Ecosystem accounting operationalization: challenges, opportunities and recommendations

1st December 2022 – EO4EA22

Alessio Bulckaen (ARIES NCA officer – BC3)

Making Science Matter in Policy-Making Where Nature Counts.

ARIES for SEEA

- ARIES for SEEA - modeling environment & data hosting platform to support countries' compilation of ecosystem accounts
  - > Can generate national tables & maps using global data for national review/ vetting
  - > Where local knowledge (data, models and model parameterizations) are available:
    - Data and models made interoperable & reusable to substantially ease future application, production of maps & tables
    - Development of data collection template
    - Handbook/guide to obtain accounts-ready data to assist countries with less experience and/or limited capacity

https://seea.un.org/content/aries-for-seea

ARIES for SEEA Explorer[1], an application running on the ARIES platform

- Enables SEEA EA compilation anywhere on earth (country, other adm. units, watershed, protected areas)
- AI → **machine reasoning** to construct best-available model for region of interest
- Most common global data sets, many of them based on EO (e.g., land-cover; elevation; precipitation) already integrated
- **Transparent** (metadata + download + analysis replicability + free access)
- Improvement with national/local data & models that others can then reuse

1: https://seea.un.org/content/aries-for-seea

Global vs. local datasets

Global data (e.g., ESA-CCI land cover) harmonise information for all countries on Earth, are **consistent over time**, enabling **direct comparison across years** & **countries**.

So far we have established official collaborations with: **Botswana, Ghana, Kenya, Philippines, Rwanda, Senegal, South Africa and Uganda**

Local data are typically **more accurate, trusted, well-suited** for local/national use.

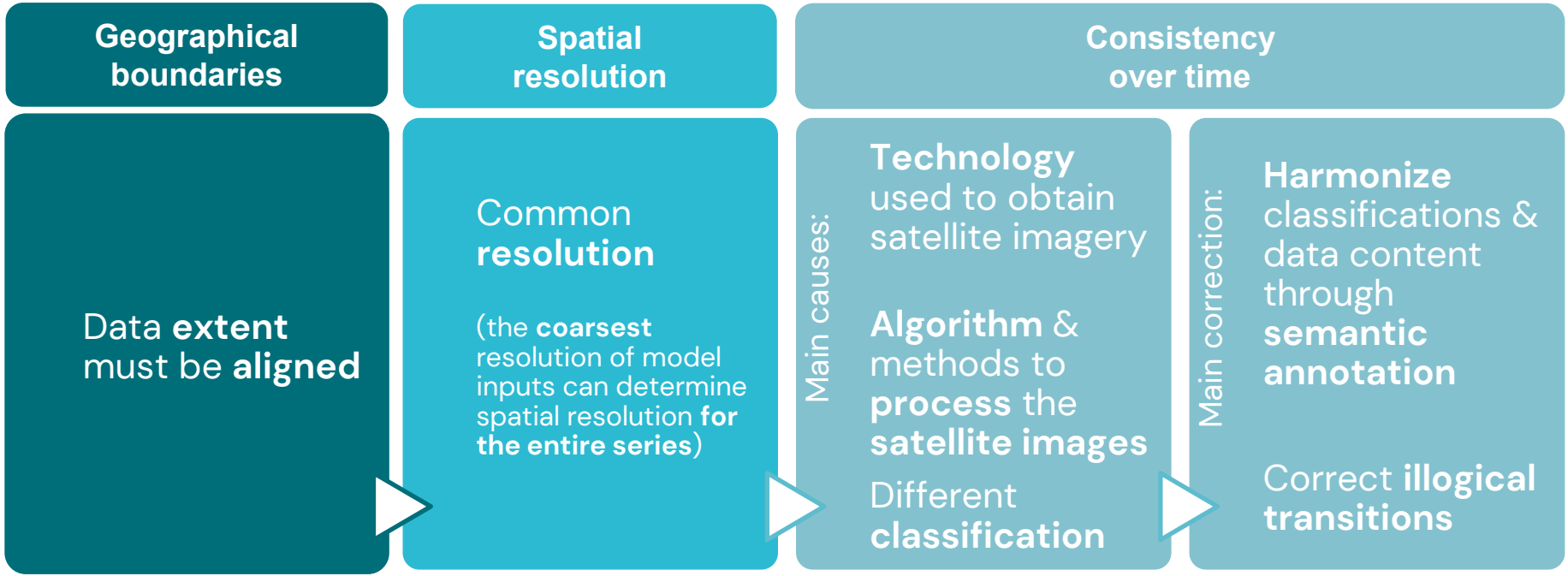
Often, data, e.g., for land cover, are one-off (for single years); combining & harmonizing multiple versions to obtain a time series can be **cumbersome to impossible**

Possible solution:

1. ARIES allows integration of national data through **semantic annotation**, provided in ARIES, allowing compilation of ecosystem accounts based on local data, & allowing (to a certain extent) comparability of results

2. ARIES can help verify whether data are suitable for accounting by **identifying and correcting inconsistencies** (e.g., different projections or country boundaries, illogical transitions, no-data values)

Data harmonization and time series



Making models interoperable

- ARIES for SEEA is **not** just for developing nations
- By making better science interoperable and reusable, developed nations that share data/models could improve global uptake of SEEA EA more than traditional capacity building,
    - Model developers specify conditions under which a particular model or parameterization of a model is appropriate for reuse

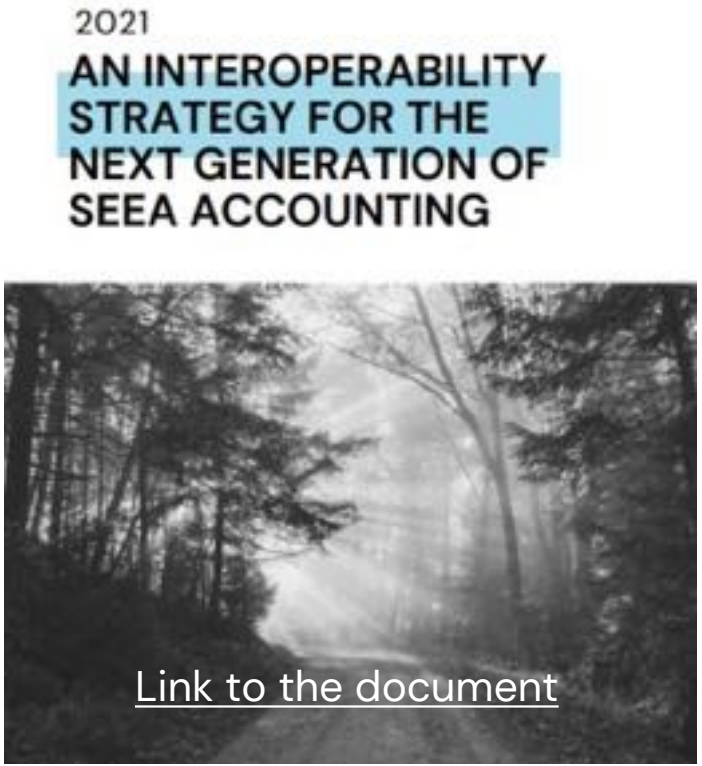
- Example 1: A scientist has developed a global model for nutrient regulation (a service not currently available in ARIES for SEEA).
    - By making it interoperable, this ES can now be added to SEEA EA accounts in nations **around the world**

- Example 2: A NSO has developed and vetted a new carbon storage model that works well within a large, multi-nation bioclimatic region.
    - By making it interoperable & specifying reuse conditions (i.e., within the bioclimatic region), the country's expertise benefits its neighbors, who can now use a more advanced model than a global version

- Given the power of this paradigm, can Global North development agencies support this more?

Future opportunities

- **Strongly support EO4AE** & similar initiatives, which are essential **to mainstream adoption of environmental accounting**
- Working towards future data becoming **accounts-ready**
- Move towards (semantic) interoperability of data & models. For instance:
  - > Custodians of data sets (global & national) to share data through APIs / nodes
  - > Interconnect data through semantics / classifications
  - > For land use & cover, align with FAO-LCCS / UML, for Ecosystem Type align with IUCN GET through experts' input - authorities & classifications custodians play an important role



How can NSOs use ARIES for SEEA?

- **Step 1**. Determine which methods a NSO wants to use for calculating SEEA accounts. If the NSO decides to use ARIES for SEEA, proceed to step 2.
- **Step 2**. In collaboration with relevant government ministries, **catalog national & subnational data, methods, models needed** for all SEEA EA accounts. Determine which data can be made public & which must be restricted to internal use by the NSO.
- **Step 3**. Work to make needed **data & models interoperable with ARIES for SEEA**, as described in the interoperability strategy. Data & models in *public projects* can be *shared with the global community*; data in *private projects* are *accessible only to NSO-determined internal users*.
- **Step 4**. **Test & validate** the models using ARIES for SEEA. When they meet NSO-defined quality standards, proceed to step 5.
- **Note**: at no point above is there a step for "run ARIES for SEEA in your country using default global data/models," nor to "directly compare outputs derived from global data & models to results from step 4." These steps could optionally happen, but publicizing results using global data/models too early may risk undermining confidence in the process.
- **Step 5**. Produce accounts using ARIES for SEEA, revisit underlying data & methods as new data/models become available.