WORKING METHODOLOGY FOR INTEGRATING SPATIAL DATA AND FINANCIAL FLOWS DATA

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Integrating Nusantara Atlas spatial data with the Forests & Finance financial flows dataset requires treating spatial units (oil palm and pulpwood concessions, mills) as assets, each connected through an ownership chain to the borrowers and issuers that appear in the financial data. This document sets out the three-tier ownership structure (A), how relationships between tiers are classified (B), how financing is attributed down the chain to individual assets (C), and the principles and confidence logic that govern the joined dataset (D).

A. THREE-TIER ASSET OWNERSHIP

Every concession polygon or mill GPS point in Nusantara Atlas sits beneath three ownership tiers.

1. **ENTITY**

The direct concession holder or facility owner, typically an Indonesian limited-liability company (PT). This is the level at which NusantaraAtlas maps the polygon or point. Entities are usually subsidiaries with little or no independent financial visibility of their own. The Forests & Finance dataset does record some financing at Entity level, but coverage is sparse.

2. **SUB-GROUP**

An operating group that consolidates multiple Entities under common ownership, management or reporting. A Sub-Group is often a publicly listed company, and may itself be owned by a Parent Group.

3. **PARENT GROUP**

The ultimate common owner across one or more Sub-Groups, often a family holding structure in the case of Indonesia (for example, the Widjaja family / Sinar Mas Group, of which Golden Agri Resources and Asia Pulp & Paper are both Sub-Groups). Where the Sub-Group is transparent, the Parent Group is a secondary, aggregating level of analysis. Where the Sub-Group is opaque, the Parent Group becomes the primary point at which financing is traceable, because

financiers and financial databases attach to the known flagship or family entity rather than to the shadow holding company beneath it.

B. RELATIONSHIPS BETWEEN TIERS

The link between an Entity and a Sub-Group, and between a Sub-Group and a Parent Group, can take several forms. It may be a formal ownership structure: Asia Pulp & Paper, for example, is an acknowledged part of Sinar Mas Group. It may also be opaque, with some parent groups controlling companies through nominees, offshore shells or undisclosed affiliates.

Each link is classified with one or more of the following tags, and every tag is backed by a reference:

- **Formal ownership:** the relationship is publicly disclosed or formally documented, for example by the company or its parent, on a producer's official supplier list, through a stock-exchange listing, as a state-owned enterprise, or via a documented registry or corporate-group link.
- **Unacknowledged/Shadow:** ownership or control is hidden, denied, or routed through nominees or offshore shells and is revealed only by investigation. A Shadow tag always requires a cited source.
- **Long-Term Supply Partner:** a formal long-term supply relationship to a producer (for example, an APP long-term pulpwood supplier or an APRIL Supply Partner). Usually combined with Acknowledged/Formalized.
- **Not Applicable:** the Entity is standalone, with no Sub-Group or Parent Group above it.

Relationships may take more than one form, and tags can be combined. For instance, the relationship between PT Mayawana Persada and Royal Golden Eagle Group is both a shadow-ownership link and a supply link.

Supply is not ownership. A concession that supplies a group's mill is not thereby owned by that group. Supplier labels on their own (such as "Supplier", "Affiliated" or "open market supplier") do not establish an ownership link. Only formally documented Long-Term Supply Partners are rolled up to the producer's Sub-Group, with the relationship type recorded in the notes. Mill-to-concession supply flows are recorded separately from ownership.

C. FINANCIAL ATTRIBUTION

The underlying financial flows dataset is published by the Forests & Finance coalition. A full methodology for how that dataset is produced is available here. Forests & Finance records credit and investment at company or group level and applies sector adjusters to estimate the share of a company's financing attributable to the relevant forest-risk commodity.

The aim is to give users the closest available financing data for each asset. Sub-Group and Parent Group credit and investment data are therefore adjusted to reflect the commodity sector of the particular entity. For instance, if a user is interrogating finance to a pulpwood concession of Asia Pulp & Paper, the financing data retrieved for the parent group – Sinar Mas Group – will only include pulp & paper financing and will exclude palm oil and other sector financing.