



Commodities that shape the world!

Guidance for sustainability in the value chains of cotton, palm oil and timber

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Learnings, conclusions and recommendations of the “Bio-Macht” Project for companies and policy makers

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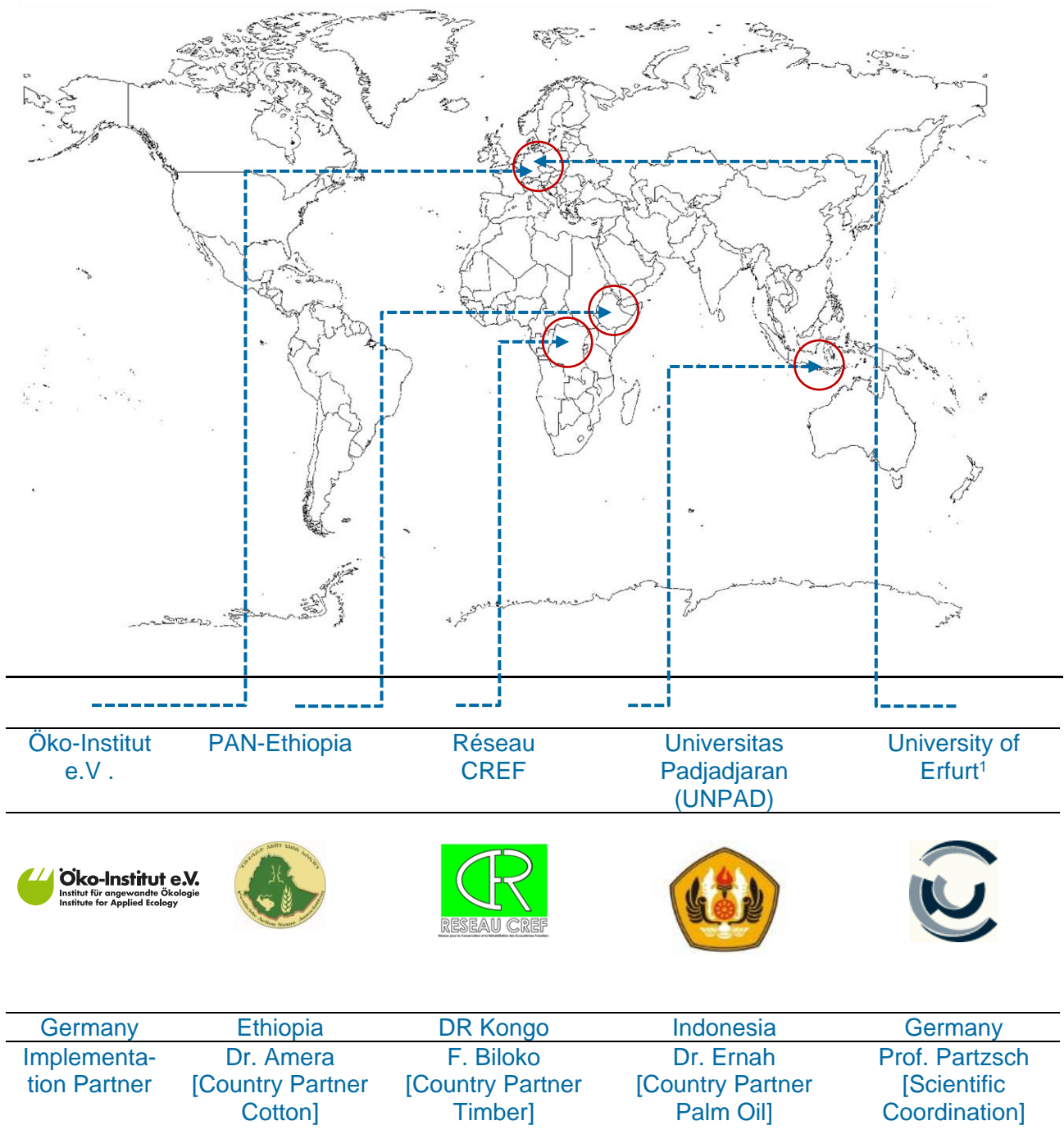
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Organisations involved in the Bio-Macht Project



¹ The Project was allocated at University of Freiburg, Chair of Sustainability Governance, Institute of Environmental Social Sciences and Geography until 31.12.2019. From 1.1.2020 the coordination of the research alliance moved to University of Erfurt.

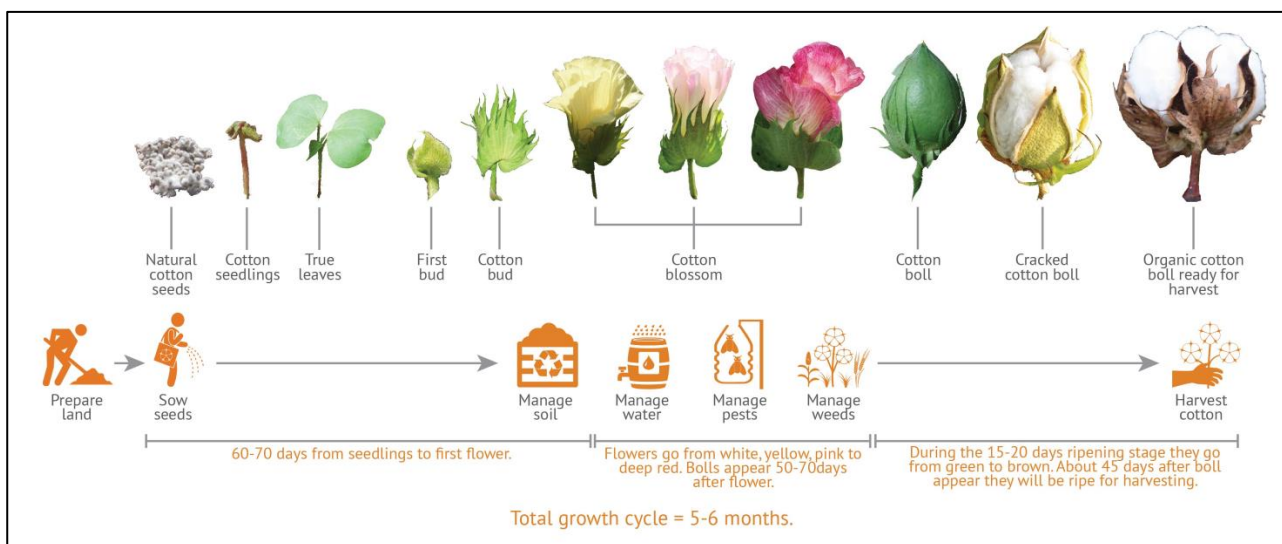
1. About the Bio-Macht Project

The project aims at researching sustainability and power aspects in the value chains of the commodities palm oil, cotton, and timber as well as providing guidance for related stakeholders such as companies and policy makers. It is funded by the German Federal Ministry of Education and Research (BMBF).

The global value chains of palm oil, cotton and timber are highly complex and include numerous actors such as smallholders, their associations, traders, and companies in the countries of origin and in export destinations. As an example, oil palms are mostly cultivated on vast plantations in Indonesia and Malaysia, the palm (kernel) oil is recovered in mills nearby (“upstream”). Its final products like biofuels, food, feed or cosmetics often are produced and demanded in world regions such as Europe (“downstream”). Very similarly, cotton cannot be cultivated in regions where many of its products are produced and consumed. Finally, while various types of timber grow in forests of many regions of the world, highly endangered and formally protected tree species are logged and traded illegally.

As a first step, the research team evaluated relevant certification schemes in the context of palm oil, cotton and timber (Work Package 1), see (Schleicher et al. 2019a; Hilbert et al. 2018; Schleicher et al. 2019b). Based on this, the project team investigated the effects of (mostly voluntary) certification instruments, due diligence and legality verification from an “upstream” perspective” at the origin of the commodities. For this, the close cooperation of the research team from Oeko-Institut e.V. & University of Erfurt with country partners PAN-Ethiopia (Ethiopia), Universitas Padjadjaran (Indonesia) and Réseau CREF (DR Congo) including intensive field research was of highest priority (Work Package 3). A special focus of the research by University of Erfurt was placed on (economic) power aspects (Work Package 4) among the actors and along the value chain in order to better understand barriers and possible solutions for change towards more sustainable resources in the global palm oil, cotton and timber sector. The upstream part of the value chain includes all steps relating to the cultivation of the plants (see Figure below).

Figure 1-1: Example: The upstream perspective of cotton cultivation



Source: Textile Exchange (2018a)

For cotton, the “upstream” stages are defined as all steps from the cotton field itself down to primary processing steps such as ginning. For palm oil, this equates to all steps on the plantations until the fresh fruit bunches (FFB) are collected and transported to a mill where crude palm oil is extracted. In the timber value chain, upstream summarizes the process steps from the logging on-site and

transporting of roundwood until the timber is sawn into boards. Hence, for all of three commodities, the first process step (mill, ginnery, saw) represents a “hinge” or “bottleneck” between the upstream and the downstream parts of the value chains.

Accordingly, the research of the Bio-Macht project follows the perspective of downstream companies in Germany/Europe to better understand possible intervention strategies for promoting sustainability as well as actual impacts on the value chain (Work Package 2). In particular, the role of value chain instruments, such as sustainability certification, due diligence and legality verification, were studied carefully (Schleicher et al. 2019a; Schleicher et al. 2019b; Hilbert et al. 2018). Therefore, the project team conducted numerous interviews with companies that make use of palm oil, cotton and timber in their products.

Figure 1-2: Example: The downstream perspective of the cotton value chain



Source: Textile Exchange (2018)

The following guidance document summarizes results, conclusions and recommendations of the Bio-Macht project for companies and policy makers in the palm oil, cotton and timber sectors.

2. Why palm oil, cotton and timber matter

Beyond energy and mineral resources, it is biomass that shapes the world’s landscapes and today’s global economy. The three commodities are used in thousands of everyday products. Palm and palm kernel oil are highly relevant commodities for producing countries such as Indonesia and Malaysia but also for industries and consumers in Europe. They are used in the food and feed sector, as well as in many areas of the chemical industry, such as detergents, cleaning and care products. In addition to this, palm oil is still of importance to the energy sector as a raw material for producing biodiesel and HVO (hydrogenated vegetable oil) which are used in the transport sector or for electricity production. Altogether, about 1.1 million tonnes of palm oil and about 120,000 tonnes of palm kernel oil were consumed in Germany in 2017 (Meo Carbon Solutions 2018).

Figure 2-1: Large-Scale Palm Oil Plantations in South Kalimantan, Indonesia

Source: Oeko-Institut e.V. (November 2018).

The focus on the upstream part of the value chain for palm oil shows that the largest producing and exporting country of palm oil in 2016 was Indonesia (49%) followed by Malaysia (33%) (OECD 2019). According to (Chatham House 2019), Indonesia alone exported 5.4 million tonnes of crude palm oil (CPO) to other countries worldwide in 2016.

Palm oil production is related to several ecological, social and economic risks. One of the most relevant environmental risks is due to land use change and related deforestation and fire (Carlson et al. 2018). From 1995-2015, oil palm plantations in Indonesia expanded at an average annual rate of 450,000 ha/a, resulting in an average of 117,000 ha/a of deforestation (Austin et al. 2017). Further environmental hot spots comprise biodiversity loss, peatland conversion and greenhouse gas emissions. Beyond that, the project also focuses on social and human-rights risks related to palm oil cultivation in Indonesia (Schleicher et al. 2019a).

Cotton, by its very nature, is a unique and omnipresent commodity. It accompanies almost everybody in daily life, and not just as a clothing product. It also plays its role in other sectors such as the automotive industry (e.g. car seats) or home furnishing (e.g. curtains). It has been one of the most relevant trade commodities for centuries, pushing industrialization and globalization from the 16th century until today. However, for a long time, Europe hardly had any access to the rare commodity which can only be cultivated in regions of the global south, leaving the continent needing to rely on wool and linen instead. From the 17th century, high raw cotton imports to Europe led to the development of a vibrant yarn, textile and garment industry. Due to globalisation, open markets, structural change and competitive advantages from the mid-20th century on, more and more production steps of the value chain shifted to Asian countries like China and Bangladesh. Today, China is by far the biggest cotton and yarn importer with an annual trade value of 7.4bn \$ (3.3 million tonnes) in 2016 followed by Bangladesh (2 bn \$, 0.975 million tonnes) and Turkey (1.8 bn \$, 1 million tonnes). Altogether, with a world market share of more than 80%, cotton is the most important natural fibre today (FNR 2014). In the 2017/18 season (Johnson et al. 2018), the world cotton production reached 121.4 million bales (each weighing around 500 lbs).

Figure 2-1: Cotton plantation and worker preparing to distribute pesticides without proper protection equipment



Source: Oeko-Institut e.V. (2018)

Cotton cultivation is also related to considerable environmental and human-rights risks. The Bio-Macht project therefore had a strong focus on the use of pesticides on cotton fields, a risk not only to the environment but also to the health of cotton farming communities. Therefore, highly effective alternatives were explored and documented (see chapter 6).

Finally, timber is also one of the most relevant biomass resources for economies and for personal livelihoods. Worldwide, around 1.6 billion people (20% of the world population) depend heavily on forests for their daily livelihoods. At the same time, half of all species on the planet live in forests. Forests regulate water supplies, regulate the world’s climate, are source of medicines and help to prevent floods and droughts (Schleicher et al. 2019b).

Illegal logging and the associated trade of products produced from illegally logged timber are also causes of many severe social, economic and environmental problems (Brack, D., & Buckrell, J. 2011), (Lam 2010), not only for timber-producing and consuming countries, but also for the world in general. Illegal logging is a key driver of deforestation and degradation, leading to biodiversity loss and subsequent climate implications. During the past two decades, deforestation and forest degradation have moved to the top of the global political agenda (Tegegne, Y. T. et al. 2014). However, global attention often focuses on timber originating from the tropics since this timber accounts for much of the world’s supply. The conservation and wise use of tropical forest resources is therefore of global concern.

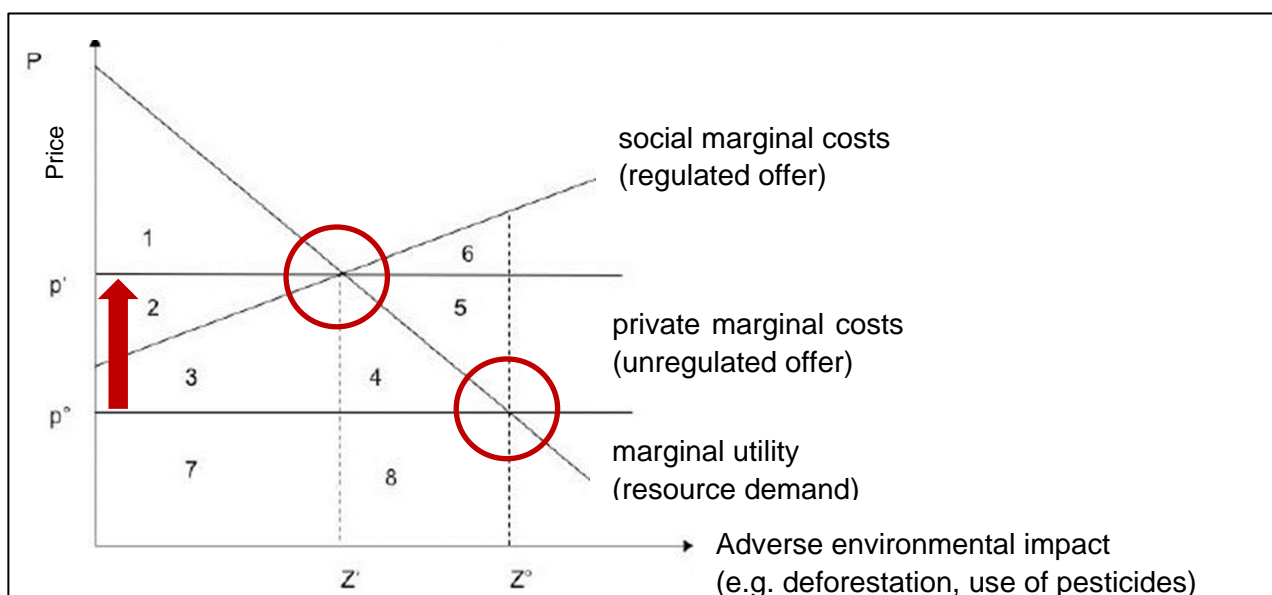
In turn, economically, the EU is a large market for timber products. Altogether, EU imports of wood products totalled 18.17 billion Euro in 2017. In the same year, wood products totalling 3.78 billion Euro originated from tropical countries (EU FLEGT Facility 2019). Moreover, according to (EU FLEGT Facility 2019), illegally logged timber accounts for up to 30% of the global timber trade. In particular, illegal logging and trade is one of the most important and most relevant “environmental crimes” (Nellemann, C. et al. 2016), the latter term being defined as “illegal activities harming the environment and aimed at benefitting individuals or groups or companies from the exploitation of, damage to, trade or theft of natural resources”. (Nellemann, C. et al. 2016) estimate that the annual government revenue losses due to deforestation and forest degradation amount to 50.7 – 152 bn. USD, causing major impacts on local livelihoods in related forests, on species extinction, on the loss of endangered forests, on national economies and on the global climate crisis.

In summary, palm oil, cotton and timber are of tremendous economic importance, in particular to smallholders and companies, and are therefore essential commodities for the economies of upstream regions. At the same time, however, they are associated with very high social and environmental risks. Beyond the environmental and social issues, the project also focussed on economic conditions on the various resource markets (see chapter 3).

3. Market failure, externalities and power dynamics in upstream resource markets

In terms of economics, the project revealed that for all of the upstream resource markets (palm oil, cotton and illegally harvested timber) societies are faced with severe market failures in the context of public goods, common goods, unclear rights of use, free-rider behavior & overuse (Fullerton 2001, Lloyd 1833, Hardin 1968, Ostrom 1994). Particularly in situations of vast deforestation e.g. in favor of new palm oil plantations in Indonesia (see Schleicher et al. 2019a) or illegal timber harvesting in the DRC (see Schleicher et. al. 2019b), (long-term) social marginal costs exceed short term marginal private costs of exploiting actors, mainly due to the loss of primary forest as an indispensable global asset as a CO₂ sink. The consideration of private marginal costs only, however, leads to low prices and incentives for over-exploitation of resources. The difference between social and private marginal costs, in economic theory but also on real upstream resource markets, is defined as “externalities” that need to be corrected to allow a “level playing field” for all economic actors on the resource market and to avoid short term free riding (see Figure 3-1). With regards to cotton markets, there is a situation where long-term marginal social costs (e.g. better health of smallholders who avoid pesticides, see chapter 6) are often neglected in favor of lower prices and short-term profits. However, the project also showed that, especially in cotton cultivation, alternative organic agrotechnical methods (usage of food spray instead of pesticides) can lower marginal social costs and balance the short-term private needs of smallholders.

Figure 3-1: Environmental externalities and market failure on unregulated global markets



Source: Own illustration following Fullerton 2001 & Kriström 2006.

The revealed market failures show that only considerable financial effort can lead to an integration of externalities: this can be achieved by financial (e.g. subsidies or price premia for sustainable products) or fiscal (e.g. tax on adverse behavior) instruments resulting in higher prices. The other opportunity would be to limit adverse environmental behavior (e.g. illegal logging) by enforcement of regulatory law (e.g. limiting logging to Z' instead of Z^o , see Figure above).

The project has revealed several price effects that illustrate market failure and asymmetric power on the resource markets. In the case of palm oil, several smallholder associations in Indonesia reported that they had invested considerable efforts in complying with sustainability certificates such as RSPO, aiming to gain market access in Europe. Technically, these efforts lead to higher private marginal costs closer to the total social marginal costs. However, as most of the produced quantities of palm oil in the world are still cultivated conventionally (only ~17% of the world's palm oil production is compliant with any sustainability certification (Voora et al. 2020)), and due to excess supply of conventional palm oil, prices are pushed down and investments in more sustainable cultivation do not pay off for many smallholder associations. Externalities are not internalized effectively. In terms of market power, low prices on downstream markets do not allow for sustainable development on upstream markets. Typically, certification only includes requirements and efforts for upstream producers – whereas downstream actors such as palm oil processing companies and consumers do not commit themselves to long-term contracts or guaranteed purchasing volumes. Furthermore, certification measures are mostly voluntary.

On cotton markets, middlemen between cotton cultivators and processing industries typically play an important role in asymmetric power distribution. The studies of the project show that smallholders in Ethiopia are often faced with short term financial liquidity problems which are solved by upfront credits from middlemen – on the condition that future yields are sold at low prices (Hilbert et al. 2018). Financially, this leads to considerable pressure on smallholders within the upstream value chain. The Bio-Macht project studied and illustrates effective pathways out of dependencies, and how to implement sustainable cultivation methods at the same time. However, the study shows that the latter was only possible when additional upfront investments were realized. By doing so, it was finally possible to internalize the most pressing upstream environmental externalities (see chapter 6).

Regarding timber, the studies show that subsistence economic activities of chainsaw operators in Eastern regions of the DR Congo, including? illegal logging under unclear concessions and with poor governance of regulations, lead to high environmental externalities. In this case study, effective integration of externalities and forest conservation can only be achieved when effective reforms of the regulatory sector are carried out (see chapter 7).

4. The role of voluntary certificates, due diligence & legality verification

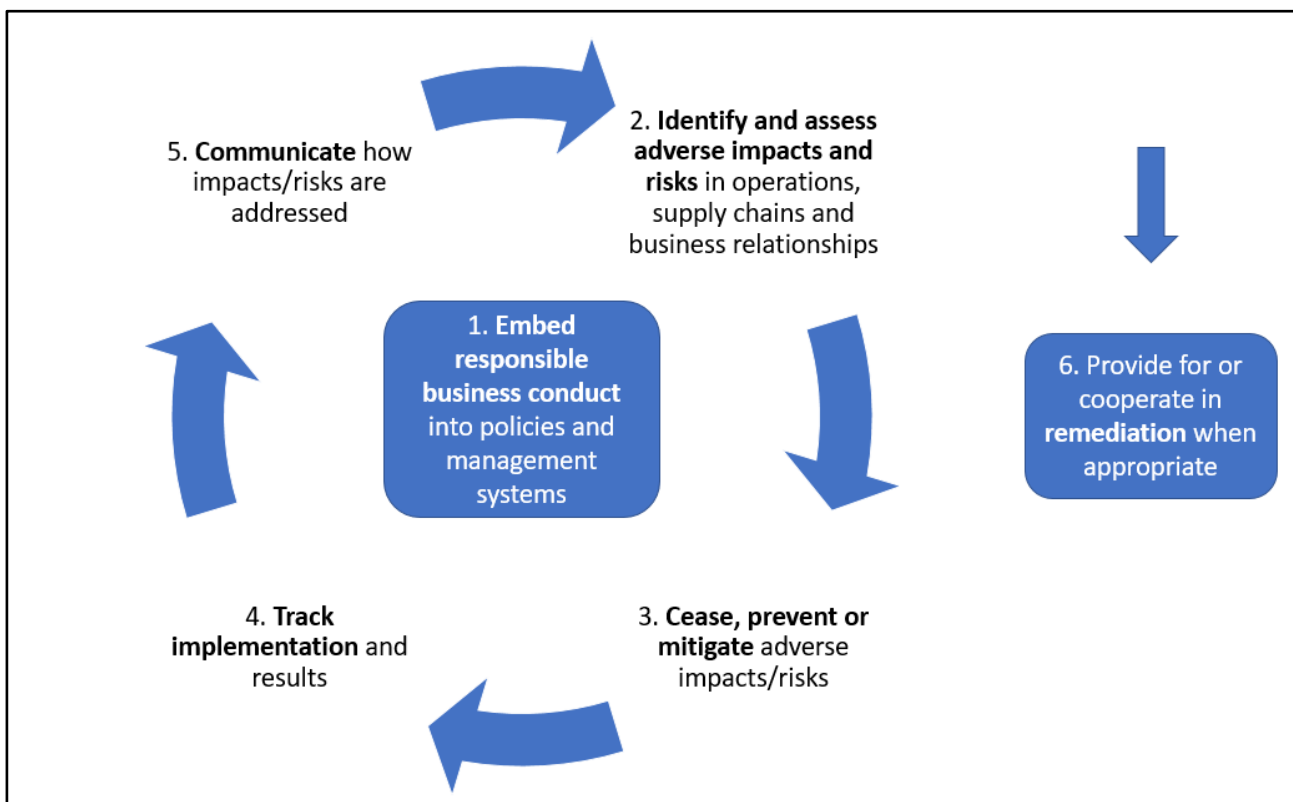
Hitherto, the predominant policy instruments to address sustainability in the value chains of palm oil, cotton and timber have been (1) voluntary and partly mandatory upstream certification, (2) corporate due diligence requirements and (3) legality verification instruments. Current legislation from the downstream perspective of the European Union, however, places different emphasis on the instruments for the above-mentioned value chains.

Mandatory due diligence requirements were implemented in the EU Timber Regulation (EUTR) in 2010 for the first time (EU/ 995/2010), with a strong focus on prohibiting the placement of illegally harvested timber and some derived products on the EU market. Under these requirements, importers of timber and derived products must exercise “due diligence” and keep records of their suppliers and

customers. The key elements of due diligence in the EUTR include (1) information requirements on imported timber and timber products, (2) a risk assessment of the supply chain based on this information and (3) risk mitigation measures with legality verification instruments. Several voluntary certification schemes (e.g. FSC Chain-of-Custody) include requirements leading to EUTR compliance (see Schleicher et al. 2019b). Also, within the EU Action Plan on Forest Law Enforcement, Governance and Trade (FLEGT), the EU negotiates bilateral trade agreements with timber-exporting countries in the tropics aimed at ensuring that trade is conducted with legal timber and timber products only (EU FLEGT Facility 2019). Based on this – and in order to ensure that the timber was logged legally – a FLEGT licence can be issued. Hence the mandatory legislative framework, comprising due diligence, legality risk assessment and verification, can be characterized as the strictest when compared with the palm oil and cotton sectors.

The palm oil value chain, however, is characterized by a hybrid (mandatory/voluntary) governance approach (Partzsch et al. 2018). The EU has set out mandatory requirements for the biofuel sector in the EU Renewable Energy Directive (RED-I 2009/28/EG & recast RED-II 2018/2001/EU); all other sectors are subject to voluntary measures. Sustainability requirements of the RED-I Directive are typically implemented by voluntary certificates that are recognised by the EU (e.g. ISCC-Certificate, see (Schleicher et al. 2019a)). The RED-II Directive, furthermore, approaches indirect land use change (ILUC) by setting limits on “high risk ILUC biofuels”, freezing the level of 2019 for the period from 2021-23 and then gradually decreasing it to zero between 2023-30. In summary, it is also the case in the palm oil sector that the current approach of the EU and downstream actors is to create an interplay of voluntary certification within a mandatory framework (see chapter 5). However, sectors other than biofuels, bioliquids and biomass fuels, such as the food and feed sector, are not addressed by mandatory requirements and address sustainability by voluntary certificates only (e.g. RSPO Certificates).

Figure 4-1: Due Diligence Process and Supporting Measures



Source: Own illustration based on OECD 2018: mneguidelines.oecd.org/due-diligence-guidance-for-responsible-business-conduct.htm

Finally, the cotton and subsequent textile sector are characterized by several voluntary certificates covering different stages of the value chain (e.g. GOTS, IVN-Certification, CmiA, BCI, see Hilbert et al 2018). Due diligence guidance for “Responsible Supply Chains in the Garment & Footwear Sector” was developed and adopted in 2017 (OECD 2017), setting up a step-by-step framework approach comprising: (1) the identification of potential and actual harm in the enterprise’s own operations and in its supply chain, (2) ceasing, preventing or mitigating harm in the enterprise’s own operations and in its supply chain, (3) tracking (verification, monitoring and validating the progress of due diligence within the enterprise’s own operations and the supply chain), (4) communication of the due diligence process. Beyond this, the due diligence process is framed by responsible business conduct in enterprise policy and management systems and the provision of remedy (see Figure 4-1). However, due diligence requirements are purely voluntary for companies and so far, not embedded in a mandatory legislative framework.

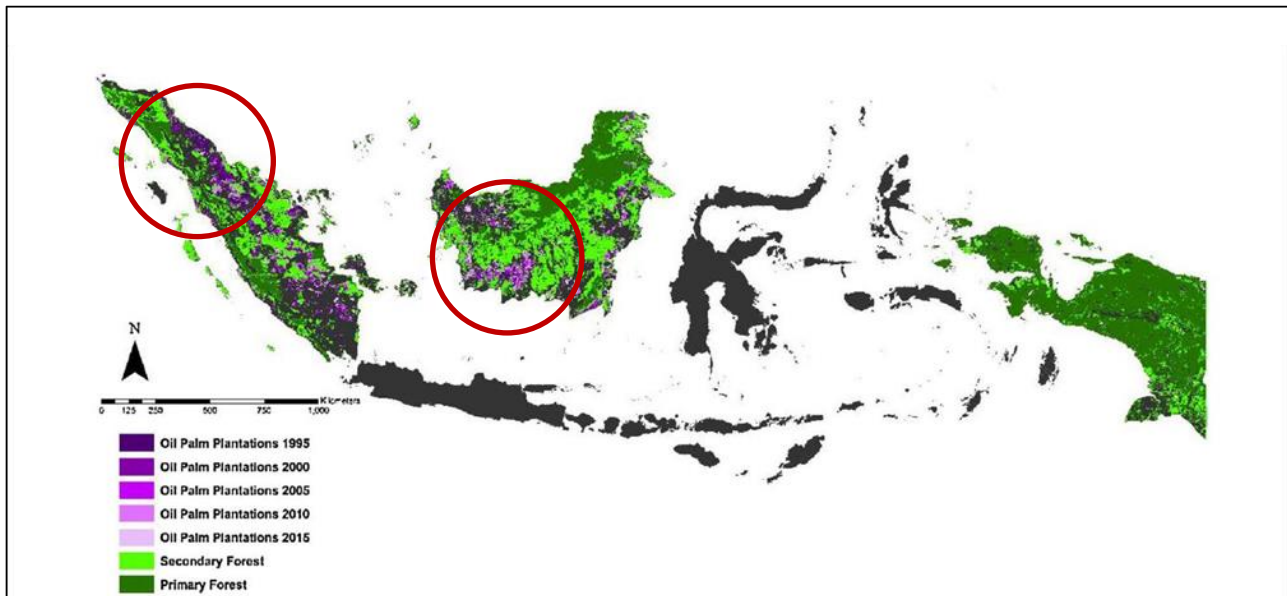
5. Focus on Palm Oil from Indonesia

In order to build up more sustainable palm oil value chains, European stakeholders very much concentrate on voluntary certification instruments such as the RSPO Certificate. Mandatory certification requirements within the RED-I Directive only limited access to the common market for biofuels and bioliquids. However, these activities generated an impulse to also initiate national certification efforts in upstream regions such as Indonesia. Beyond international certificates such as RSPO or ISCC, Indonesia started its own national certification system, the Indonesia Sustainable Palm Oil (ISPO). Generally, these developments represent important processes within their specific contexts. However, from the perspective of market failures (see chapter 3) it becomes obvious that the concentration on voluntary one-way certification requirements is not enough to effectively trigger a move towards sustainability on the global market as it does not allow for a necessary price signal. Hence, (voluntary) certification efforts in the upstream part of the value chain need to be flanked by other instruments that refer to financial commitments by downstream companies (see chapter 9). The Bio-Macht project studied the palm-oil value chain from Indonesia, which is the most relevant export country.

Deforestation, land-use change & biodiversity

While certification of palm oil plantations in Indonesia was found to have triggered some positive social aspects (e.g. schooling of workers’ children, see Schleicher et al 2019), observations with regards to deforestation, related biodiversity losses and adverse climate effects show that certificates alone seem to be rather ineffective to address this very important environmental hot spot.

Figure 5-1: Land use changes from rainforest to palm oil plantations from 1995-2015 in Indonesia



Source: K.G. Austin et al. in *Land Use Policy* 69 (2017) 41–48

As illustrated in the figure above, according to (Austin et al. 2017), in Indonesia oil palm annual plantation expansion occurred at a rate of 450,000 ha/y which resulted in an average of 117,000 ha/y of deforestation between 1995-2015. However, during the most recent five-year period (2010-2015), the analysis shows that the annual rate of deforestation due to new palm oil plantations has remained at the same level as documented for 2005. Hence, certification alone was not suitable to set sufficient incentives for forest protection or a shift of new plantations towards degraded areas. Furthermore, weak governance structures, the use of parallel maps and concession rights and undocumented ownership are barriers that hinder forest protection in controlling expansion of palm oil plantations in Indonesia. Accordingly, downstream actors such as palm oil processing companies are called upon to contribute to an effective system of stopping deforestation that goes beyond voluntary certification. Also, long-term trade relations with smallholder associations on-site can stabilize the social situation of these associations and reward engagements. Finally, as a high demand for palm oil worldwide triggers deforestation and destruction of biodiversity, companies should accelerate the phase out of palm oil in biofuels as fast as possible (see chapter 9). The loss of demand for palm oil from the biofuel sector should be offset by the introduction of mandatory instruments in other palm oil consuming sectors.

Smallholders' livelihood & a lack of downstream efforts

The studies of the project revealed the important role of smallholders at the origin of the palm-oil value chain. In Indonesia, smallholders account for up to 40% of the countries' total palm oil production (Schleicher et al. 2019a). However, as smallholders revealed to have marginal market power only, the foundation of cooperatives/associations in order to increase bargaining power is one important first step. Also, without organizational support, smallholders lack capabilities and resources to meet certification requirements. As world market prices for conventional crude palm oil have a strong depressing effect on prices for fresh fruit bunches (FFB), sustainability requirements should not only address this stage of the value chain but should be distributed evenly along the chain.

Especially, downstream companies and consumers should be willing to pay prices that guarantee the livelihood of smallholders by supporting them in a targeted manner.

Beyond, high upfront efforts for palm plantations are still a barrier for certification. Once, certification is reached, however, demand for certified palm oil from smallholders exceeds the available supply. Accordingly, financial engagement from downstream actors to reach a higher standard and access to certified palm oil markets should support upstream smallholders effectively in order to guarantee a transition from conventional oil plantations to certified palm oil plantations. Greater efforts by downstream actors can be integrated into product prices and hence make consumers pay prices that reflect the social and environmental situation on-site.

Recommendations in a nutshell

Downstream Companies

- Accelerate phase out of palm oil in fuels to reduce upstream land-use pressure
- Engage in stable, transparent and long-term trade relations (beyond voluntary certification and due diligence) with existing organic and sustainability certified plantations
- Solve economic power dilemma between downstream companies and upstream smallholders by correcting upstream market failures with higher and targeted financial engagement and accept higher prices for crude palm oil (CPO) when sustainability standards are met on the plantations

Upstream Companies & Smallholders

- Invest in better conditions and more sustainable cultivation methods such as organic certification, integrated pest management (IPM) and agro-forest systems, as current certificates are still based on monocultures (and partly allow for the use of pesticides)

Downstream Policy Makers

- Introduce mandatory due diligence and certification in other palm oil sectors beyond biofuels (such as the food and feed sector)

Upstream Policy Makers

- Create financial incentives for palm oil plantations to move towards degraded lands instead of primary forests and support replanting for smallholders (e.g. within a national fund system)

6. Focus on Cotton from Ethiopia

The cotton value chain from the plantation to the final product comprises several *upstream* stages such as soil preparation, seeding, soil management, water management, pest management, weed management and harvesting (see chapter 2). Accordingly, the upstream steps are followed by several *downstream* process steps such as ginning of fiber bales, spinning to remove seeds, weaving or knitting to produce bolts and fabric, dyeing and finishing to create smooth fabric, cutting and sewing of final garments to retailing.

In order to explore sustainability and power aspects of upstream cotton cultivation, the project team conducted extensive field research in Ethiopia together with PAN-Ethiopia, the country partner (see Hilbert et al. 2018). A special focus of the research was on the environmental and social hot spots on the cotton fields from soil preparation until harvest.

Smallholders realize high organic cotton yields with Integrated Pest Management (IPM)

A central environmental hot spot of cotton cultivation is pest management. Accordingly, alternative pest management methods were studied in the Gamo Gofa region (South-Ethiopia). Pilot projects showed highly successful cotton cultivation by smallholders who abandoned pesticides completely, realizing high yields per hectare and receiving the official organic certificate of the European Union (Amera 2016). This success case is mostly due to the application of an educational approach called “Famer Field Schools” (FFS) in combination with an integrated pest management (IPM) approach. Farmer Field Schools are based on a long-term participatory educational system (rather than short-term training) where smallholders meet up in the field on a regular basis for an exchange of experiences with agronomic experts on cotton cultivation. Furthermore, first generation “scholars” (lead farmers) spread their experiences and learnings to other farmers in the region and, hence, create a considerable multiplication effect. As innovative organic approaches (food spray method within integrated pest management (IPM) (see Hilbert et al. 2018, Amera 2016)) of cotton cultivation succeeded in the region, yields of the cooperative were increased from 800 kg/ha to 2,300 kg/ha and sales prices from 19 ETB/kg (with middlemen) to 45 ETB/kg (~1.40 €) (Amera 2016). Against this backdrop, farmers participating in the Farmer Field Schools, within the project in Gamo Gofa, completely discontinued the use of pesticides and their plantations became organically certified. Beyond the environmental effect of the pesticide-free farming method, this resulted in improved health for local farmers and their communities.

Figure 6-1: Smallholders evaluating the proportion of pests and beneficial insects in cotton cultivation within Integrated Pest Management (IPM) in Gamo Gofa



Source: Oeko-Institut e.V. & PAN-Ethiopia (2018)

Access to downstream markets

Apart from the above-listed environmental, social and economic advantages, the analysed organic cotton pilot project in Gamo Gofa succeeded in obtaining access to the cotton markets further down the supply chain and, hence, avoided working with middlemen. The latter had been involved in the past, leading to very low cotton prices. It was reported that, before, smallholders were regularly at risk of lacking short-term financial resources. There was a risk of them becoming trapped in a vicious cycle of dependencies on middlemen, leaving them only with the option of accepting poor credit terms, which was then reflected by very low cotton prices later. Here, the Bio-Macht studies showed that the foundation of the cotton cooperative had a strong social impact on the smallholder communities by empowering them to negotiate better prices and cut out middlemen.

Altogether, for the case of Ethiopian cotton cultivation, it was shown that sustainable development in the cotton sector was possible, and that this could be accompanied by increased yields, dispensing with pesticides and empowering cotton smallholder communities. In this context, the special role of the foundation of cotton cooperatives must be highlighted from the perspective of economic negotiation power aspects. Beyond this, additional financial and technical support of a project within international cooperation has contributed to the success.

Fibre quality matters for textile durability

Beyond recommendations regarding upstream cultivation of cotton, the project team identified a sustainability issue further downstream the supply chain. This related to the production of yarn by spinning cotton fibres. Cotton consists of fibres of different length. The higher the share of long cotton fibres relative to shorter fibres in the spun yarn, the higher is the resulting tear resistance and durability of the yarn. To achieve this, short fibres can be combed out of the ginned cotton. For example, 1 kg of ginned and combed cotton can be spun to 600 g of good quality yarn consisting of long fibres (where 400 g of short fibres are combed out). However, if the share of short fibres remains relatively high, the risk of spinning low quality yarn increases. Beyond fibre length, another factor is the contamination of the ginned cotton. Inappropriate mechanical cotton harvesting or picking where leaves or other particles remain in the cotton can lead to vulnerable yarn. Also, the type of seed, appropriate cultivation methods (irrigation of the plants at the right time) and the moment of harvest (maturity of the plant) determine the quality of the cotton.

The project team found that the global textile market was dominated by price competition rather than quality competition ("cheap & fast fashion"). This leads to strong economic pressure from downstream actors on upstream actors, such as spinning mills, resulting in an incentive to not comb out short fibres sufficiently. Textiles woven from low quality yarn further down the value chain, however, are less durable and tend to lose shape easily.

Recommendations in a nutshell

Downstream Companies

- Encourage and support the avoidance of pesticides in favour of innovative agricultural cultivation knowledge such as Integrated Pest Management (IPM) in cooperation with upstream smallholder associations and companies (support the conversion to organic cotton production)
- Encourage and support the establishment of Farmer Field Schools (FFS) teaching integrated Pest Management (IPM) which have proved to have a significant impact on the livelihood and health of smallholders in cooperation with upstream smallholder associations and companies
- Encourage and actively support the establishment of smallholder associations to increase economic bargaining power and mid-term liquidity in order to avoid dependencies on middlemen.

Accordingly, provide financial support to smallholder associations initially in order to allow them to be independent of middlemen.

- Conclude direct, reliable long-term trade relations with upstream smallholder cotton associations to balance their price risks and volume risks.
- Acceptance of purchase quantities and price guarantees that reflect higher efforts for high quality and sustainable certified cotton.
- Design textiles for quality and durability (e.g. by fostering quality standards for yarn production)

Upstream Companies & Smallholders

- Phase out the use of pesticides in favour of integrated pest management (IPM)
- Avoid middlemen in the cotton trade in favour of long-term direct trade arrangements
- Foster the establishment of smallholder associations to increase bargaining power
- Strategically decide for a combination of organic and Fairtrade certification

Downstream Policy Makers

- Introduce mandatory due diligence for textile companies
- Encourage the creation of conditions conducive to a quality market rather than a price market to prolong the lifetimes of textile products and reduce economic pressure on the respective spinning mills

Upstream Policy Makers

- Initiate a national program for quality and sustainability in the cotton sector and foster it as a global brand such as “Cotton made in Ethiopia”

7. Focus on Timber from the Democratic Republic of Congo

Timber from the DR Congo (DRC) is the third commodity focused on by the Bio-Macht project. The DRC itself is covered by 152.6 million hectares of forest which amounts to 67.3% of the total land area of the country (FAO 2019; ITTO 2019). However, large parts are not accessible by infrastructure. Hence, a coherent execution of (mandatory) legality verification schemes involves very significant governance challenges. Without structural reforms addressing the effectiveness of regulatory frameworks and enforcement, verification schemes (including voluntary schemes) are prone to failure.

Furthermore, many regions of the DRC repeatedly face violence from numerous militias, particularly in the Eastern region of the DRC. Especially in this area, multiple militias are involved in timber exploitation and trade – along with other assets such as the so-called conflict minerals (Manhart, A. & Schleicher, T. 2013). Without a successful comprehensive country-wide peace building process, forest protection governance schemes such as certification and legality verification towards sustainability are severely hampered.

Due diligence, trade and legality verification

Regarding certification, by FSC and PEFC, at least two prominent internationally recognized sustainability schemes for timber have been developed worldwide (Schleicher et al. 2019b). However, to-date – also due to the above-mentioned reasons – neither has been applied in the DRC yet. Hence, beyond the development of tailored regional systems (e.g. FSC-Congo) it remains a most relevant challenge to create a suitable economic and institutional environment that allows for the application of both legality verification and sustainability certification. Also, it has thus far not been

possible to successfully negotiate a Voluntary Partnership Agreement (VPA) under the EU-FLEGT process between the DRC and the EU. Accordingly, certification under the FLEGT license is still not possible.

A majority of the timber exports from the DRC go to China (Schleicher et al. 2019b). From a European perspective, this fact hampers the degree of influence on the value chain. However, it cannot absolve European stakeholders from engaging pro-actively and trying to promote more sustainable and legally verified timber sources as well as effective forest protection. This also covers financial engagement in the development of sustainable value chains from the demand side.

Both due diligence and legality verification represent instruments to increase transparency along the value chain. However, the instruments themselves do not provide economic incentives for a change of logging and trade behaviour per se, neither for small-scale loggers nor for companies. As illegal logging is a typical example for negative environmental externalities (see chapter 3), government plays a crucial role in the creation of a suitable regulatory framework for all concerned actors. Only if reliable disincentives for illegal logging as well as positive incentives for very moderate and focussed logging (e.g. based on criteria for sustainability certification) are in place will the related market failures and environmental externalities be able to be corrected effectively.

The role of international enterprises, however, could be to support reliable “regions of stability” where only very moderate logging can be ensured, and certified timber can be cultivated. However, this may translate into higher costs (due to internalised environmental and social externalities) and reliable market conditions (e.g. acceptance guarantee). However, such a roadmap needs to be embedded within the necessary institutional policy commitment. Both legality verification within mandatory due diligence (step 1) and sustainability certification (step 2) can be parts of a suitable roadmap to (1) limit illegal logging and (2) stabilize and limit environmental impacts from widespread unsustainable logging activities. However, as isolated instruments, the latter do not have the potential to take a stand within an unlevelled economic playing field. In the long run, from an economic perspective, forest protection and sustainable logging are also a matter of finance. Only if forests receive an economic value as such (e.g. certificates connected to values, increased stumpage fees etc.) will incentives for forest protection be provided and promise to be successful (Schleicher et al. 2019b).

Beyond this, timber products are often not exported as roundwood but in the form of various derivatives. As (Nellemann, C. et al. 2016) show, a high share of the illegal trade also refers to loopholes in the context of derivative products such as pulp, paper or charcoal. Hence, it is of utmost importance for legality verification schemes – but also within due diligence guidance – to consider wood derivative products and close existing loopholes.

Finally, peace building, legal and sustainable logging can only be successful with regard to small-holders if suitable (possibly also alternative) employment possibilities are created in the region.

Pre-financing, smuggling and re-labelling of timber

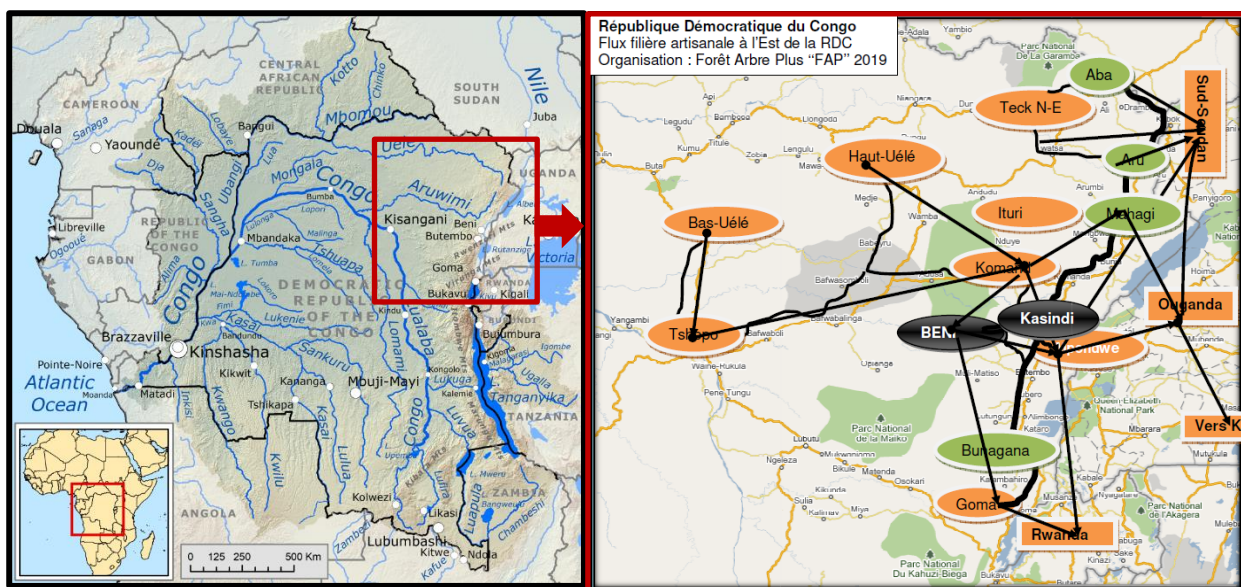
Turning back to the DRC, it is reported that considerable amounts of artisanal timber are logged illegally – mostly in the Province of Tschopo in the east of the country. Current estimations show that, in the DRC, ~600'000 m³ of timber are logged by small-scale operators annually. From the year 2000, the forest setback from the City of Beni towards the West has amounted to 800 km, translating into a recoil of ~42 km per year up until 2019. Most of the artisanal timber from this region is meant for the export to Rwanda, Kenya, Uganda and South Sudan (Chishweka Lubala 2019).² Typically,

² Apart from local consumption for the cities of Kisangani, Bunia, Beni, Butembo, Goma et Bukavu.

artisanal logging is limited to three main forest species, namely Sapelli, Iroko and Mahogany of Africa. However, from recent observations on the ground, it appears that the species Sapelli and Iroko have also become rare. Also, species like Bulungu, Alumbi, Mukulugu, Bilinga, Tali and Padouk have been more and more in the focus of artisanal logging (Chishweka Lubala 2019).

From a governance perspective, it is noteworthy that, legally, timber logging is related to around 107 types of taxes. However, current reports show that small-scale chainsaw operators and traders have developed several methods to circumvent taxation, e.g. by submitting incorrect declarations of amounts (e.g. 50 m³ instead of 100 m³ per transport), in combination with the corruption of tax agents. Hence, exports from the region are typically underestimated in official statistics (Chishweka Lubala 2019).

Figure 7-1: Flow chart of artisanal timber in the East of the DRC



Source: © Wikipedia & Chishweka 2019.

A closer look at the region reveals that one of the most relevant trade hubs for timber is located near the city of Kasindi (see map above). Whereas officially, the hub is meant to facilitate good control of sawn timber transactions from the point of view of wood legality, quality and resource estimation, it is reported that the Kasindi timber park is merely a transit hub where artisanal loggers are ransomed with taxes and other fees and nothing is unloaded in the first place. Instead, the real lumberyards where quantification is organized are located across the border (e.g. on the Ugandan side). Beyond the border, the merchandise is unloaded, and each piece of wood is quantified and stamped following an actual measurement. Once the wood is stamped, it is then reportedly re-labelled (e.g. as Ugandan wood). According to local reports, this is a typical example of how transactions between Ugandan, Rwandan, Kenyan, Sudanese, Tanzanian and Congolese operators take place (Chishweka Lubala 2019).

Hence, in order to gain control over the social, environmental, commercial and financial situation in the East of the DRC, an effective timber park should be created in the town of Beni or Komanda. This could serve as a real trade hub where transactions and the estimation of the resource at its fair value according to the current market prices could be imposed. Also, legality verification schemes, as elaborated in (Schleicher et al. 2019b), can only be implemented if robust local governance structures are established within such a "timber park" on the territory of the DRC.

In terms of financial power aspects, reports from the region also reveal that 70% of sawn timber of artisanal/small-scale origin is pre-financed by operators from neighboring countries east of the DRC. As artisanal chainsaw operators would not have access to pre-financing in the DRC, they have turned to their “customers” beyond the borders. This means that importers of Congolese timber influence artisanal logging on the territory of the DRC in two ways: firstly, by imposing the method of estimating quantities (see above) and secondly, by imposing a suitable purchase price (Chishweka Lubala 2019). Finally, empirical evidence from current reports shows that timber from the DRC is re-labelled and certified in the neighboring countries rather than in the DRC. However, to allow for an effective due diligence process within the DRC, certificates would have to be addressed in the DRC itself.

Recommendations in a nutshell

Downstream Companies

- Comply with mandatory due diligence requirements of EU Timber Regulation No. 995/2010.
- Support “Regions of Stability” in the DRC in order to make it possible to limit and effectively control illegal logging and positively influence the livelihoods of artisanal/small-scale woodworkers

Upstream Companies

- Use internationally available CoC certification and legality verification mechanisms on the territory of the DRC
- Offer alternative possibilities of income for illegal loggers

Downstream Policy Makers

- Address loopholes in the current due diligence requirements in EU Timber Regulation No. 995/2010 relating to pulp, charcoal and other current exemptions
- Foster the EU-FLEGT/VPA process within the DRC including all countries in the region of the Great African Lakes

Upstream Policy Makers

- Establish functioning “timber trade hubs” (“parcs à bois”) in the Eastern region on the territory of the DRC to effectively limit, control and regulate artisanal logging
- Stop smuggling and re-labelling activities of timber traders in the context of the near borders within an effective control mechanism elaborated together with the neighbouring countries
- Encourage and support processes to formalise the timber sector in order to effectively control logging and forest protection
- Incentivize alternative sources of income for illegal loggers
- Strengthen the banking system in the eastern regions of the DRC in order to improve the situation of poor equity capital of artisanal woodworkers to allow for better control of their activities

8. Conclusions

As shown in chapters 2, 3 and 4, current efforts by downstream companies aimed at an improvement of sustainability aspects in the value chains of cotton, palm oil and timber have a strong focus on (mostly voluntary) certification activities and transparency implemented by due diligence requirements. These efforts are well recognised and have shown at least some environmental, social, and economic impact on the upstream side of the value chains. Furthermore, as illustrated in chapter 3, economic considerations show that sustainability issues in the context of market allocation are characterized by the divergence of (short term) private marginal costs of resource exploitation as compared to (long term) marginal social costs resulting in negative externalities. Hence, an effective correction classically needs a regulatory framework that allows for a corresponding increase in prices. Otherwise resulting market failure and short-term exploitation by specific interest groups lead to highly destructive consequences for natural resources and the wellbeing of (future) communities.

The analysis of all commodities in the Bio-Macht project showed that an effective integration of social and environmental costs cannot be guaranteed by non-financial instruments such as voluntary certification or due diligence *alone*. In particular, the case of palm oil revealed that certification of plantations was mostly realized on existing plantations within a “deadweight” effect. That means there is little financial incentive for certification in the first place. Financial benefits were found to be not high enough to represent a stand-alone motivation to invest in more sustainable cultivation practices. Instead, market access to Europe was reported as the main reason. Beyond this, deforestation data in the context of new palm plantations show that certificates alone were not able to develop an effective allocation effect or disincentive to the expansion of plantations. Also, palm oil certification was seen to set requirements from downstream actors towards upstream actors only. Hence, requirements are typically passed from downstream to upstream actors resulting in an asymmetric distribution of efforts.³ Therefore, the project team strongly recommends ambitious financial engagement of downstream actors to allow upstream actors to economically benefit from improved practices and to provide a mechanism effectively shifting the market towards sustainability (see chapter 9).

The case of cotton revealed that, especially for smallholders, better agricultural methods such as Integrated Pest Management (IPM) in combination with suitable irrigation taught on a regular basis within Farmer Field Schools (FFS) lead to high yields and very good cotton quality. Hence, adverse health effects can be avoided and an increase of incomes for smallholders realized, if middlemen can be cut out by reducing financial dependencies. In terms of market allocation, better agricultural methods (in this case) can lead to fewer marginal social costs (due to less pollution and fewer health consequences) and partially integrate negative externalities. Long term direct trade relations with smallholder associations can contribute to such a result effectively (see chapter 9).

Finally, the case of timber from the DRC revealed a situation of dramatic market failures and negative externalities from the large extent of illegal deforestation, particularly in the Eastern Regions with borders to South Sudan, Uganda, Kenya and Rwanda. A lack of regulatory structures in combination with re-labelling and smuggling of timber can be observed, leading to a situation where it has not yet been possible to implement any voluntary certification or effective legality scheme. The reported irregular transboundary trade structures as well as financial dependencies lead to a situation of multiple strong barriers for forest protection. The establishment of “real” regional trade hubs (“parcs à bois”) on the territory of the DRC could be a first step to better regulating and controlling artisanal logging as a starting point for formalisation, quantification and legality verification. However, effective

³ Only recently, the RSPO Standard has initiated an approach of “Shared Responsibility” for all actors in the value chain of palm oil. The project team recognizes the new approach in the context of asymmetric distribution of efforts.

forest protection also needs to establish alternative income possibilities for the workers in question (see chapter 9).

9. Summary: Recommendations for Companies and Policy Makers

Based on the country commodity reports of the Bio-Macht project (Hilbert et al. 2018, Schleicher et al. 2019a & Schleicher et al. 2019b) as well as the elaborations above, the project team summarizes the following recommendations for companies and policy makers to effectively address sustainability and power aspects in the palm oil, cotton and timber value chains.

	Palm Oil	Cotton	Timber
Downstream Companies	<ul style="list-style-type: none"> Accelerate phase-out of palm oil in fuels to reduce upstream land-use pressure Engage in stable, transparent and long-term trade relations (beyond voluntary certification and due diligence) with existing organic and sustainability certified plantations Solve economic power dilemma between downstream companies and upstream smallholders by correcting upstream market failures with higher and targeted financial engagement within direct and long-term contracts and accept higher prices for crude palm oil (CPO) when sustainability standards are met on the plantations 	<ul style="list-style-type: none"> Encourage and support the avoidance of pesticides in favour of innovative agricultural cultivation knowledge such as Integrated Pest Management (IPM) Encourage and support the establishment of Farmer Field Schools (FFS) teaching Integrated Pest Management (IPM) which has proved to have a significant impact on the livelihood and health of smallholders. Encourage and actively support the establishment of smallholder associations to improve economic bargaining power and mid-term liquidity in order to avoid dependencies on middlemen. Establish direct, reliable long-term trade relations with upstream smallholder cotton associations to balance their price as well as volume risks. Purchase as well as price guarantees reflecting higher efforts for high quality and sustainable cotton do have a real impact on the ground. Design textiles for quality and durability (e.g. by fostering quality standards for yarn) 	<ul style="list-style-type: none"> Comply with the mandatory due diligence requirements contained in EU Timber Regulation No. 995/2010 Support “Regions of Stability” in the DRC in order to enable illegal logging to be limited and effectively controlled and positively influence livelihoods of illegal loggers

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Upstream Companies & Smallholders</p>	<ul style="list-style-type: none"> Invest in better conditions and more sustainable cultivation methods such as organic certification, Integrated Pest Management (IPM) and agro-forest systems, as current certificates are still based on monocultures (and partly allow for the use of pesticides) 	<ul style="list-style-type: none"> Avoid the use of pesticides in favour of Integrated Pest Management (IPM) Avoid middlemen in cotton trade in favour of long-term direct trade arrangements Foster the establishment of smallholder associations to increase bargaining power Strategically opt for a combination of organic and Fairtrade certification 	<ul style="list-style-type: none"> Use international Chain-of-Custody Certification and legality verification mechanisms within the DRC Offer alternative possibilities of income for artisanal woodworkers
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Downstream Policy Makers</p>	<ul style="list-style-type: none"> Introduce mandatory due diligence and certification in other palm oil sectors (such as the food and feed sector) 	<ul style="list-style-type: none"> Introduce mandatory due diligence for textile companies Encourage the creation of conditions conducive to a quality market rather than a price market to prolong lifetimes of textile products and ease economic pressure on the concerned spinning mills 	<ul style="list-style-type: none"> Address loopholes of the current due diligence requirements in EU Timber Regulation No. 995/2010 related to pulp, charcoal and other current exemptions Foster the EU-FLEGT process within the DRC including all countries of the Region of the Great African Lakes

Upstream Policy Makers

- | | | |
|--|---|--|
| <ul style="list-style-type: none"> • Create financial incentives for palm oil plantations to move towards degraded lands instead of primary forests and support re-planting for smallholders (e.g. within a national fund system) | <ul style="list-style-type: none"> • Initiate a national program for quality and sustainability in the cotton sector and foster it as a global brand such as “Cotton made in Ethiopia” | <ul style="list-style-type: none"> • Establish “timber hubs” in the Eastern region in the territory of the DRC to effectively limit, control and regulate artisanal logging and • Stop the smuggling and re-labelling activities of timber traders in the context of near borders within an effective control mechanism developed in cooperation with the neighbouring countries • Encourage and support processes to formalise the timber sector in order to effectively control logging and forest protection • Strengthen the banking system in the eastern regions of the DRC in order to improve the situation of poor equity capital of artisanal woodworkers and allow for better control of their activities |
|--|---|--|

10. Further Readings of the Bio-Macht Project

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