

Forest conservation and the private sector: stakeholder perceptions towards payment for ecosystem service schemes in the tobacco and sugarcane sectors in Malawi

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Abstract The tobacco and sugarcane industries play an important role in the national economy of Malawi. Collectively, they account for approximately 79 and 22% of the national foreign exchange earnings and gross domestic product, respectively. However, the sustainable production of high-quality tobacco and sugarcane has been threatened due to the continued deterioration of forest ecosystems. Considering the importance of tobacco/sugarcane production for the national economy and rural livelihoods, there is an urgent need to implement effectively different forest conservation initiatives in the country. Considering the complex linkages at the interface of deforestation, sugarcane/tobacco production, and economic activity, this is a complicated task that must be undertaken by both the government and tobacco/sugarcane companies. Incentive-based forest conservation management approaches, including Payment for Ecosystem Services (PES) schemes, can be one of the approaches that can help curb deforestation. However, there are significant knowledge gaps regarding how the private sector can be meaningfully involved in PES schemes, especially in developing country contexts. This paper draws on expert interviews with multiple stakeholders at the interface of tobacco/sugarcane production and forest conservation in Malawi to highlight the role of the private sector in promoting forest conservation among farming

communities and the potential for participating in PES schemes. Different forest conservation initiatives are currently being implemented by the sugarcane and tobacco sector, but are not coordinated. While PES schemes are currently not operational in Malawi, there seems to be a relatively high support among private companies towards such incentive-based conservation mechanisms. The introduction of PES schemes as corporate social responsibility (CSR) projects or on a credit-based form (e.g., as conditionality to access credit for farm inputs or eligibility to be contracted to farm tobacco/sugarcane) could be the most appropriate structures for effectively involving the private sector. Establishing an independent multi-stakeholder PES coordination committee would be necessary for the effective coordination and implementation of such PES schemes. However, any future effort to promote a PES scheme in Malawi needs to be informed with on-the-ground knowledge and should be weighed against other forest conservation options.

Keywords Forest conservation · Payment for Ecosystem Services (PES) · Private sector · Tobacco · Sugarcane · Malawi

Introduction

It is estimated that approximately 80% of the population of Malawi is engaged in agriculture for their income and livelihoods (FAO 2015; NSO 2012). However, Malawi's current agricultural productivity is low compared to the 1960s because of land degradation, declining soil fertility, poor access to financial services and markets, unfavourable weather, and small landholdings (Phiri et al. 2012; AGRIFOR 2006; Malawi Government 2010; Njuki et al. 2011; Tchale 2009).

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Large agro-industries such as tobacco and sugarcane contribute significantly to the national economy and the livelihoods of a large fraction of the population. They collectively account for approximately 79% of the national foreign exchange earnings and 22% of the gross domestic product (GDP) (Chirwa 2011). Therefore, the Government of Malawi has been promoting and investing in tobacco and sugarcane expansion. For example, the smallholder tobacco sector benefited from the targeted Farm Input Subsidy Programme (FISP) between 2006 and 2010 (Dorward and Chirwa 2011). Similarly, the Government of Malawi and its partners have been investing in the expansion of the sugarcane industry through the Green-belt initiative (Malawi Government), with significant expansion currently underway mainly through smallholders (EthCo-Malawi, personal communication, March 2016).

As any agro-industry, the tobacco and sugarcane sectors depend on the sustainable flow of ecosystem services, including those from forest ecosystems. These include the maintenance of soil structure and fertility, nutrient cycling, and regulation of waterflow (Power 2010; Jackson et al. 2005; Sousson et al. 1995), among others. At the same time, forests significantly contribute to the Malawian economy as approximately 130,000 households rely on them for their livelihoods, both in the formal and informal sectors (NSO 2008; Yaron et al. 2010). Furthermore, forests provide local communities with numerous ecosystem services such as woodland products (e.g., for fuel, food, and medicinal purposes), water purification, soil erosion regulation, and several other regulating and cultural services (Kamanga et al. 2009; Smith et al. 2017).

However, the pressure of an increasing (and largely agriculture-dependant) population, combined with other drivers of ecosystem change, has contributed to deforestation in the country (NSO 2012; FAO 2011) (Table 1). Deforestation has been estimated at 2.8% per annum (UNDP, Human development report 2011; NSO 2008), resulting in the degradation of arable land, the reduction of agricultural productivity and hindering the growth of private agro-industries (e.g., tobacco and sugarcane) (MNREE 2011). Thus, solving the deforestation challenge is of great importance for both the public and private sector stakeholders in Malawi (MNREE 2011; Sacchetto 2012; Mindle et al. 2001) (see Table 1).

On the other hand, certain agricultural practices associated with tobacco and sugarcane can contribute significantly to deforestation and forest degradation in Malawi (Kerr 2005; Mindle et al. 2001; Tobin and Knausenberger 1998; Romeu-Dalmau et al. 2016; Mandondo et al. 2014). For example, tobacco curing in the country requires approximately 102,000 tonnes of wood per year (Bunderson and Hayes 1997; Sacchetto 2012). Tobacco smallholders often source a large proportion of this wood from protected forests or other natural

Table 1 Key drivers of deforestation and forest degradation in Malawi Sources: (Malawi Government 2010; Mauambeta et al. 2010; Mindle et al. 2001)

Direct drivers	Agriculture expansion
	Smallholder farmers
	Large-scale, commercial farmers
	Fuelwood consumption
	Wood and charcoal for domestic consumption
	Wood for tobacco curing
	Commercial logging and timber production
Indirect drivers	Infrastructure development
	Demographic drivers
	Population growth (3.7% annual growth rate in the year 2015)
	Economic drivers
	Natural resources are the major economic base
	Policy and governance drivers
	Limited investment in renewable resources infrastructure
Limited enforcement of existing forest governance laws and policies	

woodlands (Mandondo et al. 2014). Past sugarcane expansion in the Dwangwa sugarcane estate in Malawi has contributed to the loss of high-density forests (Romeu-Dalmau et al. 2016), while current expansion is feared that will induce indirect land-use effects in the forest reserves. In addition, as outgrowers are now more actively being involved in sugarcane production in the Dwangwa area, new areas of expansion are located in wetlands and areas of riparian vegetation for easy access to water. This could potentially result in the degradation of wetland ecosystems, and the ecosystem services they provide.¹ Considering that agro-industries are of high economic importance to Malawi, and at the same time ‘agents and victims’ of deforestation, forest conservation is a key sustainability challenge for the country. Solving this issue would not only have environmental benefits, but it could also bring significant economic and poverty alleviation co-benefits to the population (Malawi Government 2010).

To tackle deforestation, the Malawian government has been implementing different forest management initiatives (e.g. community-based forest management) to enhance forest conservation (Zulu 2008). However, despite these efforts, forest degradation continues unabated in the country (Zulu 2010).

Several scholars have suggested that deforestation can be particularly challenging sustainability challenge to tackle, as most forest management approaches tend to

¹ Although not currently observed in Malawi, sugarcane production has been shown to affect water quality and quantity in several parts of Africa, resulting in the degradation of wetland ecosystems (e.g. Hess et al. 2016; Nhwatiwa et al. 2017; Fernandes and Adams 2016).

provide minimal economic and welfare benefits to forest-dependent communities (Gutman 2003; Pearce 1990). Considering that households often deforest to meet their livelihood needs (especially in rural contexts) (Mindle et al. 2001), effective tackling of forest degradation will remain a challenge in the absence of livelihood and welfare benefits that can offset the ‘benefits’ received from deforestation. Furthermore, reducing deforestation effectively often requires the involvement of multiple stakeholders including the private sector (especially companies directly and indirectly depending on forests), which is largely driven by profit motives (Henderson et al. 2012).

Incentive-based conservation mechanisms such as Payment for Ecosystem Services (PES) schemes have received policy attention in the past decade as one of the potential tools for enhancing forest conservation (e.g. Wunder 2007; Dougill et al. 2012; Tschakert 2007; Ferraro and Kiss 2002; Wunder 2007). PES schemes use direct or indirect payments, compensations or rewards (in cash or kind), to motivate communities to conserve and restore ecosystems (Wunder 2005; Swallow et al. 2009). Through such payments or rewards, PES schemes essentially make forest conservation a livelihood opportunity, as well as a conservation tool (Pagiola et al. 2005; Pattanayak et al. 2010; Ferraro and Kiss 2002; Wunder 2007). However, a substantial financial investment is usually required to make PES schemes successful (Namirembe et al. 2014). Given the financial limitations that most governments in developing countries face (Banana and Ssembajjwe 2000; Agrawal et al. 2013), financing PES schemes will be difficult without financial assistance from the private sector and other investment agencies (Wiyo et al. 2014; MCA 2012; Namirembe et al. 2014).

At the same time, several scholars have raised concerns that PES schemes might have the opposite effect, as they can commodify nature (e.g., Spash 2015; Corbera et al. 2007; Kosoy and Corbera 2010; McCauley 2006). Spash (2015) and McCauley (2006), for example, argue that the commodification of forest ecosystem services could result in erosion of the ethical reasoning behind participation in ecosystem conservation. Other scholars argue that the commodification of ecosystem services masks ecological complexity and the non-economic values of ecosystems, thereby transforming a symbolic value into an objective and quantifiable relationship (Kosoy and Corbera 2010). Another angle of concern is that introducing PES schemes could result in the elite capture of the resources, hence benefiting only those individuals with social power (Corbera et al. 2007; Harvey 2003).

Considering the above pros and cons of PES schemes, this paper does not view these schemes as a panacea to forest conservation, but as one of the many tools that can promote it by motivating land users to participate or adopt

sustainable land-use practices (e.g., Muradian et al. 2010; Namirembe et al. 2014; Swallow et al. 2010; van Noordwijk et al. 2012). Thus, like conventional forest conservation management approaches, PES could either fail or promote forest conservation depending on existing social, economic, political, and ecological drivers and conditions (Andrew and Masozera 2010; Chinangwa et al. 2017; Bowler et al. 2012; Poteete and Ostrom 2004). As such, the implementation of PES schemes should be based on a strong evidence basis related to (a) acceptability by stakeholders, (b) existing development and conservation policies and initiatives, and (c) track-record of effectiveness given existing conditions (Andrew and Masozera 2010; Kaczan et al. 2013; Schulz et al. 2014).

Currently, there is very limited research about the design and implementation of PES schemes in Africa and Malawi in particular. In addition, there is limited information and experience globally regarding how the private sector can be meaningfully involved in the implementation of PES schemes (Pattanayak et al. 2010; Wunder 2007; Engel and Wunsher 2015), and particularly when it comes to companies involved in industrial crops such as tobacco and sugarcane. Understanding the perceptions of relevant stakeholders before rolling out PES schemes in industrial crop settings is crucial not only for understanding their acceptability, but also for receiving insights about the potential structure and the effective inclusion of stakeholders (Dougill et al. 2012).

Therefore, the aim of this paper is to explore the perceptions of key stakeholders at the interface of tobacco/sugarcane production and forest conservation in Malawi regarding PES acceptability and, based on these perceptions, to suggest possible PES structures. We have to clarify that with this paper, we do not aim at advocating PES schemes as a sole measure of forest conservation. Instead, we explore the potential for involving agro-industries in PES schemes, and as a possible tool for motivating smallholder industrial crop farmers in adopting production practices that are not detrimental to forest ecosystems.

The following sections describe the methodology and highlight the main results of expert interviews with key stakeholders at the interface of tobacco/sugarcane production and forest conservation in Malawi. The results identify the main mechanisms through which deforestation can affect sugarcane and tobacco production, as well as the attitude of the private sector in Malawi towards forest conservation, and PES schemes in particular. Based on the elicited stakeholder perceptions, the “Discussion” describes possible PES designs and institutional structures that could meaningfully involve the private tobacco/sugarcane agro-industries in Malawi. Key pros and cons of these PES designs (and of PES schemes in general) are also

Table 2 Key statistics of the tobacco and sugarcane sectors in Malawi Sources: (Bunderson et al. 2009; Chirwa 2011; FAO 2015; Illovo Sugar Malawi Limited 2014; Jaffee 2003; Koester et al. 2004; Murkherjee and Benson 2003; Sacchetto 2012)

	Sector	
	Tobacco	Sugarcane
Estimated area in 2010 (ha)	165, 000	40, 000
Annual production in 2013 (tonnes)	118 million	2.9 million
Production mode (%)		
Estate	5	84
Smallholder	95	16
Value (USD)	165 million	61 million
Contribution to the economy (%)		
Foreign exchange	60	19
GDP	13	9
Contribution to employment (number of individuals)	1.6 million	30, 871
Destination of product		
Foreign	62	30
Domestic ^a	38	70

^a Part of this might be exported after initial treatment in Malawi

outlined to appreciate their potential and pitfalls as forest conservation mechanisms in Malawi.

Methodology

Study context

The tobacco and sugarcane agro-industries contribute significantly to the national economy and the livelihood of a large fraction of the population in Malawi (Table 2). They collectively account for approximately 79% of the national foreign exchange earnings and 22% of the gross domestic product (GDP) (Chirwa 2011).

While in the past, there were several large tobacco estates in Malawi, tobacco is now overwhelmingly being produced by smallholders (FAO 2016). Currently, there are more than 20,000 smallholder farmer clubs involved in burley tobacco production that are mainly spread across three political regions of Malawi: (a) Central region (Mchinji, Ntcheu, Lilongwe, Dowa, and Kasungu districts); (b) Northern region (Rumphu and Mzimba districts); and (c) Southern region (Balaka and Mangochi districts) (Makoka et al. 2016; Negri and Porto 2008; Ministry of Agriculture, personal communication, March, 2017) (Fig. 1). Most of this tobacco is produced and bought through loan-based smallholder schemes run by Limbe Leaf Tobacco Company, Alliance One Tobacco Company and Japanese Tobacco International (JTI).

Sugarcane is produced in two areas in Malawi, Dwangwa (Nkhotakota district) and Nchalo (Chikhwawa district) (Fig. 1). In both areas, sugarcane is produced in large plantations operated by Illovo (a multi-national

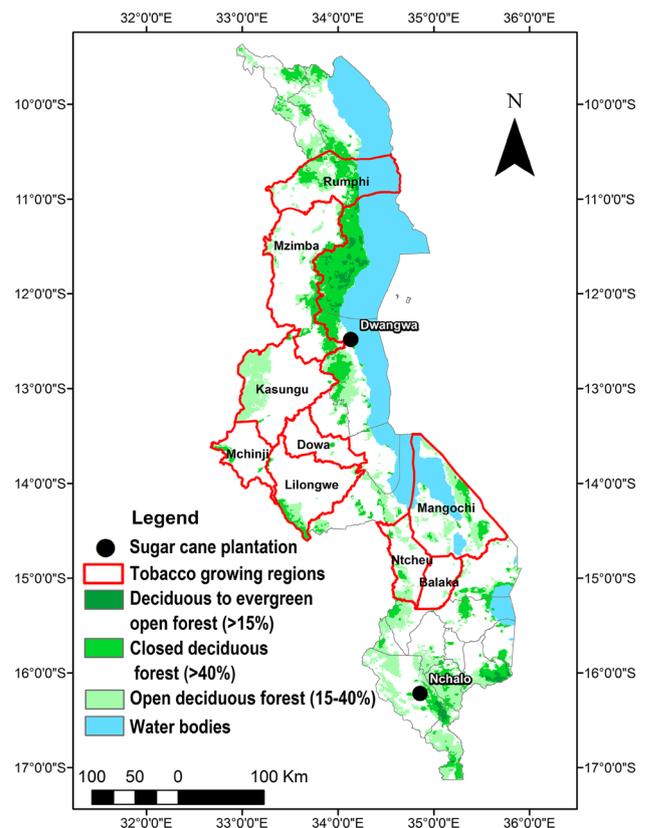


Fig. 1 Main tobacco/sugarcane producing areas and forests in Malawi

company headquartered in South Africa), and surrounded by thousands or rainfed and irrigated smallholders that sell the crop to the mills operated by Illovo. A new sugarcane production area is currently developed in Salima district.

Table 3 Main forest conservation areas and biodiversity hotspots in the tobacco/sugarcane producing areas Source: Munthali and Murayama 2013; Environmental affairs Department 2006

Crop	Region	Forest conservation areas/biodiversity hotspots
Tobacco	Central	Mchinji forest reserve Dzलयama forest reserve (Lilongwe and Mchinji districts) Kasungu National Park
	North	Vwaza Marsh (Rumphi district) Nyika national park (Rumphi district)
	South	Mangochi Forest reserve (Mangochi district)
Sugarcane	Central (Nkhotakota)	Nkhotakota forest and wildlife reserve Dwambazi Forest reserve
	South (Chikhwawa)	Lengwe National park Shire river water catchment

Figure 1 suggests that there is a good overlap between tobacco/sugarcane production areas and the remaining forests in the country. Table 3 highlights some of the major forest conservation areas and biodiversity hotspots that are to be affected directly and indirectly by tobacco and sugarcane production. Furthermore, most of the tobacco-growing districts mentioned above participate or benefit from the current Tobacco Levy Afforestation and Forest Conservation programme, which is coordinated by the Malawi Government through the Department of Forestry (Department of Forestry, personal communication, April, 2017). Considering that nine of the largest tobacco-producing districts are already benefitting from financial support through this programme, further suggests the good overlapping of tobacco-producing areas and forest conservation areas or environmental hotspots. The above suggest that the main tobacco/sugarcane areas of the country contain several forested areas (whether formally protected or not) that could be targeted for PES schemes.

Data collection and analysis

First, we undertook an extensive review of academic papers, reports and policy documents to identify key issues related to (a) industrial crops in Malawi, (b) current forest conservation initiatives implemented by the tobacco and sugarcane sectors, and (c) private–public PES schemes for sustainable forest management. Through this review process, we identified the key stakeholders at the interface of tobacco/sugarcane production and forest conservation in Malawi.

We conducted 21 expert interviews (February–March 2016) among the key stakeholders, which represented private and public institutions. Between them, they included the main stakeholders at the interface of tobacco/sugarcane production and forest conservation and included (a) tobacco-buying companies, (b) tobacco regulatory authorities, (c) tobacco and sugarcane farmer cooperatives and associations, (d) sugarcane/ethanol companies, and

(e) different departments of the Malawi government. Respondents from the private sector represented approximately 80% of the tobacco and sugarcane companies operating in the country (Table 4). Apart from the key players identified from the literature review and institutional analysis, snowball sampling was used in which the initial interviewed experts were asked to provide contact details of other actors from relevant institutions and stakeholder groups. We used this approach as a mechanism to ensure that all major players were represented in our expert interviews.

At the beginning of each interview, we sought verbal agreement of each participant and, in return, we assured them of their complete anonymity. Hence, the participant information in Table 4 does not provide the names or the positions of the interviewees. The questions initially sought to identify how deforestation can affect the operations of the sugarcane and tobacco industries. It should be mentioned that these expert interviews are complemented with insights obtained from long-term research projects in sugarcane (Dwangwa) and tobacco (Kasungu) areas that identified the main mechanisms through which the production of these crops affects locally ecosystem services and food security. Subsequent questions aimed to record the existing forest conservation initiatives undertaken by the tobacco and sugarcane sectors, and to identify the interviewees' perceptions with regard to PES schemes as a tool for enhancing forest conservation and the characteristics of these schemes that could influence stakeholders getting involved.

Stakeholder perspectives and opinions were used to design different possible PES mechanisms, including the most appropriate institutional structures, and the suggested types of involvement and roles of key players within each of these PES scheme (see “Discussion”). Special attention was paid to identify the key emerging themes that were raised repeatedly by the different respondents, and were frequently highlighted in the various reports and policy documents. These themes further informed the design of

Table 4 Details of expert interviews

Sector	Name of company/Institution	Number of interviews
Private sector	Illovo sugar company (Illovo)	2
	Ethanol company (EthCo-Malawi)	1
	Limbe Leaf Tobacco Company (LLT)	1
	Alliance One Tobacco Company	1
	Japanese Tobacco International (JTI)	1
	Malawi Leaf	1
	Tobacco Control Commission (TCC)	1
	Auction Holdings limited (AHL)	1
Farmer associations	Kabadwa Cane growers Association (Kabadwa)	3
	Kasinthula Cane growers Association (KCGA)	1
	Tobacco Association of Malawi (TAMA)	1
Malawi government	Department of Forestry	2
	Environmental Affairs Department (EAD)	3
	Department of Crop Extension (Ministry of Agriculture) (DCE)	1
	Department of Economic Planning and Evaluation (Ministry of Agriculture) (DEPE)	1
	Land Resources Conservation Department (Ministry of Agriculture) (LRCD)	1

Brackets include the abbreviations of institution names as they have been referred to in this paper

Table 5 Perceived/experienced impacts of deforestation on the tobacco and sugarcane sectors in Malawi

Perceived/experienced impacts	Sector	
	Tobacco	Sugarcane
Soil erosion	✓	✓
Loss of wood resources	✓	–
Reduced water availability	✓	✓
Contribution to climate change	✓	✓

the public–private partnership PES schemes, as outlined in the “[Discussion](#)”.

Results

Perceived/experienced impacts of deforestation on the tobacco and sugarcane sectors

The respondents highlighted four negative impacts that forest loss could have on the tobacco and sugarcane sectors in Malawi, namely, soil erosion, loss of wood resources, reduced water availability, and contribution to climate change (Table 5).

First, respondents from both sectors reported that soil erosion due to the loss of forest cover can affect both the tobacco and the sugarcane sector (Table 5). However, while respondents from the tobacco sector did indeed perceive that forest loss could affect soil erosion, they could not clearly articulate the mechanism through which

this affects tobacco-growing areas.² On the other hand, respondents from the sugarcane sector, especially from the Kabadwa and Kasinthula Cane Growers Associations, highlighted that soil erosion driven by deforestation in upland areas and riparian strips has resulted in soil loss. This has led to the siltation of rivers and other water-courses, which in-turn damages irrigation equipment, making the irrigation of sugarcane plantations problematic. Respondents from the Illovo sugar company highlighted that significant financial resource and effort is needed to maintain and replace the irrigation equipment damaged as described above. These costs can increase the total production cost of sugarcane and can, at times, affect yields if maintenance and replacement are not done on time.

Second, deforestation can induce fuelwood scarcity, which is key input for tobacco processing. In particular, respondents in the tobacco industry reported that a decline in the availability and accessibility of wood resources for

² It is interesting to note, however, that soil erosion can affect significantly the tobacco/sugarcane sector even if it cannot always directly be linked to deforestation. In particular soil loss, which is an undeniable reality in Malawi, contributes to the decline of soil fertility and agricultural yields (FAO 2016). As a result, tobacco/sugarcane producers need to use larger amounts of inorganic fertilizers to replenish soil nutrients. However, the sugarcane and tobacco several farmers’ associations and cooperatives highlighted that inorganic fertilisers are expensive for most smallholders in Malawi, and can increase production costs and reduce profit margins. Furthermore, the sugarcane and tobacco farmers’ associations and cooperatives pointed out that due to their high prices, some smallholders tend to apply a minimum (or below minimum) amount of inorganic fertilisers, thus compromising the quality, yield and overall income of tobacco and sugarcane.

leaf curing could significantly increase the production costs of tobacco. In addition, other stakeholders (e.g., TCC, Ministry of Agriculture) are of the perception that as tobacco production becomes expensive due to wood scarcity, farmers may shift from tobacco growing and uptake of other cash crop options that do not require wood. This could have implications on the economic development of the country considering that tobacco remains a major source foreign exchange for the country (Ministry of Agriculture DCE and DEPE, personal communication March 2016).

Third, respondents highlighted that forest loss has affected the availability of water for the irrigation of sugarcane fields and tobacco nurseries. Sugarcane is largely grown in Malawi using irrigation as both large plantations in Dwangwa/Nchalo and some smallholder associations follow this practice. In Dwangwa area, the streams and rivers that are often used to draw water for irrigation originate from upstream-forested areas. While tobacco production is mainly rainfed, tobacco nurseries established during the dry season (September–October) rely on underground water, streams/rivers, and swamps or dambo areas for water. Respondents identified that deforestation can be a key driver of water shortages in areas of sugarcane and tobacco production.

Finally, all respondents recognise that the continuous forest loss can contribute significantly to anthropogenic climate change. As several respondents pointed out, climate change can affect tobacco and sugarcane production through changes in temperature, precipitation, and the occurrence of dry spells and droughts. While changes in regional and local climate are more of an indirect impact of deforestation, it is important to note that several stakeholders make links between deforestation, climate change, and effect on agricultural productivity. For example, representatives from Kasinthula Cane Growers Association highlighted that the occurrence of climate-related droughts and dry spells has reduced their sugarcane production by approximately 28%. Similarly, drought occurrences have negatively affected tobacco production in Malawi by causing an estimated average annual production loss of 1.2% (Ministry of Agriculture—DCE). The above suggest that while deforestation-driven climate change can be less of a direct incentive to develop PES schemes, it might be an add-on incentive, especially considering the importance that climate change has received in CSR efforts of the tobacco industry (see “[Discussion](#)”).

Forest conservation initiatives promoted by the tobacco and sugarcane sectors

Expert interviews suggest that sugarcane and tobacco companies implement numerous forest conservation

initiatives (Table 5) that can be categorised into five major types: (a) capacity building; (b) reforestation and forest conservation; (c) promotion of sustainable household practices; (d) promotion of sustainable farming practices; and (e) financial support, i.e., forest development fund–tobacco levy (Table 5).

Regarding capacity building, tobacco and sugarcane companies are currently implementing forest management awareness and capacity-building activities among the farming communities, such as community training in forest management and offering technical support in silviculture practices (Table 5).

Re-afforestation, afforestation and forest conservation initiatives include, among others, establishing large-scale tree plantations on leased estates and promoting natural regeneration of degraded customary forests (Table 6). Alliance One and LLT respondents pointed out that such plantations will be the major (or sole) source of curing wood for the contract tobacco farmers of Limbe Leaf and Alliance One by 2020. Furthermore, the tobacco companies (e.g., Alliance One and LLT) are also encouraging their contract farmers to establish woodlots by providing inputs such as tree seedlings (as part of a loan agreement at the beginning of each cultivation cycle) and technical support. Furthermore, through their partners (e.g., NGOs), companies mobilise local communities to participate in community forest management schemes for their indigenous customary forests³ (JTI; personal communication, March 2016). Tree seedlings are also provided for the establishment of school woodlots, where the schools that exhibit the highest tree survival rates are rewarded (e.g., with school materials such as books).

Sustainable household practices promoted by tobacco and sugarcane companies include the use of ethanol and wood-saving stoves (Table 5).⁴ For example, EthCo-Malawi has in the past supported the Lilongwe University of Agriculture and Natural Resources (LUANAR) in its research on the use of ethanol cooking stoves by providing ethanol fuel to households in the study area. JTI has been supporting Total Land Care (an international NGO operating in Malawi) to raise awareness among communities on the use of wood-saving stoves and to further train some individuals on how to manufacture them.

³ This is in line with the Malawi Government’s Forest Policy (1996) and Act (1997), which promote community participation in the management of forests.

⁴ The use of fuelwood and charcoal for cooking can contribute significantly to forest degradation in Malawi, as 90% of the population depends on these traditional fuels (Fisher and Shively 2005; NSO 2012). UNDP Malawi (2007) suggests that 1 L of ethanol can produce the same useful energy as 5 kg of fuelwood or 2 kg of charcoal. Similarly, the use of efficient wood stoves for cooking can reduce fuelwood use by 50% (Bunderson et al. 2009).

Table 6 Forest management initiatives by the tobacco and sugarcane sectors in Malawi

Activity	Specific activity	Rationale/expected impact on forest	Estimated achievement to date/future targets
Capacity building	Community training in forest management	Improve public awareness in forest issues and impacts	More that 120,500 farmers trained by 2009
	Technical support in silviculture practices	Improve forest management skill and knowledge	
Reforestation, afforestation and forest conservation	Provision of tree seedling	Increase area under forests cover	36,470,914 trees planted till date; 95,077,500 to be planted in the next 5 years
	Plantation and woodlot establishment	Enhance natural regeneration and management of forests on customary land	919,135 bamboos planted and 3,595,950 projected for the next 5 years
	Community forest management initiatives		More than 20 000 ha under private tree plantation
	Bamboo planting		9 schools participated in school in 2014/15 season
Promotion of sustainable household practices	Wood-saving stoves	Reduction of wood energy consumption	Approx. 142 individual trained in construction of wood-saving stove by 2009
	Ethanol stoves	Use of cleaner energy	Approx. 2000 individuals trained in construction of wood-saving stove by 2009 Ethanol cook stove project initiated 2016
Promotion of sustainable farming practices	Use live barns	Reduction of wood energy consumption	1000 rocket barns till date
	Use of bamboo barns and curing;	Improve wood efficiency for fire cured tobacco	projected 100% live barn use for all their contract farmers by 2010
	Rocket barns for flue cured Virginia tobacco		30% of funding in sugarcane Fairtrade projects, allocated of tree nurseries establishment
Financial support	Forest development fund-tobacco levy	Financial source for forest management and conservation activities	Approx. 454,339,661 million Malawi Kwacha collected to date and almost 50% remitted. Approx. 5,000,000 trees planted by 2014

In terms of sustainable farming practices, the tobacco companies including JTI, Limbe Leaf, and Alliance One encourage their contract farmers to use live barns and bamboo barns to reduce wood consumption for curing tobacco, or rocket barns as a more energy-efficient method for curing FCV tobacco (see “Discussion”). However, respondents highlighted that the use of bamboo for tobacco curing has been hindered by the scarcity of bamboo seeds (TCC, LLT, and AHL; personal communication, March 2016).

Finally, since 2011, tobacco smallholders have been charged USD 0.02 per kg of tobacco sold by the purchasing companies. This levy contributes to the government’s forest conservation initiatives, thus internalising some of the negative externalities associated with forest loss. The money is collected by the Tobacco Control Commission and later remitted to the government account number one for use by the Department of Forestry.

Perceptions towards PES schemes as tools to enhance forest conservation

Respondents indicated support towards the introduction of incentive-based conservation programmes such PES

schemes in Malawi, as a means of motivating local communities to invest in tree management. In addition, the respondents highlighted the fact that participation in PES schemes could be an innovative way towards fulfilling their CSR commitments (see above).

Apart from the need to motivate communities, expert interviews reveal that the tobacco and sugarcane sectors benefit from the provisioning and regulating ecosystem services offered by forest ecosystems, e.g., wood for curing tobacco, erosion prevention, improvement of water availability, and regulating the climate through carbon sequestration (see above and below). Some respondents, especially from the Department of Forestry and Environmental Affairs, also emphasised the opportunity costs incurred by communities living in (and near) forests. These opportunity costs were a good reason for involving companies that directly benefit from these ecosystem services when managing forests through a PES scheme.

However, several issues were repeatedly highlighted during the course of the interviews regarding the practicality of a PES scheme in Malawi. These included the (a) actors and their roles, (b) type of compensation, (c) contract agreement/services, and (d) supporting institutional structure (Table 7).

Table 7 Emergent issues related to potential private–public partnership PES programmes in Malawi

Emergent Issues	Description
Actors	Who will be involved? What is each actor's role and implementation level?
Compensation/incentive	What is the kind/type and level of compensation?
Contract agreement and services provides	Which kind/type of services is to be paid for? (additionality) What are the inclusion mechanisms for beneficiaries? (conditionality) What is the time frame for compensation/financing?
Institutional structure	Who will manage? (flow of command) What is the monitoring mechanism? What are the governing policies?

Discussion

Private sector support for forest conservation in Malawi: drivers, practices, and attitudes towards PES

The expert interviews suggest that the tobacco and sugarcane sector recognise forests (and woodland resources) as crucial to their operations. They highlight four negative impacts that forest loss could have on the cost-competitive production of high-quality tobacco and sugarcane in Malawi. Following the conceptual frameworks of the Millennium Ecosystem Assessment (2005) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (Díaz et al. 2015), all of these perceived impacts can be linked to the loss of ecosystem services provided by forests, i.e., erosion regulation (regulating service), woodland products (provisioning service)⁵, freshwater availability (provisioning service), and carbon sequestration (regulating service).

As discussed in the previous section, sugarcane and tobacco companies are implementing numerous forest conservation initiatives in Malawi. This contrasts with previous studies, which found only a minimal involvement of the private sector (especially tobacco) in forest management initiatives in Malawi (Mindle et al. 2001; Missanjo and

Kamanga-Thole 2015). Our findings possibly differ with Mindle et al. (2001) for two reasons. The first is the difference in data collection methods and study participants. While our paper reports the responses of private sector stakeholders, Mindle et al. (2001) emphasise on the perspectives of local communities that might have actually been unaware of conservation initiatives from the private sector. The second reason might have been that Mindle et al. (2001) conducted their study more than 15 years ago, during a period when the structure and regulation of the tobacco sector were very different (Mandondo et al. 2014). Over time, the experience and awareness of private sector actors on the importance of forest conservation may have changed, and catalysed reforms in their approach (and strategies/practices) towards environmental conservation. This change might have been influenced from the general international trend towards the promotion of the best environmental practices from the tobacco and sugarcane industry (e.g., Otañez and Glantz 2011; Bonsucro 2016), especially considering that large international players have become more prominent in the tobacco/sugarcane value chains in Malawi (e.g., JTI-Japanese Tobacco International 2016; Illovo Sugar Malawi Limited 2014; Alliance One 2014) (see also below).

When it comes to the private sector support of forest conservation, three reasons stand out in Malawi. First, participation in forest conservation is seen as strategy to secure future production and benefits, as most private sector respondents acknowledge that tobacco and sugarcane production depends on the availability and sustainable flow of forest-related ecosystem services (see above). Second, some companies consider their forest conservation activities as a means of fulfilling their corporate social responsibility (CSR) commitments (EthCo-Malawi, Illovo, AHL, Malawi Leaf; personal communication, March 2016). Indeed, most of the international companies involved in sugarcane/tobacco production in Malawi highlight extensively in their CSR reports some of the key measures they adopt to reduce deforestation in Malawi (e.g., JTI-Japanese Tobacco International 2016; Illovo Sugar Malawi Limited 2014; Alliance One 2014; McDaniel et al. 2016). Third, major international buyers of Malawian tobacco [e.g., Philip Morris, British American Tobacco, Japanese International Tobacco (JTI)] reportedly adhere to strict environmental standards for the sustainable production of tobacco (McDaniel et al. 2016; TCC, JTI, LLT; personal communication, March 2016).⁶ In fact, the largest tobacco-buying companies in Malawi such as JTI, Limbe Leaf, and Alliance One are mandated to

⁵ Apart from access to wood, forest loss due to tobacco production in Malawi could affect the flow of a number of other provisioning ecosystem services that are important for rural livelihoods (e.g. Mandondo et al. 2014). However, there is critical literature about the motives and effectiveness of such measures considering the extensive use of “nominal self-evaluation (not truly independent evaluators) and public relations to create the impression of social responsibility” (Otañez and Glantz 2011: 403), or their often lop-sided presentation in the media (McDaniel et al., 2016).

⁶ However, there is critical literature about the motives and effectiveness of such measures considering the extensive use of “nominal self-evaluation (not truly independent evaluators) and public relations to create the impression of social responsibility” (Otañez and Glantz 2011, p 403), or their often lop-sided presentation in the media (McDaniel et al. 2016).

promote sustainable tobacco production and to implement sustainable forest and environmental management/conservation practices.

As outlined in Table 5, tobacco and sugarcane companies in Malawi promote extensively forest management awareness and capacity building among the farming communities. Such activities can positively contribute to forest conservation, considering that the limited awareness, knowledge, and technical capacity among rural communities with regard to sustainable forest management have been major limiting factors for effective forest conservation in Africa (Engida and Teshoma 2012; Zulu 2013).

Re-forestation and forest conservation initiatives, including the establishment of woodlots⁷ (Table 5), have the potential to offset some of the deforestation and forest degradation witnessed in the country (Mandondo et al. 2014). This can be achieved by reducing pressure on natural forests, thus allowing forest regeneration. Some of the sustainable farming practices promoted by tobacco companies, such as live barns for air curing tobacco, also aim at reducing pressure on forests. The traditional tobacco barns use upright poles or timber, which have to be maintained and replaced frequently (i.e., annually or bi-annually). On the other hand, live barns are constructed by planting trees to form a permanent barn structure within 3 years. It has been estimated that live barns can reduce the wood/timber needed for maintaining and constructing the barn by approximately 66% (Bunderson et al. 2009). Similarly, bamboo can be used for barn construction, potentially altogether replacing wood for tobacco curing (Malawi Leaf; personal communication, March 2016). Rocket barns are also a more energy-efficient method for curing FCV tobacco. This type of barn has an improved furnace that minimises heat loss and allows for greater heat use efficiency during the tobacco curing process (Geist 1999). Probec-GIZ (2013) suggest that rocket barns could reduce almost tenfold the wood consumed to obtain 1 kg of cured tobacco (i.e., from 20 to 2–3 kg of wood).

Our results reveal that the private sector in Malawi is largely supportive of incentive-based conservation programmes such as PES schemes. Several respondents highlighted that participation in PES schemes could be an innovative way towards fulfilling their CSR commitments (EthCo-Malawi, Illovo, AHL, Malawi Leaf; personal communication, March 2016) (see above). An even more important reason for private companies to be involved in PES would be to motivate local communities to invest in tree management. Several respondents highlighted that despite the high financial investment in

tree planting and afforestation programmes, tree survival rates remain low due to the minimal investment in tree management by local communities (FD, EAD, LRCD, AHL, TCC, Malawi Leaf; personal communication, March 2016). While communities are to an extent aware of the non-monetary value of forests and natural resources (Meijer et al. 2015; FD; personal communication, March 2016),⁸ this low investment can be attributed to the minimal short-term economic and livelihoods benefits that can be accrued from trees (Chinangwa et al. 2016; Meijer et al. 2015; Sirrine et al. 2010; Pircher et al. 2013). Therefore, since PES schemes have the potential to contribute to rural livelihoods through compensation and payments (see “Introduction”), they could enhance the willingness of local communities to invest time and labour in managing the trees.

Therefore, by participating in a PES scheme, the private sector will be motivating investment in tree management, for both the economic benefit of the private sector and the public. While the economic benefit of the private sector from such activities is not obvious, it should not be easily discarded. Currently, smallholders practically grow the majority of all the tobacco in Malawi. The continuous production of high-quality tobacco leaf is key for the profitability of the large tobacco companies (Makoka et al. 2016). Furthermore, the role of outgrowers is rapidly expanding in the sugarcane value chain (Kabadwa; Personal Communication, March, 2016). While the core Illovo plantations in Dwangwa and Nchalo can meet a large proportion of the capacity of their respective sugar mills, they cannot meet the entire capacity (Gcanga 2014). With the current plans to expand mill capacity and without the ever increasing contribution of smallholders, they will end up work under capacity, losing revenue in the process. Smallholders can thus influence to a large extent the profitability of tobacco and sugarcane companies even if they are not integrated “formally” in corporate structures.

As discussed above given the generally positive attitude of the private sector towards incentive-based forest conservation activities, the remainder of the “Discussion” explores different PES structures in Malawi that can involve meaningfully the private sector, as well as their limitations.

Considerations for the design of PES schemes in Malawi

The concept of PES has evolved into a wide spectrum of different models (Muradian et al. 2010). PES schemes in developing countries largely fall into three

⁷ Woodlots have a clear use value for smallholders, so it is difficult to be viewed as a conventional forest conservation tool. However, by establishing woodlots to source wood for tobacco curing, smallholders reduce pressure to natural forests indirectly, and for this reason it could be viewed as a forest conservation strategy.

⁸ The Malawi Government (through the Department of Forestry) also implements annually a national tree planting season to improve the public awareness about the monetary and non-monetary values of forests and nature conservation.

Table 8 Emergent issues to be considered in private–public partnership PES programmes in Malawi

Emergent Issues	PES as CSR	Credit-based PES
Actors	Tobacco and sugarcane companies as funders Smallholders as adopter and implementers of forest conservation activities PES coordination committee Community committees and village heads for mobilising participants	Tobacco and sugarcane companies as lenders/credit fund providers Farmers as adopter and implementers of forest conservation activities PES coordination committee NGO as platform for loan disbursement
Compensation/incentive	Kind/development projects	Cash/kind
Contract agreement and provided service	Afforestation or increase in forested area/tree population Agree survival rate of planted trees Initial provision of forest inputs by companies through their afforestation programmes	Afforestation or increase in forested area/tree population Adoption of wood-saving technologies, e.g., use of live/rocket barns Annually, upon demonstrating the initiative (staring) Provision of material
Institutional structure	Companies and PES coordination committee guidelines Government PES and afforestation policies	Companies and PES coordination committee guidelines Government PES and afforestation policies

main categories, namely, commoditization, compensation, and co-investment⁹ (Namirembe et al. 2014; Swallow et al. 2010; van Noordwijk et al. 2012). Compensation and co-investment schemes are possibly the most common and suitable form of PES in Africa, considering the challenges regarding market constraints and ecosystem services assessment/valuation (Namirembe et al. 2014).

Therefore, in the Malawi context, compensation or co-investment schemes could be the most feasible forms of PES for private tobacco/sugarcane companies to participate. Considering that the companies themselves sometimes invest in providing ecosystem services (e.g., through the establishment of forest plantations, see “Results”), it would be difficult for them to participate as buyers when they can equally be qualified as sellers. Thus, co-investment or compensation schemes can provide a platform for companies to contribute to forest conservation and improve the environment for the benefit of their businesses, as much as for the benefit of the environment itself and the national economy.

However, compensation and co-investment PES schemes are characterised by minimal conditionality, undefined ecosystem services outcomes and the lack of

monitoring frameworks (Swallow et al. 2010; van Noordwijk et al. 2012). These characteristics could make PES projects unattractive for the private sector (e.g., Engel and Wunsher 2015). Thus, including conditionalities, additionality, and monitoring measures in PES schemes would be almost a pre-condition to meaningfully involve the tobacco/sugarcane companies (see the next section). This will help, among others, to convince companies that the proposed PES scheme will not be a money-siphoning tool but a legitimate forest conservation mechanism (Namirembe et al. 2014; Ferraro and Kiss 2002; Adhikari and Boag 2013). However, it should be mentioned that a strict adherence to conditionalities and additionality measures could risk minimal community participation (Engel and Wunsher 2015). Therefore, action-based compensation or incentives in case of uncertainties (e.g., drought) should be included to enhance participation (Ferraro and Simpson 2002; Groom and Palmer 2010).

It should be kept in mind that tobacco and sugarcane companies are profit-making entities, and thus, their willingness to participate in a PES scheme will be limited if extra financial obligations are demanded. Alternatively, companies may shift the financial burden to poor farmers through buyer or processing fees. Therefore, the PES schemes explored below should ideally be readily integrated into the existing activities of these companies. Based on our expert interviews, PES schemes that can contribute to CSR activities and/or adopt credit-based models could form part of the current forest management initiatives promoted by tobacco/sugarcane companies in Malawi (Table 8).

⁹ Commoditization entails payment for the actual delivery of specific ecosystem services upon assessment, verification and certification by a third party. Compensation refers to payments for accepting or achieving conditions for a specified environmental outcome (Swallow et al. 2010; van Noordwijk et al. 2012). Co-investment is defined as a non-market driven conditional reward aimed at motivating the adoption of good land use practices (Namirembe et al. 2014).

Possible PES designs for involving the tobacco and sugarcane industry in Malawi

PES schemes as part of CSR activities

Currently, the tobacco and sugarcane industries in Malawi implement various CSR activities to improve the environment and socioeconomic development of local communities (e.g., JTI-Japanese Tobacco International 2016; Illovo Sugar Malawi Limited 2014; Alliance One 2014). As most respondents from the private sector viewed PES to be an innovative form of CSR, it is plausible to assume that companies will be willing to implement PES schemes as part of their CSR activities.

However, some scholars have argued that if PES is carried out as a CSR activity, then actors from the private sector may not be interested in enforcing additionality and conditionality measures (e.g., Engel and Wunsher 2015). However, considering that forest conservation is crucial for the operations of the tobacco and sugarcane sector in Malawi (see “Results”), we expect that enforcing outcomes (i.e., additionality and conditionality) will be of interest to such companies. Thus, a PES scheme that is part of CSR activities should not only focus on fulfilling social expectations, but also emphasise the impacts and outcomes that are good for the environment, business and rural livelihoods (Ibe et al. 2015). In addition, implementing PES as a CSR activity in a community setting should be linked to the current implementation of (or demonstrated willingness to implement) forest conservation activities, e.g., establish village forest areas or enforce sustainable forest management in existing village forest areas (Cranford and Mourato 2014). Furthermore, any subsequent project should be based upon achieving the forest conservation commitments agreed to by the target communities (Cranford and Mourato 2014).

It should be noted that most CSR initiatives in Malawi are community-based, hence making the excludability of beneficiaries a challenge¹⁰. Giving compensation in cash that will be shared among actual participants would be one plausible solution to this excludability challenge (e.g., Namirembe et al. 2014; Cranford and Mourato 2014; Ibe et al. 2015). However, private sector respondents were not in favor of cash rewards, but favoured developmental rewards (EthCo-Malawi, Illovo, AHL, Malawi Leaf; JTI, TCC, LLT; personal communication, March 2016). Therefore, using/including existing community institutions (e.g., village heads, development committees) in PES schemes will be crucial in mobilising community participation and avoiding free riding. As local institutions and

power hierarchies are highly valued among communities in Malawi, those individuals unwilling to participate in a community development activity can be persuaded to participate through a directive from the village head (Chinangwa et al. 2016; Bene et al. 2009). Therefore, considering the above, Table 8 outlines appropriate stakeholders (and their roles) and contractual agreements in Malawi for PES schemes as part of CSR activities.

Credit- or contract-based PES schemes

Credit-based PES reflects the lending condition that a borrower will only be eligible to access credit by demonstrating or adopting environmentally friendly practices or behaviours (Cranford and Mourato 2014; Wild et al. 2008; Anderson et al. 2002). According to Malawi Growth and Development Strategies 1 and 2, promoting the financial independence of smallholders (including tobacco and sugarcane farmers), is a key policy goal of the Malawi government. However, currently, most of the tobacco and sugarcane smallholders depend on credits to produce their crops (Makoka et al. 2016).

Tobacco companies in Malawi provide their contract farmers with financial inputs (e.g., seeds, fertilisers, tree seedlings) on a credit basis. Similarly, the sugarcane growers' associations provide on credit their members with financial (e.g., seeds, fertilisers, herbicides) and production services (e.g., land preparation, transport). Thus, building on existing credit structures and practices, it could be feasible to design a credit-based PES scheme by making the ex-ante or post-ante adoption of environmentally friendly practices a conditionality for contract farming, association membership and accessing farm inputs and services on credit (e.g., Anderson et al. 2002; Cranford and Mourato 2014).

Examples of conditions may include to (a) allocate a portion of tobacco/sugarcane land to trees, (b) use live/rocket barns for tobacco farmers, and (c) agree to a minimum survival rate for trees. This could be an efficient arrangement, because contracts/credits can be made directly with the individual farmers, thus minimizing the risk of criticising the conditions or free riding. Moreover, as tobacco and sugarcane production are major household income streams, producing households are expected to make an effort to meet such conditions to secure their main livelihood activity.

Furthermore, forest degradation caused by tobacco and sugarcane expansion can affect the community at large, including those not involved per se in tobacco/sugarcane production. Therefore, instead of only targeting tobacco/sugarcane smallholders, a credit-based PES scheme could also be made accessible to non-growers by establishing a community development fund, where

¹⁰ Excludability usually refers to the ability an actor has in preventing other actors from accessing or benefiting from public goods or common-pool resources (e.g. Ostrom 1990).

farmers could borrow (e.g., Mandel et al. 2009). Further to adopting environmentally friendly practices as a conditionality for borrowing, the capital deposited into the fund should depend on the natural capital base of the local community (Anderson et al. 2002; Mandel et al. 2009). For example, communities with greater forest resources and lower deforestation rates should have larger amounts of financial capital deposited into their funds, as compared to those with relatively low resources base and/or high deforestation rates. Similarly, the amount of funds available for borrowing should be adjusted according to the level of forest degradation or conservation at a particular point in time (Groom and Palmer 2010), as this could ultimately motivate communities to invest in forest conservation and management.

However, using the existing forest and natural capital as a basis for available community funds can only be practical if the PES scheme is incorporated in existing forest management structures, such as community-based forestry management programmes (Cranford and Mourato 2014; Wild et al. 2008; Anderson et al. 2002). Integrating a credit-based PES scheme in community-based forest/natural resource management programmes can empower farming communities as these approaches revolve around community governance, capacity building, and empowerment (e.g., Anderson et al. 2002).

Finally, it should be mentioned that the limited access to financial resources (including access to credit), because smallholders do not meet the traditional criteria for borrowing, is a major constraint of financial development in rural Malawi (Fletschner and Kenney 2011; Burritt 2006; Diagne and Zeller 2001). Therefore, integrating a credit-based PES programme in community-based forest management programmes could facilitate access to credit to those meeting the PES scheme criteria, and thus indirectly contribute to rural financial development and poverty alleviation at a wider scale.

Towards an effective multi-stakeholder private–public PES coordination structure

Expert interviews reveal that, apart from the tobacco levy, companies implement their forest conservation activities (see Table 4) rather independently. This disjointment could duplicate effort and result in the inefficient use of financial resources for forest conservation. Furthermore, without a coordinating body, the monitoring and accountability of PES activities may be compromised during implementation.

Considering that the Department of Forestry is the government institution responsible for forest management, it is the obvious choice for coordinating forest-based PES initiatives. However, Wiyo et al. (2014) suggest that due to limited human resources, lengthy bureaucratic procedures,

and other challenges (e.g., misdirection of forest funds to other activities); the department is not an effective institution to manage PES schemes. Similar opinions were expressed from interviewees in the tobacco sector, as some respondents expressed concerns regarding the process through which the Department of Forestry handles the afforestation levy (AHL, TCC, LLT; personal communication, March 2016).

For this reason, we believe that a multi-stakeholder committee would be an important element to effectively coordinate PES scheme(s) such as the ones outlined in the previous sections (Fig. 2). The coordination institution should be comprised of different stakeholders from the private, public, and civil society sectors, as well as representatives from the district and community development committees.

In the above structure the private sector (i.e., tobacco/sugarcane companies) will be responsible for providing funds and implementing the CSR and/or credit-based PES scheme. To ensure that such PES schemes are effective, the private sector should also be involved in the dissemination of best practices within the targeted communities. In addition, the private sector should also be involved in the monitoring of the: (a) implementation of afforestation activities to ensure that positive environmental impact is achieved and (b) payments to beneficiaries as per contract agreement to ensure that positive socioeconomic impact is achieved.

Government institutions (e.g., Department of Forestry, Ministry of Agriculture, Environmental Affairs Department) will be responsible for (a) providing policy guidelines, (b) establishing and overseeing legal and regulatory procedures, and (c) offering technical support for the implementation of afforestation activities and PES schemes. For example, our expert interviews revealed that the current policies that govern the production of industrial crops such as tobacco, cotton, sugarcane, and tea are outdated Ministry of Agriculture—DCE and DEPE; personal communication, March 2016; see also Wiggins et al. 2015). Thus, the public sector should ensure that new policies include clauses that promote forest conservation/protection among farming communities, e.g., conditionalities to credit-based PES. These policies should be embedded in existing land-use policies and strategies, such as the 2002 National Land Resources Management Policy and Strategy that promotes the development of (and adherence to) land-use plans and the incorporation of land and natural resources conservation technologies in farming systems (Malawi Government 2002). In addition, existing policies and legislations (e.g., the 1996 Forest Policy, the 1997 Forest Act, and the 2003 Malawi Energy policy) should be reflected in any new policies that will govern the production of industrial crops such as tobacco, cotton, sugarcane,

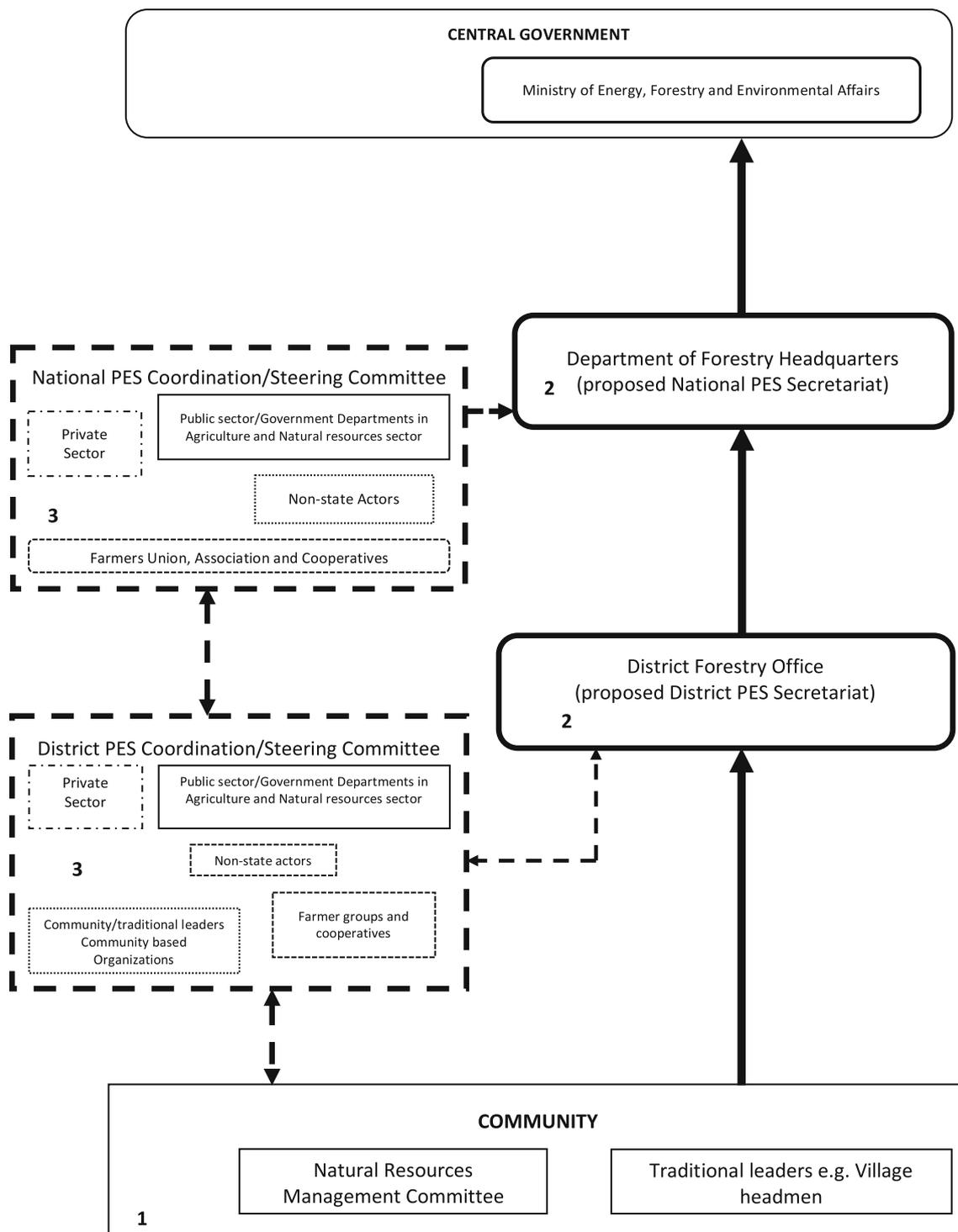


Fig. 2 Potential institutional structure (PES Committee) to coordinate the implementation of a multi-stakeholder private–public PES programme in Malawi. PES scheme structure includes; 1 the existing local or traditional leadership and village-level natural resources management committee; 2 the state through the Department of Forestry, which follows a hierarchal structure from the headquarters at the national level (represented by Director) and at the district and

community levels (represented by the district forest officer and forest extension officers, respectively), and 3 a suggested new PES committee at the district and national levels with representatives from the community (i.e., Natural Resources Management Committee members), government departments, private sector (e.g., tobacco and sugarcane industry) and civil society

and tea (Malawi Government 1996, 1997, Malawi Government 2002, 2003). Other government departments responsible for trade and industry should oversee that related business operations adhere to environmental standards and that CSR activities are impact-oriented and not just socially acceptable. The public sector should ensure that the involved smallholders and local communities benefit from any operationalised PES scheme and that they receive their incentives.

Non-state actors such as NGOs can act as power brokers or mediators between the PES sponsors (i.e., tobacco/sugarcane companies) and the communities. They can help the communities to actively participate, fully benefit from PES schemes and safeguard their empowerment and negotiating ability (Oyono 2003). NGOs could further ensure that the benefit-sharing processes do not marginalize the under-privileged in the participating communities and that they are implemented in an accountable manner. Some respondents pointed out that certain tobacco/sugarcane companies involve NGOs during the implementation of forest conservation activities through the provision of funds (e.g., JTI; personal communication, March 2016). Thus, apart from just being represented in the PES committees, NGOs could also take an active role in mobilising, training, and facilitating the implementation of PES schemes.

We believe that the PES committee should have two tiers: one at the national level and one at the district (or implementation) level (Fig. 2). The national level would oversee the overall policy and coordination issues (e.g., formulate policy and contracting guidelines/procedures), while the district committee would coordinate and facilitate the implementation/monitoring activities (e.g., identify farmers/communities, monitor outcomes/impacts, and ensure contract agreements are fulfilled). This committee should, therefore, be linked in parallel to the main structure of the Department of Forestry, so that its activities are consistent with the standards and policies governing forest conservation in Malawi.

It should be mentioned that Wiyo et al. (2014) have proposed a similar institution in Malawi, i.e., a Reforestation and Environmental Protections Authority, that would be responsible for collecting funds from the private sector to fund community afforestation activities through a district structure. However, the institution proposed in this paper is different, in the sense that its mandate would be to coordinate/monitor the different PES activities that would be implemented by the private sector itself or through a third party (e.g., NGO), and will not itself collect and disburse the funds. This is because the PES activities outlined above should build on (or be integrated into) the existing activities of sugarcane/tobacco companies. Thus, the PES committee is envisaged to be a

supporting institution rather, than a regulatory or controlling structure.

Possible scenarios for implementing private–public PES schemes in Malawi

Like any other conservation tool, PES schemes should not be considered as a universal solution to conservation problems (Wunder 2013). PES design and implementation should be reflective of the existing environmental and socioeconomic context at the local level within which the scheme will be implemented.

To explore the potential of a public–private PES scheme, different possible implementation scenarios need to be explored. Such scenarios should be based on context-specific evidence and assumptions regarding the drivers of forest ecosystem change. Currently, there is a limited literature on scenario building with regard to PES schemes, globally (Schulz et al. 2014), and more so in Malawi and other countries of Africa. For the purpose of this paper, we use four scenarios developed by Schulz et al. (2014) for a PES programme in Brazil: (a) ecosystem service-based economy; (b) business as usual; (c) ecological breakdown; and (d) extensive adoption of green technologies.

PES schemes as the ones explored above will only be fully viable in an ecosystem service-based economy scenario. In such a scenario, the government and the private sector are well aware that the economic success (for companies) and the wellbeing of citizens (for the government) depend on well-functioning forest ecosystems, and are hence willing to finance such a PES scheme. This has been reflected by interview results, as some respondents highlighted the need to have support between different actors for introducing a PES scheme, and further demonstrated the importance of forest ecosystems to their continued production (FD, EAD, LRCO, AHL, TCC, Malawi Leaf; personal communication, March 2016). However, for such PES schemes to be fully effective, they need to be accompanied with appropriate environmental education with regard to the importance of forest ecosystem services in the targeted community (Wunder 2013; Muradian et al. 2013; Spash 2015).

Using the business-as-usual scenario, a public–private PES scheme will not be a viable conservation tool if the payments from the PES scheme are not economically attractive compared to the other existing land-use options (i.e., tobacco/sugarcane or food crop farming). The opportunity cost of the land becomes a major consideration in this case, and in cases of high opportunity costs, then conservation strategies other than PES might be more appropriate.

The ecological breakdown scenario represents areas, where environmental degradation has been so severe, such

that few forest ecosystem services could be paid for. In these contexts, a conventional PES scheme based on a commoditization approach (i.e., payment for the actual delivery of specific ecosystem services) would be difficult (possibly impossible) to be implemented effectively (Namirembe et al. 2014; Swallow et al. 2010; van Noordwijk et al. 2012). In this scenario, it would be more meaningful to direct efforts towards building a natural capital base. However, since in this paper, we have outlined PES schemes based on compensation and co-investment (see section above), their introduction could be a viable tool for achieving short-term afforestation or reforestation contexts of high environmental degradation (Ferraro and Simpson 2002; Groom and Palmer 2010).

Finally, the last scenario implies that communities have attained high living standards and environmental awareness, which has resulted in substantial investments in green technologies. In such a scenario, PES will have no impact. However, it will be difficult to find a community with such characteristics in Malawi, and most of the Sub-Saharan Africa.

Future research steps

Despite the possible stakeholder support for forest-based PES schemes in Malawi as outlined in the previous sections, the literature outlines several challenges that can hinder the effective implementation of PES schemes (see below). As such, our study should only be seen as the first step towards establishing the true potential of PES mechanisms in tobacco/sugarcane settings of Malawi, let alone operationalise it.

Some of the key issues that future research should tackle are:

- (a) How to ensure additionality.
- (b) How to avoid buyer–seller conflicts.
- (c) What is the actual willingness of companies and farmers to participate in PES schemes.
- (d) What are the synergies and conflicts between PES schemes and other forest conservation mechanisms.
- (e) What are the ethical and equity dimensions of PES implementation in Malawi.

For (a), a proper ecosystem services assessment/mapping exercise would be key for identifying the true forest resource base and possible conservation benefits of PES schemes. However, ecosystem service mapping remains a challenging practical issue in most developing countries (Namirembe et al. 2014). While Fig. 1 provides a rough approximation of the co-location of forests and sugarcane/tobacco production areas, more comprehensive mapping exercises should identify the most promising areas in terms of threatened ecosystems services from

tobacco/sugarcane production. Such future research could be used to shortlist promising areas to locate PES schemes, and would be an important first step to define and quantify additionality.

Regarding (b), our expert interviews suggested that the tobacco and sugarcane sectors traditionally benefit from the services provided by forest ecosystems managed by the state and local communities. However, the companies are also involved in forest management, already investing in a number of such activities (Table 5). As a result, the companies can define themselves both as ecosystem service providers and as potential beneficiaries of a compensation or co-investment-based PES. Hence, it is possible that some “buyer–seller” conflicts could arise, as it is difficult to clearly define or persuade companies to pay for the ecosystem services or fund PES schemes. Therefore, further research should investigate if such buyer–seller conflicts exist, their extent, and what policy interventions could be put in place to mitigate such conflicts.

Regarding (c), as already discussed, CSR activities (including those related to PES schemes) are voluntary (Wunder 2005). As a result, the tobacco/sugarcane companies may not be willing to actually participate in PES schemes if CSR is not key to the goals of the company. In this respect, it could be the case that only some companies in Malawi are eventually willing to be involved in CSR-based PES schemes. Participatory research exercises need to further explore the actual commitment of tobacco/sugarcane companies to be involved in PES schemes. Apart from discussing potential designs such as the ones outlined above, these exercises should have clear information about additionality [Point (a) above] and buyer–seller issues [Point (b) above] in local areas that have been prioritized for PES schemes subject to extensive ecosystem services mapping exercises.

At the same time, it would be necessary to determine how much investment will be needed in PES schemes. Apart from capturing the farmers’ willingness to accept (WTA) or the private sector’s willingness to pay (WTP) compensation, it is necessary to understand what kind of programmes would be acceptable to local communities. This is particularly important for credit-based PES schemes, as sugarcane/tobacco smallholders often enter loan agreements that are against their interests, and are thus mistrusted by local communities.

Regarding (d), while PES schemes are promising in sugarcane/tobacco contexts of Malawi as discussed above, the fact remains that they are only one of the numerous mechanisms to conserve forests and alleviate poverty (Roe et al. 2012; CBD 2010). This means that PES schemes might not be the only available conservation option in a given setting. In reality, it might be the case that other conservation mechanisms might hold more promise in

Malawi, or PES could only yield significant benefits when implemented alongside other conservation mechanisms. Further research would be needed to understand the synergies and conflicts between PES and other forest conservation mechanisms. A policy-mix approach could be an interesting approach to explore such institutional trade-offs (e.g., Klassert and Möckel 2013; Barton et al. 2013).

Finally, regarding (e) ethical issues have been associated with the introduction of monetary or incentive-based conservation strategies among rural communities, e.g., the potential to compromise the socio-cultural and ethical values of conservation (Muradian et al. 2013; Spash 2015). Various scholars suggest that the societal values of forest ecosystem services should be based on personal intrinsic values related to the actual benefits obtained from ecosystem services, and not to the commoditization of the services per se (Gómez-Baggethun and Ruiz-Pérez 2011; Arsel and Buscher 2012; McAfee 2012). Hence, by introducing PES schemes, there is a risk that local communities will only engage in conservation to obtain income, which could have adverse effects if buyers pull out (e.g., increased deforestation). In the same vein, there is a risk of elite capture of the monetary benefits that accrue from PES schemes, leading to the marginalization of the poor. For example, profit-oriented farmers and private traders could aim at increasing their profit margins by further degrading common pool resources such as forests. Understanding the local ethical and equity dimensions of PES introduction (and mitigating the negative outcomes) should be a key research task in promising areas shortlisted for PES schemes.

Conclusions

Forest degradation in Malawi remains a major sustainability challenge that affects local communities, private companies, and the national economy as a whole. Tobacco and sugarcane companies are willing to implement forest conservation initiatives, as these initiatives often benefit their own operations. Such forest conservation activities can be as diverse as (a) capacity building, (b) reforestation and forest conservation, (c) promotion of sustainable household practices, (d) promotion of sustainable farming practices, and (e) tobacco- and forest-levy programmes.

Our interviews suggest that the private sector in Malawi has a positive disposition towards the introduction of incentive-based conservation programmes or PES schemes as a means of tackling deforestation. However, it should be kept in mind that profit-making is a key consideration of the private sector. Thus, PES schemes that aim to involve the private sector should ideally be readily integrated into existing company activities. In this respect, co-investment

and/or compensation PES schemes can be the most suitable platform to involve the private sector. In particular, PES schemes that are part of CSR activities or a conditionality for accessing credit for farm inputs or gaining eligibility for contract farming (credit-based PES) hold the most promise. To coordinate effectively such PES schemes, it would be necessary to establish locally and nationally multi-stakeholder committees.

However, there are still multiple research gaps that need to be explored before such PES schemes are operationalized such as: (a) how to ensure additionality; (b) how to avoid buyer–seller conflicts; (c) what is the actual willingness of companies and farmers to participate in PES schemes; (d) what are the synergies and conflicts between PES schemes and other forest conservation mechanisms; and (e) what are the ethical and equity dimensions of PES implementation in Malawi. In addition, further research in scenario building is recommended, to assess under what existing social and ecological conditions will a PES scheme be a viable forest conservation tool in Malawi.

Finally, it should be stressed that PES schemes are only one of the possible forest conservation mechanisms that could be implemented in any given context. A good understanding of national and local realities would be necessary to ensure if such schemes hold promise or are socially acceptable. PES schemes should not be a replacement for awareness activities related to forests and the multiple benefits their multi-faceted contribution to human wellbeing.

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