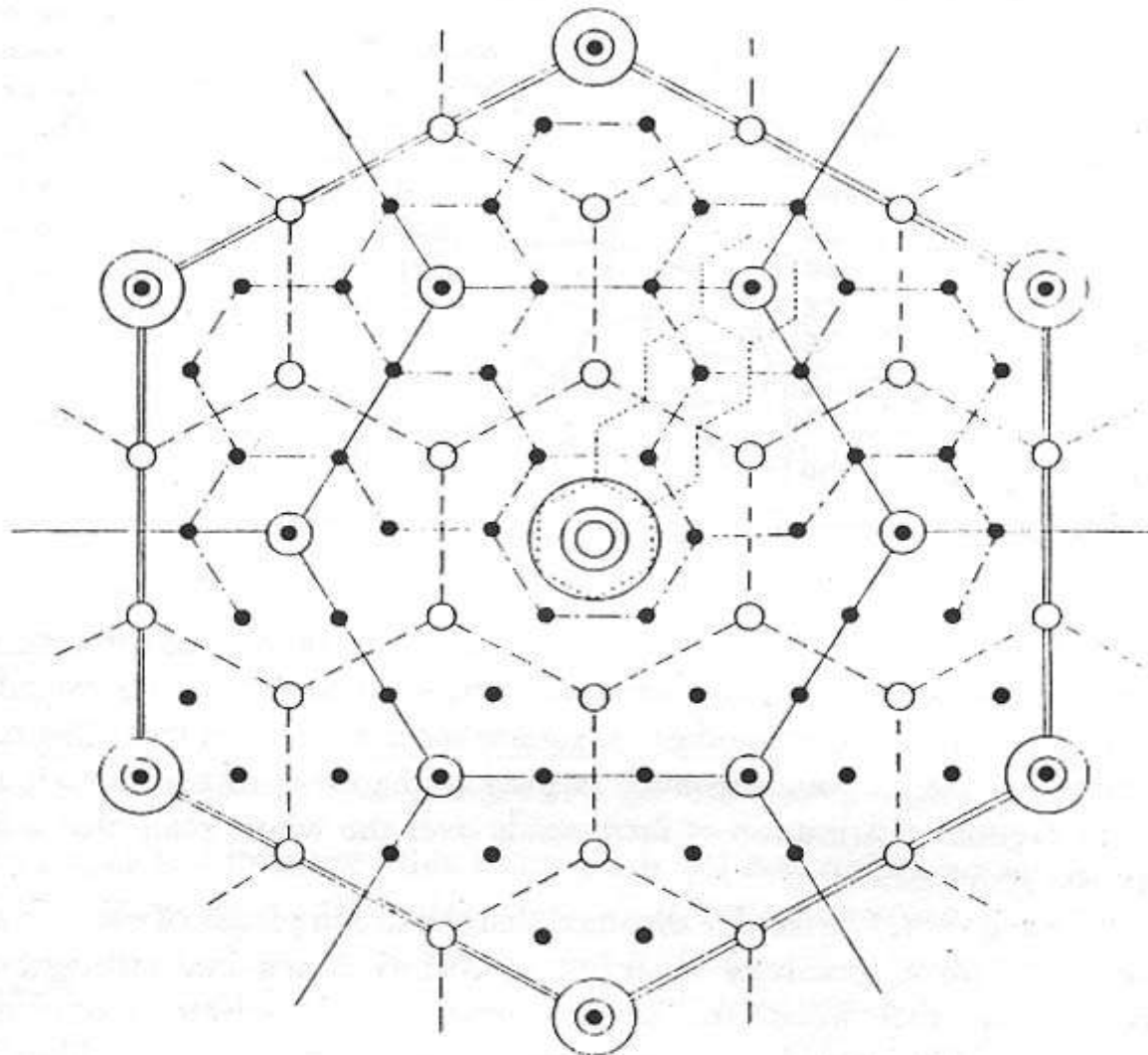
- Market-based Perspectives
  - Neo-classical economics
  - Assumes individuals allocate resources to maximize profit
  - Two types of market impacts on land use:
    - 1. Market penetration
      - The expansion of markets changes land use
      - Shift from subsistence to commodity production
    - 2. Market dynamics
      - Supply and demand determine land use choices
      - Price fluctuations generate further changes in land use
      - Shifts among commercial crops

# Land Use Change: Theoretical Perspectives

- Property Rights Arguments
  - Hardin, Alchian, Demsetz, Feder, etc.
  - Land tenure arrangements determine access to and terms of use of land
  - Open access -- lack of controls on access to land, use
  - Leads to overuse, degradation
  - Private property rights -- restricted access, determined by cost of improvements or purchase
  - An investment to be protected, sustainably used
  - Privatization changes land use toward sustainability

# Land Use Change: Theoretical Perspectives

- Distance-based Perspectives
  - von Thünen, Central Place Theory, etc.
  - Shorter distance to market raises profitability



'G' place



'B' place



'K' place



'A' place



'M' place

==== Boundary of 'G' region

———— Boundary of 'B' region

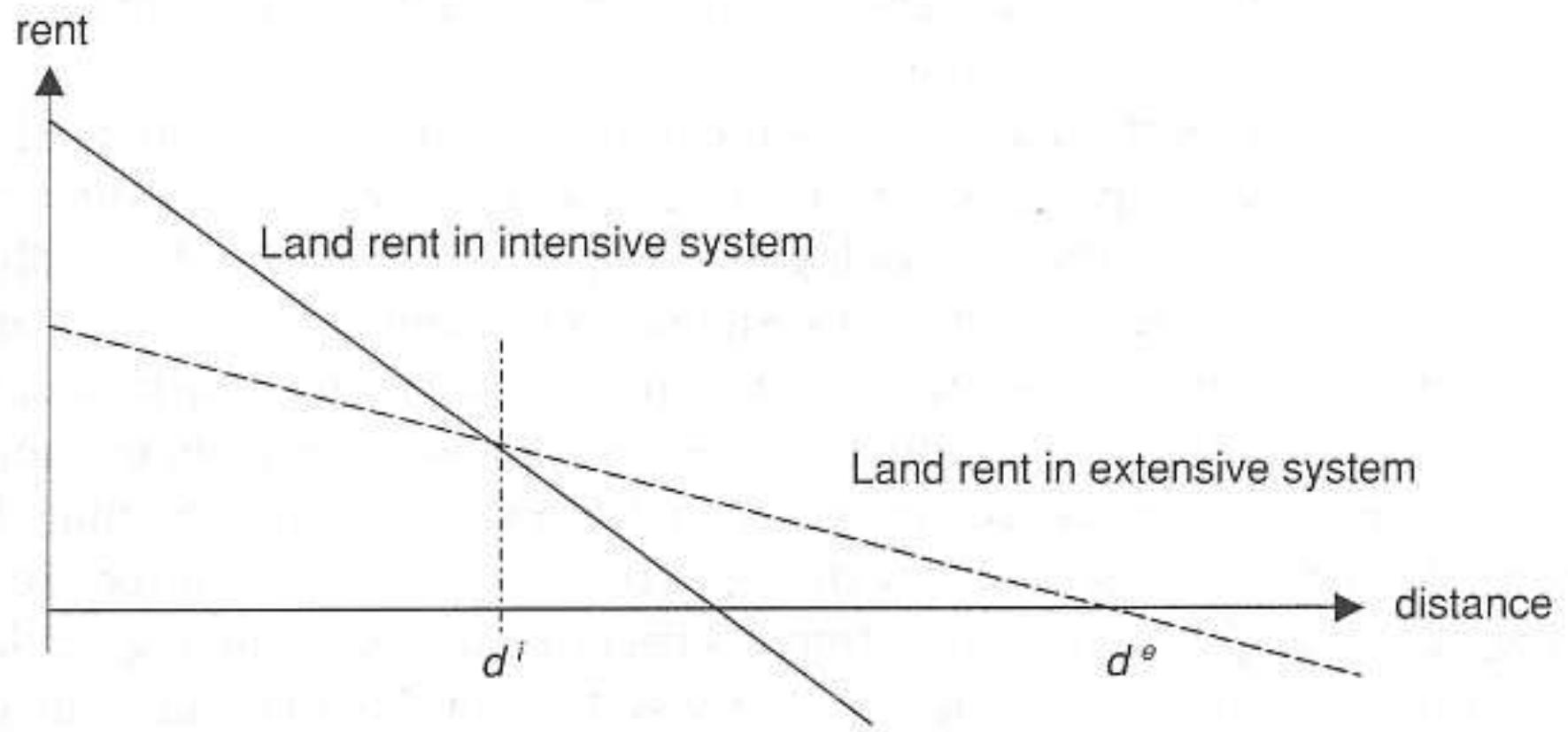
----- Boundary of 'K' region

-.-.-.- Boundary of 'A' region

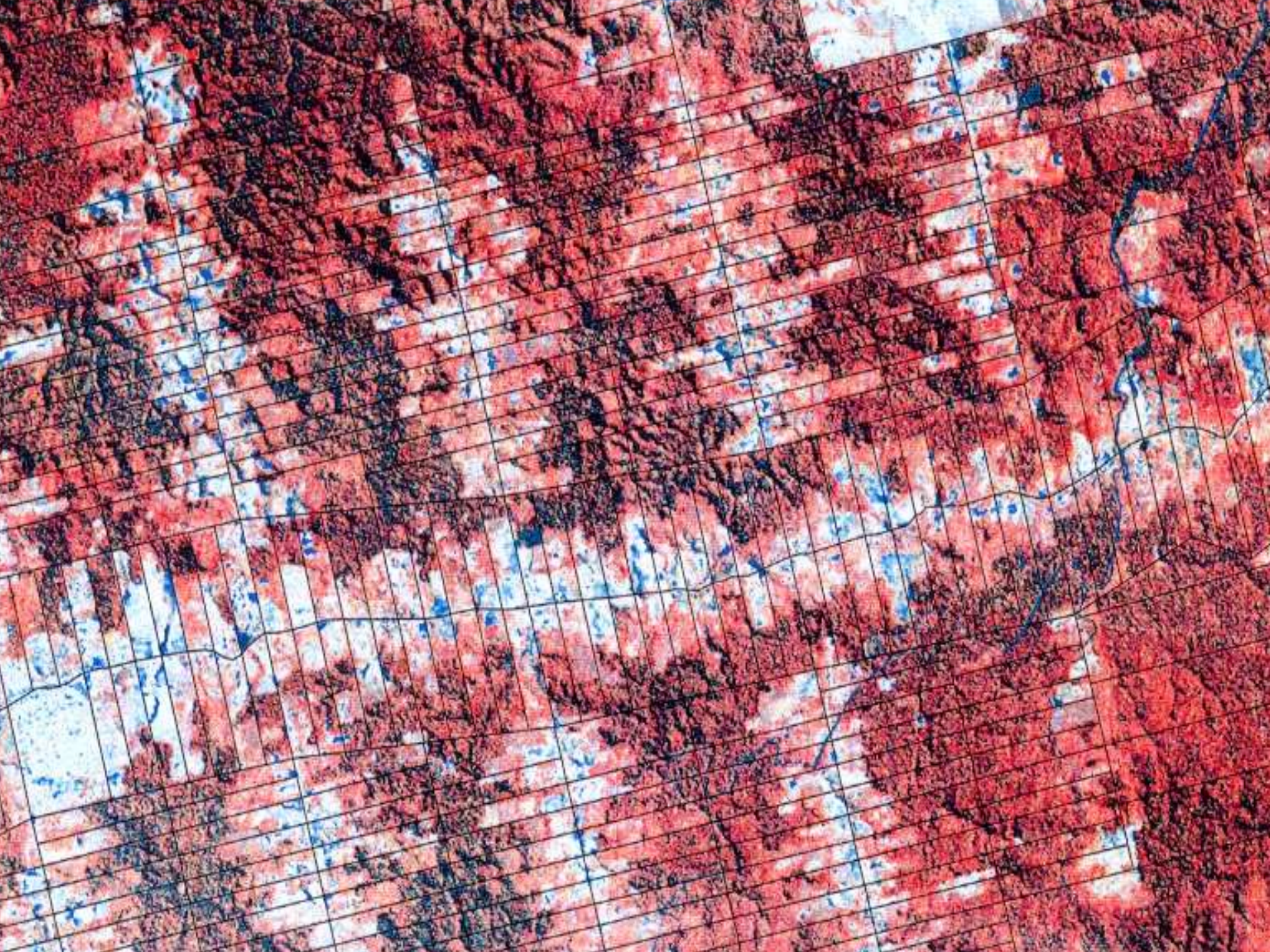
..... Boundary of 'M' region

# Land Use Change: Theoretical Perspectives

- Distance-based Perspectives
  - von Thünen, Central Place Theory, etc.
  - Shorter distance to market raises profitability
  - Changes in settlement patterns, market centers changes land use in a given place
  - Shift to commodity products, high-value products
  - Shift from extensive to intensive production practices



**Fig. 2.2.** Intensive and extensive frontiers.



# Land Use Change: Theoretical Perspectives

- Technology-based Perspectives
  - Diffusion of new technologies changes land use decisions
  - Reduces risk, labor inputs, or raises yields, allows commodity marketing
  - Shift from low-tech to higher-tech land use practices
  - Shift from subsistence to commodity crops
  - Induced innovation -- market expansion leads to technology diffusion
  - Induced intensification -- many factors drive technology diffusion



**Table 2.1.** Classification of technologies based on change in yield and factor intensities.

Type of technology	Yield ( $y$ )	Labour per ha ( $l$ )	Capital per ha ( $k$ )
Labour-intensive	+	+	?
Labour-saving	?	-	?
Capital-intensive	+	?	+
Capital-saving	?	?	-
Pure yield-increasing (Hicks neutral)	+	0	0
Yield-increasing and input- intensive ('land-saving')	+	+	+

# Land Use Change: Theoretical Perspectives

- Political Economy perspectives
  - Dependency, neo-Marxism, World Systems Theory, etc.
  - Capital penetration changes land use
  - Outside firms exploit resources and expropriate surplus value from local communities
  - Shift from traditional practices, local regulation of land use...
  - ...to non-traditional practices, external control
  - Domination by outside capital marginalizes local populations, accelerates resource exploitation, and shifts land use toward commercial products for external markets





# Land Use Change: Theoretical Perspectives

- Household Life Cycle Dynamics
  - From Chayanov, etc.
  - Household age structure influences labor availability and child dependency
  - This influences the latitude households have to engage in certain land use practices
  - Family formation and aging changes labor availability and child dependency, altering land use

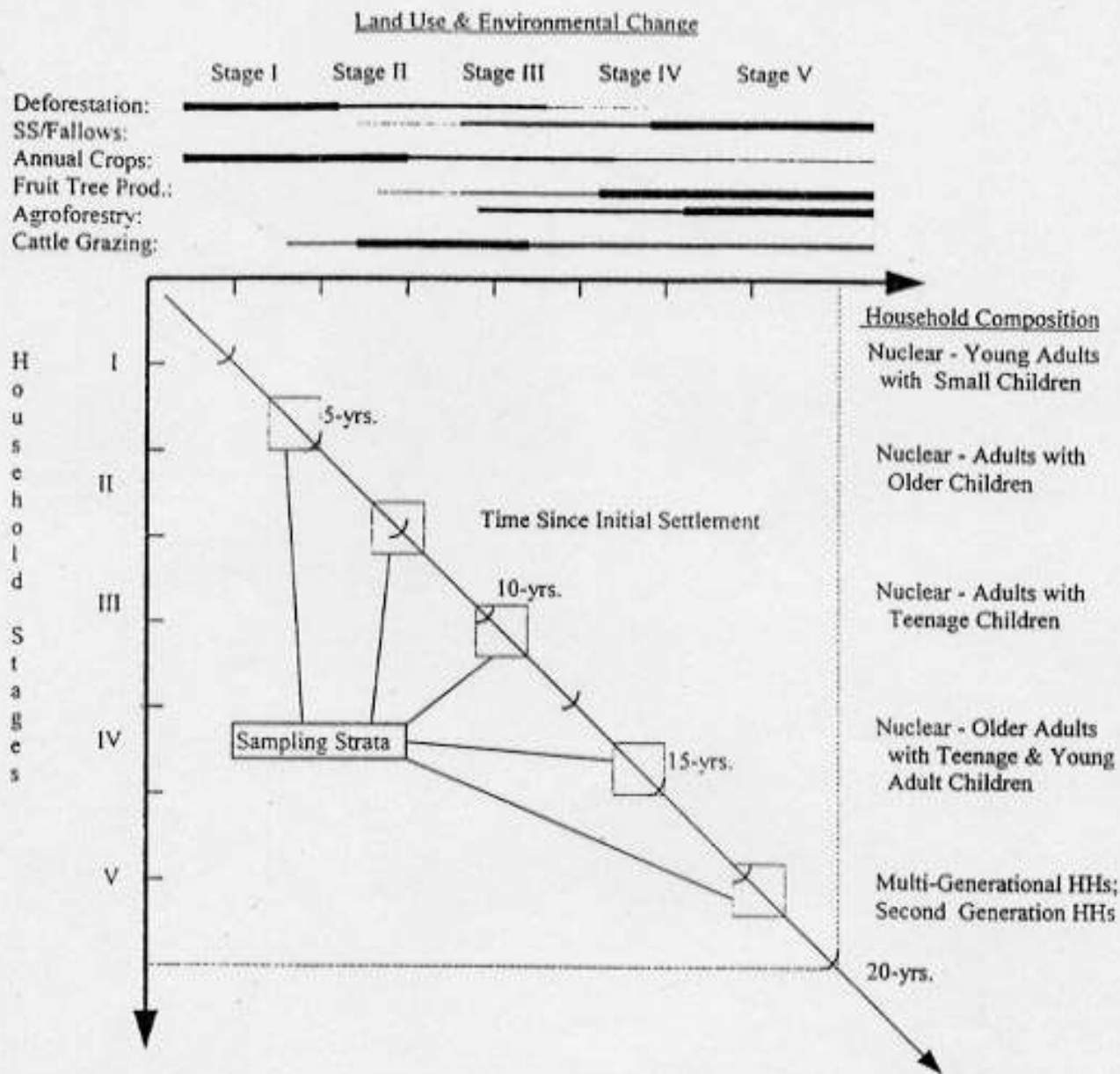


Figure 1 Conceptual model of household transformation, land use, and environmental change.

# Land Use Change: Theoretical Perspectives

- Institutional Perspectives

- Institutions -- formal or informal regimes of practice
  - Formal -- laws, markets, organizations
  - Informal -- cultural norms, political practice
- Focus on “historical institutionalism”
- All social actors (firms, state agencies, communities) have political histories reflected in their institutions
- Strategic action can reinforce or change institutions
- This in turn can change land use practices
- Changes in legal codes, ownership rights, etc.





# Land Use Change: Theoretical Perspectives

- Social Mobilization Perspectives
  - Focus on political ecology
  - Features strategic action by local communities with respect to outside actors; states, firms, markets, etc.
  - Mobilization to influence outcomes via contests over resources
  - Organizations, alliances, networks, partnerships, etc.
  - Indigenous federations, producer cooperatives, labor unions, church base organizations, etc.
  - Demand for land rights, minimum prices, credit, better roads, health care, citizenship rights, etc.
  - Changes land use via other factors; land tenure, etc.

# Photo resou









ESCOLA DE FORMAÇÃO SINDICAL

CHICO MENDES

CUT RJ

Recomendações da M. CARTA DE



IV FORUM TRINACIONAL  
CONSTRUINDO UMA HISTÓRIA DE COOPERAÇÃO PARA  
DESENVOLVIMENTO DA REGIÃO MAP  
MADRE DE DIOS-PERU, ACRE-BRASIL, PANDO-BOLIVIA  
Brasília – Epitaciolândia – Acre, 15 a 18 de agosto de 2.003

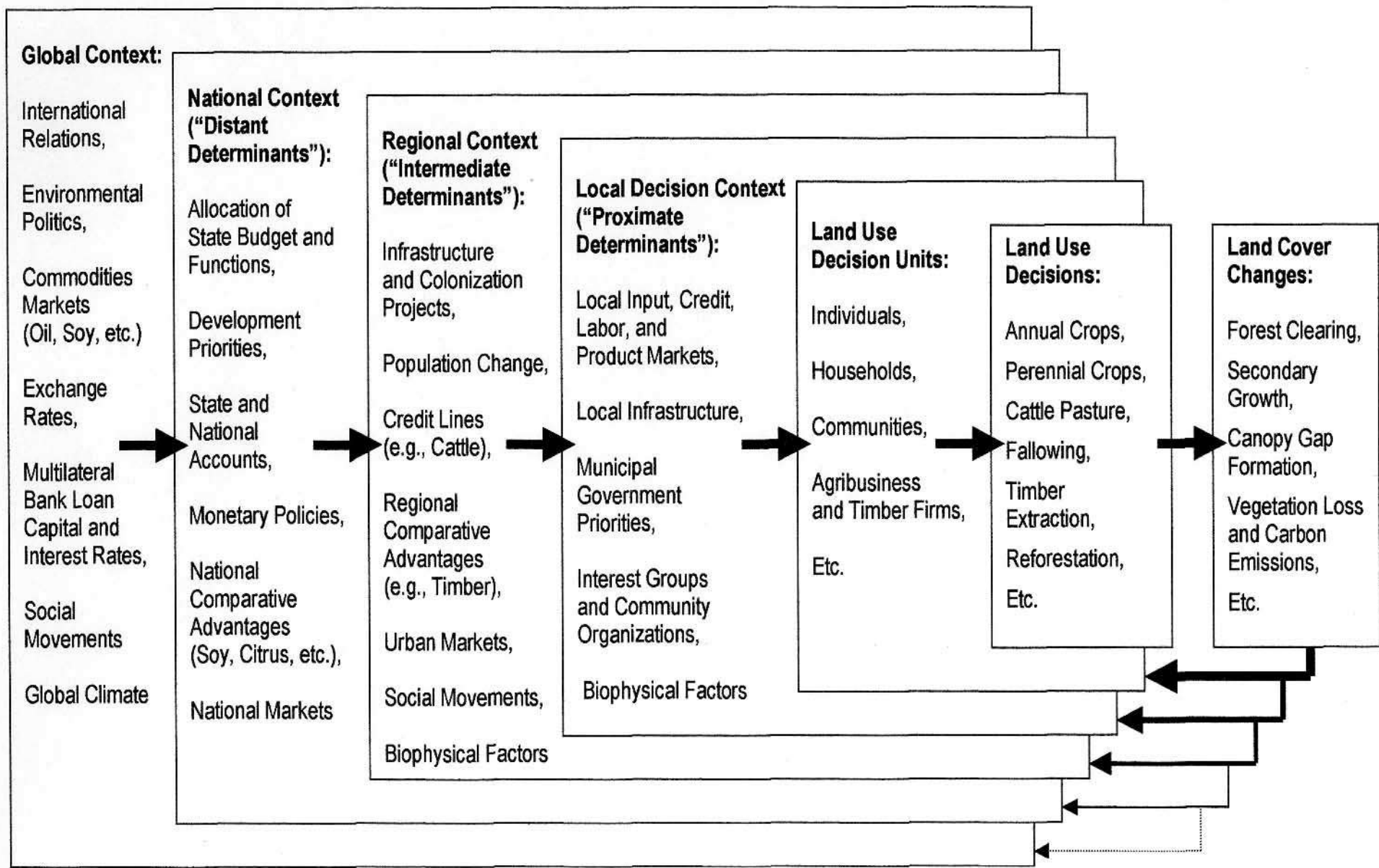
## **CARTA DE BRASÍLIA E EPITACIOLÂNDIA SOBRE COOPERAÇÃO PARA O DESENVOLVIMENTO SUSTENTÁVEL DA REGIÃO MAP (MADRE DE DIOS-PERU, ACRE-BRASIL, PANDO BOLÍVIA) DA AMAZÔNIA SUL-OCIDENTAL**

O coração da Amazônia Sul-Occidental, formado pelo estado peruano de *Madre de Dios*, o estado brasileiro do *Acre* e pelo estado boliviano de *Pando*, aqui denominado Região MAP, encontra-se em um momento decisivo de sua história. Os planos de integração regional, os avanços na infra-estrutura e as exigências de uma vida melhor nas sociedades da região geram crescentes demandas sobre os recursos naturais e seus ecossistemas. O resultado é que este território converteu-se em um cenário regional de mudanças globais, onde a pobreza, a fome, as doenças, o analfabetismo e a contínua degradação dos ecossistemas são causas de grande preocupação na região. Uma alternativa para amenizar esta difícil situação é a integração de iniciativas inovadoras relativas ao meio ambiente e ao desenvolvimento. Com esta integração espera-se elevar o nível de vida das sociedades regionais, conseguir uma melhor gestão dos ecossistemas para um futuro mais seguro e próspero. Esta integração exigirá a solidariedade e a colaboração efetiva dentro e entre as nações.

# Land Use Change: Theoretical Perspectives

- General Systems Perspectives
  - From landscape, systems ecology, etc.
  - Hierarchy theory
  - Actors and processes on various scales influence land use
  - Proximate, intermediate, distant causes; interactions, feedbacks

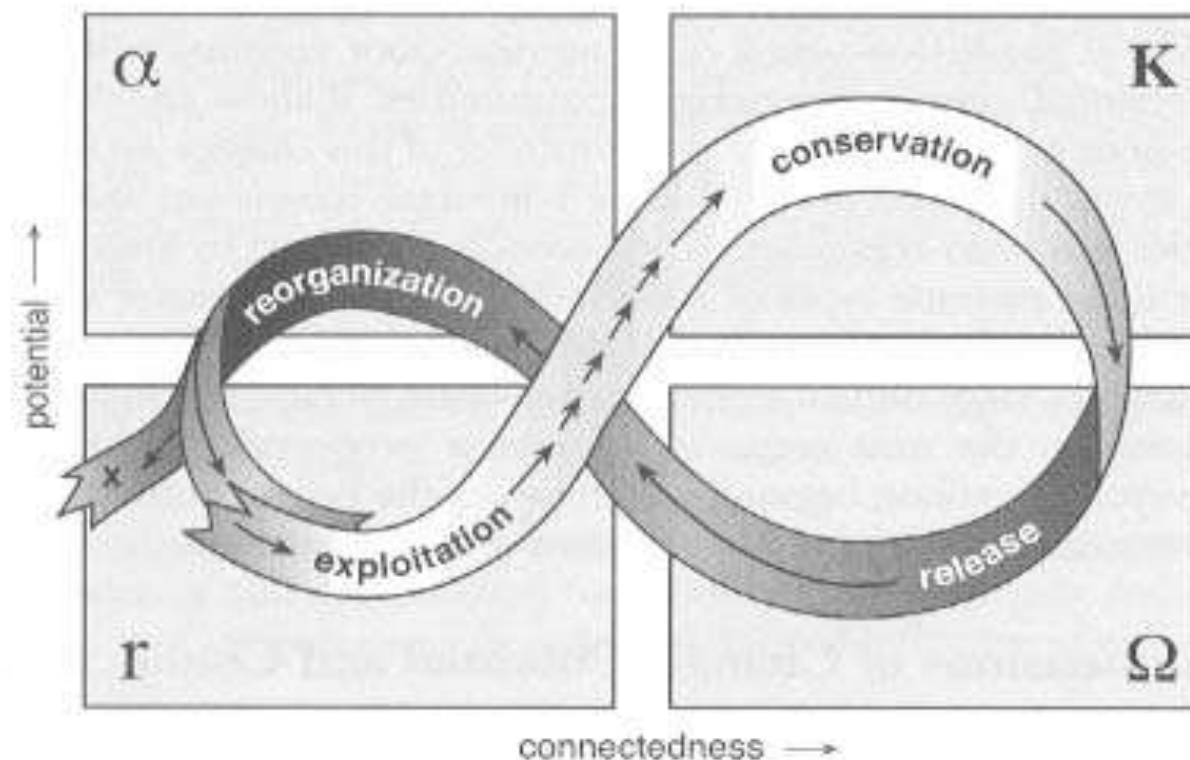
Figure 1. A Hierarchical Framework of Contexts and Decision Units that Determine Land Cover Change





# Land Use Change: Theoretical Perspectives

- General Systems Perspectives
  - From landscape, systems ecology, etc.
  - Panarchy
  - Actors and processes change over time
  - Heuristic of the adaptive cycle; slow and fast changes



**Figure 2-1.** A stylized representation of the four ecosystem functions ( $r$ ,  $K$ ,  $\Omega$ ,  $\alpha$ ) and the flow of events among them. The arrows show the speed of that flow in the cycle, where short, closely spaced arrows indicate a slowly changing situation and long arrows indicate a rapidly changing situation. The cycle reflects changes in two properties: (1) Y axis—the potential that is inherent in the accumulated resources of biomass and nutrients; (2) X axis—the degree of connectedness among controlling variables. Low connectedness is associated with diffuse elements loosely connected to each other whose behavior is dominated by outward relations and affected by outside variability. High connectedness is associated with aggregated elements whose behavior is dominated by inward relations among elements of the aggregates, relations that control or mediate the influence of external variability. The exit from the cycle indicated at the left of the figure suggests, in a stylized way, the stage where the potential can leak away and where a flip into a less productive and organized system is most likely.

# Land Use Change: Theoretical Perspectives

- General Systems Perspectives
  - From landscape, systems ecology, etc.
  - Panarchy
  - Actors and processes change over time
  - Heuristic of the adaptive cycle; slow and fast changes
  - Onset of fast changes in one actor can catalyze fast changes in another
  - Highly complex, unpredictable dynamics among actors, processes that influence land use decisions

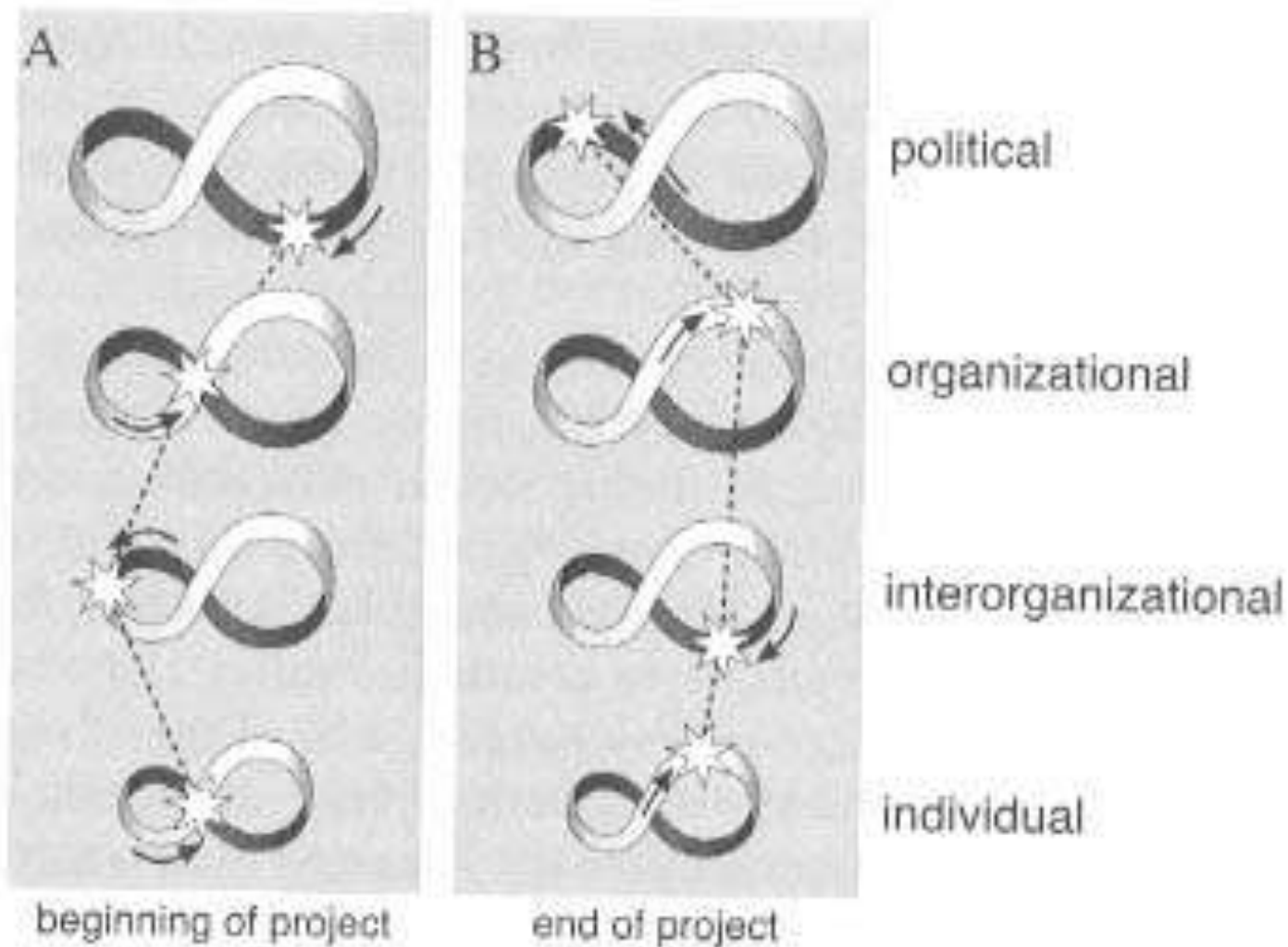


Figure 13-2. Use of separate adaptive cycles to depict phases of issues as interpreted in four systems—political, organizational, interorganizational, and individual. Managers, actions, and solutions must account for the dynamics of these systems.

# Land Use Change: Theoretical Perspectives

- Application: Debates over Technology and LUCC
  - Agricultural technology and deforestation
    - 1. Intensification reduces deforestation
      - Technology adoption allows higher yields per hectare, reducing demand for more cleared land
      - Given prices and labor and capital availability, technology can reduce labor demand while allowing the same production
    - 2. Intensification increases deforestation
      - Adoption of technologies occurs in order to expand agricultural enterprises, which expands cleared area
      - More capitalized enterprises are better able to make investments to adopt new technologies, and are more commercial, capitalistic operations that seek to expand, including the expansion of deforested land

# Land Use Change: Theoretical Perspectives

- Application: Debates over Technology and LUCC
  - Transgenic crops and biodiversity
  - 1. Transgenic crops threaten biodiversity
    - Transgenics can pollinate or outcompete similar native varieties, reducing natural genetic diversity
    - Transgenics are usually planted as monocultures in large fields, which eliminate other species & isolate forest stands
  - 2. Transgenic crops rely on biodiversity
    - Identification of key genetic characteristics for transgenics requires large genetic libraries, dependent on high biodiversity as a resource
    - Elimination of biodiversity undermines transgenic research and product development

# Land Use Change: Theoretical Perspectives

- Conclusion
  - There are many perspectives on LUCC
  - These perspectives underlies debates over issues related to the sustainability of LUCC
  - Debates are reflected in discussions of policies, social action, and other initiatives to influence LUCC