

A Socio-Economic and Environmental Knowledge Needs Knowledge Base (SEE-IN KB) in Support of SDG Implementation and Monitoring

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AGENDA 2030 AND SUSTAINABLE DEVELOPMENT GOALS

The United Nations agreed in 2015 on the Agenda 2030 with seventeen Sustainable Development Goals (SDGs) to be reach by 2030. The SDGs are detailed in 170 Targets and a monitoring framework of currently 240 SDG Indicators provides the metrics to measure progress towards these targets. The SDG Indicators are report cards for the progress towards the targets and a measure to assess potential impacts of policies and other means in support of SDG implementation. Implementing and monitoring the SDGs requires science and Earth observation support (Fig. 1).

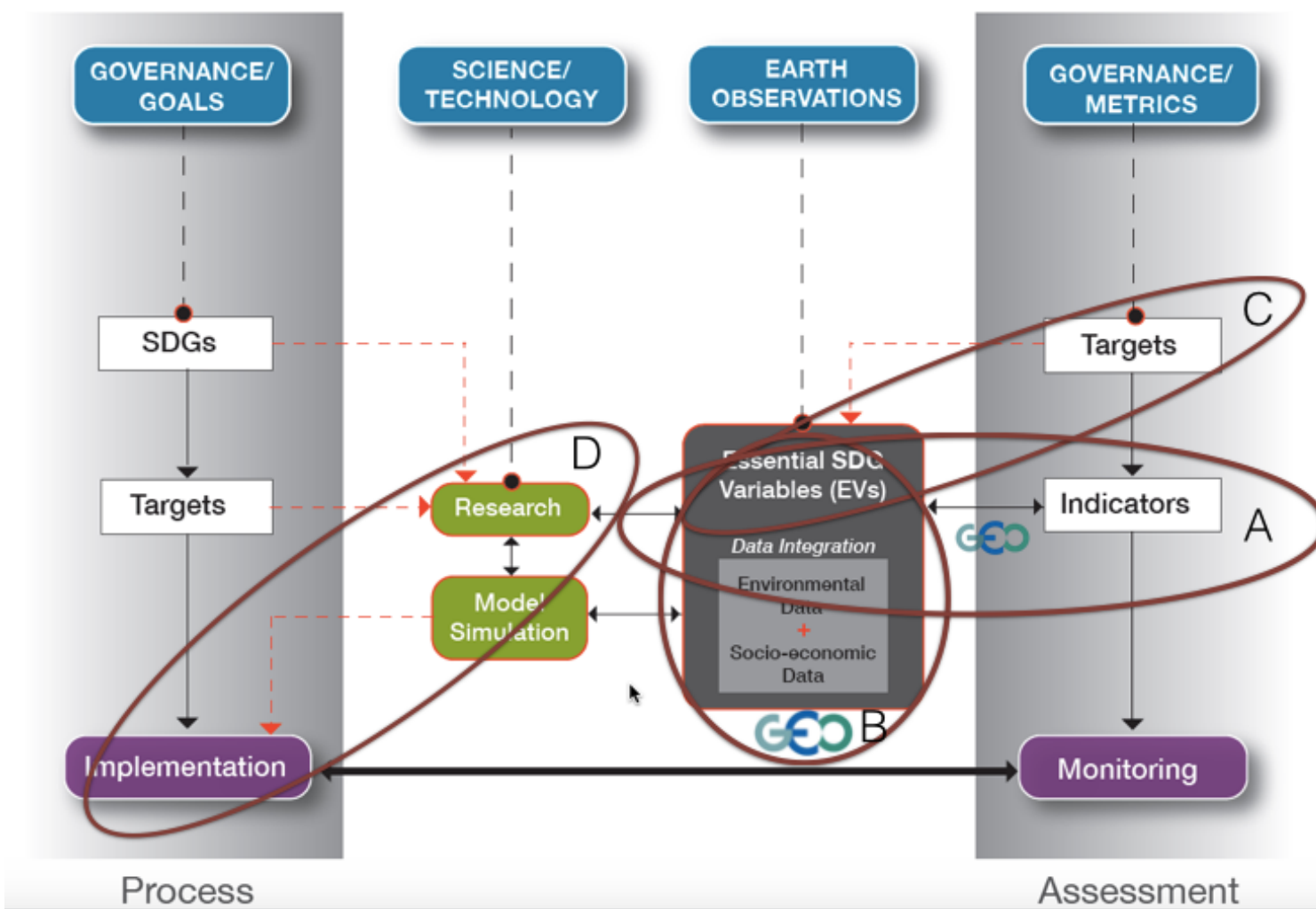


Figure 1: Earth observation in support of monitoring SDG progress and Tools in support of Policy development. A. GEO in its GEO Initiative 18 (GI-18) of the 2016 Work Programme and ConnectinGEO are developing methods for the quantification of those indicators that depend on Earth observations for quantification. B. For many of the indicators, the integration of socio-economic statistical data with environmental data is of importance. C. Applying the goal-based approach to the SDG Targets shows that many of the Targets would benefit from indicators that are directly related to the natural environment. D. There is an urgent need to support the planning of actions and the development of policies that would facilitate progress towards the SDG Targets. From Jules-Plag and Plag (2016)

THE SEE-IN KB

The SEE-IN KB is developed as part of the GEOSS Knowledge Base. The unstructured object-based data model supports capturing a wide range of elements and their interconnectivity (Fig. 3). Queries can utilize the captured interconnectivity to discover linkages between societal goals, applications, products, services and experts. The value chains also allow for the construction of business processes to answer "What if?" questions and supports knowledge creation. This process supports the development of policies and the planning of activities to make progress towards the SDGs.

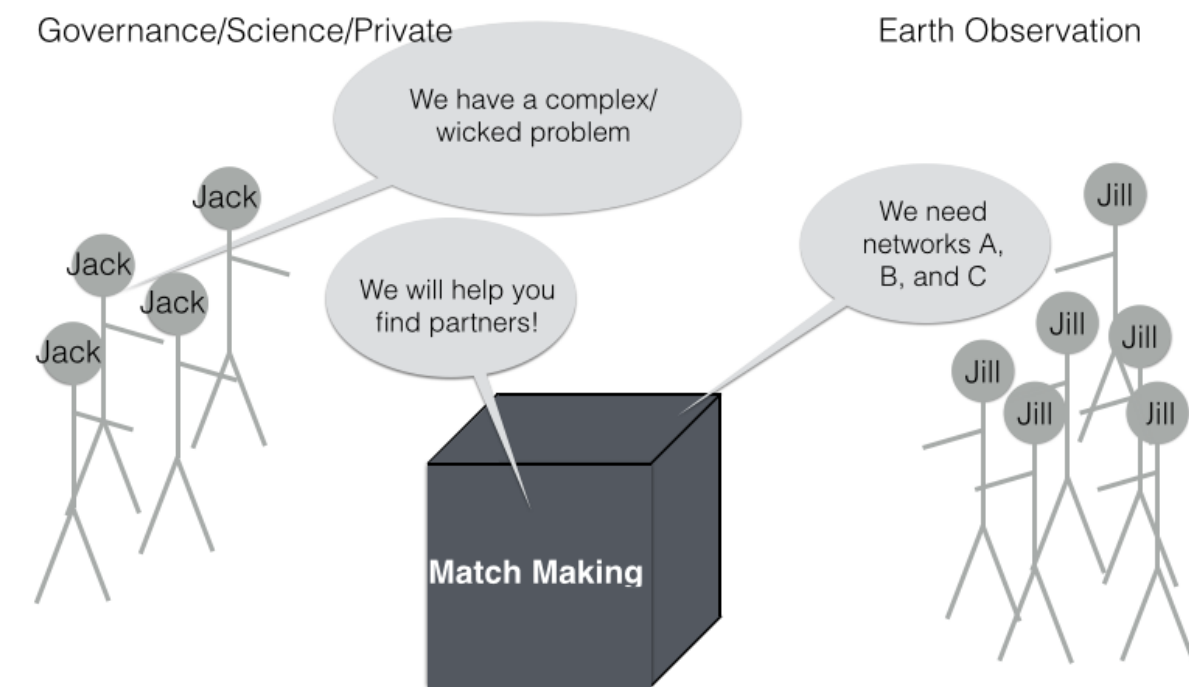


Figure 2: Dialog between Earth observation providers and users. Assessments of user requirements often result into a dialog of "Jills" with other "Jills" while the societal users (Jacks) are not involved. In the goal-based approach starting with a societal goal or issue, there is a need for match making.

LINKING SOCIETAL GOAL TO KNOWLEDGE AND DATA NEEDS

The dialog between users and beneficiaries of Earth observations and derived products, information and knowledge and those engaged in designing, deploying, and maintaining observation systems and processing the data has been complicated by a large communication gap between these groups. Using the style of R.D. Laing in "Knots", who presents a series of dialogue-scenarios mainly between Jack and Jill describing the "knots" and impasses in various kinds of human relationships, Fig. 2 illustrates this dialog. In most cases, user requirements registries are developed in Earth observation communities and associated scientific communities with little communication with other societal stakeholders who potentially could benefit from the observations and derived knowledge. Even more so, the dialog between societal stakeholders, who are challenged with an issue, and those Earth observation and scientific communities who could provide valuable observations and knowledge supporting the development of solutions, is limited. User requirements registries often are the results of Jills talking to Jills assuming that they know what the Jacks out in society need. A serious gap is the absence of matchmaking institutions and experts that could effectively engage users and providers in a dialog.

SEE-IN KB Data and Gap Model

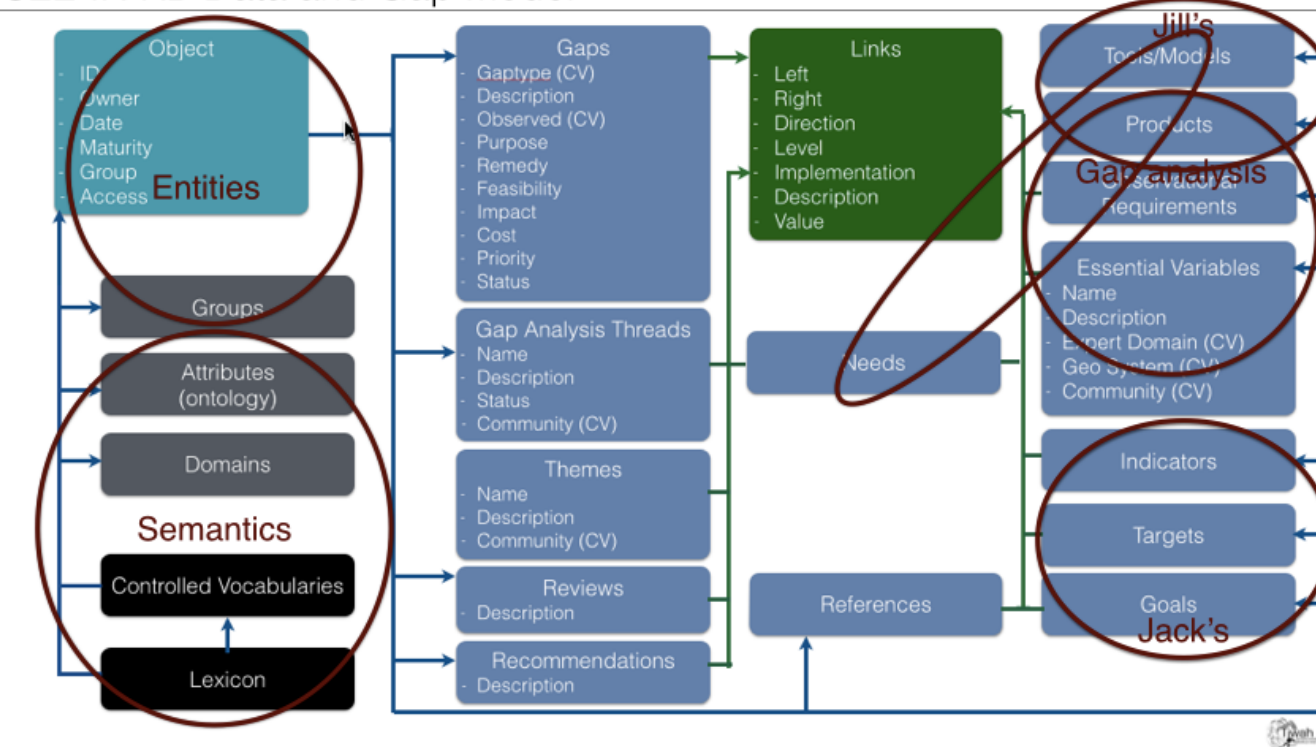


Figure 3. The SEE IN KB collects information on objects such as user types, applications, observational requirements, a number of needs, societal goals and targets, indicators and indices, models, services, and data-sets, as well as comprehensive information concerning the interconnections between instances of these objects. With the connectivity, it documents the societal benefits of "value chains" from initial observations to end users.

REFERENCES

Laing, R. D., 1970. Knots. Random House, New York
Jules-Plag, S., Plag, H.-P., 2016. Supporting the Implementation of SDGs. Geospatial World, On-line publication on August 15, 2016. <http://www.geospatialworld.net/article/supporting-implementation-sdgs/>.

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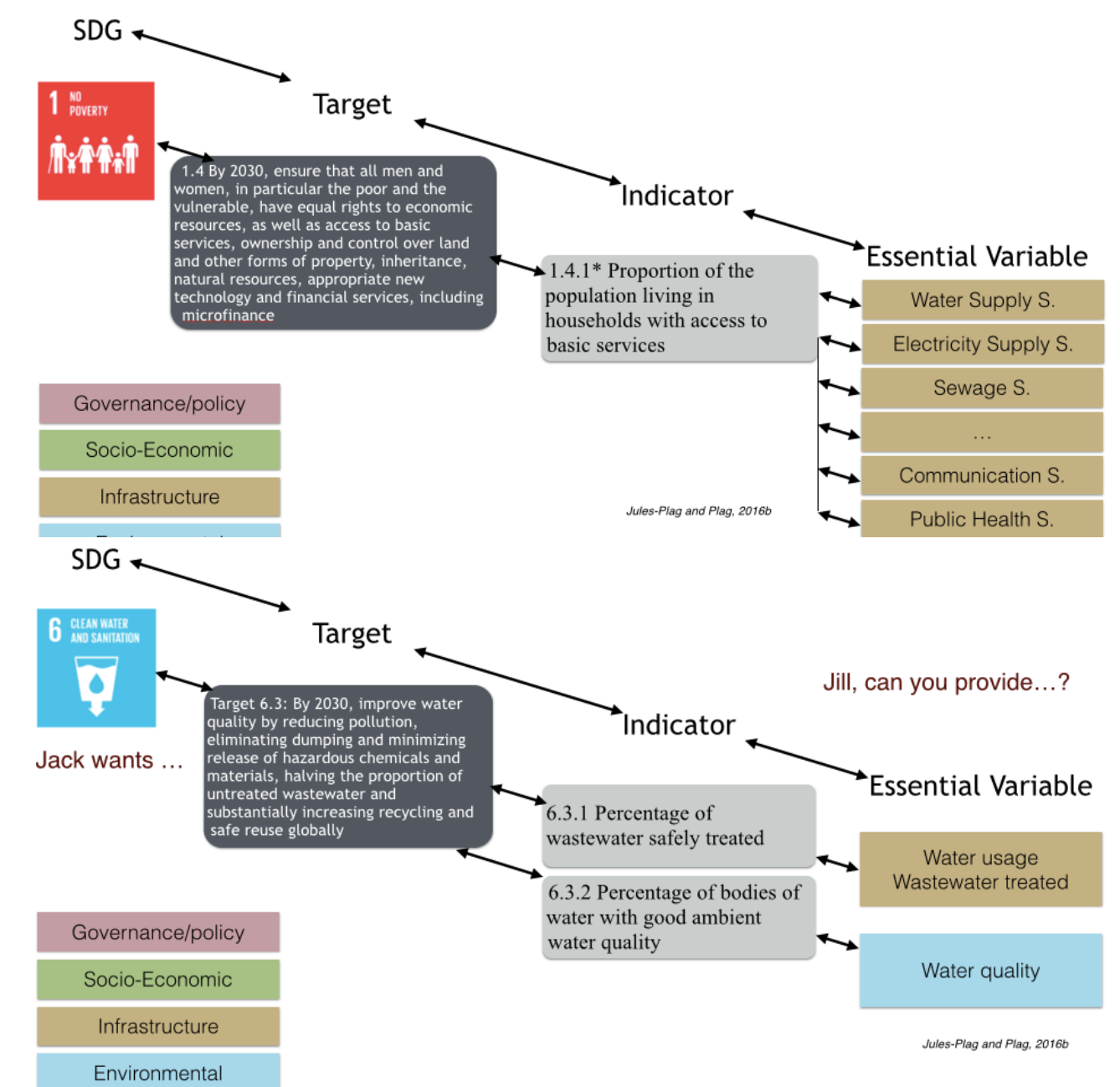


Figure 4. Applying the goal-based approach to selected SDGs.

A GOAL-BASED APPROACH TO ESSENTIAL VARIABLES

A core function of the SEE-IN KB is to facilitate the linkage of societal goals, targets, and indicators to EVs that need to be monitored in order to measure progress towards the targets. A goal-based approach is used to identify the EVs. Applying this approach to the SDG Indicators revealed that a minor fraction of the SDG Indicators requires traditional Earth Observations of the natural environment for quantification, while many of the EVs of the SDG monitoring framework are related to the built environment (Fig. 3). For many of the SDG Indicators, the integration of socio-economic statistical data with environmental data, including in situ observations, is of importance (Fig. 1). The goal-based approach was also applied to the SDG Targets, and this analysis showed that many of the Targets would benefit from additional indicators that are directly related to the environment. Many of the more environmentally focused indicators would require in situ data for quantification. A revision of the monitoring framework could take these findings into account and account for the linkage of the socio-economic and environmental aspect reflected in the SDGs.