

Geospatial Data Sharing Protocol

For deforestation-free commodity value chains

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Introduction

- Preferred by Nature has coordinated the development of this Protocol in a collaboration with certification scheme owners and commercial organisations with expertise in managing supply chain data. The Food and Agriculture Organisation (FAO) has provided support under the [Forest Data Partnership](#), a program aiming to halt and reverse forest loss from commodity production by improving global monitoring and supply chain tracking.
- Obtaining information describing the land where relevant commodities were produced (harvested or grown) is a growing requirement for organisations sourcing agricultural and forest Goods. Adequate geospatial data must be transferred through value chains to allow due diligence for unacceptable activities such as deforestation. Information systems must therefore perform tasks relative to sending and receiving geospatial data relating to the production of commodities on land.
- The Protocol's aim is to support this process, in particular in view of emerging regulatory frameworks, some imposing a very short timeline for compliance (e.g., the [European Union Deforestation Regulation](#) - EUDR).
- Given the vast range of organisations concerned with sharing geospatial information (from primary production to retail across multiple industry sectors and from around the globe), it is explicitly acknowledged that the Protocol will only seek to address specific requirements for sharing geospatial data and not address other business processes.
- The Protocol seeks to be minimalist: only requirements that are proven to be indispensable are included.
- The Protocol is primarily focused on efficiency and seeks to maintain an appropriate balance between being very general and flexible for all to use and being very prescriptive and specific to effectively foster standardisation of practices. It aims at allowing the sharing of geospatial data even when the volume of data is large as well at streamlining various possible practices. This is partially at the expense of inclusion of / accessibility to actors engaged in different practices. Where necessary, the Protocol prescribes data formats and structures to be used when sharing data, thereby reducing the structures and formats that may be currently in use.
- The Protocol does not provide guidance on information management for internal product processing within each organization.

- This Protocol is updated and amended from time to time. The Protocol is version-controlled. It is up to the users of the Protocol to check for updates and to communicate relevant version information to other parties etc.

Document Details

Name	Geospatial Data Sharing Protocol ('GDS Protocol', or 'Protocol') for deforestation-free commodity value chains
Objective	The Protocol is intended as a voluntary standard for providing a uniform means for sharing geospatial data. This will allow organisations to exchange geospatial data efficiently.
Reading indications	<ul style="list-style-type: none"> • Words in bold are defined terms. Definitions can be found in the relevant section. • "shall" indicates requirements strictly to be followed in order to conform to the Protocol.
Version	1.0
Last updated	06 th October 2023

Defined Terms

Data structure	A way of arranging data digitally so that it can be easily accessed and updated. A data structure is used for organizing the data as well as ensuring processing, retrieving, and storing actions.
Geospatial Data	Information describing the extent and boundary of the land involved in the production of the Goods. It can be any vectorized geometry type including Points.
Goods	Physical objects over which ownership can be established and whose ownership can be transferred from one organisation to another by engaging in transactions on markets.
Identifier	A name that identifies someone or something. It may be a word, number, letter, symbol, or a combination of those.
Metadata	Metadata is data that provides descriptive information about other data.

Organisation	In the Protocol, Organisations are only described as “Sender” or “Receiver” - in the context of sharing Geospatial Data - where the Sender is the Organisation responsible for providing the Geospatial Data to the Receiver.
Protocol users	Organisations voluntarily applying the GDS Protocol.
Receiver	Organisation receiving Geospatial Data from a Sender.
Sender	The organisation is responsible for providing Geospatial Data to a Receiver.
Spatial Indexing System	A system for representing Geospatial Data on the surface of a sphere. These systems are particularly useful for geographic information systems and other applications that require spatial indexing and computations on the Earth's surface. For more detailed information, please refer to the S2 Geometry Library or H3 Hexagonal Hierarchical Spatial Index .
Structured Information	Data that has a standardized format for efficient access by software and humans.
Supply Network	Cluster of interconnected organisations which are jointly involved in the manufacturing and delivery of Goods.
Traceability	The ability to know the history of a product or its components through the supply chain by means of documented recorded identification.
Transaction	Instance of trading or exchanging of Goods from one organisation to another.

Scope and application

Item	Description	Guidance/clarification
1	The Geospatial Data Sharing Protocol (' GDS Protocol ', or ' Protocol ') provides guidance to Organisations on how to share data describing the extent and location of land implicated in the production of Goods .	--
2	The Protocol does not provide requirements as to when Geospatial Data should be collected/generated, nor how to create such Geospatial Data .	<p>Guidance on <i>how</i> to create Geospatial Data has already been developed by other initiatives: see for instance ISEAL's Guidance on the collection of polygon location data.</p> <p>Protocol users must identify <i>when</i> or <i>for which class of Goods</i> Geospatial Data must be generated, before using the Protocol.</p>
3	The Protocol does not provide requirements relating to data security.	<p>Information security is an important element when exchanging data. It is, however, not in the scope of this version of the Protocol.</p> <p>It is up to Protocol Users to agree on appropriate data security mechanisms. It is likely that other trade and due diligence information being exchanged are already covered by data security mechanisms, which can then be extended to Geospatial Data.</p>
4	The Protocol does not directly provide for the validation of Geospatial Data .	<p>It is up to the Organisations (and their business processes) to establish the accuracy, precision and reliability of the Geospatial Data in the context of the Goods in a Transaction.</p> <p>Note: The use of an indexing system will enforce some quality/validation aspects (e.g.</p>

Item	Description	Guidance/clarification
		overlapping assessment, closed geometry, etc.).
5	The Protocol is not intended to be a risk management mechanism. Data communicated in compliance with the Protocol's requirement may or may not be associated with deforestation events, and/or legally non-compliant / unsustainable practices.	<p>The Protocol does not include requirements on how to assess Geospatial Data, in particular, to detect deforestation events.</p> <p>Application of the Protocol requirements may be a small part of larger supply chain risk management systems when combined with other data (e.g., crops baseline maps) and assessments.</p>
6	<p>The Protocol is not in itself a Traceability protocol or mechanism.</p> <p>It does not seek to obtain or maintain Structured Information about the configuration of a Supply Network.</p> <p>The Protocol does allow the identities of Organisations in the Supply Network to be collected, accumulated and transmitted if agreed and/or required. This is optional and to be agreed between the Sender and Receiver.</p>	<p>Geospatial Data may form part of a larger Supply Network risk management system when combined with other data etc. The Protocol will enable visibility/transparency over where the commodities used to produce Goods have been produced (grown or harvested). It does not require the identifying of land ownership or users, nor does it require identifying and locating Organisations having successively owned or processed the Goods concerned. This is possible, but not mandatory.</p> <p>Application of the Protocol requirements may be a small part of larger supply chain visibility and management systems allowing identification of trading partners product-backwards up to commodity producers.</p>
7	The Protocol is not an Internal Traceability protocol or mechanism. It does not seek to provide requirements on how Geospatial Data should be managed during processing or storing events relative to Goods .	The Protocol does not include requirements on how Geospatial Data must be managed to mimic the events relative to physical Goods outside of Transaction events (e.g., manufacturing events where Goods may be aggregated or disaggregated).

Item	Description	Guidance/clarification
8	<p>The Protocol is expected to be useful for Organisations in the context of regulatory frameworks (e.g., the EU Deforestation Regulation - EUDR¹). The Protocol aims to provide sufficient guidance to allow regulatory requirements for obtaining Geospatial Data to be met by relevant Organisations. The EUDR is only one possible application.</p>	<p>In other words, it does not cover the “Goods-in to Goods-out” of an entity / facility, but only the “Goods-out to Goods-in” events that must be associated with Geospatial Data.</p> <p>The Protocol can be used for various applications and purposes.</p> <p>Moreover, submitting data compliant to this Protocol does not mean that compliance to such regulation as the EUDR is fully achieved. It is supporting one component of the processes that must be conducted to reach compliance.</p>
9	<p>The Protocol can be applied to any Transaction between two Organisations – when both Organisations agree to apply it.</p>	<p>It is expected that Organisations will specify and/or agree to use the Protocol to share Geospatial Data as part of normal commercial and contractual arrangements on a case-by-case basis.</p> <p>There is no formal registry of Protocol users, nor validation of who is actually compliant with the Protocol. Determining who uses the Protocol to transmit Geospatial Data about Goods shall be part of a conversation between Senders and Receivers.</p> <p>In the event where an entity is declaring use of the Protocol but submits Geospatial Data that is not compliant with the Protocol, the consequences will be entirely commercial/contractual (e.g. not dealing with a specific supplier anymore - this event will be</p>

Item	Description	Guidance/clarification
		similar to what happens if a buyer receives Goods not matching quality / technical specifications set out in contracts or by other means).

The Protocol

Item	Description	Guidance/clarification
1	Organisations sharing Geospatial Data shall be uniquely identifiable.	<ul style="list-style-type: none"> • Organisations must be registered on a publicly available, official listing which maintains uniqueness within a defined context (globally, nationally etc.) • Organisations must agree how to uniquely identify each other before or as part of their use of the Protocol. As there is no current consensus on a single registry of Organisations, it is up to the trading parties to decide. • It is recommended to include the declaration of the registry being used for the Sender and Receiver data as additional Metadata (see Annex 1), so that this information may travel through the Supply Network if required.
2	Geospatial Data shall be shared on the basis agreed between the Sender and Receiver .	<ul style="list-style-type: none"> • Typically, Geospatial Data is shared when the physical location and/or ownership of Goods changes, but other scenarios are possible. • Geospatial Data may be requested and shared retrospectively after the physical exchange of Goods has happened. This might however not be aligned with certain regulatory frameworks. • Geospatial Data is shared on demand by Receivers, i.e., the Protocol does not request systematic sharing of Geospatial Data by Senders (without being clearly requested).

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3	When sharing Geospatial Data, Organisations shall include an appropriate Identifier , agreed between Sender and Receiver .	<ul style="list-style-type: none"> Typically, this will be the number of an order, invoice, or bill of lading– but any Identifier known to both Sender and Receiver can be used.
4	The Sender shall share the Geospatial Data using the JSON Data structure configuration and minimal Metadata described in Annex 1.	<ul style="list-style-type: none"> The file type shall follow the JSON format described in Annex 1. The Data structure shall be complied with to ensure file compatibility. The Metadata is flexible. Some minimal elements are compulsory (see Annex 1). The use of a Spatial Indexing System (see 4.5) makes the use of JSON sufficient. Geospatial Data is communicated through relevant cell IDs and not geometries. GeoJSON is not needed, but there is nothing preventing Protocol users from also using GeoJSON.
5	Geospatial Data shall always be indexed using a Spatial Indexing System (e.g., S2 geometry or H3 geometry) down to 2 meters.	<ul style="list-style-type: none"> Index technology for Geospatial Data offers advantages in terms of efficiency, scalability, uniformity, and integration with modern data systems, especially when dealing with large-scale and dynamic spatial datasets. It is a good way to fix many issues associated with projection, as it passively enforces data quality issues (e.g., having a geometry that is not a closed polygon). Indexing also minimizes the size of data files as it converts Geospatial Data to numeric values. There is currently no global consensus on the use of a single indexing system. Using either indexing system will function. S2 and H3 are two acceptable spatial indices, each having specific advantages. Note: The use of a Spatial Indexing System does not mean that the Geospatial Data is necessarily

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6	<p>In the event of a dispute between the Sender and Receiver when Geospatial Data has been transformed (from one format or projection to another), the spatial index of the geometry will prevail.</p>	<p>aggregated as relevant products move through Supply Networks. Products may be associated with a list of indexed geospatial cells.</p> <ul style="list-style-type: none"> The spatial relationships and properties of the geometric elements within the data, as determined by the spatial index, will be given priority or considered as the authoritative source.

Annex 1 – Data Structure

Envelope

- ID: int
- sender: int
- receiver: int
- CRS: int
- spatial_Index: List[int]
- sources: List[Envelope]
- metadata: Dict[str, Any(hashable)]

Description

Envelope: The **Geospatial Data** and **Metadata** associated with a product. Envelopes can be nested. For example, a group of envelopes can be included in a single envelope for a product. This allows all the points or polygons for harvest location to be passed for each trade.

ID: The unique **Identifier** of the **Transaction**.

Sender: The unique ID of the **Sender** (the real name is thus only accessible upon request).

Receiver: The unique ID of the **Receiver** (the real name is thus only accessible upon request).

Coordinate Reference System (CRS): **Protocol users** shall provide source data coordinate reference system (CRS), using a known **Identifier** of said CRS (e.g. EPSG **Identifier**).

Spatial index: The indexed list of the cell IDs for each point or polygon in the S2 or H3 geometry:

- Point or polygon – equivalent to coordinates to six digits (e.g., EUDR requirements)
- Resolution to two meters
- Indexing system: e.g. H3 (Uber) VS S2 (Google).

Sources: This is the list of the envelopes describing the goods included in the

Transaction: The number of nested elements found in an envelope will largely depend on the supply chain (the number of nodes in the supply chain down to the point of harvest).

Metadata: Dictionary of the **Metadata** related to the **Transaction** (species, harvest start, harvest end, and any other information).

NOTE: *It is likely that specific APIs are needed to handle envelopes, for instance, to ensure the conversion to spatially indexed cells, or to support recursive read of enveloped to extract each node participation, etc.*