

## The Harmonized World Soil Database (HWSD) as a First Step Towards a Global Soil Information System

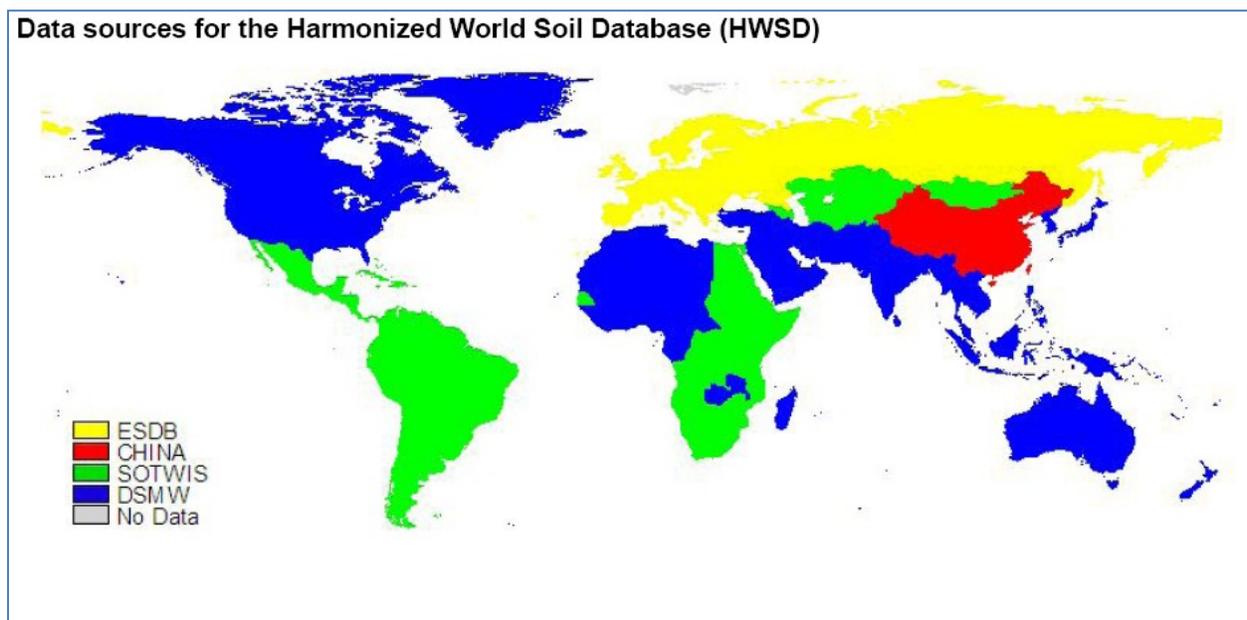
Recognizing the critical importance of soil observations to GEOSS, the global soil survey community is uniting to contribute to GEO (Task DA-09-03: Global Data Sets, sub-task Global Soil Data). This sub-task is co-led by a group of soil institutions, including the European Commission Joint Research Centre, and the International Soil Reference and Information Centre (ISRIC)-World Soil Information in The Netherlands is the point of contact ([vincent.vanEngelen@wur.nl](mailto:vincent.vanEngelen@wur.nl)). The purpose of this effort is to support the development of a global soil information system that builds upon the work of ongoing and completed projects. The system will incorporate data from global, regional, and national soil data projects into a coherent system using a common dictionary – to support implementation of major multilateral environmental agreements (e.g., United Nations Framework Convention on Climate Change, United Nations Convention to Combat Desertification, and Convention of Biological Diversity) and provide harmonized and policy-relevant information to users at the global, regional, and national level. The freely accessible system will deliver web-based services on soil information.

The Food and Agriculture Organization of the United Nations (FAO) and the International Institute for Applied Systems Analysis (IIASA) have taken the first step towards a fully operational global soil information system. They took the initiative of combining the recently collected volumes of regional and national updates of soil information with the information already contained within the 1:5 M scale digital FAO-United Nations Educational, Scientific and Cultural Organization (UNESCO) Digital Soil Map of the World (DSMW; FAO/UNESCO 1995, 2003), to create a new comprehensive Harmonized World Soil Database (HWSD).

HWSD uses four distinct sources of data (see Figure 1):

- (1) The European Soil Database (ESDB) extended with information of the Northern Circumpolar soil map at 1:1 M scale. This database is considered of moderate reliability with an adequate scale but often lacking soil profile information.

**Figure 1. Sources of HWSD**

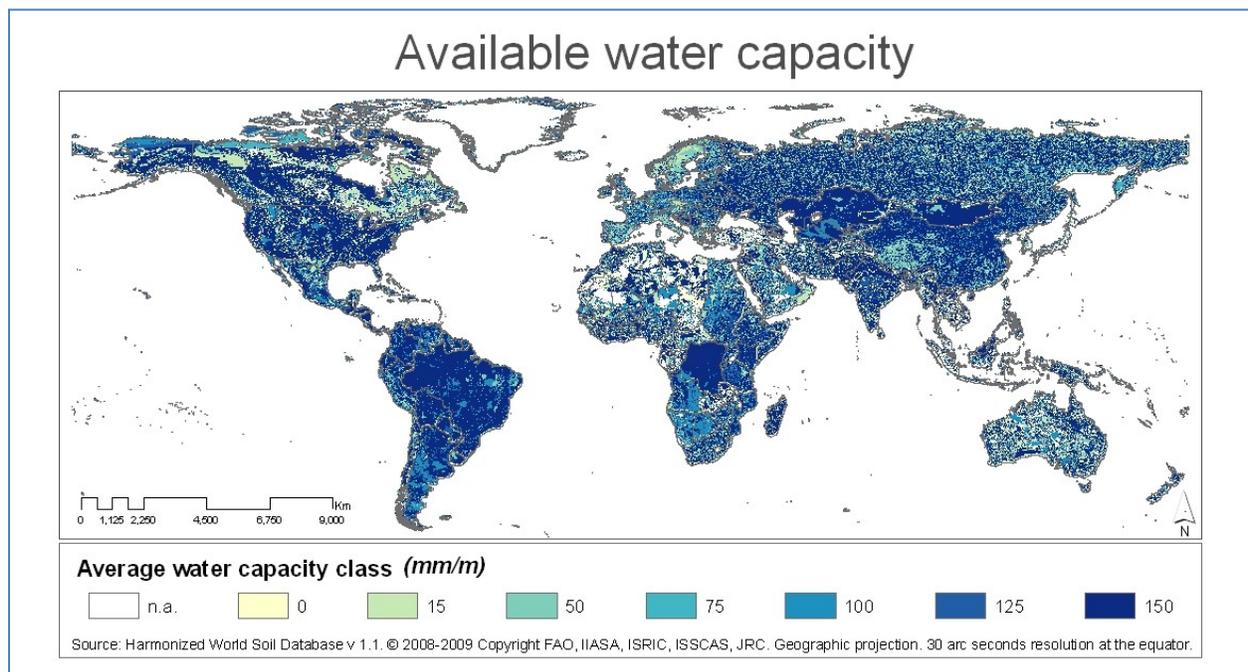


- (2) The new Soil Map of China at 1:1 M scale produced by the Chinese Academy of Sciences. The database is considered of moderate reliability for the same reasons as the one above.
- (3) The SOTER databases mainly for Eastern, Central, and Southern Africa; South America and the Caribbean; and parts of Asia. This database is considered of moderate reliability in regions where the scale was smaller than 1:1 M as is the case in South America and the Caribbean, Congo, and Angola or where soil profiles were scarce such as in Mongolia, Egypt, and Sudan. The database is considered of high reliability in areas where the scale of the original maps was 1:1 M or better and a complete soil profile database was available (Southern Africa, Central and Eastern Europe).
- (4) For the areas not covered by the above, mainly West Africa, North America, South Asia, and Australia, the DSWM was re-interpreted. This part of the database is considered of low reliability.

A number of soil qualities can be derived from this new database. Examples include the organic carbon pool and the soil water holding capacity (see Figure 2).

The HWSD constitutes improvements for about 60% of the land area as compared to the FAO/UNESCO Soil Map of the World. The GlobalSoilMap.net (Sanchez, et al., 2009) digital soil mapping project that will provide the global information system of the future is in its second year, and completion for Sub-Saharan Africa, let alone the World, is some time off. Readily available databases such as those present in Australia, Canada and the United States of America can easily be transformed in a similar 30 arc sec product. In other regions, such as West Africa and South Asia many countries have the soil maps and soil profile databases required to contribute to an expanded HWSD. Ongoing discussions in the framework of the Group on Earth Observations (GEO) that aim towards the development of a Global Soil Information System (GLOSIS)—a “system of systems of soil data and information” as part of the Global Earth Observation System of Systems (GEOSS)—already have identified a possible improved HWSD as an intermediate product to be completed in the short term, prior to the final release of the future Global Soil Map (GEO 2009-2011 Work plan, 2009).

**Figure 2. Soil Moisture Holding Capacity Derived from Soil Properties in HWSD**



For more information visit [http://eusoils.jrc.ec.europa.eu/esdb\\_archive/Soil\\_Data/Global.htm](http://eusoils.jrc.ec.europa.eu/esdb_archive/Soil_Data/Global.htm).

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