**“Money Growing on Trees” Background: Global Deforestation & Payments for Ecosystem Services**

Over 50% of global forests have been converted to human use since the advent of agriculture (MEA, 2005) and the world has lost 178 million hectares of forests since 1990 (FAO, 2020). Tropical forest area is decreasing at over 10 million hectares per year, with much of the deforestation occurring in developing countries (Bluffstone et al., 2013; FAO, 2020; MEA, 2005; Pan et al., 2011). Forest degradation accounts for about 11% of annual greenhouse gas emissions (IPCC, 2014; Saatchi et al., 2011; Van der Werf et al., 2009).

Restoring forests and preventing forest degradation can help fight climate change. The 2015 Paris climate accord committed signatories to limit “the increase in the global average temperature to well below 2°C above preindustrial levels” and counted countries’ efforts to offset their emissions by planting or protecting forests toward emission reduction targets (Griscom et al., 2017; Popkin, 2019). Bastin et al. (2019) find “there is room for an extra 0.8 billion hectares of canopy cover, which would store 205 gigatonnes of carbon,” which is about twenty times global annual carbon emissions in 2010 (IPCC, 2014). Curbing deforestation and forest degradation is believed to be a very cost-effective way to address climate change and also support adaptation (Angelsen, 2009; McKenney et al., 2004; McKinsey & Company, 2009; Stavins and Richards, 2005; Stern, 2006).

The United Nation’s Framework Convention on Climate Change (UNFCCC) proposed a payment for ecosystem service program, Reducing Emissions from Deforestation and forest Degradation (REDD+), to pay for reduced deforestation and forest degradation with funds from a global carbon market. While the program as initially envisioned never came to fruition due to the lack of a global carbon market, the efforts contributed to the created of the UN-REDD Programme, a joint effort between UNEP, UNDP, and FAO to reduce deforestation and forest degradation (Angelsen et al., 2018; Duchelle et al., 2019; UNFCCC, 2011). There are similar bilateral and multilateral efforts funded by the Green Climate Fund, the World Bank and other countries and entities focused on creating markets to reduce deforestation. Many of these programs are examples of payments for ecosystem services (PES), an incentive-based approach to environmental regulation that is a key part of the policy toolkit for goals like watershed management, reducing deforestation, species preservation, and managing non-point source pollution (Engel, 2016; Engel et al., 2008; Wunder, 2005).

PES programs use a market to connect the receivers of an ecosystem service (a benefit generated by an ecosystem, often public goods like improved air and water quality) to the providers of that service. Global forest-based PES programs create a market for net reductions in greenhouse gas emissions by linking providers of carbon sequestration with countries or entities that are required, or voluntarily choose, to reduce emissions (FAO, 2020; Goldstein and Ruef, 2016). These programs provide incentives for some countries to release less, and sequester more, carbon and for countries that are required to reduce emissions to fund these efforts by purchasing credits (Baker et al., 2019; Bluffstone, 2013; Bluffstone et al., 2013; Rakatama et al., 2017).

Forest-based PES programs may create an opportunity to increase investment in forest management. This investment can bring many benefits, including achieving critical development goals, enhancing forest governance, bolstering global conservation efforts, reducing carbon emissions and deforestation, and contributing to poverty reduction, particularly in communities that manage forests (Andam et al., 2010; Bluffstone et al., 2013; Economist, 2010; Senadheera et al., 2019; Sims and Alix-Garcia, 2017; Springate-Baginski and Wollenberg, 2010; Toni, 2011). As of 2014, about 64 counties were engaged in conducting about 300 pilot forest preservation projects through REDD+ alone (Sills et al., 2014; UN-REDD, 2015) and in 2015, governments and companies committed $888 million in new funding for protecting forests and other carbon-absorbing landscapes (Goldstein and Ruef, 2016).

Community forestry management has generally been considered a successful means to not only to halt deforestation and forest degradation but also to craft institutional mechanisms for equitable benefit sharing in communities. About 25% of forest area in developing country is owned by communities, and this is about three times as much as is owned by the private sector (Agrawal et al., 2008; Bluffstone, 2013; Bluffstone et al., 2013; Chhatre and Agrawal, 2009). Therefore, the successful adoption of forest-based PES in developing countries depends on the effectiveness of these programs in community-controlled settings. Community-controlled forestry requires coordination between community members, but, as discussed by Ostrom (1990, 2010), Bluffstone et al. (2013), and Agrawal et al. (2008), such coordination can be challenging.

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