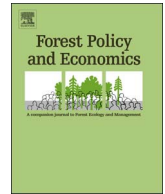




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## Forest transition through reforestation policy integration: A comparative study between Ghana and the Republic of Korea



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### ABSTRACT

Deforestation and forest degradation severely devastated forestlands in Ghana and the Republic of Korea (ROK) in the 1990s and 1950s, respectively. However, through government intervention in the form of an integrated reforestation policy and programs, both countries have restored their degraded forestlands and increased their forest cover. We analyzed the reforestation policy and programs implemented in Ghana using the theory of policy integration and compared it to the successful case of the ROK. We observed that Ghana used the vertical policy integration approach to drive forest transition, unlike the ROK, which used the horizontal policy integration approach. Both countries used similar strategies to implement the integrated reforestation policy and programs, including coordinated national forestation plans, collaboration among ministries and departments, and organizational reform. This integrated approach facilitated the successful implementation of the reforestation programs in Ghana and the ROK. Government intervention through an integrated reforestation policy and programs is an innovative way to slow the rate of deforestation and enhance economic development. This paper may contribute to the literature on how reforestation policy integration can reduce deforestation and achieve forest transition, especially in developing countries.

### 1. Introduction

Forest transition is described as the changes that occur in the forest cover of a country from a period of contraction to a period of expansion of forests (Mather, 1992; Mather and Needle, 1998) or a turnaround in forest cover trends from reducing to expanding forest area over time (Meyfroidt and Lambin, 2011; Oduro et al., 2015; Park and Youn, 2017). The reduction of the forest cover is associated with deforestation, especially in tropical developing countries, and it remains an ongoing process in these regions contributing to climate change, biodiversity loss, and environmental degradation. This phenomenon affects the livelihood activities of forest-dependent communities and, thus, worsens the plight of the local people. The causes of deforestation in the tropics are linked to agricultural expansion, fuelwood extraction, urbanization, and industrialization.

The forest cover in Ghana suffered high rates of deforestation in the 1900s. Approximately 8.2 million hectares (ha) of Ghana's primary forest in 1900 declined to 1.5 million ha in 1999 (Owusu et al., 1999), which means that the nation lost more than 80% of its primary forest cover between 1900 and 1999. The annual deforestation rate in Ghana is estimated at 135,395 ha (Oduro et al., 2015). However, it is difficult

to obtain the actual figure on the country's total forest cover (Ghartey, 1990; Blay et al., 2008). A recent estimate stated that Ghana's forest cover had been reduced to some 5 million ha in 2010, from approximately 7.5 million ha in 1990 (FAO, 2010; Oduro et al., 2015). The rapid loss of Ghana's forest cover seems to have had an impact on the climatic conditions of the country. The country now experiences extremely harsh weather conditions, with long periods of drought and flooding.

The Korean peninsula, similarly, saw its forest area reduced drastically in the 1950s. Millions of hectares of forest cover were destroyed and degraded, especially in the 1950–1953 Korean War (Park and Youn, 2017). The total denuded forestland of the Republic of Korea (ROK) in 1956 was estimated at 0.69 million ha, corresponding to 10% of the total forestland (KFS, 1997). After the war, the ROK further experienced high rates of deforestation and forest degradation. Illicit logging and conversion of forestlands to agricultural lands for food production emanated from extreme poverty and hunger in the region (Park and Youn, 2017). According to Bae et al. (2012), between 1952 and 1968, the forestlands converted to agricultural lands increased from approximately 2 million ha to 2.34 million ha.

However, both Ghana and the ROK in different periods have

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responded to the devastation of their forestlands with comprehensive reforestation policies and programs. The forest cover in the ROK started to increase in the late 1950s and increased further in the 1970s when the National Forest Development Plans (NFDPs) were initiated. Through the NFDPs, approximately 2 million ha of denuded forest areas were reforested (Park and Youn, 2017); furthermore, approximately 12 billion trees were planted on 4.5 million ha of land across the nation (KFS, 1997). The growing stock increased from 10 m<sup>3</sup>/ha to 146 m<sup>3</sup>/ha (KFS, 2016). Ghana, in 2001, also implemented the National Forest Plantation Development Programs (NFPDPs) to restore the degraded forestlands by annually planting 20,000 ha (Domson, 2007; Forest Commission, 2008). However, the NFPDPs implemented have not driven forest transition in Ghana, although they do seem consistent with the state forest policy pathway (Odoro et al., 2015).

Effective reforestation policies and programs by governments are important to halt the high rates of deforestation and accelerate forest transition. Some countries in addition to the ROK, such as Japan, China, Vietnam, and the Philippines, have increased their forest cover or experienced forest transition in recent years as a result of government intervention through a series of reforestation policies and programs. It is important to compare these government interventions among countries to provide useful lessons to halt deforestation and enhance forest cover, especially in developing countries. Comparing the reforestation policies and programs initiated in Ghana and the ROK is an invaluable exercise that may contribute to the understanding of deforestation issues and provide a relevant pathway to achieving forest transition. In particular, the successful forest transition of the ROK through national forest policies is enviable and can be applied in not only Ghana, but also other developing countries to avoid deforestation and improve their natural environments.

Attempts have been made by researchers to analyze the governments' reforestation policies and programs and the conditions necessary for forest transition. However, the studies are limited to certain specific countries (e.g., Bae et al., 2012; Odoro et al., 2015) without any comparison between countries. Furthermore, these previous studies provide a descriptive analysis of the subject matter but “lack a theoretical analysis of the design and implementation of reforestation policies” (Park and Youn, 2017). This study attempts to use the theory of policy integration to compare the reforestation policies and programs initiated in Ghana toward forest transition and the successful case of the ROK. We believe that this paper will contribute to benefit sharing of the experiences of the two countries and also provide significant lessons from both countries for effective policy design and implementation to avoid deforestation and accelerate forest transition in developing countries.

## 2. Conceptual framework

The conceptual model provides a general view of the activities involved in changing the forest cover from net deforestation to net reforestation. The conceptual model was developed based on previous studies (e.g., Bae et al., 2012; Odoro et al., 2015; Park and Youn, 2017). It explains that forest transition can be achieved through the state forest policy pathway, where forest cover lost as a result of deforestation can be recovered and expanded by government intervention through integrated reforestation policies and other sectorial policies (Fig. 1).

Deforestation is a serious environmental problem in many developing countries. Vast forestlands are being converted to other land uses, such as mining, road construction, infrastructure expansion, and agricultural production. The high rates of deforestation in these regions largely depend on population growth, income growth, forest policy, literacy rate, forest ownership, food production, and timber trade. Therefore, to address this environmental problem, a concerted effort is required from various sectors to provide a comprehensive and systematic approach to avoid deforestation and drive forest transition.

The concept of forest transition has been used by some researchers

to investigate and understand the circumstances that contribute to forest recovery over time. According to Mather and Needle (1998), factors such as economic development, industrialization, and urbanization lead to forest cover change in countries. The forest cover rapidly declines when forests are continuously converted to other land uses but increases when deforestation stops and reforestation begins (Rudel, 1998; Foley et al., 2005).

Perz (2007) argued that the mechanisms that drive forest transition vary from one place to the other. Five pathways have been suggested for forest transition (Rudel et al., 2005; Lambin and Meyfroidt, 2010). These pathways include “economic development,” “forest scarcity,” “globalization,” “state forest policy,” and “smallholder tree-based land use intensification.” For the economic development pathway, it is hypothesized that economic development will lead to off-farm job opportunities for local people, which will cause them to abandon their agricultural lands. This induces forest regeneration and forest recovery over time. Growth in some economic sectors, such as service and industry, drive the labor force from agriculture in the rural areas to urban areas, thereby reducing the pressures on the forest areas. For the forest scarcity pathway, it is hypothesized that the reduction in forest cover will cause the price of forest products to increase, and thus, efforts to produce and trade forest products will result in an increase in forest cover. The scarcity of forest products persuades governments to implement reforestation policies and programs to enhance forest cover (Lambin and Meyfroidt, 2010; Meyfroidt and Lambin, 2011; Rudel et al., 2005). Park and Youn (2017) argued that the globalization pathway occurs inadvertently, as do the economic development pathway and forest scarcity pathway. The globalization pathway arises as a result of the internalization of markets. The state forest policy pathway and smallholder tree-based land use intensification pathway occur intentionally through policy intervention to increase the forest cover. The state forest policy pathway hypothesizes that national forest policies, driven by factors outside and within the forest sector, can promote forest transition (Bae et al., 2012; Odoro et al., 2015). However, implementation of the policies requires strong state commitment and willingness. For the smallholder tree-based land use intensification pathway, forest transition is triggered by smallholders' reforestation activities, such as the expansion of woodlots and agroforestry systems for economic and ecological benefits (Park and Youn, 2017).

Previous studies (e.g., Bae et al., 2012; Park and Youn, 2017) have shown that the state forest policy pathway is ultimately an effective driver of forest transition in countries where deforestation occurs irrespective of the conditions required. Bae et al. (2012) examined the forest transition in the ROK and found that the national reforestation policies and programs put in place by the government in the 1970s resulted in forest recovery. Additionally, Park and Youn (2017) argued that the state forest policy initiated in the ROK decisively contributed to forest transition, with similar results in countries such as China (Mather, 2007; Xu et al., 2007; Liu et al., 2017), Vietnam (Mather, 2007; Clement et al., 2009) and Bhutan (Lambin and Meyfroidt, 2010) (Fig. 2). Odoro et al. (2015) observed that, in Ghana, the trend of rehabilitation and restoration of degraded forestlands seems consistent with the state forest policy pathway. Thus, our comparison focused on the state forest policy pathway as a driver of forest transition.

Although the state forest policy pathway is an effective driver of forest transition, policies of multiple sectors, such as forestry, agriculture, industry, and energy must be aligned and coordinated to address the environmental problem (Park and Youn, 2017). Policy integration is a process whereby “separate policies are aligned and harmonized into an extant policy to produce an integrated policy” (Briassoulis, 2005), and it is “the highest level of collaboration among organizations in policy making” (Park and Youn, 2017).

Policy integration has two dimensions: horizontal and vertical (Lafferty and Hovden, 2003). Horizontal policy integration is the integration of policy carried out by national governments and their composite departments and ministries. Vertical policy integration

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