

EARTH OBSERVATION FOR REAL-TIME GLOBAL DEFORESTATION INFORMATION

Earth Observation Technological Feasibility Assessment “Proposal for a Regulation on Deforestation-free Products”¹ - by Article. This document has been produced by EARSC Green Deal working group.

Article	Comment on Technological Feasibility
<p>Article 2: Definitions “The definition of deforestation-free sets a cut-off date of 31 December 2020. This means that no commodities and products in the scope of the regulation would be allowed to enter or exit the EU market if they were produced on land subject to deforestation or forest degradation after that date. “</p>	<p>Verification with respect to historical cut-off date: Earth Observation offers daily, global high resolution imagery. This information is automatically saved into an archive which contains daily imagery of the whole land’s surface. Combining commercial and Copernicus² archives, providing daily, canopy-level information since 2017, can the necessary before/after comparisons be carried out so that verification of any specific plot of land globally has been subject to deforestation or forest degradation since the cut-off date can take place. This combined imagery archive would also help detect degradation or deforestation happening after the cut-off date, even if the signs of logging have disappeared due to vegetation growth.</p>
<p>Article 9: Information requirements [...] (d) geo-localisation coordinates, latitude and longitude of all plots of land where the relevant commodities and products were produced, [...] (g) adequate and verifiable information that the relevant commodities and products are deforestation-free; [...]</p>	<p>Geo-localisation coordinates: In order to verify that specific commodities and products are deforestation-free with the use of Earth Observation technology, the geographical location of the plots of land under examination must be provided. From a technological point of view, this information can be easily retrieved for all plots globally, including small and remote areas. In instances where plots of land are located in countries lacking a digital land register, land owners themselves can easily get either one coordinate of their plot or their complete land border digitized, requiring only access to a device with GPS (such as a smartphone or tablet). Such</p>

¹ Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the making available on the Union market as well as export from the Union of certain commodities and products associated with deforestation and forest degradation and repealing Regulation (EU) No 995/2010

² Copernicus is the European Union's Earth observation programme coordinated and managed for the European Commission by the European Union Agency for the Space Programme in partnership with the European Space Agency, the EU Member States (www.Copernicus.eu)

	<p>devices (or an additional GPS tracking SW App) will enable any farmer to easily get their land border digitized by simply walking along the borders of their land. This will automatically record their GPS positioning.</p> <p>In addition to GPS technology, high-res EO data can also be used to automatically extract and/or validate geolocated field boundary data in small holder landscapes.³</p>
<p>Article 14: Obligation to perform checks “The competent authorities shall carry out checks to establish whether operators and traders comply with their obligations under this Regulation and whether the relevant commodities and products placed or made available on the Union market or exported from it are compliant with the requirements of this Regulation.” [...]</p>	<p>Stakeholder enablement: Today, Earth Observation data and technology to enable checks on deforestation and forest degradation by competent authorities as required by the proposal is already available on the market. If it is to be procured, it would probably be more efficient for the Commission to make such data services available to the competent authorities, thereby ensuring a harmonised approach, and a level-playing field.</p> <p>Evidence from the Common Agricultural Policy: The modernisation of the Common Agricultural Policy (CAP) includes an area monitoring system to be adopted by competent authorities which relies on satellite data.⁴</p>
<p>Article 15: checks on operators [...] “(g) any technical and scientific means adequate to determine whether the relevant commodity or product are deforestation-free, including Earth observation data such as from Copernicus programme and tools, and (h) spot checks, including field audits, including where appropriate in third countries through cooperation with the administrative authorities of third countries”</p>	<p>Earth Observation tools: Today, information offered by Earth Observation data and value added services can enable competent authorities to carry out the required checks on operators and determine whether a globally-sourced commodity or product is deforestation and degradation-free. However, Copernicus data alone is not sufficient for deriving the necessary forest measurements. Commercial contributions, interoperable with Copernicus, providing daily, global, highly detailed (3-4 m per pixel) satellite imagery offer today the necessary additional spatial and temporal resolutions.</p> <p>Detecting forest degradation:</p>

³ See: <https://www.frontiersin.org/articles/10.3389/frai.2021.744863/full>

⁴ Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the financing, management and monitoring of the common agricultural policy and repealing Regulation (EU) No 1306/2013. Adopted by the Council in December 2021, see article 22, article 63.4(b), article 64 for the implementation of satellite technologies. Evidence from the Slovenian Paying Agency on the use of satellite imagery for CAP checks: [blog post](#). Art. 65.4 (b) “area monitoring system” means a procedure of regular and systematic observation, tracking and assessment of agricultural activities and practices on agricultural areas by Copernicus Sentinels satellite data or other data at least equivalent value”

	<p>Today, from Earth Observation data (alone or combined with ground-truth) we can derive information services⁵ detecting signs of forest ecosystem degradation such as:</p> <ul style="list-style-type: none"> ● Stem volume estimation ● Change in canopy cover ● Quantification of loss (or gain) in above ground biomass (AGB). ● Local anomalies in the chlorophyll content that indicate vegetation stress ● Changes and anomalies in phenology ● Water content in leaves can serve as early signs of drought ● Detection and monitoring of pests and diseases ● Detection and monitoring of Invasive Alien Species ● Changes in the productivity of Forest Ecosystems ● Species disappearance ● Changes in the vertical structure of the Forest Ecosystem ● Reduction of crown cover ● Forest succession ● Forest Ecosystem fragmentation <p>The derivation of the above must take into account that for each of these parameters the boundary conditions (available input data such as satellite data, reference data and other in-situ data sources) must be suitable in terms of the requested/needed data quality on the user side. The parameters must also be validated according to their usability in the areas of interest (tropical, sub tropical and other forested regions).</p> <p>Field deployments: Earth Observation-based deforestation information systems can improve the efficiency of monitoring activities by automatically highlighting areas of interest. This can drive a more effective use of limited resources, supporting and guiding field validation to ascertain conformity with the documentation of the due diligence process.</p>
<p>Article 16: checks on traders [...]</p>	<p>Field deployments:</p>

⁵ products such as Normalized Difference Vegetation Index (NDVI), Enhanced Vegetation Index (EVI), Ratio Vegetation Index (RVI), Leaf Area Index (LAI), Fraction of Photosynthetically Active Radiation (FPAR) and Net Primary Production (NPP) which can be indicators to describe forest degradation.

<p>(b) where appropriate, spot checks, including field audits”</p>	<p>Earth Observation-based deforestation information systems can improve the efficiency of monitoring activities by automatically highlighting areas of interest. This can drive a more effective use of limited resources, supporting and guiding field validation to ascertain conformity with the documentation of the due diligence process.</p>
<p>Article 18: Cooperation and exchange of information “Competent authorities shall cooperate with each other, with authorities from other Member States, with the Commission, and if necessary, with administrative authorities of third countries in order to ensure compliance with this Regulation.” [...] 3. “Competent authorities shall exchange information necessary for the enforcement of this Regulation.” [...]</p>	<p>Cooperation and exchange of information: Earth Observation data, by design, is wide scale and globally consistent, offering harmonized and comparable information. This can help construct uniform measurement systems across the board, facilitating harmonization in reporting as well as cooperation and information exchange between stakeholders as required by the proposed deforestation-free regulation.</p>
<p>Article 19: Reporting</p>	<p>A homogeneous reporting basis on deforestation and forest degradation globally does not exist today, but is a fundamental prerequisite for effective legislation and decision making. Earth Observation data, by design, is wide scale and globally consistent, offering harmonized and comparable information. This can help construct uniform measurement systems across the board, facilitating harmonization in reporting.</p>
<p>Article 20: Enhanced scrutiny “Where relevant commodities or products were produced in a country or part thereof listed as high risk” [...]</p>	<p>Canopy-level detail for enhanced scrutiny: The identification of deforestation, forest degradation and selective logging drive the need for a specific spatial resolution.⁶ This is particularly pertinent in areas posing high risk of deforestation where enhanced scrutiny will require a high level of information detail. The publicly available Copernicus data with 10 m resolution per pixel are not sufficient for addressing these needs. Only with the addition of commercially available data can Europe obtain the necessary combination of spatial resolution (3-4 m per pixel) and near-daily imaging cadence to discern canopy level information.</p>

⁶ Spatial resolution is the ability to see fine detail in an image. It refers to the number of pixels utilized in construction of the image. Images having higher spatial resolution are composed of a greater number of pixels than those of lower spatial resolution.