The GEOGLAM in-situ coordination activities using a data lifecycle approach

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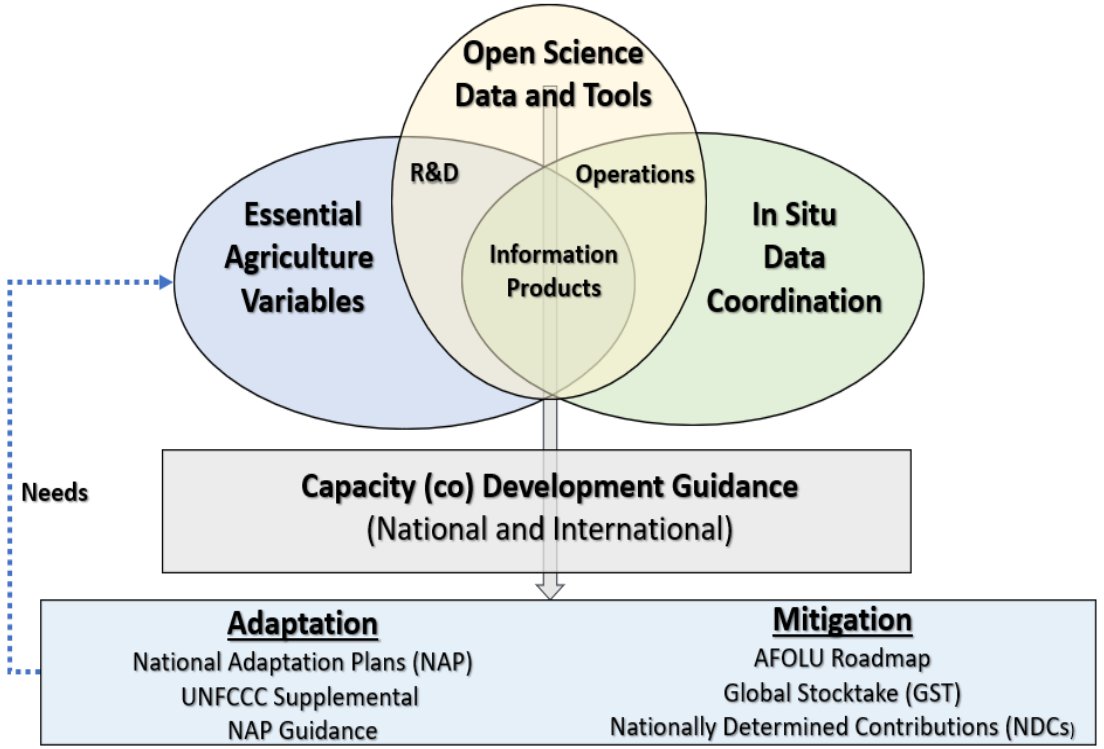
What is GEOGLAM ?

- GEO Flagship activity – G20 original mandate, now evolving to broader food security mandate.
- Open, cooperative initiative bound together by common interest and good intent.
- Driven primarily by in-kind work contributions towards a common vision for food security.
- Provider of independent, timely science-based information.



Why in situ data ?

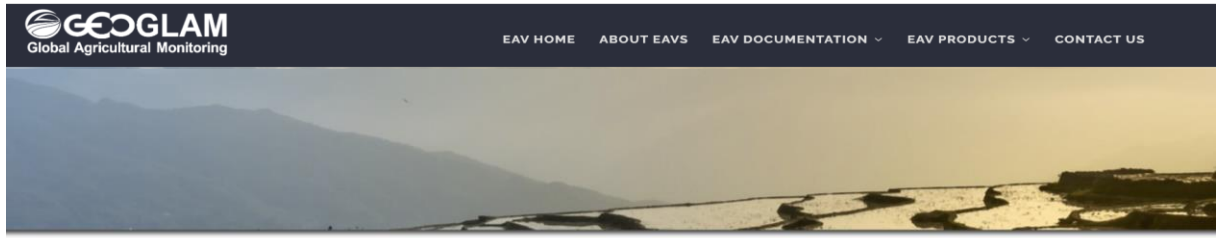
- A decade ago, the major constraint to operational monitoring was access to free and open EO (satellite) data.
- Then the major hurdle became the cost and availability associated with big data analytics.
- The next constraint was access to mature, reproducible analytical tools.
- Perhaps the last frontier to bridge:

“Open access to high quality, well managed in situ data for training and validation.”

GEOGLAM Essential Agriculture Variables (EAVs)

- Website, tables and requirements:

https://agvariables.org



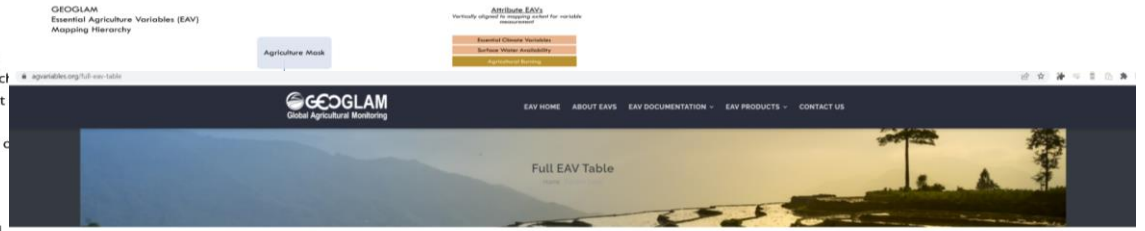
Essential Agriculture Variables & Agricultural Indictors for GEOGLAM

Essential Agricultural Variables for GEOGLAM are Earth observation-based "building blocks" that in combination with one another or with other non-EO information provide insight into the "GEOGLAM Agricultural Indicators" – which themselves provide actionable information on the state, change, and forecast of agricultural land use and productivity (Figure 1). GEOGLAM covers land devoted to agriculture, which is defined as the systematic and controlled use of land and livestock to produce food, fiber, and fuel. This includes croplands, rangelands, and short-term fallow lands.

The EAVs can be measured or inferred from satellite data, and are supported through field data for calibration and validation. They support the core work of GEOGLAM and its constituent communities, including supporting national and global policy frameworks (e.g. G20 Action Plan and UN Sustainable Development Goals).

Full EAV Table

EO Data R



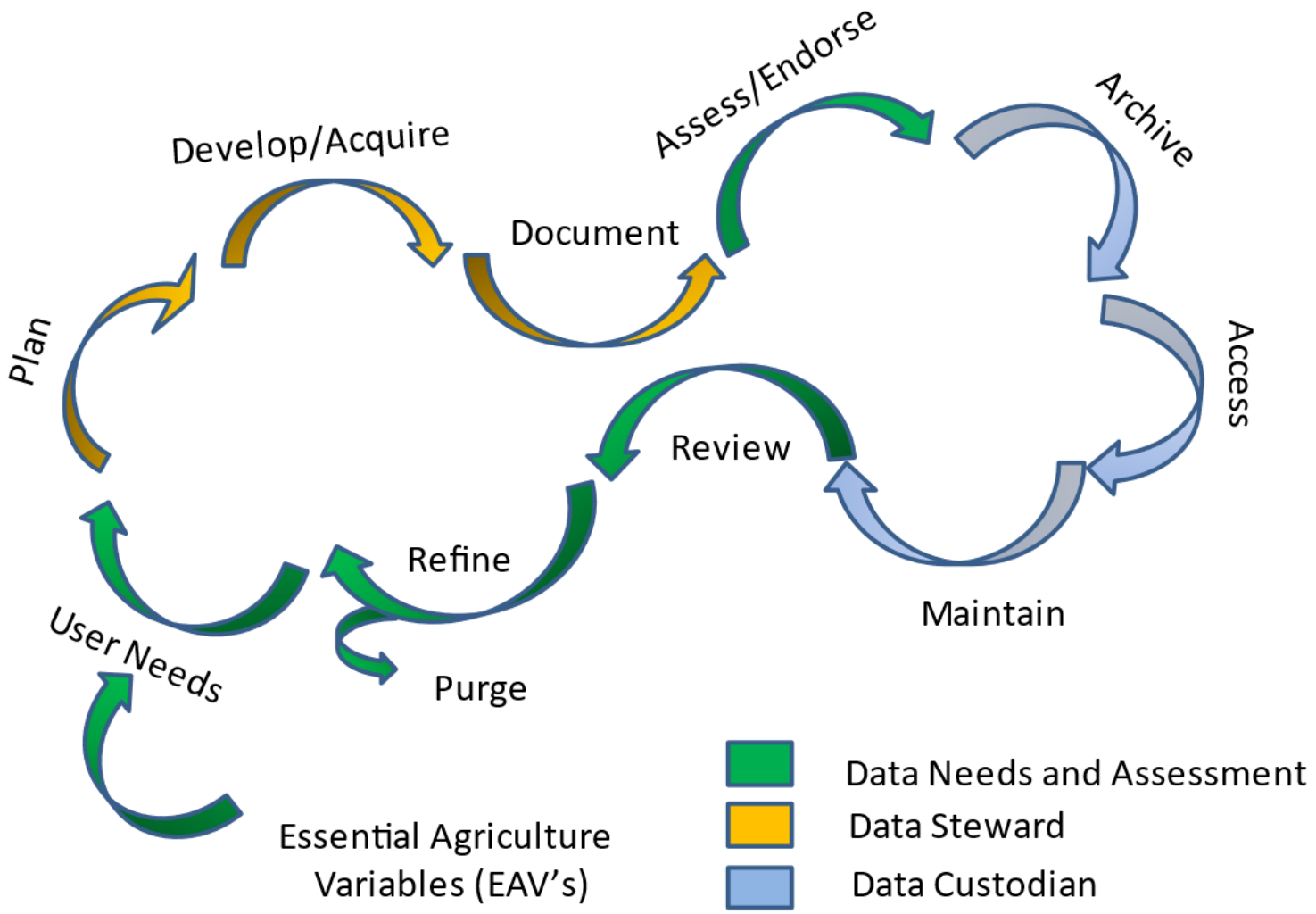
Full EAV Table

This is the table for Land Use and Productivity EAVs. For information on Agronomic Management EAVs, please see this **page**.

A note on Uncertainty, Error, and Validation: With few exceptions (e.g. Yield Estimation, a few borrowed ECVs), we are not prescribing maximum allowable uncertainty or error. We are, however, requiring that all EAVs when generated as products undertake error or uncertainty estimation, and document and publish that analysis along with the products themselves. As Earth observation data for agriculture becomes more commonly implemented, error tolerance will become clearer, and at that point, the EAV Working Group may choose to update uncertainty requirements.

	Definition	Agricultural Land Includes or is Indicated by	GEOGLAM Agriculture Indicator Category	Application or Policy Supported	Frequency of Update	Spatial Unit	EAV Stewards
Seasonal Dynamics of Surface Water Availability	Areas covered by inland water providing a maximum and minimum extent of water surface as well as the seasonal dynamics Binary map / water / non water Frequency (See CGLS waterbodies)	All land (product is available over all land)	Productivity	Livestock, flood detection, SDG 6, The area of water bodies is identified as an Essential Climate Variable (ECV) by the Global Climate Observing System (GCOS)	Daily (ideal); 10 days (feasible)	30m	Sven Gilliams
Reference Evapotranspiration	ETo from the reference surface. The reference surface is a hypothetical grass reference crop with an assumed crop height of 0.12 m, a fixed surface resistance of 70 s m-1 and an albedo of 0.23. (FAO).	Agriculture Mask	Land Use, Productivity	SDG 6.4, drought, climate adaptation, water & irrigation management	Daily - monthly, within each season	Field - Watershed	Benjamin Koetz, Bimal Bhattacharya, Jippe Hoogeveen
Reference Crop Calendars	Identification of the typical or usual planting and harvesting dates or windows per crop per region.	For Global Analyses, the target is the same crops covered by the GEOGLAM Crop Monitor for AMIS and Crop Monitor for Early Warning. For National Analyses, the target is each nationally relevant crop type, accounting for ~80% of total area under production.	Land Use, Productivity	Production Outlooks; Crop status anomaly detection, both spatial and temporal; Crop growth simulation modelling; Identifying agriculture practices; UNFCCC; GHG emission monitoring; Disaster risk assessment	Every 5 years unless major events have driven a change in practices or crop utilization in an area.	As stand-alone output, subnational admin unit. Rasterized for inputs to analysis (for colocation with other data).	Alyssa Whitcraft, Andrew Nelson, Sven Gilliams

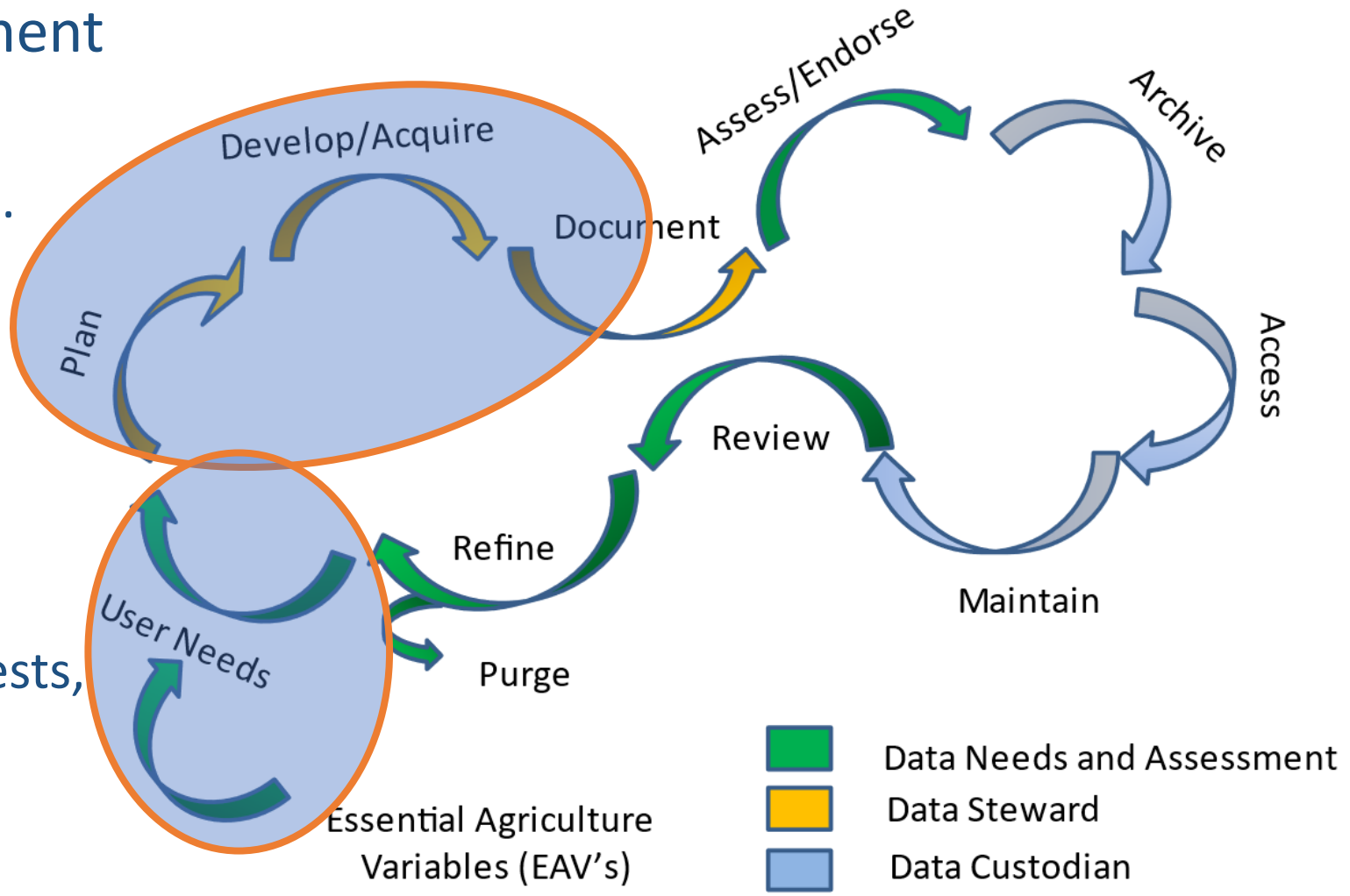
A data lifecycle approach



In Situ Coordination Workshop (Nov. 2022)

1- Users & Data Development

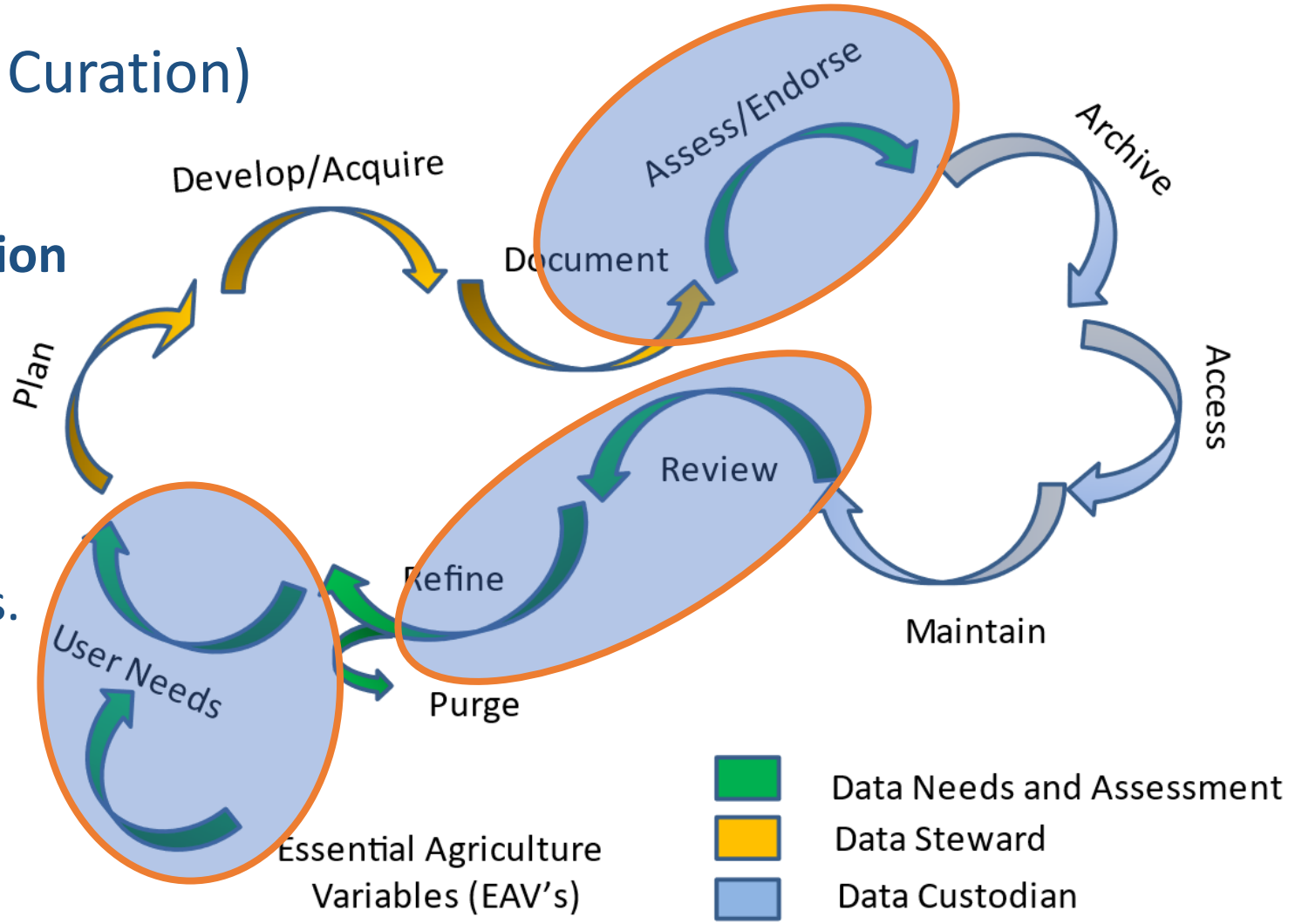
- Prioritize **less sensitive** EAVs.
- Need for EAVs **stewards**.
- Document **requirements** from users for in situ data.
- **Registry** of field activities to coordinate data collection.
- Integrate in a **terrestrial monitoring framework** (forests, wetlands etc…)



In Situ Coordination Workshop (Nov. 2022)

2- Data Usability (Quality & Curation)

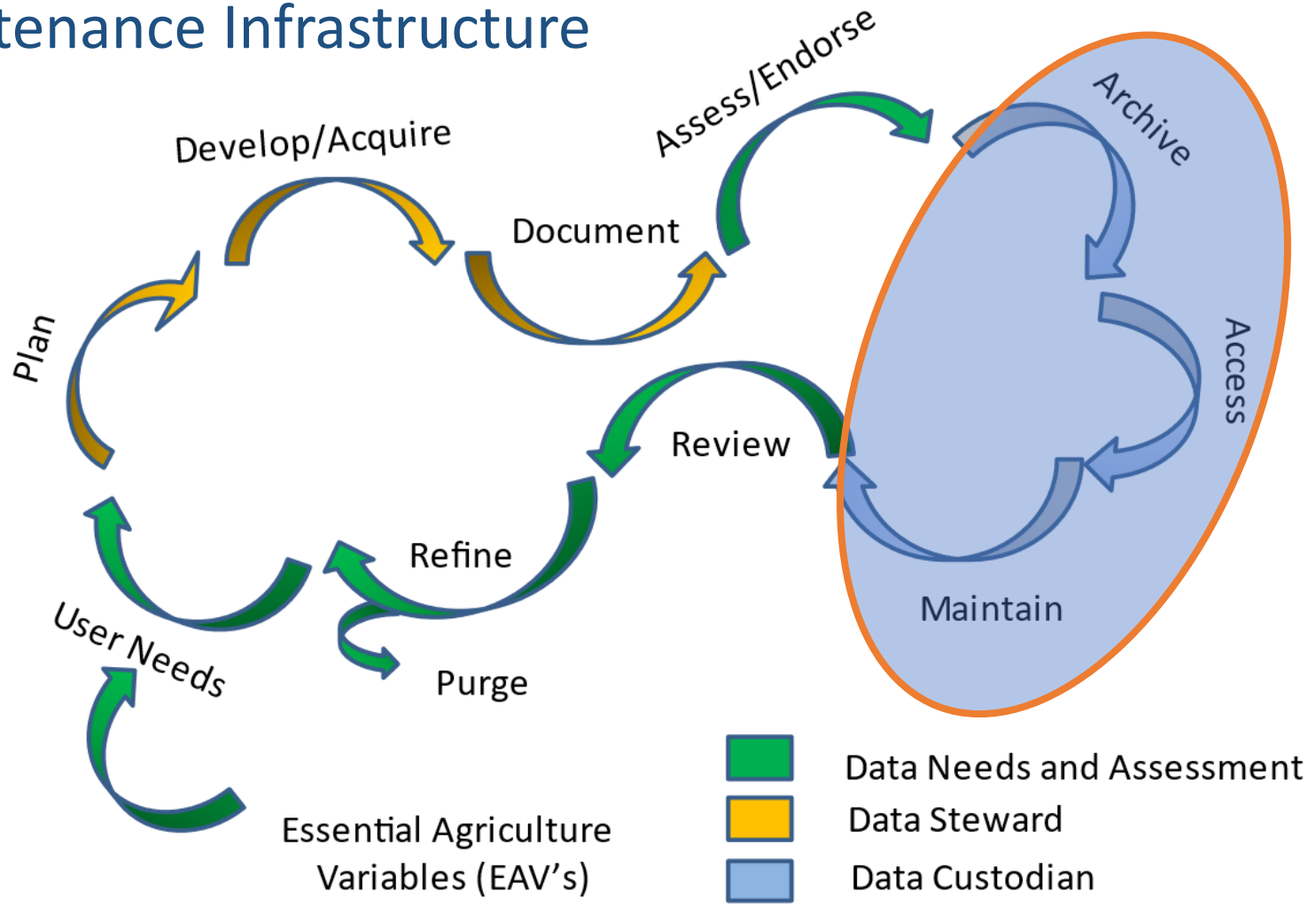
- Protocols for data **harmonization** (e.g. WorldCereal).
- **Code books** for collection, processing and analysis practices sharing.
- Common **language**/definitions.
- **Resources** for data curation.



In Situ Coordination Workshop (Nov. 2022)

3- Data Structure and Maintenance Infrastructure

- **Flexible**, open-source solution to store in situ data
- Global to National authority to **manage the data.**
- Transparent, trusted and **neutral** approach
- Clarify the GEOGLAM **added value** and why coordinated approach is needed.
- **Incentives** for data sharing.



GEOGLAM future steps around in situ

- **Prioritize EAVs** : crop map, crop condition, field boundary, crop yield/phenology.
- Advance **coordination** of data collection, processing and analysis practices.
- Test **practical feasibility** of open-source demo infrastructure:
  - CKAN for data storage.
  - STAC for metadata and cataloguing, validation of remote sensing imagery.
  - Leverage existing projects for data harmonization.
- Seek for strategic **partnerships and funding**.

GEOGLAM is always welcoming contributions to support the future work around in situ data.

Thank You !

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