

**IPBES template for the submission of requests, inputs and suggestions on short-term priorities and longer term strategic needs that require attention and action by IPBES as part of its future work programme.**

Name and contact details of individual submitting requests/inputs/suggestions:

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Submission from: IPBES member: \_\_\_\_\_

Observer allowed enhanced participation in line with decision IPBES-5/4:  
\_\_\_\_\_

MEA(s): \_\_\_\_\_

United Nations body: \_\_\_\_\_

Expert on, and holder of, indigenous and local knowledge: \_\_\_\_\_

Other Stakeholder(s): \_\_\_\_\_ *Global Soil Biodiversity Initiative* \_\_\_\_\_

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Please provide the following information for any request and, where relevant, for any inputs and suggestions (additional attachments can also be submitted):

**Request/input/suggestion:**

**Primary -** *Integration of the multiple disciplines of soil biodiversity science and the ecosystem services they provide into the broader context of reports and assessments of overall biodiversity to better determine the state of knowledge of soil biodiversity science and strengthen global biodiversity assessments and syntheses.*

**Secondary -** *A global soil biodiversity assessment to fill knowledge gaps in our understanding of the status of global soil biodiversity, biogeography, and threats to soil biodiversity and the services it provides; and to address conservation, restoration and sustainable use of soil biota.*

**Information to accompany requests submitted to the Platform (see also Decision IPBES-1/3 Procedure for receiving and prioritizing requests put to the Platform):**

1.	<p>Relevance to the objective, functions and work programme of IPBES:</p> <p><i>Request 1: This requested action addresses all four of the mandated IPBES functions – 1) catalysing syntheses of new knowledge that has until recently been separated by discipline, taxonomic group, methods, geography, 2) the production of assessments of existing knowledge, and 3) regarding the support of policy formulation and implementation and 4) build capacities relative to achieving primary and secondary requests for action.</i></p> <p><i>“Soil biodiversity represents a major terrestrial biodiversity pool, supports key ecosystem services (Bardgett and van der Putten 2014; attached) and is under pressure from human activities” (Cameron et al. 2018; attached). However, while aboveground biodiversity is protected under actions such as the European Commission Habitats Directive, Natura 2000, no such protection is extended to belowground biodiversity. This imbalance is attributable in part to the opacity of soil biota and biodiversity (Phillips et al. 2017; attached).</i></p> <p><i>Therefore, it is the concern of the GSBI that considerations of soils and their biota as separate from aboveground biodiversity reduces the understanding of the entire terrestrial ecosystem. Soil biodiversity is under threat from global changes (climate change, invasive species, land use change, pollution, etc.). To support these claims in regards to this request for action, we have attached a table of vital ecosystem functions provided by soil biota and soil biodiversity and supporting documentation (Table 1). These are critical aspects that are so far not well covered within current and past IPBES assessments and also within its expert structure.</i></p> <p><i>Request 2: A global soil biodiversity assessment. This addresses IPBES mandated functions 1) catalysis of new knowledge, and 4) building capacities to achieve these goals. The assessment will cross biome and geographic region and will contribute new knowledge that integrates soil life and habitat rather than the current disciplinary approach of separating each group of taxa from the physical habitat, and the response of biota to global changes. It further engages the newest science and molecular technologies to understand the contributions of biota to ecosystem services such as carbon storage, to ‘hotspots’ of aboveground biodiversity and plant, animal and human health (Wall et al. 2015; attached).</i></p>
2.	<p>Urgency of action by IPBES in the light of the imminence of the risks caused by the issues to be addressed by such action:</p> <p><i>Globally soils and their biota are at risk from climate change (UNFCCC), land use change, desertification (UNCCD), invasive species (UNCBD), pollution and other impacts, resulting in shifts or loss of species. The GSBI is working with the FAO as partners in the Global Soil Partnership. Additionally, soil biota support wildlife in food webs aboveground. They are key to cycling of soil nutrients for food, soil formation and erosion prevention, and regulate pests and parasites of plants and animals including humans. The status of soil biodiversity is a cross cutting issue. This integration is regarded as urgent, given that globally soil biodiversity has only been considered under agricultural policy umbrellas (Convention on Biological Diversity – CBD Report). However, soil biodiversity and function are inextricably linked to aboveground processes and functions both positively and negatively. Regarding soil as a ‘separate’ resource reduces the precision of ecosystem understanding and policy recommendations. Above- and belowground are in-fact one system and should be regarded as such. Given the lack of protection regulations for soil biota, the complete absence of patterns and trends of soil biota in current and past assessments hampers the ability of society to recognize their importance and the need for stronger conservation mechanisms.</i></p>
3.	<p>Relevance of the requested action in addressing specific policies or processes:</p> <p><i>Both requested actions are supportive of determining how soil biodiversity and soils can be conserved and used sustainably. Without integration of the knowledge of soil biota, their biogeography, the status of functions and services, the existing and new global soil biodiversity</i></p>

	<p><i>data will not be considered in environmental management and conservation policies. Knowledge of indigenous peoples on soil biota for soil fertility, farming, land and water use, human and animal health will be critical to integrate knowledge.</i></p> <p><i>The primary action is relevant to the specific policy support tools of sustainable use of water, land, atmosphere, urbanization, food security and management. It includes biological and ecological context including ecosystem services, as well as biome classification. This action seeks to unite belowground biodiversity to associated aboveground contexts (e.g. tropical rainforests and associated soils).</i></p> <p><i>Additionally, the secondary requested action is a challenge, namely integrating existing and missing information from indigenous peoples to the latest microbiome knowledge to better inform knowledge of global soil biodiversity trends and patterns.</i></p> <p><i>Undertaking this action will improve the understanding of the relationship of both above- and belowground biodiversity to critical ecosystem functions, improve policy, recommendations and ideally improve policy decisions to the benefit of those affected by said policies.</i></p>
4.	<p><i>Geographic scope of the requested action, as well as issues to be covered by such action:</i></p> <p><i>This request for reclassification is implicitly global in scale, therefore taking such action will cover a wide range of issues to the benefit of multiple member states, Earth systems comprehension and policy recommendations.</i></p>
5.	<p><i>Anticipated level of complexity of the issues to be addressed by the requested action:</i></p> <p><i>Multiple existing and emerging disciplines will be involved, from the Arctic to Antarctic and from geologists to ecosystem scientists and economists, historians and political scientists. Integration of knowledge from publications as well as from databases; and as necessary from collections in universities and museums (earthworms, beetle larvae that feed on roots, ants that are food for bears) could add to the complexity. Additionally, contributions from taxonomic experts, and industries that use physiological components of a species will also add considerably to assessing services. Integration of soil biodiversity into past assessments of aboveground biodiversity will be more complicated. However, with the exception of potential targeted expansion of research efforts to address specific geographical knowledge gaps, the knowledge to integrate these fields already exists. (See item 7 –Availability of scientific literature and expertise for IPBES to undertake the requested action)</i></p>
6.	<p><i>Previous work and existing initiatives of a similar nature and evidence of remaining gaps, such as the absence or limited availability of information and tools to address the issues, and reasons why IPBES is best suited to take action:</i></p> <p><i>Previous work and existing initiatives carrying out the work which would inform this integration include IPBES (i.e. Assessment Report on Land Degradation and Restoration), the Global Soil Biodiversity Initiative (GSBI; <a href="http://globalsoilbiodiversity.org">globalsoilbiodiversity.org</a>), Additionally, the European Academy Scientific Advisory Committee 2018 Report: “Opportunities for soil sustainability in Europe”; attached) highlights the importance of promoting soil biodiversity in regards to maintaining critical ecosystem functions. Research efforts in nations such as iDiv’s sWORM (<a href="https://www.idiv.de/sdiv/working_groups/wg_pool/sworm.html">https://www.idiv.de/sdiv/working_groups/wg_pool/sworm.html</a>) and the Critical Zone Observatories (<a href="http://criticalzone.org/national">criticalzone.org/national</a>) as well as many global studies on soil organisms have emerged. Previous research initiatives such as the original initiative on soil biodiversity - GEF Tropical Soil Biology and Fertility Program provided publications that are useful today. The European Commission’s Joint Research Centre and GSBI’s Global Soil Biodiversity Atlas (<a href="http://atlas.soilbiodiversity.org">atlas.soilbiodiversity.org</a>) launched at the UNEP in Nairobi in 2016 is a resource which has promoted public engagement and enthusiasm for this underserved spectrum of biodiversity. Additionally, the GSBI had over 700 participants in the first Global Soil Biodiversity (GSB) conference in Dijon in 2015, and over 1000 participants at GSB2 in Nanjing, China. Multiple scientific societies including the Ecological Society of America and European Soil Science Society are just two examples of the many scientific societies that are embracing global soil biodiversity research. Journals have increased their publications on soil biodiversity and global</i></p>

	<p><i>cycles.</i></p> <p><i>IPBES is best suited to take this action as this is a global forum aimed at providing member states with synthesis of biodiversity data to inform policy-making – directly in line with the action proposed. Given the current low profile of soil biodiversity and related ecosystem functions, a direct action by IPBES would allow for more visibility and better assessments and understanding of biodiversity crises and how is it represented across realms, including the soil realm.</i></p>
7.	<p>Availability of scientific literature and expertise for IPBES to undertake the requested action:</p> <p><i>Research on soil biodiversity science has accelerated in the past 10 years with the advent of new technologies. And it has broadened to incorporate all peoples, and many earth system cycles. All of the literature, the peoples including early career scientists and indigenous peoples want to know how to best manage our soils.</i></p> <p><i>Table 1 contains a foundation of scientific literature grouped by relevance to specific ecosystem functions. While this table is not exhaustive, it illustrates the importance of soil biodiversity to a number of critical processes. Additionally, it is within the mission of the GSBI to facilitate the promotion of expert knowledge on soil biodiversity into environmental policy – the GSBI is therefore well suited to support this action.</i></p>
8.	<p>Scale of the potential impacts, and potential beneficiaries of the requested action:</p> <p><i>The scale of potential impacts and potential beneficiaries of these requested actions are global in scale, parallel with the actions requested. These actions would benefit policymakers with more accurate summaries of where above and belowground diversity are vulnerable to threats and potential regional management actions for sustainable use of soils of forests, grasslands, deserts, urban areas and agriculture. For example, industries that currently use knowledge from nematodes to control insects in household yards, or apply nematode anhydrobiosis mechanisms to dry and store human blood, will be interested in other organisms. Knowledge of predator-prey interactions in soil food webs will be interesting for farmers of small scale and large scale farming who prefer biocontrol to chemical control methods. The World Health Organization and other health associations will be interested in learning the distribution and land use changes that influence transfer of soil transmitted diseases, including helminths, to humans and other animals. Managing the soil food web for increased soil fertility and primary production will be useful for policy makers in all nations.</i></p> <p><i>Therefore, these actions have the potential to better inform policy decisions and aid in the conservation of soil biodiversity and valuable ecosystem functions – aiding both the organisms and people which rely on these functions (Table 1; attached).</i></p>
9.	<p>Requirements for financial and human resources, and potential duration of the requested action:</p> <p><i>There is a need with current resources to expand the number and diversity of soil ecologists/ soil scientists and topics in future IPBES Assessments.</i></p> <p><i>There is a need with new resources to capacity build in countries that have growing populations, urbanization and land use change.</i></p>
10.	<p>An identification of priorities within multiple requests submitted:</p> <p><i>Requested Action 2: Priority should be placed on the integration of soil biodiversity knowledge into ongoing works related to terrestrial biodiversity and ecosystem services broadly.</i></p> <p><i>Requested Action 2: A workshop or survey to determine the scope of a Global Soil Biodiversity Assessment should be undertaken. Critical will be making available the best soil biodiversity science to the multiple users (policy, industry, economists, small scale farmers, entomologists, etc.) needing knowledge. And to consider the advancing threats to soil biodiversity and to understand the potential outcomes of these threats as they relate to all peoples who rely on soil biodiversity for a range of functions. Emphasis should include underrepresented geographical</i></p>

	<i>regions and taxonomic groups. Initial work to survey existing biodiversity observation networks has started to identify both geographic and taxonomic shortcomings.</i>
11.	<p>Any other relevant information (including a list of any attachments provided):</p> <p><i><u>Bardgett and van der Putten. 2014. Belowground biodiversity and ecosystem functioning. Nature. 515:505-511.</u></i></p> <p><i><u>Cameron et al. 2018. Global gaps in soil biodiversity data. Nature Ecology and Evolution. 2:1042-1043.</u></i></p> <p><i><u>Phillips et al. 2017. Red list of a black box. Nature Ecology and Evolution. 1: 0103.</u></i></p> <p><i><u>Wall et al. 2015. Soil biodiversity and human health. Nature 528: 69-76</u></i></p> <p><i><u>Table-1 File name: Table1.IPBES-ActionRequest.GSBI.30Sept18.xlsx – Contributions of soil biodiversity to ecosystem function (unpublished review in process).</u></i></p>