土地利用変化のメカニズムをめぐって

京都大学東南アジア研究所
河野泰之

Land Cover /Land Use 研究
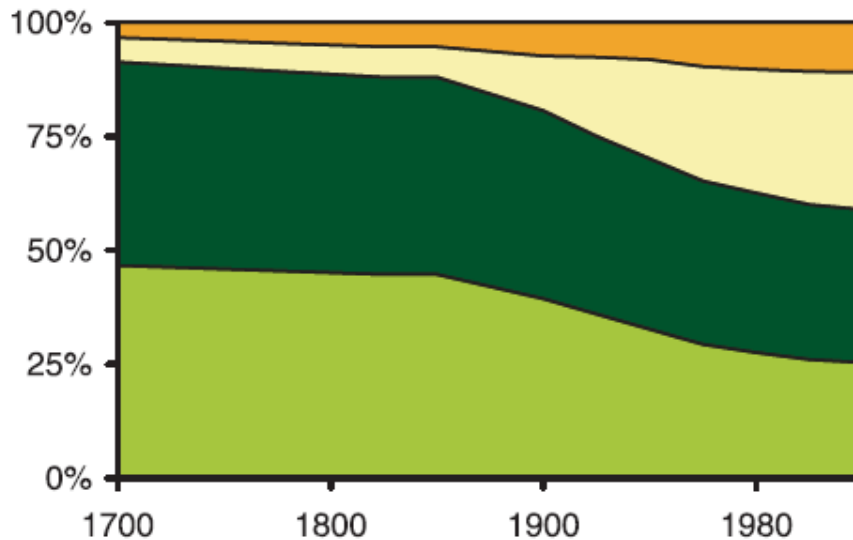

Figure 2. Estimated changes in land use from 1700 to 1995 [2]

Global land-use and land-cover change: what have we learned so far?
by E. F. Lambin and H. J. Geist*

Common understanding of the causes of land-sed and land-cover change is dominated by simplification which, in turn, underlie many environment-development policies (Lambin et al. 2001)

Proximate Causes and Underlying Driving Forces of Tropical Deforestation

HELMUT J. GEIST AND ERIC F. LAMBIN

Proximate causes

Infrastructure extension
- Transport (roads, railroads, etc.)
- Markets (public & private, e.g. sawmills)
- Settlements (rural & urban)
- Public Service (water lines, electrical grids, sanitation, etc.)
- Private Company (hydropower, mining, oil exploration)

Agricultural expansion
- Permanent Cultivation (large-scale vs. smallholder, subsistence vs. commercial)
- Shifting Cultivation (slash & burn vs. traditional swidden)
- Cattle Ranching (large-scale vs. smallholder)
- Colonization (incl. transmigration & resettlement projects)

Wood extraction
- Commercial (State-run, private, growth coalition, etc.)
- Fuelwood (mainly domestic usage)
- Polewood (mainly domestic usage)
- Charcoal production (domestic & industrial uses)

Other factors
- Pre-disposing environmental factors (land characteristics, e.g. soil quality, topography, forest fragmentation, etc.)
- Biophysical drivers (triggers, e.g. fires, droughts, floods, pests)
- Social Trigger Events (e.g. war, revolution, social disorder, abrupt displacements, economic shocks, abrupt policy shifts)

Underlying causes

Demographic factors
- Natural Increment (fertility, mortality)
- Migration (in/out migration)
- Population Density
- Population Distribution
- Life Cycle Features

Economic factors
- Market Growth & Commercialisation
- Economic Structures
- Urbanization & Industrialization
- Special Variables (e.g. price increases, comparative cost advantages)

Technological factors
- Agro-technical Change (e.g. in/extensification)
- Applications in the wood sector (e.g. mainly wastage)
- Agricultural production factors

Policy & Institutional factors
- Formal Policies (e.g. on economic development, credits)
- Policy Climate (e.g. corruption, mismanagement)
- Property Rights (e.g. land races, titling)

Cultural factors
- Public Attitudes, Values & Beliefs (e.g. unconcern about forest, frontier mentality)
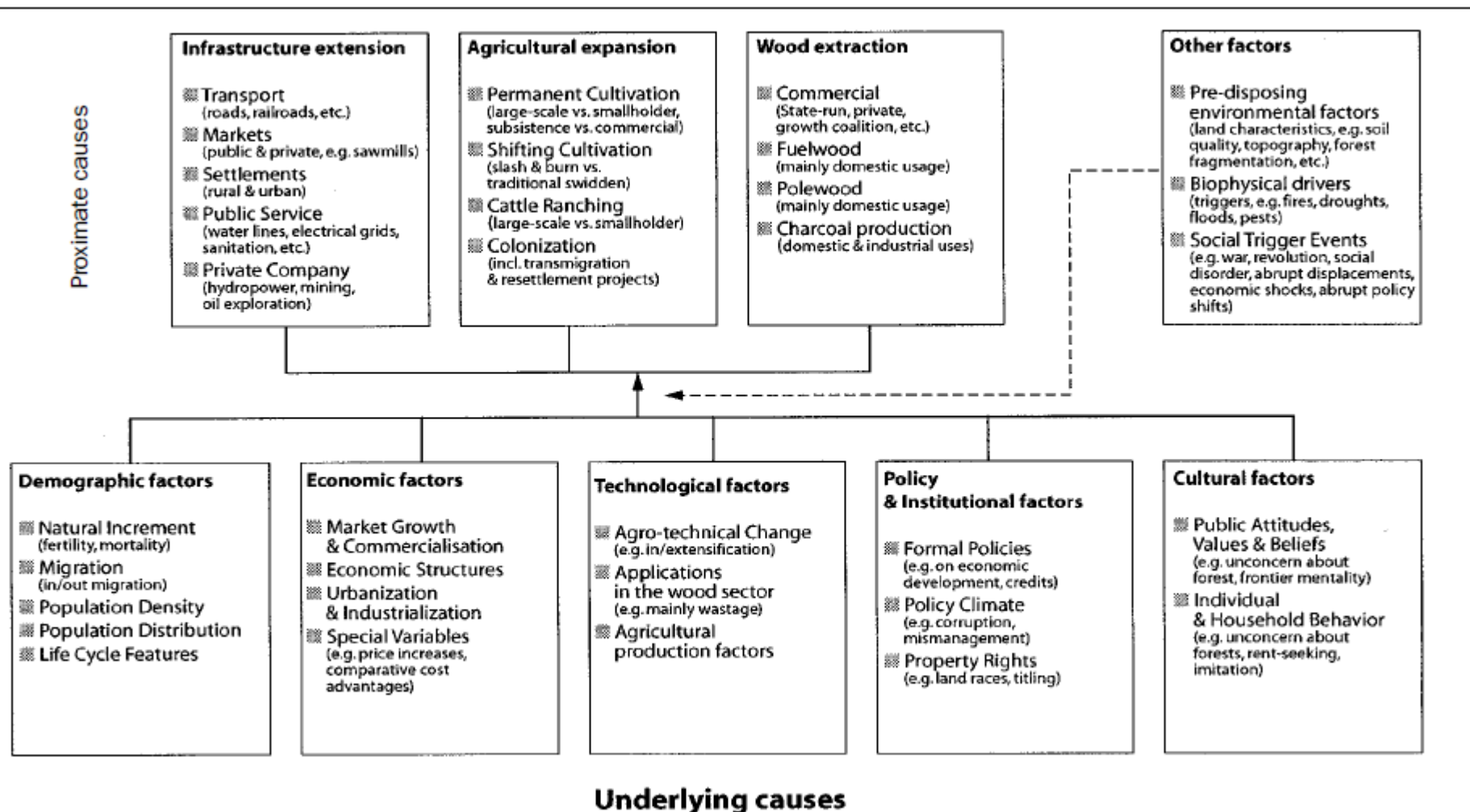- Individual & Household Behavior (e.g. unconcern about forests, rent-seeking, imitation)

Figure 1. Causes of forest decline. Five broad clusters of underlying driving forces (or fundamental social processes) underpin the proximate causes of tropical deforestation, which are immediate human actions directly impacting forest cover.

A Major Implication

No universal policy for controlling tropical deforestation can be conceived. Rather, a detailed understanding of the complex set of proximate causes and underlying driving forces affecting forest cover changes in a given location is required prior to any policy intervention.

The causes of land-use and land-cover change: moving beyond the myths

Eric F. Lambin[a],*, B.L. Turner[b], Helmut J. Geist[a], Samuel B. Agbola[c], Arild Angelsen[d], John W. Bruce[e], Oliver T. Coomes[f], Rodolfo Dirzo[g], Günther Fischer[h], Carl Folke[i], P.S. George[j], Katherine Homewood[k], Jacques Imbernon[l], Rik Leemans[m], Xiubin Li[n], Emilio F. Moran[o], Michael Mortimore[p], P.S. Ramakrishnan[q], John F. Richards[r], Helle Skånes[s], Will Steffen[t], Glenn D. Stone[u], Uno Svedin[v], Tom A. Veldkamp[w], Coleen Vogel[x], Jianchu Xu[y]

Common understanding of the causes of land-use and land-cover change is dominated by simplifications which, in turn, underlie many environment-development policies. This article tracks some of the major myths on driving forces of land-cover change and proposes alternative pathways of change that are better supported by case study evidence. Cases reviewed support the conclusion that neither population nor poverty alone constitute the sole and major underlying causes of land-cover change worldwide. Rather, peoples' responses to economic opportunities, as mediated by institutional factors, drive land-cover changes. Opportunities and constraints for new land uses are created by local as well as national markets and policies. Global forces become the main determinants of land-use change, as they amplify or attenuate local factors. © 2001 Elsevier Science Ltd. All rights reserved.

From simplicity to complexity and generality (Lambin et al. 2001)

Simplicity

- Population and poverty drive deforestation, mostly through shifting cultivators' land use.

- Rangelands are "natural" and "climax" vegetation.

- Rangeland has a natural 'carrying capacity' for livestock, and exceeding this causes degradation especially in tropical and subtropical zones.

- Population growth drives unsustainable intensification in smallholder agriculture.

- Urbanization is unimportant in global land-cover change

Complexity

- Opportunities and constraints for new land uses are created by markets and policies, increasingly influenced by global forces.

- Various human-environment conditions react to and reshape the impacts of drivers differently, leading to specific pathways of land-use change.

➤ 京都大学グループ
Dao Minh Truong (CRES, Vietnam National University)
Linkham Douangsavanh (NAFRI, Laos)
Thatheva Saphangthong (MAF, Laos)
Yanagisawa Masayuki, Kono Yasuyuki

➤ East-West Centerグループ
Jefferson Fox
Yayoi Fujita (National University of Laos)
Stephen Leisz (CARES, Hanoi Agricultural University)
Xu Jianchu (ICIMOD, Kathmandu, Nepal)
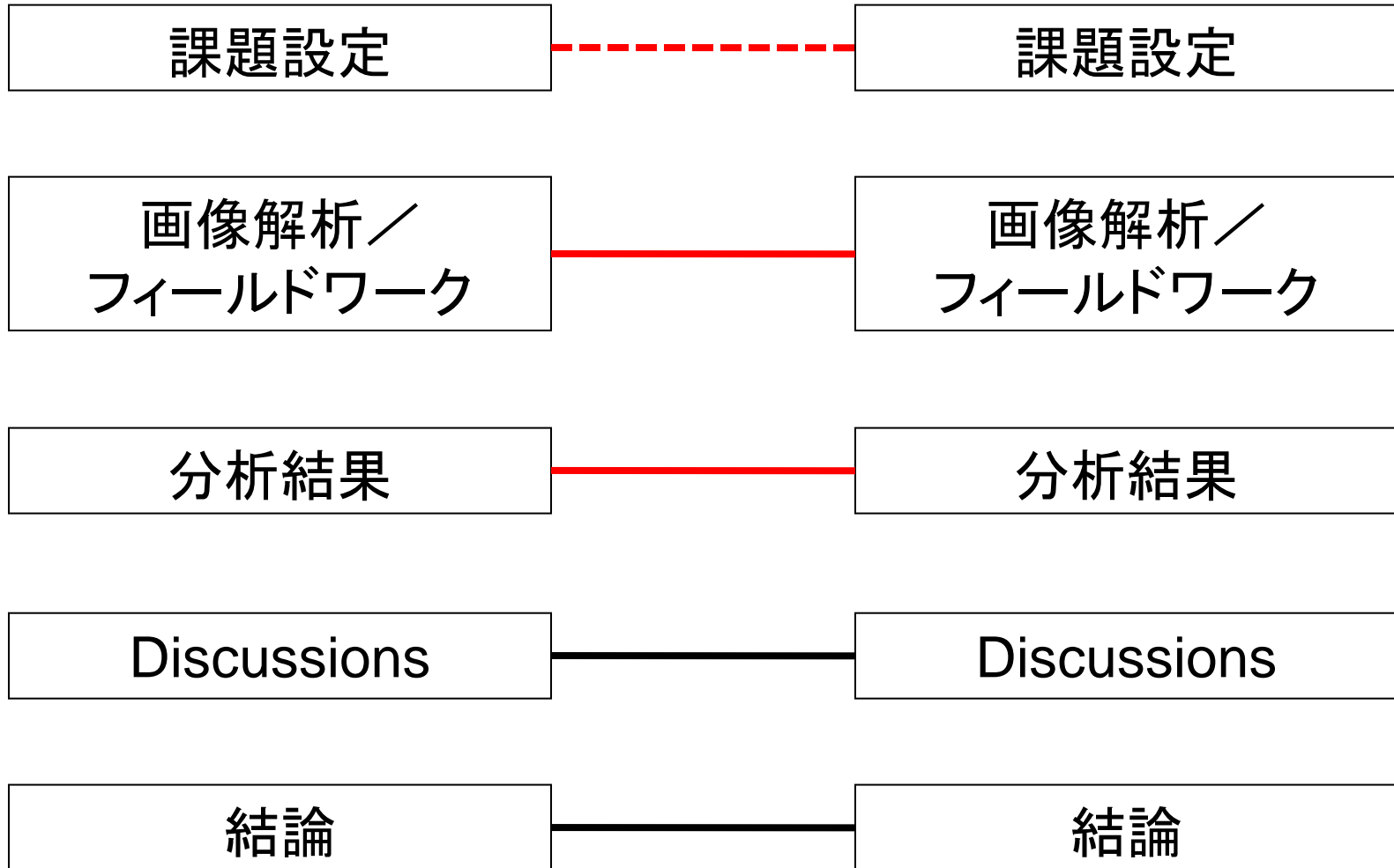
➤ ICRAF-Chiang Maiグループ
David Thomas, Nathan A. Badenoch

➤ Khon Kaen Universityグループ
Terry Rambo, Roengsak Katawatin, Patma Vityakon,
Somsak Sukchan (Land Development Department, Thailand)

個の統合－メタ分析－

| 課題設定 | ┄┄┄┄ | 課題設定 |

| 画像解析／
フィールドワーク | ─── | 画像解析／
フィールドワーク |

| 分析結果 | ─── | 分析結果 |

| Discussions | ─── | Discussions |

| 結論 | ─── | 結論 |

1st level	2nd level	3rd level	4th (fill in from own classification schemes)
Trees (tree dominated or landscape in the transition/regrowth to a tree dominated landscape)	Climax or near climax tree cover	Trees (mature to semi-mature trees - areas that would resemble a conventional definition of forest as per the latest FAO land cover description)	
		Bamboo (bamboo dominated)	
	Tree cover in transition	Young regrowth (ex. Short types of vegetation that regrow after an area is cleared or disturbed - e.g. areas of mixed grass and short woody tree and bush regrowth; areas of mixed bamboo, grass, short woody tree/bushes and herbaceous bushes, etc.)	
	Human induced tree cover	Agriculture with trees (ex. Orchards, tea, coffee and industrial tree plantations)	
Non-trees (not dominated by trees)	Agriculture	Crops on flat fields (non-sloping field agriculture) [This includes the following two major categories: (1) Paddy areas (irrigated paddy, rainfed paddy, bunded paddy fields, etc.); (2) Dryland crops (maize, cassava, dryland rice planted on flat fields [if any], winter vegetable crops [in some areas], etc.)]	
	Grass		
	Bare land (rocks, beaches, sand bars, etc.)		
Other	Human induced 'other' land cover (settlement areas, roads, mines, etc.)		
Water	Water		

『東南アジア研究』特集号

"Mechanisms of land use change in the Mountainous regions of Mainland Southeast Asia"

Edited by Kono, Y., Yanagisawa, M., Leisz, S. J. and Fox, J.

Aim of the special issue

➤Common LCLU classification

➤Micro observation, macro mechanisms behind

➤Driving forces and triggers

➤The common key questions

(1) what are the overall trends in the land use change at the case's study site?

(2) what are the driving forces behind the case's land use change?

(3) what are the trigger events that influenced the driving force(s) at each study site?

➤Land use change case studies from the mountainous areas of Vietnam, Laos, Thailand, Cambodia, and the province of Hai Nan in China

Contents

特集号の編集過程でわかったこと

➢ Common LCLU classification
失敗（例えば、"Human induced tree cover"）

➢ Driving forces and triggers
現在進行形の土地利用変化に関しては、Driving forcesとtriggersを区別するのが困難

➢ Similarity in changing trends and driving forces of land use among case studies

- Simplicity
- Complexity
- Generality/Regionality
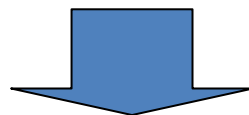
土地被覆・利用とその変化の地理的普遍性と固有性

土地被覆・利用変化の2つのメカニズム

社会構造の変化
- 人口増加・移動、産業構造の変化、技術革新、土地所有制度など
  例えば、林地→農地→都市的土地利用
- 変化は緩やかで、不可逆的
- 普遍性のある因果関係が支配的であり、地域間比較に基づいた変化の予測が有効

出来事
- 戦争・紛争・社会不安、大規模災害、政治経済システムの急激な変化など
- 変化は急激で、可逆的／不可逆的
- 固有性の強い因果関係が支配的であり、変化の予測は困難

実際の土地被覆・利用変化は2つのメカニズムの合成結果

Similarities among case studies

- Forest cover changes intermittently, not continuously.
  Northern Vietnam and Northern Laos: Post-war period (Late 70s and early 80s)
  Southern Vietnam: Anti-France War and Vietnam War (50s to 70s)

- Commercial cropping introduced, shifting cultivation decreased and forest cover maintained/increased widely since the 1990s.
  Cashew nut: Rattanakiri, Cambodia
  Rubber: Luang Nam Tha, Laos
  Maize: Northern Vietnam and Northern Laos

- Settlements moved to road-side and became large sizes in terms of household number. Ethnic composition maintained.