

Draft Plan of Action for Pillar Four of the Global Soil Partnership

Executive Summary

Unprecedented demands are being placed on the world's soil resources. By 2050 they need to support increased food production of >70%. However, arable land is finite and soil degradation widespread. Major crops are reaching yield plateaux and better soil management is needed to conserve nutrients, improve water-use and reduce emissions. Climate change compounds the situation.

Responding to these challenges requires reliable information because we manage what we measure. Unfortunately, global information on the functional properties of soils is completely inadequate (GSP State of the Art Report on Global and Regional Soil Information). We cannot credibly answer fundamental questions such as: how much arable land will be available in coming decades? How much food and fibre can it produce? Where are rates of soil change affecting ecosystem services? What are the stores and fluxes of water, carbon, and nutrients?

Pillar 4 of the Global Soil Partnership (GSP) provides the mechanism to rectify this untenable situation. In March 2012, the FAO convened a meeting of more than 80 of the world's leading experts on the mapping, monitoring and forecasting of soil condition. The workshop considered the status of current methods for soil survey and monitoring, existing soil information systems, and future directions for Pillar Four. This Draft Plan of Action for Pillar Four is an outcome of the workshop. It has been prepared by a team of regional experts in consultation with the broader technical community. It is intended to provide an input and starting point for more formal planning by the GSP and the Intergovernmental Technical Panel on Soils (ITPS).

In preparing the Draft Plan, careful attention has been given to the mandate of the GSP and the sovereign rights of nations over their natural resources. The issue of sovereignty extends to data and information insofar that the global soil information system has to support the integrity of national information systems but at the same time produce a harmonized global view.

The Draft Plan begins with an outline of the primary reasons for having a global soil information system. This summary of user needs is followed by a set of design issues and proposed decisions that need to be made by the GSP (e.g. via the ITPS or future plenary sessions). In some cases, the preferred outcome is clear so the committee has simply provided a recommendation. In other cases, the decision is more complex and several options have been formulated. Some of these options relate to priorities but others have significant implications for existing institutions involved in gathering and supplying soil information. There are 20 recommendations.

Establishing the global soil information system will take approximately five years, significant investment and a major technical effort. The timing is ideal because there is now a highly motivated community of experts, exciting new technological capabilities, and the opportunity to mobilize efforts through the International Year of Soils.

The establishment of the GSP provides an historic opportunity to build the enduring and authoritative global system to monitor and forecast the condition of the Earth's soil resources. This information is integral to the mission of the FAO and it is essential for decision making at global, regional and more local scales. If realized, the global soil information system will provide a material improvement in our ability to sustain soil resources and achieve a more food-secure world.

Summary of recommendations

Recommendation 1: The design and operation of the global soil information system will use data primarily from national and within-country systems and will focus on delivering products and information services for regional and global purposes. Agreements about harmonization requirements to achieving comparability of measurements and observations as well as systems for aggregating data and information between scales are therefore essential.

Recommendation 2: That the global soil information system and its associated Community of Practice formally joins the much larger effort to build and maintain the Global Earth Observing System of Systems overseen by the Group on Earth Observations.

Recommendation 3: The global soil information system will be comprised of consistent spatial data sets and services provided by a mix of institutions with soil information facilities in place (research, industry, land owners). However, national soil agencies will play a predominant role as facilitators for the collection, management, quality assurance and provision of the diverse data collections and storage systems; in some cases, also organizations are important which act on behalf of other countries through mutual agreement.

Recommendation 4: The global soil information system intends to include a maximum amount of digital soil information, however, it must facilitate that information can be harmonized thus becoming comparable globally. Data from contributing organizations need to conform to mutually agreed standards set out according to an agreed measurement method, or can be transformed using a global reference system.

Recommendation 5: A stepwise approach is suggested for Pillar Four: First complete a reliable baseline for selected soil properties, then build on it an operational global soil monitoring capability.

Recommendation 6: Aim to achieve net benefit for all partners involved in the global soil information system and monitor this through regular engagement and review.

Recommendation 7: Follow up developments in research and create a mechanism for incorporating new technical developments for further improving of the Global Soil Information System.

Recommendation 8: Immediately establish full-time leadership and technical support teams on the basis of the existing facilities of GSP members with sufficient resources to build the global soil information system by 2018.

Recommendation 9: Train a new generation of specialists in mapping, monitoring and forecasting of soil condition with an emphasis on countries where improved soil knowledge is essential for food security and restoration and maintenance of ecosystem services.

Recommendation 10: Develop the spatial data infrastructure and information systems necessary for delivering consistent and reliable soil information products as web services.

Recommendation 11: That Pillar Four supports the ongoing development and maintenance of three primary data sets central to the global soil information system (global soil grids, polygons and profiles) to be defined according to specifications responding to end user needs.

Recommendation 12 – Option 1: Update the current Harmonized World Soil Database and use it as the de facto standard soil grid for the world until better products are released (see Options 2–4 below).

Recommendation 12 – Option 2: The global soil grid is produced according to the *GlobalSoilMap* specifications via web-services provided by national soil agencies or organizations acting on behalf of one or more countries through mutual agreement.

Recommendation 12 – Option 3: ISRIC produces a 1km global grid within 12 months using its own data holdings with a view to developing the Global Soil Information Facility in the longer term including updates to this grid.

Recommendation 12 – Option 4: The global soil grid is produced using a hybrid approach involving *GlobalSoilMap* and SoilGrids1km under the direction and governance of the GSP and Intergovernmental Technical Panel on Soils. The first data release would be on World Soils Day in December 2014.

Recommendation 13: Replace the FAO/UNESCO Soil Map of the World by completing the SOTER coverage for the world by incorporating the missing coverage from North America, Oceania and Europe using revised technical specifications.

Recommendation 14 – Tier 1: Compile a large soil profile and analytical database for the world without the stringent requirement for a minimum data set (apart from geo-referencing and metadata) or representativeness.

Recommendation 14 – Tier 2: Compile a database of soil profiles with comprehensive morphological, physical and chemical data that are globally representative of geographic regions, major soil types, or significant for other reasons. This dataset is very likely a subset of the Tier 1 soil profile collection. High requirements to data quality, parameters contained, harmonization, documentation and representation are applied.

Recommendation 15: Encourage all GSP member countries to implement national monitoring systems with the capacity to detect soil change with time.

Recommendation 16: Undertake a feasibility study to identify investment priorities and design options for establishing a global system for monitoring and forecasting soil condition.

Recommendation 17: A five-yearly report on global soil health is produced and endorsed by the Intergovernmental Technical Panel on Soils on the basis of operational soil monitoring at global scale.

Recommendation 18: Pillar Four will include data and information delivery to existing global reporting mechanisms and reports on global soil health are not produced on a separate five-year cycle.

Recommendation 19: The coordinator of the global soil information system is responsible for all project teams and reports directly to the ITPS. Advisory committees may also provide advice to the coordinator of the Global Soil Information System, and they also report directly to the ITPS.

Recommendation 20: A charter of ethics is developed for the global soil information system including protection of privacy of individuals and intellectual property rights.