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Complexities of sustainable palm oil production by smallholders in sub-Saharan Africa

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Abstract

Sub-Saharan Africa is increasingly viewed as an important area for oil palm cultivation and expansion. Palm oil is a commodity that can help developing countries like Cameroon attain their sustainable development goals (SDGs) targets through poverty alleviation (SDG 1) and by providing revenue to smallholder farmers to buy a variety of food thereby reducing hunger. However, due to the many negative environmental and social consequences, the sector needs to be made more sustainable. In this study, we set out to unpack the complexities including costs and benefits for smallholder farmers to practice sustainable palm oil production. We use both gray and peer-reviewed literature, conversational interviews with smallholder farmers and managers of certified palm oil mills, and a workshop with smallholders in Cameroon. We found that smallholders face several challenges including weak land tenure rights, the use of poor-quality seeds and low-yielding oil palms, and a lack of skills, expertise, and access to financing. Certification could help alleviate some of the challenges by providing access to financing, training to improve yields, access to better seedlings, and increased access to higher value markets. However, the certification cost is very high compared to the income from oil palm cultivation for most farmers. Farmers will therefore need considerable assistance from organizations and brokers to remain financially viable. Our study provides important insights to countries such as the EU, United Kingdom, and United States that are in the process of adopting legislation to regulate deforestation associated with imports of key commodities such as palm oil.

KEYWORDS

deforestation, ecosystem services, forest conservation, jurisdictional approach, oil palm, RSPO certification, smallholders, sustainable palm oil

1 | INTRODUCTION

Oil palm cultivation is booming due to the increasing global demand for palm oil which has many useful applications in the food, cosmetics, and biofuel industries, (Kaniapan et al., 2021; Kurnia et al., 2016).

Sub-Saharan Africa is increasingly viewed as an important area for the cultivation and expansion of both large and small-scale palm oil production, partly due to its relative availability of land and government interest in promoting economic development through palm oil trade (Semroc et al., 2015). Oil palm is cultivated in about 40% of African

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countries located in the tropical belt of the continent from Liberia to Tanzania and extending southwest to Angola (Descals et al., 2021). In 2018, Nigeria, Côte d'Ivoire, Ghana, Cameroon, and the Democratic Republic of Congo were the top five palm oil producers in Africa (FAOSTAT, 2021). Recently, more African governments are targeting the palm oil sector for agricultural expansion to improve livelihoods and increase gross domestic product (GDP) despite potential negative environmental and social impacts. For example, Gabon, a highly forested country, has ambitions of becoming a leading palm oil producer in Africa. It signed a US\$236 million contract with Olam in 2010 to develop 50,000 ha of palm plantation, eventually expanding to 300,000 ha (République Gabonaise, 2012). In 2021, Olam Palm Gabon produced close to 100,000 tons of crude palm oil (Olam, 2022). Similarly, the Liberian government has invested over US\$500 million since 2008 and is prioritizing the development of agroforestry concessions, and interests from global companies confirm palm oil as a significant economic opportunity for the country (Niessen & Sayon, 2020).

While palm oil provides a source of income for many underprivileged people and improves the GDP in countries where it is grown (Li, 2015), its production comes with many negative consequences as forests are cut down to make way for oil palm plantations (Lim & Biswas, 2019; Oosterveer, 2015) causing a loss of biodiversity, releasing greenhouse gases, and depriving forest-dependent people of livelihoods (Danielsen et al., 2009; Koh & Wilcove, 2008; Phalan et al., 2013). For example, between 1995 and 2000 the sector contributed approximately 7% of Indonesia's GDP but 54% of plantations in Indonesia replaced forests (Austin et al., 2017).

In Cameroon, smallholder growers involved in micro and small-scale processing of palm oil are increasingly cutting down new forests for the cultivation of oil palm more than agro-industrial companies (Ordway et al., 2019). More than 70% of smallholder farmers who expanded their oil palm plantations in the South West Region of Cameroon did so at the expense of secondary forests and much less on intact forests (Ndjogui et al., 2016; Nkongho et al., 2014). With the increasing interest in oil palm across the African continent and the increase in smallholder involvement in the sector, we can expect to see more deforestation in the future if nothing is done to curb this. Such clearing of forests and natural vegetation results in the loss of both plant and animal biodiversity as well as the many ecosystem functions (e.g., soil retention, carbon storage, and water infiltration) and associated ecosystem services (e.g., soil fertility and water purification; Ayompe, Schaafsma, & Egoh, 2021). Additionally, some of these plants serve as food and medicine for local communities (Gumisiriza et al., 2021; Mbuni et al., 2020) while some animals are important sources of protein (Cawthorn & Hoffman, 2015; Ordaz-Németh et al., 2017). The negative impacts associated with palm oil production are many and are both environmental and social such as deforestation, water pollution, soil erosion, conflicts, forced labor, and violations of workers' rights (Ayompe, Schaafsma, & Egoh, 2021; Ordway et al., 2017; Vijay et al., 2016), including health effects (Capecchi et al., 2019; Jensen et al., 2019) and land use issues such as habitat destruction and fragmentation (Disdier et al., 2013; Mehraban et al., 2022) that need to be addressed.

While trade in palm oil can spur economic development especially where governance is strong, there are concerns about the local impacts of palm oil production and distribution on the environment and on people (Schaafsma et al., 2023a). The need for sustainable production of such an economically important commodity cannot be overstated especially in sub-Saharan Africa, where about 5% of global palm oil is produced. There have been several policies and regulations introduced to regulate the production and distribution of palm oil across different markets. Due to increasing consumers' demand for sustainable palm oil (i.e., palm oil produced without harm to the environment and people), there have been collaborations among several stakeholders including the palm oil industry, conservation organizations, and businesses to respond to these negative impacts resulting in the creation of the Roundtable on Sustainable Palm Oil in 2004 (RSPO, 2011). RSPO seeks to promote the growth and use of palm oil products through global standards and multistakeholder governance as well as a certification system to ensure sustainable palm oil production (Schmidt & De Rosa, 2020). The RSPO has emerged as one of the most respected and widely recognized organizations working with agro-industries and smallholders to promote sustainable palm oil production around the world (Parveez et al., 2021). Smallholders here are referred to as farmers who grow oil palm on less than 50 ha, alongside subsistence crops, where the family provides most of the labor and the farm provides the principal source of income. Much progress has been achieved by RSPO to make palm oil production sustainable using their certification standards. As of 2020, more than 500 companies (very few in Africa) had signed a no-deforestation agreement with the RSPO, and many countries are fully committed to not cutting down forests (Thomson, 2020). While some of these companies have left the African continent, others have stayed on and are working with smallholders, who are increasingly implicated in the negative impacts of palm oil.

While efforts to reduce deforestation around the world are being put in place by companies and governments, RSPO certification standards have received a very low uptake in Africa. Although RSPO has successfully certified smallholders in other regions including Asia, less than 1% of smallholders in Africa are RSPO certified (according to records obtained from RSPO). Globally, smallholders are responsible for about 27% oil palm cultivation 5.72 ± 0.22 Mha. In West Africa and Central Africa, smallholders occupy about 68% (0.79 ± 0.11 Mha) and 26% (0.21 ± 0.6 Mha) of total area cultivated, respectively (Descals et al., 2021). In Cameroon, smallholder oil palm plantations range from smallholding (>0–5 ha), medium holdings (>5–20 ha), and large holdings (>20 ha). The majority of oil palm plantations in Cameroon fall within the smallholdings and few within large holdings. The sizes of the plantations also have an influence on the sourcing of labor for farm upkeep and whether the entire FFBs will be processed in an artisanal mill, or part/all will be delivered to the industrial mill. Since recent studies have shown overwhelming negative social impacts in addition to recorded environmental impacts in the palm oil sector in Africa (Ayompe, Schaafsma, & Egoh, 2021; Burton et al., 2017; Fraser & Mousseau, 2016; Ohimain et al., 2014; Ordway et al., 2019), the challenge is how to get smallholder farmers in Africa

certified through RSPO or follow some other sustainable practices. There are still hundreds of thousands of smallholders in sub-Saharan Africa who could benefit from RSPO certification. These benefits include better waste management, enhanced productivity, reduced emission of greenhouse gases, reduction in workplace accidents, reduced usage of pesticides, and improved compliance with regulatory requirements. Other certification programs for smallholders in the palm oil sector include international programs such as the International Federation of Organic Agriculture Movements (IFOAM; Furumo et al., 2020) and the International Sustainability and Carbon Certification (ISCC), as well as national certification standards such as the Indonesian Sustainable Palm Oil (ISPO), Malaysian Sustainable Palm Oil (MSPO).

This study aims to unpack the complexities including costs and benefits for smallholders to practice sustainable palm oil production in sub-Saharan Africa. We use the RSPO as an example of how independent smallholder farmers could get certified in sub-Saharan Africa. The overall objective was to understand the challenges and complexities of sustainable palm oil production by smallholder farmers in sub-Saharan Africa. We specifically seek to understand (1) the structure of smallholder oil palm farmers in sub-Saharan Africa; (2) their agricultural and milling practices; (3) their revenue streams including from both oil palm and forest; (4) the potential for them to be RSPO certified given the costs and benefits of certification. As part of the benefits, we assess the farmers' perceptions of ecosystem services provided by forests. Lastly, we discuss the possible challenges faced by farmers to implement the RSPO Independent Smallholder Certification Standard or any other similar standards. We focus on smallholders in Cameroon because they have been identified by previous studies as deforesting more and the widespread potential future smallholder schemes advocated by the government as a poverty alleviation strategy (Ordway et al., 2019).

2 | METHODS

To understand the complexities that smallholder oil palm farmers in Africa must navigate to get certified, we used the RSPO independent smallholder certification standard as an example and three streams of information gathering. Specifically, we conducted: (1) a review of both gray and peer-reviewed literature to understand aspects such as land conversion, farm management, and milling practices; (2) Based on our initial results, we conducted conversational interviews with smallholder farmers in 5 African countries (Cameroon, Ghana, Sierra Leone, Nigeria, and Liberia); (3) We further carried out a workshop with 60 smallholder farmers in Cameroon.

2.1 | Literature review

We conducted desk studies to review relevant peer-reviewed scientific and gray literature (government and organization reports, online newspapers, scientific publications) as shown in Figure 1a. We

searched for studies using the term “smallholder and oil palm OR palm oil and Africa” both on Google and Google Scholar. We made every attempt to exhaustively screen all published articles and papers on both websites. We read all documents found and used snowballing to find additional documents. We found and reviewed 52 peer-reviewed studies with the majority from Cameroon (26.9%), Nigeria (21.2%), and Ghana (13.5%) (Figure 1b). We also reviewed 42 gray literature mostly from Cameroon (19.0%), Ghana (16.7%), Liberia, and Nigeria (14.3%). Most of the peer-reviewed literature was published between 2014 and 2019 while most of the gray literature was published between 2012 and 2014 (Figure 1b). These enabled us to identify the existing milling models practiced in High Forest Cover Countries (countries with high intact continuous forests) in Central and West Africa, as well as other regions as reported in both gray and scientific literature.

2.2 | Workshop and interviews

We conducted interviews with in-country experts and relevant stakeholders identified through the literature review process. This included researchers, smallholder farmers, and Government as well as NGO officials. Virtual meetings through telephone and Zoom teleconferencing as well as face-to-face conversations were held where possible between August and October 2021. We also carried out in-depth interviews with representatives of smallholder farmer groups who have been certified in Africa to understand what works and what does not work with the RSPO certification standard. Follow-up interviews were carried out where necessary. During the interviews, we focused on understanding the structure of the smallholder palm oil sector (including farm size, farm yield, milling practices, level of deforestation, availability, and participation in government programs, as well as relationships with bigger mills where applicable). We interviewed 15 experts in total from Cameroon, Côte d'Ivoire, Ghana, Liberia, Nigeria, Sierra Leone, and 3 experts in the USA working in the oil sector in sub-Saharan Africa. Most of the interviews lasted 1 h and all meeting proceedings were recorded and transcribed.

2.3 | Case study, Cameroon

We used Cameroon as a case study to assess how smallholder palm oil producers perceive the RSPO certification standards and if they will be inclined to enroll in the certification process that involves a no-deforestation commitment. To this end, a workshop was held with 60 smallholders in Ndoupe, a village close to a recently built palm oil mill in Sombo, Center Region of Cameroon on September 18, 2021. Ndoupe was chosen as the workshop location due to the existence of a community-based mill processing palm oil and an association of oil palm farmers. The Sombo palm oil mill was constructed by the Income Generating Potential of the Oil Palm smallholders project known by its French acronym “Projet APROCOPH” (Djouma, 2014). The project is a partnership between the Government of Cameroon and the

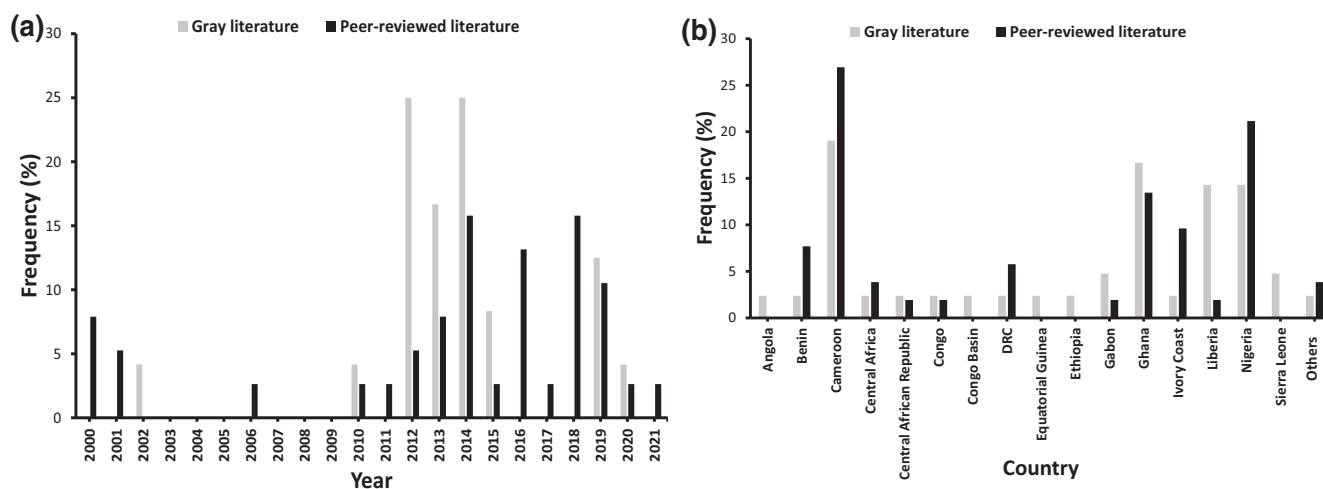


FIGURE 1 Frequency distribution of documents reviewed by (a) year, and (b) country. Peer-reviewed literature ($n = 52$ studies), Gray literature ($n = 42$ studies).

United Nations Industrial Development Organization (UNIDO). The mill is a steam-system complete processing chain with a capacity of two tons per hour and an extraction rate of between 17% and 20% (according to experts). Currently, the mill is operating at 25% capacity and faces many challenges including a low participation rate by nearby farmers in supplying fresh fruit bunches (FFBs) to the mill. During the workshop, facilitators presented a case study of certified smallholders in Sierra Leone and explained the benefits of certification and the expectations of the process. Participants were asked questions related to their farming and milling practices, income from palm oil production and forest products as well as their thoughts and perceptions on ecosystem services provided by forests compared to oil palm plantations. During the session, the 60 participants were also broken into six groups for focused group discussions. Each group was first presented with RSPO certification benefits and the expectations of the certification process. They were then asked to state whether they would be willing to join the RSPO certification program and to discuss important standards or criteria that will incentivize them to join as well as the challenges they foresee in complying with certain criteria.

3 | RESULTS

3.1 | Smallholder characteristics and conversion of forest

Based on our interviews, literature reviews, and workshop in Cameroon, we found three types of smallholders. The first group consists of those with very small farms, ranging from a few palms (10 trees) to less than 1 ha area under oil palm cultivation. These smallholders mostly practice intercropping (i.e., cultivating two or more crops in the same field at the same time) and at times their farms contain wild oil palms or densely planted oil palm plantations. They typically use a hand press to process their fruits or use

another mill near their farms. Unless they are linked to a scheme or cooperative, these farmers seldom sell FFBs. Additionally, palm oil is usually not their main source of income; instead, they generate income from selling non-timber forest products (NTFPs) and cultivating food crops such as cassava, plantains, and maize to supplement their income. The second group of smallholders identified are those with medium oil palm farms (1–4 ha) and who own small artisanal mills for processing their FFBs and also serve other smallholders in surrounding locations. If they do not process their FFBs themselves, they typically sell the FFBs to larger mills. This second group of smallholders typically has large uncultivated areas within and between their farms and may also practice inter-cropping and sell NTFPs. The last group identified is smallholder farmers with very large farms (more than 4–100 ha although more than 50 ha is not classified as smallholders by RSPO). These smallholders with larger farms are usually elites living in big cities or abroad. For example, Cameroon has seen the emergence of elites as smallholders with the average farm size being 41.3 ha. In many countries including Gabon, Liberia, Ghana, and Cameroon, these elites are either ex or present government officials or have lucrative jobs in-country or out of the country and their oil palm plantations are managed in different ways: either by a family member, typical of smallest farms; by a manager who has been hired by the owner, typical of larger farms; or at times it could be rented or pledged to another person for a specific duration. In many cases, these smallholders hire a manager or rent the farm to someone else to farm on a 1:3 basis where the benefits are shared between the landowner (25%) and the renting farmer (75%) who covers all the production costs. In some cases, the owner is the farmer who is retired from the government and managing his farm. These farmers usually own mills and seldom sell their FFBs to another mill. 50% of our workshop participants had less than 2 ha of oil palm plantation, another 40% had between 2 and 10 ha. Only 13% had more than 10 ha.

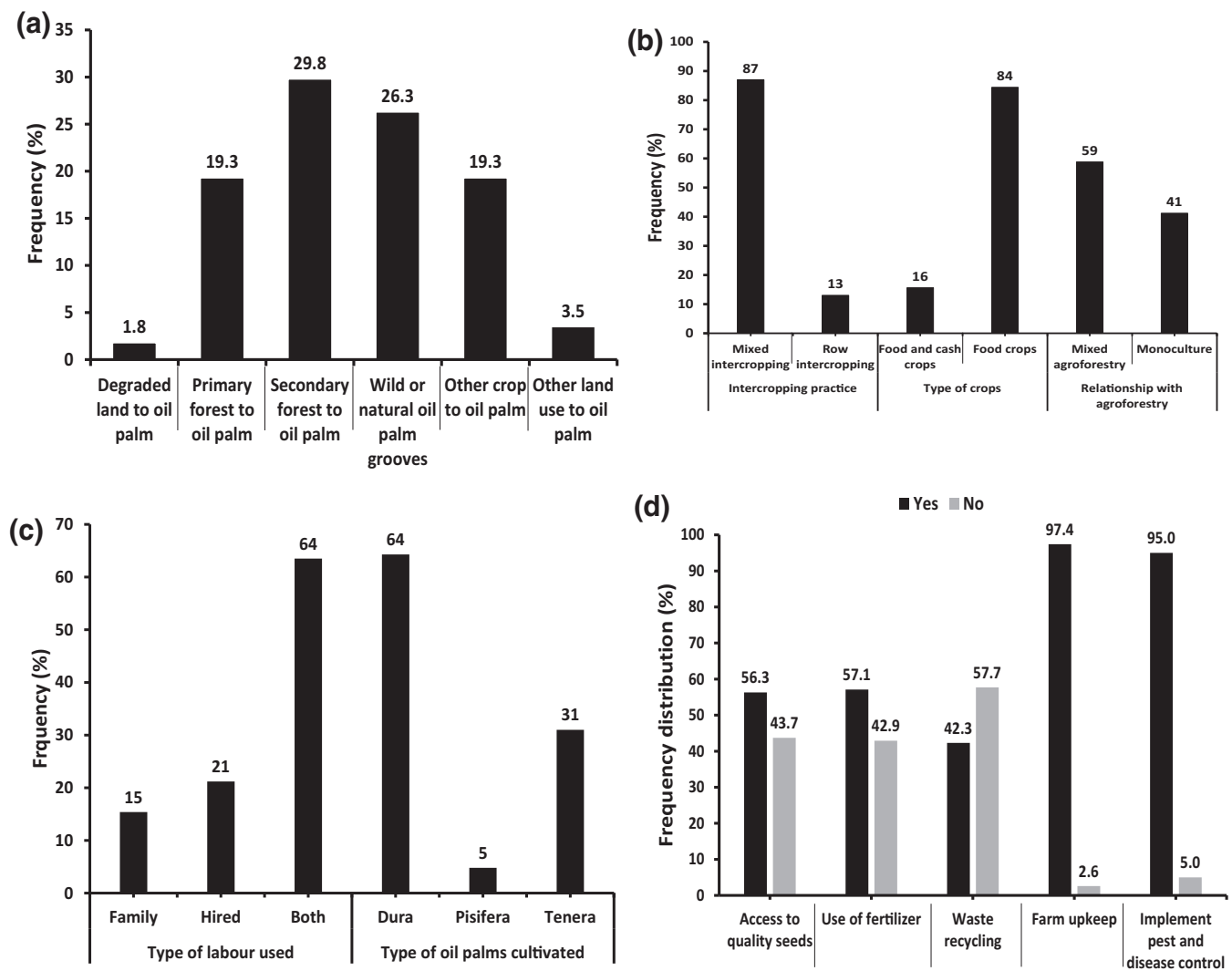


FIGURE 2 Frequency distribution of (a) land used for oil palm cultivation, (b) intercropping practices, types of crops intercropped, and relationship with agroforestry, (c) type of labor used and oil palms cultivated, (d) good agricultural practices.

Our review of the literature shows that 50% of studies highlight the conversion of forests into oil palm plantations with more secondary forests (30%) than primary forests (19%) (Figure 2a). 26% of studies show that oil palm cultivation is carried out in natural areas or palm oil is produced from FFBs gathered from the wild. We also found that intercropping is very common with more than 80% of studies indicating mixed intercropping typically with food crops rather than cash crops such as coffee and cacao (Figure 2b). Farmers commonly adopt intercropping mostly during the immature and early maturity periods of their oil palm plantation.

3.2 | Farming and milling practices

Most of the studies in our review reported that farmers use either family or hired labor for farm management but the majority use both (Figure 2c). In terms of species planted, most of the studies reported planting of Dura (about 60%), the local breed of oil palm

tree rather than Tenera (31%) which is the preferred improved crossbreed between Dura and Pisifera. Our follow-up interview revealed that planting Tenera is increasing due to the financial benefits. For example, in some countries, Tenera sells at \$55–\$60 per ton of FFB twice as much as Dura (\$37.5–\$40.5). Tenera is high yielding and produces about 20–25 tons/ha of FFB between 9 and 18 years after planting (Ferdous Alam et al., 2015) and when the farm is well maintained. In Cameroon, there are oil palm production basins in proximity to industrial mill(s) and we also have inland production basins, which are far off from industrial mill(s). Meanwhile, the production basins in proximity to industrial mill(s), due to contract linkages with agro-industries in the late 70s and 80s, must have understood the benefits of cultivating the tenera breed, the reverse is true for inland production basins, where farmers did not have this opportunity and some farmers may still rely on the Dura breed, partly as a result of other inherent challenges with regards to some level of obscurity and distortion in seed production and distribution. The studies we reviewed revealed that 97% of the

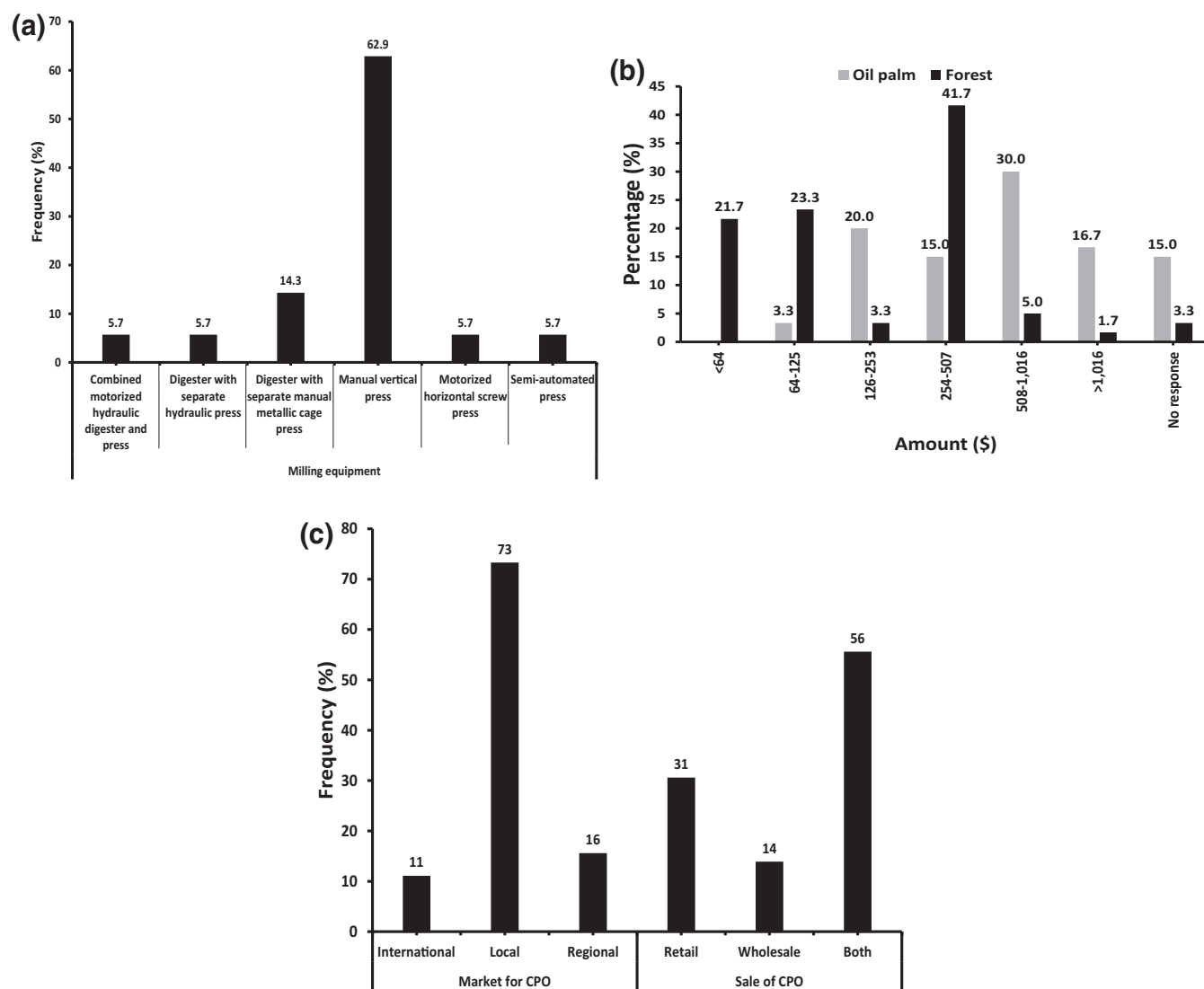


FIGURE 3 Percentage distribution of (a) type of milling equipment used (*source*: literature, $n = 35$), (b) smallholders' annual revenue from oil palm plantations (>0–10 ha) and forests (*source*: Cameroon case study, $n = 60$), (c) CPO to markets (*source*: literature, $n = 38$).

farmers implemented farm upkeep practices while 95% implemented pest and disease control measures. 56% of the farmers reported having access to quality seeds, 57% reported that they use fertilizers and only 42% reported that they recycle the waste generated in their farms (Figure 2d).

Based on our literature review, 73% of studies referred to the use of artisanal mills to process their oil palm fruits into palm oil. Of these more than 60% use manual presses (Figure 3a). Our workshop results also showed an overwhelming use of manual presses (78%) by farmers in Cameroon, while 19% use motorized presses and 3% use the UNIDO-installed cooperative mill. Manual presses have a lower extraction rate (12%–13%) than motorized (14%–15%) or semi-automated presses (17%–18%). Our review showed that about 38% of palm oil is produced with an extraction rate of 15%–20%, while 41% of palm oil is produced with less than 15% extraction rate and only 21% of palm oil has an extraction

rate >20%. Fifty percent of all smallholders sell FFB to agri-businesses some of which use artisanal mills, while 46% are independent smallholders.

3.3 | Revenue from oil palm and access to markets

During our workshop, farmers in Cameroon reported having an income of between \$64 and >\$1016 per year (Figure 3b) from palm oil trade. About 40% of farmers reported earning between \$254 and \$507 from forests, higher than what some farmers earn from oil palm, although about 30% of farmers earn more money from oil palm than forests. Interestingly, some farmers reported an income of >\$500 from forests which is significant and comparable to the highest revenues from oil palm. In line with this, more than 90% of farmers who attended our workshop said they were also dependent on forests for

TABLE 1 Provisioning, regulating, and cultural ecosystem services found in forests, oil palm plantations, and different beneficiaries.

Categories of ecosystem services	Ecosystem services	Forest	Oil palm plantation	Beneficiaries
Provisioning	Meat (hunting), fish (fishing), firewood for cooking, freshwater provision	Yes	Reduced quantities	Local, national
	Food (mushrooms, <i>Gnetum africanum</i>), traditional medicine	Yes	Reduced quantities	Local, national, and international
	Timber, wild mango (<i>Irvingia gabonensis</i>), honey, toothpick	Yes	No	Local, national, and international
	Condiments, bitter kola (<i>Garcinia kola</i>), hazelnut (<i>Corylus</i>)	Yes	No	Local
	Fruits, rock, snails	Yes	Yes	Local, national, and international
Regulating	Clean air, habitats for animals	Yes	Reduced quantities	Local, national, and international
	Shade (local climate), erosion prevention, soil fertility	Yes	Reduced quantities	Local, national
Cultural	Shrine/traditional dance	Yes	No	Local
	Walking for pleasure, showing it to people as tourism, school children visiting	Yes	Reduced quantities	Local, national, and international
	Recreation	Yes	Yes	Local, national, and international

fuelwood, medicinal plants, timber, and non-forest timber products such as wild foods. Some wild foods such as bush mango (*Irvingia gabonensis*) have a large international market and can generate significant income. These results suggest that farmers can depend on forests for their livelihoods. Our review of the literature suggests that most farmers (>70%) sell CPO locally by retailing or wholesale (Figure 3c). Only a small percentage sell internationally (11%). A recent study by Ayompe, Nkongho, et al. (2021) reveals that farmers make more money from selling CPO than FFBs.

3.4 | Ecosystem services provided by forests and oil palm plantations

When we asked farmers in our workshop to report on the ecosystem services provided by forests and oil palm plantations, it was clear that forests provide many more ecosystem services than oil palm plantations (Table 1 based on the Millennium Ecosystem Assessment, 2005 classification). These include both provisioning (e.g., wild foods, traditional medicines, and timber) and regulating services (e.g., soil fertility and microclimate regulation). Some cultural services were also reported such as spiritual and recreational services. Interestingly, the farmers also reported that despite the reduction of the diversity of species available as bush meat, some species such as cane rats, snakes, and hedgehogs increase in abundance under oil palm cultivation due to the availability of food. Some locals use palm fronds as firewood. Farmers also reported specific negative impacts such as loss of farmland, increase in pests, increase in water pollution, loss of forest products including NTFPs, and deforestation associated with loss of biodiversity. In addition, timber and NTFPs such as wild mango (*Irvingia gabonensis*) and honey are lost with the establishment of oil palm plantations. Water bodies dry up in oil palm plantations and result in a reduction in the quantity of fish compared to forests. Shading reduces by about 45%–50% in oil palm plantations compared to forests.

3.5 | Cost and potential for certification

The cost of certification includes membership, audit, staffing and training, studies of land cover/land use, soils, biodiversity, and carbon stocks (Hutabarat et al., 2018; Rietberg & Slingerland, 2016; WWF, 2022). Hutabarat et al. (2018) reported that the upfront costs of RSPO certification in Indonesia were €86 per ha. Membership cost for smallholder farmers are \$280 for <1000 ha/year; \$1100 for 1000–2000 ha/year; and \$2200 for >2000 ha/year. The annual audit cost is about \$15,000 for 10,000 ha (\$1.5 per ha) while staffing and training costs are \$75,000 for 20,000 ha (\$3.75 per ha) and \$250,000–350,000 for 200,000 ha (\$1.25–1.75 per ha; WWF, 2022). Our interviews with the representatives of certified farmer groups in Africa and Asia show that the cost of certification can be anywhere between \$60,000 and \$100,000 per year. The cost of monitoring/auditing is about \$20,000 typically covered by RSPO. Our review revealed that several government programs may offset some of the farmers' production costs and increase their income. These include low-interest loans (23%), improved seedlings (20%), and the cost of providing land (18%) amongst others (Figure 4a). When we asked farmers in Cameroon if they will be willing to adhere to the RSPO certification demands, 78% of the participants said they would, and more than 80% said yes to adhering to all the criteria (Figure 4b). The 22% who said they would not join the RSPO certification, were more concerned with the no deforestation and no child labor criteria.

While certification is proposed as a solution that may help with sustainable production, several challenges exist in sub-Saharan Africa including a lack of infrastructure such as roads and organizing farmers in cooperatives to get them certified. With RSPO certification and government programs, the income from palm oil trading may increase but it will not lift farmers out of poverty unless they have additional income from other sources. Results from a study by Hutabarat et al. (2018) in Indonesia show that the upfront costs of certification were about \$96 per ha. In addition, despite generating up to 21% higher revenues from sales, certification on average resulted in about an 8%

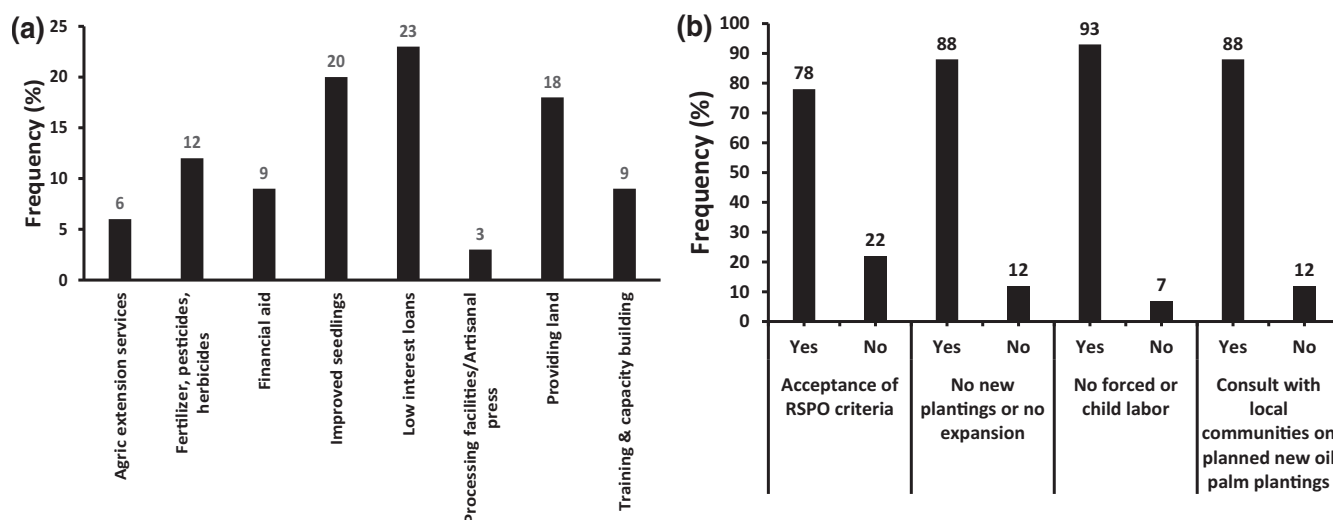


FIGURE 4 Frequency distribution of (a) different government support programs, (b) participants' perception of acceptance of RSPO criteria ($N = 60$).

loss of net income per ha per smallholder in the first year after certification, compared to the situation before certification. In a well-organized situation, our study shows that the cost will be anywhere between \$30 and \$250 per farmer to certify 2000 farmers. On the high side, this will be almost half of the farmer's annual income for those who make as little as \$600 per year from palm oil trade. In addition, we found several challenges that currently certified farmers face and cast doubts on the sustainability of the scheme and independent farmers certification initiatives in sub-Saharan Africa. Even if farmers do not cut forests for oil palm cultivation, they will cut them for food crops as is the case in Liberia where farmers first plant food crops before planting oil palms (Semroc et al., 2015).

4 | DISCUSSION

Palm oil is a commodity that can help developing countries like Cameroon attain their sustainable development goals (SDG) targets. It helps in poverty alleviation (SDG 1) by providing revenue to smallholder farmers to buy a variety of food thereby reducing hunger (SDG 2; Yusoff, 2006). When smallholder farmers live close to agro-industrial company mills, their families benefit from improved access to health and educational facilities that contribute to SDGs (3 and 4; Schröder et al., 2020). Palm oil is a food source rich in energy, fatty acid, vitamins A and E also contributing to SDG 3 (Hariyadi, 2010; Zeba et al., 2006), and gender equality (Mardiharini et al., 2021). The palm oil industry creates many direct and indirect jobs (SDG 8), contributes to boosting socio-economic development and reducing inequalities (SDG 10), and also helps mitigate climate change (SDG 13) since it uses less land compared to other vegetable oil crops due to its high yield per ha.

Despite its positive contributions, palm oil production is also seen as a commodity with many negative effects on both the environment and humans impacting negatively on several SDGs

including 12, 13, 14, and 15 (Schröder et al., 2020). Palm oil production and use have become highly controversial because it leads to numerous environmental and social problems such as the destruction of tropical forests, climate change, and threats to smallholders' livelihoods (Oosterveer, 2015; Ramirez-Contreras et al., 2020). Cultivation and expansion of oil palm plantations cause habitat loss, forest fragmentation, biodiversity loss, food chain disruption, soil property changes, and conversion of wetlands and arable lands (Khatun et al., 2017). The destruction of rainforests reduces carbon storage because oil palm trees store half the carbon as pristine rainforests per hectare (Szulczyk & Khan, 2018). Burning forests to make room for oil palm plantations is also a major source of greenhouse gas emissions. Sustainable production would significantly reduce the negative impacts on ecosystems and humans since palm oil is the most efficient commodity used in producing vegetable oils.

At the global stage, there have been several initiatives to reduce deforestation caused by oil palm cultivation. In 2021 during the UN Climate Change Conference in Glasgow (COP26) more than 140 countries signed a declaration to halt and reverse forest loss and land degradation by 2030 (Arora & Mishra, 2021). This was followed in 2022 by the launch of the Forest and Climate Leaders' Partnership (FCLP) at COP27, with an aim to identify concrete areas of action for governments to commit to take forward ranging from international cooperation to mobilizing funding and supporting initiatives by Indigenous People and local communities (UNFCCC, 2022). At the time of the launch, the FCLP was joined by 27 countries, including several countries in sub-Saharan Africa (e.g., Gabon, Ghana, Kenya, Nigeria, and Tanzania). It remains to be seen how the initiative will succeed in encouraging sustainable production of palm oil. Our results show that the challenges to making palm oil production sustainable are many including the use of mills with low extraction rates (Figure 3a), continuous deforestation of both primary and secondary forests, high cost

of subscription to certification bodies, and lack of trust between small holders and big cooperation.

In addition to the high-level commitments, a number of countries are also taking steps to adopt legislation to regulate deforestation in their international supply chains. Effective from June 2019, the European Union, which is the fourth largest palm oil consumer and key trade partner for Africa, issued a policy limiting the importation of palm oil for biodiesel products from 2021–2023 to the 2019 level, and to further reduce its use gradually until it runs out in 2030 (Sopiana et al., 2021). Furthermore, the EU is on track in implementing a mandatory due diligence framework that will hold importing businesses accountable for unsustainable commodity trade, including deforestation. An agreement on the EU law on deforestation-free products was reached in December 2022 and the negotiations on the new EU Corporate Sustainability Due Diligence legislation are due to be concluded in 2023 (European Council, 2022; European Parliament, 2022). Similar legislative initiatives are also being taken forward or considered in the United Kingdom and the United States, respectively (UNEP, 2022). This comes as 57% of the 500 most influential companies and financial institutions have signed no deforestation commitments for the forest-risk commodities they are exposed to (Thomson, 2020).

Against the backdrop of these international developments, the pressure to make commodity trade sustainable is at the highest level, with palm oil trade as one of the key areas in the spotlight. In response, many African governments including Cameroon, Liberia, and Gabon are developing their national oil palm strategies with RSPO and Non-Governmental Organizations (NGOs) contributing to the process. However, there are nuances such as sustaining economic growth and well-being while maintaining forest cover, biodiversity, and ecosystem services that are involved in the implementation of national strategies, rooted within the RSPO standards in Africa. Second, less than 3% of the over 7 million smallholder oil palm farmers globally are RSPO certified (RSPO, 2023). Independent smallholders who are not tied to a mill particularly find it difficult to get certified as a result of lack of access to markets, difficulties to access financing to meet certification requirements, lack of access to good quality planting materials and fertilizers that result in low yields, lack of information and organization (Brandi et al., 2015; Corley & Tinker, 2008; de Vos et al., 2023; Hidayat et al., 2015; Jelsma et al., 2017; Woittiez et al., 2018). Our results show that in Cameroon more than 80% of the 60 smallholder farmers who attended our workshop were willing to subscribe to a certification scheme to obtain these benefits but certification costs are extremely high. Sustainable processes of production and sourcing are focal issues of palm oil production, therefore, multi-stakeholder initiatives such as RSPO set out sustainability principles and standards, and manage the certified sustainable palm oil (CSPO) certification system (Kadarusman & Herabadi, 2018).

Governments in African countries are focusing on supporting small-scale oil palm farmers to alleviate poverty while increasing GDP. However, small-scale farmers face significant challenges in producing and trading palm oil. These include the use of low-yielding seedlings, little or no fertilizer application, and low palm oil extraction rates due

to the use of artisanal mills (Figure 3a). As the pressure to make palm oil production sustainable mounts, the RSPO certification has emerged as a means to support farmers to cultivate oil palm sustainably while earning income. Some of the challenges faced by farmers can be addressed by both government programs and benefits from RSPO certification (e.g., increased yield through better agricultural practices, increased revenue from premium pricing, increased access to high-value markets). In many African countries, government programs exist to assist farmers with some of their challenges, such as access to low-interest loans (about 20%), improved seedlings, and provision of land to smallholders. Despite efforts by the governments to incentivize smallholder farmers, many challenges remain. For example, in Cameroon, the government had supported partnerships between smallholders and large mills to alleviate some challenges, but these were not sustainable partly due to a lack of trust between smallholders and agro-industrial mills, and issues around corruption (Nkongho et al., 2015). Recently, UNIDO has partnered with the Government of Cameroon to build or refurbish four palm oil mills in the country to serve smallholders. However, these mills are running at about 25% because most farmers are not supplying their FFBs to the mills mainly because of delayed payments from mill operators who complain about not having sufficient operational funds. In addition, Ayompe, Nkongho, et al. (2021) found that farmers make more money from selling CPO oil than FFB. The relationships between farmers and big mills need to be strengthened to allow farmers to get the benefits of good extraction rates from their FFBs and premium prices while having training and management support from the mills. This will take cooperation from the government, owners of large mills, farmers, and a trusted broker to implement such an initiative and for farmers to be certified.

Silalertruksa et al. (2017) recommend that the promotion of oil palm cultivation must be based on land and climate suitability considerations along with good practices for productivity improvement. The economic performance of certified oil palm smallholders should be improved to motivate them for RSPO certification. According to Hutabarat et al. (2018), this can be achieved through an increase in FFB and CPO yields, a guaranteed premium price, or the sales of Green Palm Certificates to provide additional income. While other benefits apply to the African continent, benefits from markets may be little. Our interviews and review revealed the strong local and regional market available for smallholders in Africa with demand surpassing supply. Market incentives may not work in such a situation or have to be designed differently. We also found that cultivating oil palm alone may not lift smallholders out of poverty due to the low revenues. This is supported by a recent study by Ayompe, Nkongho, et al. (2021) that showed that unless you own land, the benefits of oil palm cultivation are minimal. RSPO is offering premiums to certified independent smallholders but the premium is also too low (which translates to about <\$1 per ton of FFB for farmers in Sierra Leone). In Asia, premiums for FFBs from certified plantations were found to fall between \$1 and 7 per ton of FFB and on average \$2.50 per ton of FFB or \$12.5 per ton of certified sustainable palm oil (CSPO) which is typically 20% of the base price (WWF, 2022). Although European consumers are increasingly concerned

about the negative impacts of palm oil production, the uptake of CSPO has been slow (Gassler & Spiller, 2018) thereby limiting opportunities for farmers to sell at premium prices.

Despite their benefits, certification schemes struggle to address the systemic issues of agriculture-driven deforestation due to the limited global demand for certified sustainable palm oil, and the high cost of certification (Buchanan et al., 2019) and are not necessarily the right way forward to a more systemic change (Glasbergen, 2018). In addition, the certification approach does not recognize and promote the critical role that governments have to play in regulating the use of natural resources. These shortcomings resulted in the development of the Jurisdictional Approach (JA) in Indonesia as a strategy to tackle deforestation and forest degradation (Nepstad et al., 2013; von Essen & Lambin, 2021). JA initiatives sought to align government-led, multistakeholder processes within provinces and districts with prospective external incentives for jurisdictional-scale performance (Seymour et al., 2020). It encourages governments and companies to work together alongside key landscape actors toward landscape sustainability, improving local livelihoods and maintaining forests and other natural ecosystems through coordinated strategies across sectors, including deforestation-free commodity production (Buchanan et al., 2019). JAs can promote action on some of the challenges to smallholder adoption of sustainable practices, like insecure land tenure by facilitating land titling (Daemeter, 2016). Despite the benefits of JAs, they need significant funding and support, and implementation can be complex, costly and take time to deliver results. In addition, there are only a few success stories to point to as examples for garnering more support and appeasing the concerns of potential partners and investors. Even when JAs are successful, there is a risk that larger-scale sustainability may not be achieved (Buchanan et al., 2019).

Forests are crucial sources of food, medicine, and drinking water, and provide immense recreational, esthetic, and spiritual benefits for millions of people (Groffman et al., 2014; Jenkins & Schaap, 2018). Forests regulate climate, harbor biodiversity, provide clean water, replenish aquifers, mitigate natural hazards, cradle indigenous cultures, and can help drive sustainable development (IUCN, 2015; Saving Nature, 2022). People, companies, and societies rely on these services provided by healthy natural habitats for raw materials, production processes, and climate stability. However, oil palm expansion at the expense of tropical forests has major ecological impacts given their conservation value and critical role in providing ecosystem services (Baccini et al., 2017; Chazdon et al., 2009). Oil palm cultivation is essentially monoculture and results in deforestation, which leads to the loss of timber species, NTFPs, medicinal plants, wildlife, habitat destruction and fragmentation, forest fire, haze, and untreated sewage from palm oil mills, which eventually leads to water pollution, among others (Vijay et al., 2016). In addition, in-situ conservation of biodiversity is greatly hampered when primary or secondary forests are replaced with oil palm plantations (McFarland, 2017). The results from our workshop show that smallholder oil palm farmers understand both the negative and positive impacts of palm oil trade and how it affects their livelihoods.

The negative impacts associated with palm oil production highlight the need to make the sector sustainable. Lim and Biswas (2019) highlighted that sustainability of production is one of the greatest challenges experienced by the palm oil industry in major producing countries such as Malaysia. In this light, sustainability frameworks have been developed to guide the analysis of the local social impacts of global value chains (Schaafsma et al., 2023b) and to assess how fair trade affects the adaptive capacity of smallholder farmers in developing countries (Borsky & Spata, 2018).

This study focused on both gray and peer-reviewed literature, conversational interviews with smallholder farmers and managers of certified palm oil mills, and a workshop with smallholders in Cameroon to understand the complexities that smallholder oil palm farmers in Africa face in getting certified. While the results are interesting and provide useful insights, they should be interpreted with care for the following reasons. First, due to limited funding, the workshop was carried out only in Cameroon. It would have been good to run workshops in other countries or with smallholders linked to certified mills. Second, there are very few oil palm smallholders certified in Africa that could enable us to get a full picture. Therefore, we had to rely on the information we got from managers of certified mills in palm oil producing countries in sub-Saharan Africa whose experiences might be different from those of smallholder farmers.

5 | CONCLUSION AND RECOMMENDATIONS

Based on our interviews, reviews, and workshop, we found that RSPO certification may help alleviate some of the smallholders' challenges through funding support as well as helping organize them to support each other. Although this has worked in some countries, several challenges need to be overcome. We also found that smallholder profits may not be enough to offset the high cost of certification. We, therefore, recommend a model where in-country auditors are trained to reduce certification costs. We noted that both communities and governments in Africa believe in biodiversity conservation and the importance of forests in providing ecosystem services such as wood, NTFPs, and the need to conserve forests for human wellbeing. Reinforcement of national programs on forest conservation such as the JA that focus on land degradation as a whole rather than on a particular sector may be beneficial to both smallholders and the environment.

There are companies in Africa that have subscribed to a no-deforestation commitment (e.g., Unilever, Cargill, Scofin) and are keen to work with smallholders partly to meet the capacity of their mills. It is important for these companies to invest in smallholders to enable them to get certified and produce sustainably. We strongly encourage compensation for farmers who are participating in certification programs with accredited companies. Such compensation should be given for keeping forests in addition to the benefits that smallholders derive from wild products to improve income and make certification attractive. We also found that some farmers are making more money from the forest than from oil palm. Payments for

ecosystem services (PES) approaches including paying farmers for not cutting forests may help improve income and incentivize farmers to avoid deforestation for all crops and not only oil palm (Jacka et al., 2008; Salzman et al., 2018). To reduce deforestation linked to palm oil production, programs could focus on increasing FFB yields and improving milling efficiencies by supporting agro-industrial and other mills that work with smallholders.

Finally, our study provides important insights to countries such as the EU, United Kingdom, and United States that are in the process of adopting legislation to regulate deforestation associated with imports of key commodities such as palm oil. It identifies the specific challenges smallholders are facing in shifting to sustainable production practices and, consequently, the type and scale of support they will require to comply with the upcoming requirements. In particular, our results highlight the need for capacity building as well as the importance of brokering relationships between smallholders and other actors in the national supply chains. Furthermore, the results indicate that identifying and supporting sustainable alternatives to smallholder livelihoods as a whole (e.g., investment in know-how and infrastructure, coupled with PES schemes) is likely to be more effective in curbing deforestation than narrow sector or commodity-specific approaches. Therefore, partnership programs designed to support the producer countries in complying with the upcoming supply chain regulations would incorporate such aspects in their focus and design.

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