Chapter 4
Institutional Settings, Renewable Energy Development, and Forest Cover Changes in Sub-Saharan Africa

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ABSTRACT

This chapter explores the roles of institutional settings in renewable energy (RE) development in Sub-Saharan Africa, and the effects of RE development on forest cover changes in the region. The study finds that the slow but persistent growth in RE contribution to total energy bundles can be credited to the general improvements in institutional reforms and frameworks. It also finds that unlike biomass-based RE systems, the indirect deforestation effects associated with solar and wind energy systems, are largely offset by the environmental benefits that accrue from them. Based on these findings, the chapter recommends that coordinated institutional interventions should prioritize the deployment of more environmentally sustainable RE technologies such as solar and wind energies.

INTRODUCTION

Forests are indispensable natural resources; covering only about 30% of the earth' land area but hosting almost 80% global biodiversity (The European Union Action Plan, 2019. Despite the importance of the forest ecosystem, the world forest area continues to decline due to anthropogenic and natural factors including logging for wood products, mineral resources extraction, urbanization, volcanic eruption, and cropland expansion, leading to a condition sometimes referred to as forest cover change (Kayiranga et al., 2018). This is particularly more challenging in Sub-Sahara Africa (SSA) where there is slow prog-

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ress in executing sustainable forest management and an increasing rate of forest loss. While forest areas may stabilize and increase in many transition countries of Asia and the Pacific, most of the low and middle-income forest-rich countries will probably witness a persistent decline in their forest area due to agricultural expansion. Forest resources in Europe are expected to continue to increase given their rising concern for environmental protection and well-structured institutional and policy frameworks (Food and Agriculture Organisation – FAO, 2009). Many other studies have suggested that global forest cover is probably changing more rapidly than the last decade and scientists believe that this trend could even peak in the next twenty years. For instance, Kayiranga et al. (2018), found that while the net deforestation rate was about 1.9%, the net annual rate of forest regeneration was about 1.8% from 1986-2000 in central and East Africa. This accounted for about 0.2% loss in the forest area between 2000 and 2015.

This growing trend of deforestation could pose bigger problems to the climate, the environment, humanity, global economy, social wellbeing and others (Negasi et al., 2018). Searchinger et al. (2018) and Waheed et al. (2017) think that harvesting wood from the forest for burning would probably increase carbon in the atmosphere for decades. This is further emphasized by FAO (2007) who opines that the possible effect of increasing the recovery of biomass from forests include biodiversity loss, scarcity of nutrient, changes to ecosystem function and difficulties in forest regeneration. Sharma et al. (1994) also identify the possibility of strong interlinkages between deforestation, environmental degradation, and long-run economic decline. In the face of these likely problems, the field of energy seems to demand more research because of the possible need for more solutions that would address the seemingly increasing forest cover changes, as highlighted by Moon & Solomon (2018). It is also argued that some of these solutions could emanate from the effective deployment of renewable energy options. For instance, Maiwada et al. (2014) believe that exploiting other renewable energy sources like biofuels, solar and wind technologies could lead to a reduction in the overreliance on forests for fuelwood and still slow down deforestation and climate change.

Renewable energy is being promoted as a possible significant way of addressing environmental and forest security concerns (OECD Policy Brief, 2015). Scholars of energy sciences often state that renewable energy deployment has been quite massive in the 21st Century and is likely to be an excellent approach towards meeting the energy demand of future generations (Owusu & Asumadu-Sarkodie, 2016). Gasparatos et al. (2017) have argued that there seems to be a rapid increase in the level of renewable energy penetration in the global energy landscape. Renewable energy deployment could provide better energy services for a sustainable social and economic development path (Moomaw et al., 2011). According to the United Nations Economic Commission for Europe - UNECE Report (2014), some European countries seem to have had their shares of renewable energy in total final energy consumption exceeding 50% as of 2012. However, compared to developed contries, renewable energy deployment and utilization remains low in Sub-Sahara Africa.

Some studies have attempted to explore the causes of the growth pattern in the renewable energy sector in Africa focusing on the production and consumption aggregates (Ackah & Kizys, 2015; da Silva, Cerqueira, & Ogbe, 2018; Rahut, Behera, & Ali, 2017). For example, Ackah & Kizys (2015) found that real income per capita, energy resource depletion per capita, carbon dioxide (CO_2) emissions per capita, and energy prices were the major drivers of renewable energy consumption in oil-producing African countries. Similar evidence was reported in a household level analysis by Rahut et al., (2017). While income and other factors may be important in determining the growth of renewable energy use, the role of institutions in promoting these technologies have been less accessed. Development of renewable energy and fostering environmental integrity requires not just more money but policy attention and massive