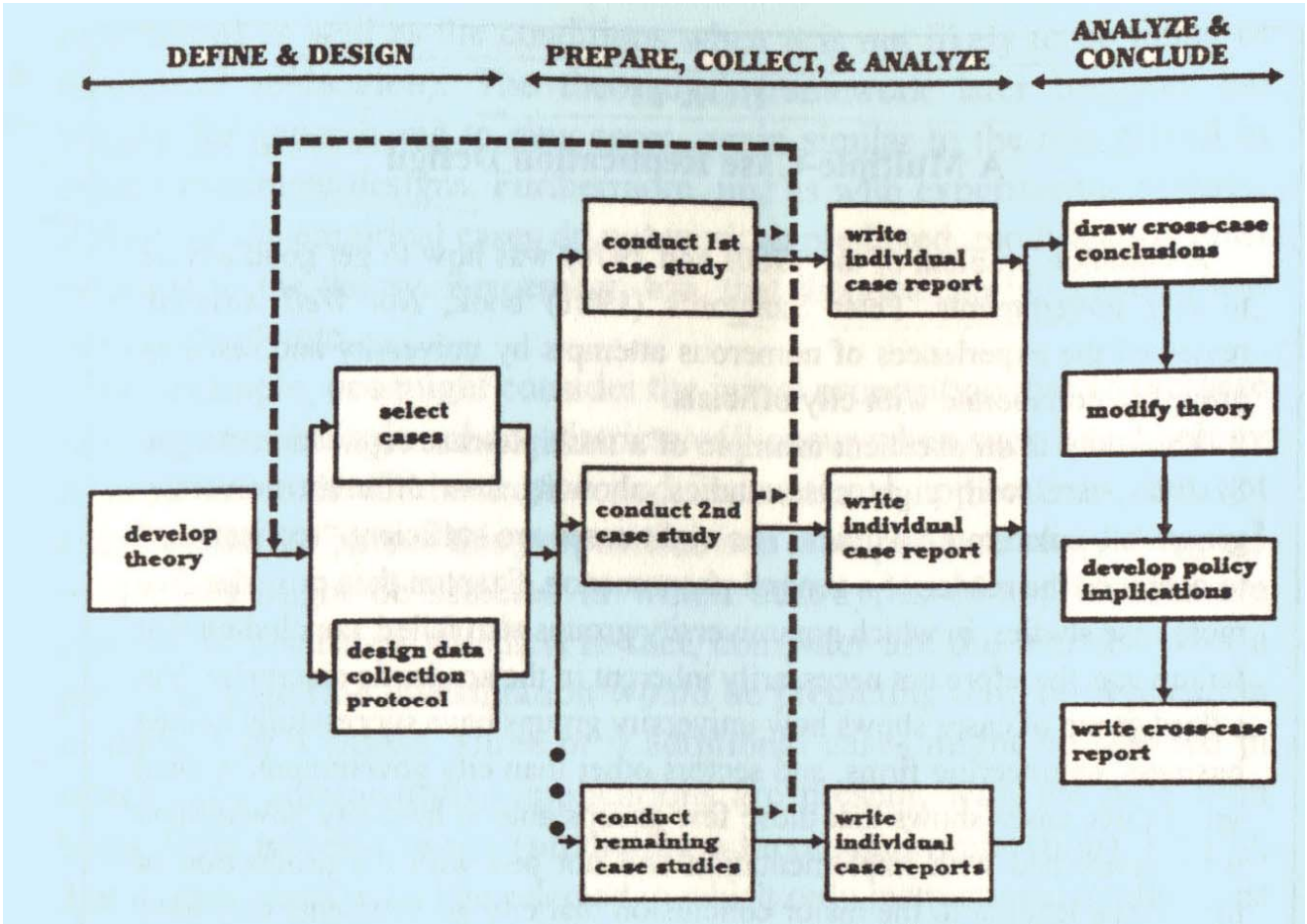
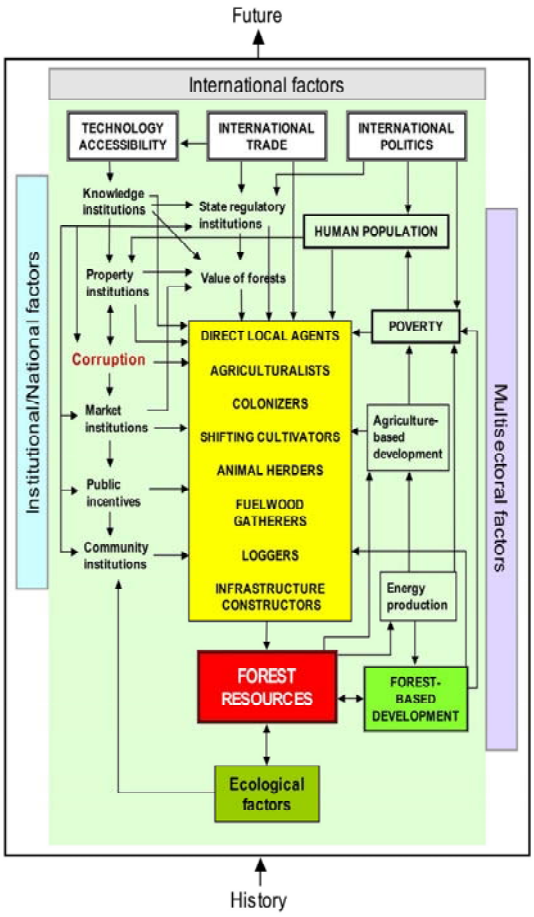
Quantitative models for identifying key variables of forest transition

1. Boolean algebra
2. Econometric model





(Source: modified from Palo 2000)

25.2.2008

Independent variables related to forest transition can be hypothesized

- The hypotheses are based on the theoretical framework and on Figures 1 and 2 . They will guide our empirical evidence gathering and our comparative analyses of the case study countries. The hypotheses have been defined in order to facilitate of finding valid and reliable answers yes/no. The number of years should be counted from the year of transition, which varies among the case study countries. In pre-transition countries the counting is done from the most recent calendar year.
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- The hypotheses are grouped according to Figure 2 and are identified below as follows:
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Property institutions:

- 1. Strong and clear property rights parallel with low or zero deforestation.
  - Is the majority of the national forest area in private or common property ownership? Yes/no?

State regulatory institutions:

- 2. The stability of government decreases deforestation.
  - Has there been a period of 50/20 (?) years without wars or military coups? Yes/no?
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- 3. Effective government forest policies decrease deforestation .
  - Has the government effectively implemented any National Forest Program during the last 30/15 (?) years? Yes/no?

Market institutions:

- 4. Increasing market-based real stumpage prices and total value of forests decrease deforestation.
  - Has the real stumpage price increased during the last 50/20 years? Yes/no?
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Social Capital:

- 5. Low corruption decreases deforestation.
  - Has the annual average Corruption Perception Index by the Transparency International (www.transparency.org) been lower than the rank of 60 (?) during the last ten years? Yes/no?
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- 6. High social capital allows local and national civil society cooperation and decreases deforestation.
  - Is the social capital relatively high? Yes/no?

Knowledge institutions:

- 7. High literacy promotes education, dissemination of research findings and innovations and decelerates deforestation.
  - Has the literacy rate as an annual average been more than 90 % (?) during the last 30 (?) ears? Yes/no?

Agricultural productivity

- 8. Increasing productivity via intensification of agriculture decreases deforestation.
  - Has the productivity in agriculture had an average annual increase during the last 20 years? Yes/no?
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Population pressure & Poverty

- 9. Decreasing poverty decreases deforestation.
  - Has the average annual growth of GNP/capita been higher than the annual average population growth during the last 20 years? Yes/no?
- 10. Low population pressure decreases deforestation.
  - Has the population growth been lower than 1.5 % per annum during the last 20 years? Yes/no?
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Forest industrial development and energy supply

- 11. Forest-based development decreases deforestation.
  - Have there been viable investments in plantation forests or pulp and paper industries during the last 30 years? Yes/no?
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- 12. Low dependence on wood fuel decreases deforestation?
  - Is the share of wood less than 50 % of the total primary energy consumption? Yes/no?

Ecological factors

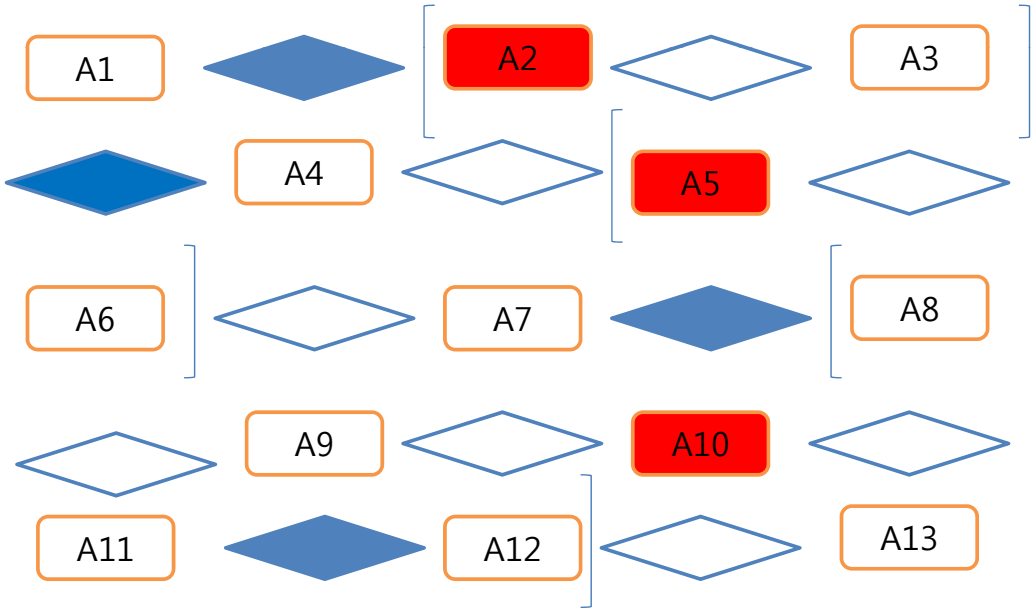
- 13. High ecological moist area decreases deforestation:
  - Is the moist area zone more than 30 % (?) of he land area? Yes/no?

Analytical Model

- Forest transition(FT) occurs if a certain set of conditions are met:
- Dependent variable = 1, 0
  - 1 if FT occurs
  - 0 otherwise
- Independent variables have either 1 or 0 value such that
  - 1 for the condition specified exists
  - 0 otherwise

Boolean algebra

- FT = A1 AND (A2′ OR A3) AND (A4) OR (A5′ OR A6) OR (A7) AND (A8 OR A9 AND A10′ OR A11 AND A12) OR (A13)



Econometric model

- Forest area (change) = function (influential factors)
- Panel data consists of data for case countries and/or case sites
- Time span of each case can vary.
  - Japan over 100 years
  - India over 50 years
  - Malaysia over 50 years
  - Korea for 40 years
  - China for 40 years
  - Indonesia for 20 years
  - Philippines for 30 years
  - Vietnam for 20-30 years
  - Laos for less than 20 years

Independent variables for econometric model

- The influential factors (chosen variables) can vary across the case countries.
- The key "common" variables can be screened through the exercise of Boolean algebra analysis of forest transition.
  - There could be some "peculiar" variables relevant for a certain country or a group of countries only.