

Knowledge gaps and research opportunities in the light of the European Union Regulation on deforestation-free products

Abstract

In recent decades the need for new legislative and technical tools to counter the main threats to the world's forests has been increasingly felt. Currently, the European Union (EU) has moved towards the implementation of the new deforestation-free products Regulation (EUDR) which builds on the experience gained by Member States and EU institutions with the Regulation on timber trade. The objective of this note is to identify the contribution of scientific research to tackling deforestation and forest degradation in the context of the EUDR which extends due diligence obligations from wood and paper products to agri-food, bio-energy and other major manufacturing sectors.

Keywords: deforestation, forest degradation, European policy, EUTR, EUDR, due diligence.

Forests cover a third of the global land area. About half of the forest area is relatively intact and more than a third is primary forest. Deforestation and forest degradation have decreased markedly since the last decade of the last century but continue to occur at an alarming rate: between 1990 and 2020, some 420 million hectares of forest were lost to deforestation – an area the size of the European Union. These processes occur mainly in the two large forest basins of the Amazon and Congo and in Southeast Asia (FAO, 2020).

Deforestation is the destruction of forests so that land is put to other uses, whereas forest degradation is a more gradual process by which a forest's biomass decreases, its species composition changes, and/or its soil quality decreases but the land still meets the definition of a forest in terms of area, canopy cover and tree height. Systematic data and statistics on forest degradation are scarcer than on deforestation as the former is more difficult to measure and monitor. According to Hosonuma et al. (2012) and FAO (2020), about one tenth of tropical moist forest are in a state of degradation, largely attributable to short-term disturbances such as selective logging, natural events and fires.

Both deforestation and forest degradation are significant environmental problems (FAO-UNEP 2020). Their impact on greenhouse gas emissions is of great concern: the Intergovernmental Panel on Climate Change estimates that nearly a quarter of total anthropogenic greenhouse gas emissions come from agriculture, forestry, and other land uses, and of these about two-fifths comes from deforestation and conversion of natural ecosystems. In addition to contributing to climate change, deforestation and forest degradation are among the main drivers of biodiversity loss. Furthermore, they can often lead to increased interaction between humans and animals, increasing the likelihood that zoonotic diseases spread from animals to humans (European Commission 2021).

Most deforestation is currently driven by agricultural expansion and demand for raw materials and derived products (e.g., soy, beef, palm oil). The European Union (EU) is a large consumer of such goods, some of which are often produced unsustainably, causing deforestation and forest degradation. According to the European Commission (2021), EU consumption of such products accounts for around 10% of global deforestation, with palm oil and soy being the most significant. Distinctively, EU consumption is held responsible for 19% of the tropical deforestation embodied in imports of raw materials and selected agrozootechnical products (cattle, cocoa, coffee, palm oil, soy, wood and rubber). To give just one example, imported timber is believed to be responsible for the deforestation of around 20,000 hectares per year (European Commission, 2021). In this specific regard, it should be highlighted that timber felling does not represent the greatest risk in terms of deforestation since 80% of forest destruction is attributed to changes in land use for agricultural purposes, and therefore largely to production and the import/export of other goods. The share of deforestation by selected agrozootechnical commodities is as follows: palm oil (34 %), soy (33 %), wood (9 %), cocoa (8 %), coffee (7 %), cattle (5 %) and rubber (3%). Conversely, inappropriate timber harvesting and illegal logging are primarily responsible for the other component of the EUDR, i.e. forest degradation, which is a more difficult and insidious phenomenon to identify and quantify.

The EU Forest Strategy, anchored in the European Green Deal and the EU Biodiversity 2030 Strategy, recognizes the central and multifunctional role of forests and the contribution of foresters and the entire forest value chain in defining a climate-neutral and sustainable economy by 2050, ensuring the recovery, resilience and adequate protection of all ecosystems. Deforestation and forest degradation have a serious impact not only on EU environmental objectives, but also on the human rights, economic well-being, peace and security of large numbers of people and rural communities based in tropical countries. This is why the EU, together with United Nations organizations, has been increasingly committed to halting global forest loss.

To respond to these needs, in November 2021 the European Commission presented the legislative proposal for a Regulation on deforestation-free products which was discussed at length and amended by the Council and the EU Parliament. Finally, on 9 June the Regulation (now known by the acronym EUDR) was published in the Official Journal of the EU. The EUDR stipulates that companies will only be able to import, place on the EU market, sell and export products whose supplier has issued a "due diligence" statement ensuring that the product does not come from deforested land and has not contributed to forest degradation after December 31, 2020. The EUDR regulated products are the aforementioned cattle, cocoa, coffee, palm oil, soy, timber, rubber and derived products. Starting from 30 December 2024, companies carrying out the aforementioned actions regulated by the EUDR will have to comply with the new legal obligations. The only temporal exemption provided concerns small and micro-enterprises that do not deal with wood products already covered by the EU Timber Regulation of 2010.

The European Commission will play a primary role in the implementation of the EUDR and, *inter alia*, will classify producing Countries, or parts of them, as low-risk, standard-risk or high-risk in order to facilitate the implementation of the mandatory due diligence, which operators and traders of regulated goods must accomplish. The EUDR will provide for significant penalties to those who break the rules, which include a fine of up to 4% of the company's total annual turnover for failing to comply with the requirements of the Regulation.

The EUDR requires companies to verify that deforestation and forest degradation has not occurred in the parcel of land where a regulated good has been produced, i.e. companies need to know where the supplied goods come from and if deforestation or forest degradation has occurred there since the cut-off date of 31 December 2020. This information must be integrated into the due diligence procedures mandatory for those placing regulated products on, or exporting them from, the EU market.

In recent decades, the recognized relevance of illegal logging and, last but not least, the mandatory obligations introduced by the EU Timber Regulation (EUTR) and other specific national forest laws and acts, logging and forest degradation have been caught in several scientific research activities. Four main areas for further research can be considered particularly relevant in relation to the implementation of the new Regulation on deforestation-free products and related forensic issues: forest monitoring, identification of wood species and origin of EUDR-regulated products, supply chain monitoring, policy issues.

The availability of quantitative data on deforestation and forest degradation data is variable and still uncertain for many Countries. The increasing use of satellite remote sensing tools for large-scale monitoring will be a key data source that will enable better nationwide monitoring of the events and types of deforestation and forest degradation and the activities that cause them. Further research avenues are: (i) improving the ability to assess forest degradation using satellite imagery; (ii) rationalization of the cost-effectiveness of satellite imaging methods and techniques for detecting deforestation and forest degradation; (iii) evaluation of the sensitivity of the driver estimate to the uncertainties related to different data sources. The EUDR introduces, as the operator's main obligation, the geolocation of the land parcels in which the raw material (of which the product to be supplied is made) was produced: therefore, a key objective will be the development of user-friendly systems, based on open source data and software, which will allow rapid compliance checks, even for people not particularly trained for such tasks.

The identification of wood species and their geographical origin can be used to verify compliance documentation and the integrity and legality of timber supply chains. Path for further research are those techniques for tracing timber based on intrinsic characteristics that include structural (wood anatomy, hand or machine vision identification), chemical (mass spectrometry, near-infrared spectroscopy, stable isotopes and trace elements), genetic methods (DNA barcodes, population genetics and phylogeographic studies, DNA profiling). These techniques vary in (i) what they can identify (i.e., species, genus, geographic origin,

individual), (ii) their potential to be used for frontline screening (in the field or at customs) or as diagnostic laboratory and (iii) logistics such as costs, processing speed, equipment and technical skills (see reviews by Schmitz et al. 2020, Schmitz 2020, Low et al. 2023). It is worth noting that this kind of tests capable for the identification of the species and the exact place of production of the raw materials are explicitly mentioned in the EUDR with regards to compliance checks to be made on traders. While in the case of wood and wood derivatives, some of the above methodologies are already exploited, a wider application of some of them is foreseeable to other regulated products, in particular for food products, which account for the vast majority of EUDR regulated goods that EU imports, produces and exports.

Research engagement is critical to achieving non-deforestation goals through advancing the traceability potential of the supply chain: the development of innovations and knowledge transfer and their implementation by companies regarding the exploitation of advanced information and communication technologies, such as the blockchain (Harfouche et al. 2023), would be crucial, as they can support the feasibility of tracking and the effective integrity of the entire supply chain. This is essential to overcome the problem of paper documentation, which currently accounts for a considerable amount of procurement information to be collected under the EUTR. Access to certain and incontrovertible information is a real necessity to ensure the legality and sustainability of regulated products. If this is true for the EUTR, it is even more true for the EUDR, that is a considerably more complex and articulated Regulation which, in addition to legality, considers the wider concept of environmental and social sustainability.

The magnitude of the impact of policy options to address deforestation and forest degradation depends on multiple factors, e.g. the geographic regions where these processes occur and the forest types affected. A key avenue for scientific research on these policy issues is the evaluation of the actual environmental benefits of policy options, i.e. the evaluation of the effectiveness of the measures included in the possible policy options. For example, the effectiveness of the EUTR (based on the share of illegally harvested timber that has been prevented from entering the EU market) has been estimated at between 12% and 29% (European Commission 2021). Furthermore, the awareness of an uncertain but certainly different future due to global changes motivates the search for innovative solutions for the sustainable management of forest and agricultural systems and related supply chains (Corona 2019): a reformulation of the institutions involved requires the transition to new types of technical intervention that connect people, sectors and decision-making levels (Nocentini et al. 2017). Under such perspective, scientists should contribute to study strategies and implement concrete tools to help rural communities and small producers of EUDR goods, based in emerging Countries, to facilitate the production and export of regulated goods fully compliant with the new specific requirements of the EU: this is to avoid the risk, unfortunately inherent in the EUDR, of marginalizing social realities that are essential for the realization of a truly fair, supportive and ecologically sustainable global trade.

The EUDR represents an important milestone in EU legislation with respect to the ongoing environmental crisis caused by climate change and the growing human ecological footprint. With the completion of the legislative process, the incubation period of the Regulation begins, during which it is necessary to ensure its correct application and to choose the best strategies to concretely achieve its objectives. Together with the readiness of national administrations of EU Member States, research input is one of the requirements for the successful implementation of this complex and ambitious Regulation.

As summarized here, the potential areas to be explored and investigated by the scientific community are multiple, heterogeneous and interconnected. Scientists are required to make effective efforts to provide understandable and manageable answers to a huge number of companies dealing with goods regulated by the EUDR. On the other hand, an even larger group of potential and responsible stakeholders may be keenly interested in the solutions science can offer to address the relevant environmental threats posed by deforestation and forest degradation.

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