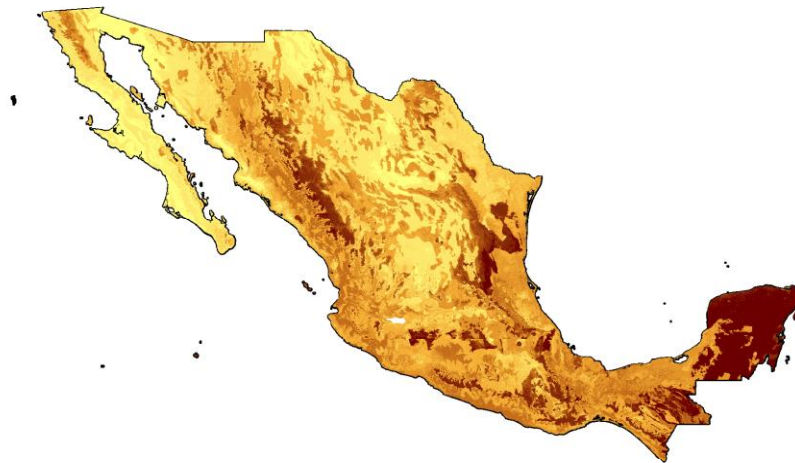




System of  
Environmental  
Economic  
Accounting

## Technical Workshop: S-Model Mexico - Towards Tier 1 and Tier 2 National Soil Accounts



**10-12 June 2019**  
**Aguascalientes, Ags., México**

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# Workshop Concept note and draft agenda

## Background

With an increasing call for agricultural development, climate change mitigation, there is a need to provide better insight in our natural resources and ecosystems. This is particularly important as the natural environment is under pressures through climate change as reported by IPCC and land degradation as reported by the UNCCD.

To provide better insight in the global soil resources the Netherlands Environmental Assessment Agency initiated an initiative that resulted in the S-World database. S-World includes global maps at a 30 arc-second resolution for a wide range of soil properties (including e.g., soil organic carbon, soil texture, soil depth) for both current and natural conditions. Details on the S-World database and the methodology have been published in a range of articles (Stoorvogel et al., 2017<sup>a,b</sup>, 2019, submitted). The global S-World database is a good Tier 1 estimate with the main benefit that its estimates are consistent for the entire globe. However, for different countries national databases are available that allow for a detailed evaluation of the Tier 1 estimates and that allow for an improvement of the estimates in a Tier 2 estimate. Mexico is an excellent example of a country where data for such an evaluation and potential Tier 2 estimates are available.

The outputs of the Tier 2 S-World model are a set of maps, that contain information on a range of soil types and associated soil variables, that are relevant for ecosystem accounting in general and allow deriving (and testing) a set of soil accounts in particular. Examples are variables such as soil thickness and soil organic carbon that can be used to inform ecosystem condition accounts, and variables that can inform specific ecosystem services such as water retention and soil fertility. The outputs may also be compared with existing work by INEGI on soil erosion and soil degradation. Therefore, the workshop provides a good opportunity to actually compile a set of experimental soil accounts for Mexico.

## Workshop objectives

The workshop has multiple objectives:

- 1) Validation of the Tier 1 results of S-World by comparing outcomes with the extensive soil profile database available at INEGI.
- 2) Compiling Tier 2 estimates using national data sources.
- 3) Establish soil accounts for Mexico.
- 4) Build capacity within INEGI by training staff in running the S-world model empowering them to do their own future analyses.

## Workshop participants

Dr Jetse J. Stoorvogel, Wageningen University  
INEGI staff t.b.d.

## Proposed Workshop program

### Day 1:

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9:00 – 9:30 Welcome, reception, get to know

9:30 – 10:30 Introduction in the S-World methodology

10:30 – 10:45 Break

10:45 – 12:15 Validation of the Tier 1 estimates

- Preparation of soil property database from INEGI soil profile database
- Overlay S-World soil property database
- Interpretation
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12:30 – 13:30 Lunch

13:30 – 15:30 Disaggregate soil associations

- Prepare and export soil map
- Prepare digital elevation map
- Evaluate soil topo-sequences used in S-world (i.e., relationships between soil types and topography)
- Run S-world disaggregation of soil associations

15:30 – 15:45 Break

15:45 – 17:00 Preparation S-world run

- Derive ranges in soil properties per soil type from Inegi soil profile database
- Set up GIS database (land cover, vegetative cover, climate)

### Day 2

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9:00 – 12:15 Run S-world resulting in Tier 2 estimate

12:30 – 13:30 Lunch

13:30 – 14:30 Evaluate the Tier 2 estimate

14:30 – 15:15 Overlay Tier 1 and Tier 2 estimate.

15:15 – 15:30 Break

15:30 – 17:00 Establishing the Tier 1 and Tier 2 databases

### Day 3

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9:00 – 10:00 The definition of soil accounts

- soil properties to include
- environmental services to include (e.g., soil fertility, water holding capacity, carbon storage)
- spatial units for aggregation (administrative units, terrestrial ecosystems)

10:00 – 11:30 Setting up the soil accounts.

11:30 – 12:15 Discussion and follow up

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## Hardware and software

So far, we have been running the S-world methodology on Windows 7 and 10 machines. We will not need excessive memory or speed to run the methodology.

We will use MS Excel, ArcMap (or ArcGIS Pro), and the S-world software.

- If people do not have ArcMap on their machine, we can run it on one machine and distribute the data. Note that we mostly use it for data preprocessing and viewing. This can be done on a single computer whereafter we can distribute the results. Other GIS software is possible, but we need to evaluate whether it can read and write the specific formats that we are using.
- The S-world software is a single executable that will does not require any installation. We can simply copy it to the machines.

## Databases

All data required for the workshop are publically available at the Inegi website. Below a comparison of the data used for S-World and the more data available for Mexico:

	<i>S-world</i>	<i>Inegi</i>
<i>Soil map</i>	Harmonized world soil database	Mapa de suelos Mexico
<i>Soil profile data</i>	ISRIC-WISE 3.1	Conjunto de datos de Perfiles de suelos. Escala 1:250 000. Serie II (Continuo Nacional)
<i>Land use map</i>	Globcov	
<i>Vegetation cover</i>	Spot images	Spot images (other?)
<i>Digital elevation model</i>	Global Multiresolution Terrain Elevation Data 2010	Global Multiresolution Terrain Elevation Data 2010 (other?)

## References

- Stoorvogel, JJ, Mulder, V.L. (2019) A Comparison, validation, and Evaluation of the S-world global soil property database. *Land Degrad. Develop.*, submitted.
- Stoorvogel, J.J., Mulder, V.L., Hendriks, C.M.J. (2019). The effect of disaggregating soil data for estimating soil hydrological parameters at different scales. *Geoderma* 347: 185-193. doi: 10.1016/j.geoderma.2019.04.002
- Stoorvogel JJ, Bakkenes M, Temme AJAM, Batjes NH, ten Brink BJE. 2017a. S-World: A Global Soil Map for Environmental Modelling. *Land Degrad. Develop.*, 28: 22–33. doi: 10.1002/ldr.2656.
- Stoorvogel JJ, Bakkenes M, ten Brink BJE, Temme AJAM. 2017b. To what extent did we change our soils? A global comparison of natural and current conditions. *Land Degrad. Develop.* 28: 1982–1991 doi: 10.1002/ldr.2721.