



## Incorporating governance into forest transition frameworks to understand and influence Cambodia's forest landscapes



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### ABSTRACT

Academic inquiry into forest transitions has produced a rich body of literature examining the shift from net deforestation to net reforestation at multiple land use scales. However, researchers, practitioners, and policy analysts question the utility of current forest transition theory. Does it accurately describe and provide insight into strategies to influence patterns of forest change in countries where forest cover continues to decline? Forest transition theory has provided important insights into the ‘necessary but not sufficient’ conditions for countries shifting from net deforestation to net reforestation. To advance forest transition theory, scholars should recognize forests as complex and dynamic social-ecological systems and use analytical methods that accommodate that complexity. Transdisciplinary research that incorporates a broader range of qualitative and quantitative methods and tools is required. We analyzed the historical, social, and political factors influencing forest transition pathways in Cambodia. Cambodia exhibits similar economic pre-conditions to its neighbors, which have passed through a forest transition, yet deforestation rates remain high with no indication of slowing. We found that complex governance arrangements at multiple scales negatively influences Cambodia's forest cover and development trajectory. Attempts to nurture Cambodia's forest transition will require strengthening governance and institutions across all of the natural resource sectors. Further research that incorporates governance into forest transition frameworks is required to improve policy responses for post-transition forest outcomes.

### 1. Introduction

Since 1990, economic growth in rural and urban Asia has reduced poverty and increased prosperity. Trade, technological innovation, and investment in health and education transformed Asia from a largely agrarian society to an urbanized, industrial powerhouse. As in Europe and the Americas, economic growth and industrialization has come at a cost. Income gaps are widening, leading to increased inequality (Zhuang et al., 2014). Large-scale agriculture, logging, mining, and infrastructure development drives widespread environmental degradation (Laurance et al., 2014). However, the recent Food and Agriculture Organization Forest Resource Assessment states Asia experienced a net increase in forest stocks over the period 1990–2015 (FAO, 2015b). While there is large variation among the forty-eight nations examined, the net increase in forests associated with industrialization and urbanization represents a regional forest transition – defined here as a shift from net deforestation to net reforestation.

Forest transitions have been documented for a number of Asian countries, including Vietnam, India, China, Japan and South Korea (Youn et al., 2016). A recent special issue in Forest Policy and Economics (see de Jong et al., 2016) highlights this phenomenon,

providing insights into the pre-conditions and pathways of forest transitions in nine Asian countries. Forest transitions in countries such as China (Zhang, 2000) and Vietnam (Meyfroidt and Lambin, 2008b; Minh et al., 2017) are well documented. However, fewer studies examine the processes that determine forest transitions in countries where transitions have not yet occurred, such as Indonesia, Laos, and Cambodia.

Cambodia is one of the least developed countries in Asia and deforestation rates are still high. According to current analysis (Liu et al., 2016), Cambodia meets the econometric pre-conditions, so is primed to move through a similar forest transition to that of other Asian nations. But deforestation rates have not decreased (FAO, 2014c). Analytical frameworks used to measure and explore forest transitions have mainly been quantitative (Ashraf et al., 2017; Meyfroidt and Lambin, 2008b). They have relied upon econometric measures, which are helpful for between country comparisons, but offer little insight into influences inside countries where forest cover continues to decline (de Jong et al., 2016). In other words, econometric models demonstrate the ‘necessary but not sufficient’ conditions to describe and influence a forest transition. Limitations of forest transition theory are increasingly recognized, prompting calls for interdisciplinary frameworks and heuristic models

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(Kull, 2017; Perz, 2007). Studies incorporating regression analysis with in-depth analysis of institutional and socio-economic factors are beginning to heed this call (Clement et al., 2009; Minh et al., 2017). Insight from a broader set of criteria is needed if decision makers want to use the knowledge on forest transitions, from countries that have made the transition, to influence forest trajectories in countries such as Cambodia, where forest cover continues to decline.

Given the extent of interest and academic inquiry into forest transitions, how can we increase the utility of forest transition theory for improving forest policy? The extent to which forest transitions can maintain desired environmental outcomes often depends on governance and management of multi-functional landscapes (Barbier and Tesfaw, 2015; Melo et al., 2013). However, good governance is inherently difficult to define and measure (Kaufmann et al., 2011). Forest transition frameworks might better describe and potentially nurture forest transitions if they consider forest transitions occurring in complex and dynamic social-ecological systems and use analytical models that accommodate this complexity (Kull, 2017). By including the social and political dimensions of forest transitions, such as governance and institutions, analytical models may better help us understand the barriers preventing forest transitions. This is especially relevant in countries such as Cambodia, where the econometric preconditions have been satisfied.

In this paper, we consider how more holistic analytical models of forest transitions could provide better insight into the processes by which development leads to transitions from deforestation to reforestation. Using the five forest transition pathways described by Mather (2007), we analyze the case of Cambodia, where governance is a barrier to a forest transition (Mahanty and Milne, 2015). We aim to demonstrate the decisive role of governance in forest transition outcomes, and the need to address governance challenges in efforts to nurture forest transitions. We argue that econometric frameworks fail to adequately consider the governance factors necessary to describe and influence forest transitions. We show how expanding frameworks to incorporate richer insights into governance and institutions could deliver a more holistic understanding of forest transitions and how the resulting knowledge might be used to influence the quality of natural capital as well as forest cover.

## 2. Forest transition frameworks: shy of their potential

Forest transition theory gained traction in the 1990s when Alexander Mather described the historical forest trends of a number of developed countries throughout the twentieth century (Mather, 1992). Mather found that as countries developed, exploitation of ‘old growth’ forest shifted to ‘second growth’ forest and plantations. The shift was described as a forest transition. Mather also made the case for a second type of forest transition in which forest cover contracted and expanded as societies moved from resource-dependent economic growth to industrialization and urbanization. The transition from net deforestation to net reforestation has been documented throughout Europe and North America and more recently in tropical developing countries (Mather, 2004, 2007; Mather and Fairbairn, 2000; Mather et al., 1998). Keenan et al. (2015) found that 13 tropical countries have either passed through their forest transition between 1990 and 2015 or have embarked on the path of forest expansion.

Examining empirical evidence of forest transitions, Rudel et al. (2005) developed two forest transition pathways; forest recovery driven by forest scarcity and economic development. However, on further examination of forest transitions in Asia, Mather (2007) found recent forest transitions to exhibit different characteristics to their European predecessors, prompting scholars to identify new transition pathways. Building on Rudel's work, Lambin and Meyfroidt (2010) derived five pathways to describe causal mechanisms associated with forest transition trajectories; (1) economic development; (2) State forest policies; (3) global pressure; (4) forest scarcity and; (5) forest recovery driven by

smallholders. These five forest transition pathways are now well described and empirically examined in the literature (Lambin and Meyfroidt, 2010; Liu et al., 2016). These pathways do not exist in isolation; multiple factors interact in several ways to drive forest transitions across geographic and temporal scales. Reforestation may happen simultaneously to deforestation, or deforestation can occur long after a country appears to have moved through the forest transition (Drummond and Loveland, 2010; Lambin and Meyfroidt, 2010). In addition, factors that may drive transitions in some countries contribute to continued deforestation in others (Liu et al., 2016).

Numerous econometric models analyze the social, biophysical and economic drivers of forest transitions (Ashraf et al., 2017; Meyfroidt and Lambin, 2008a; Satake and Rudel, 2007; Sloan, 2015). Many of these studies highlight the role of macroeconomic policies and socio-political institutions (Bhattarai and Hammig, 2001; Ewers, 2006; Satake and Rudel, 2007) and shed light on the actors and incentives that contribute to reforestation (Rodríguez and Pérez, 2013). Yet more recently, researchers have called for better analysis of forest transitions as social-ecological systems, by considering forests as “contingent, power-laden, dynamic relationships between an assemblage of diverse natural and human actors in particular geographic spaces and times” (Kull, 2017). In their book on navigating social-ecological systems, Berkes et al. (2008) highlight three key limitations of traditional analytical models: (1) the inadequacy of models based on linear thinking, (2) a lack of recognition of the value of qualitative analysis to complement quantitative approaches, and (3) a disregard for the importance of using multiple perspectives in the analysis and management of complex systems. Given the multiple actors, objectives, and interests involved in forest cover change, forest transitions are non-linear processes that cannot be reduced to a single set of variables or causal linkages.

The majority of econometric models fail to capture the role of governance in shaping forest cover trends. Addressing these concerns, Barbier and Tesfaw (2015) developed a model of competing land uses that explicitly includes governance using a combination of Worldwide Governance Indicators (Kaufmann and Kraay, 2017) and other sources. They found that poor governance delays the onset of a forest transition. Barbier and Tesfaw's model is comprehensive, but governance indicators are often imperfect measures of a complex reality. They are “imprecise proxies for the broader concepts they are intended to measure” (Kaufmann et al., 2011). Governance indicators fail to capture human-made governance systems (Duit et al., 2010) in which individual actors and institutions may interact differently to prescribed policies or regulations. Examples include adaptive policy making, state capability, collective leadership, how institutions function, and different subnational social-ecological contexts. Legislation and policies do not guarantee implementation (World Bank, 2017b). In addition, analysis of national forest transitions fails to capture the influence of transnational governance and in turn, transnational displacement of deforestation (Ashraf et al., 2017; Meyfroidt and Lambin, 2009).

Evaluating progress towards poverty alleviation and economic development is not the aim of forest transition theory but multiple scholars acknowledge the strong interaction between forest cover and economic development (Ewers, 2006). The 2015 FAO Forest Resources Assessment shows that since 1990, wealthier countries have registered forest gains, middle income countries are moving through the forest transition and poorer countries are still losing forest (Sloan and Sayer, 2015). Forest transitions as a broad-scale, country wide phenomenon often rely on analysis from coarse scale data such as gross domestic product, production values, remotely sensed land cover categories, demographic indicators and trade (Ashraf et al., 2017; Liu et al., 2016). Multiple elements of social and economic development that affect both land use and forest cover are not captured in national statistics. Some of those elements are the unevenness of development, land-grabs, elite capture and enclosure, patron-client relationships, and landscape-scale drivers of change. Claims that understanding forest transition

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