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Work of the Intergovernmental Technical Panel on Soils (ITPS)

Executive Summary

- This document contains the annual progress report of the ITPS. It provides a succinct overview of the main activities carried out by the Panel since the 4th session of the Plenary Assembly in May 2016. The ITPS Chair is also due to make an oral presentation.
- The 6th working session of the ITPS was held in March 2017, and the full report of this meeting can be consulted at: <http://www.fao.org/3/a-bs095e.pdf>. Besides formal working sessions, the ITPS relies on the convening of smaller groups as appropriate to deal with specific assignments. In fact, as indicated below, a number of such groups are to deal with follow-up on the “Status of the World’s Soil Resources” report, and the implementation of Plans of Action under the GSP Pillars at both the global and regional levels.
- The most notable activity was the organization of the Global Symposium on Soil Organic Carbon (GSOC17), the outcome document of which can be found here: <http://www.fao.org/3/b-i7268e.pdf>. This seminal event was the result of a collaborative effort with various UN panels and agencies. It is associated with the ongoing preparation of the Global Soil Organic Carbon Map (GSOCMap) to be released on 5 December 2017.
- As requested by the Plenary Assembly during its 4th session, the ITPS is currently preparing a report on the assessment at global level of the impact of Plant Protection Products on soil functions and soil ecosystems. Considering that soil pollution constitutes one of the major soil threats addressed by the Voluntary Guidelines for Sustainable Soil Management, the ITPS will organize a Global Symposium on Soil Pollution to be held in March 2018, again in a very collaborative manner. The ITPS in fact intends to fill scientific knowledge gaps in all matters related to soils to ensure that scientific evidence is obtained to support sustainable soil management.

Suggested action by the GSP Plenary Assembly

- The Plenary Assembly (PA) may wish to:
 - review and comment as appropriate on the range of activities undertaken by the ITPS during the last twelve-month period;
 - express its appreciation of the successful Global Symposium on Soil Organic Carbon and recommend the dissemination of its outcome document, as well as the active

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implementation of the recommendations and activities for the way forward provided therein;

- review and comment on the proposed time frame and modality of work for the preparation of the second Status of the World's Soil Resources report;
- support the key role of the ITPS in guaranteeing scientific rigour in the finalization of the Global Soil Organic Carbon Map;
- note the ongoing collaboration between ITPS and other UN panels and encourage the further strengthening of these linkages;
- welcome the forthcoming report on the assessment at global level of the impact of Plant Protection Products on soil functions and soil ecosystems, while endorsing the organization of a Global Symposium on Soil Pollution, to be held in March 2018, jointly with other UN organizations and panels;
- approve the amendment to the Rules of Procedure in order to increase the term of ITPS members from two to three years;
- request resource partners/donors to provide further financial resources to support the increasing number of ITPS activities such as the organization of global symposia, the preparation of important global reports, and fulsome interaction with other panels, as well as support to the Sustainable Development Goals (SDGs).

2.1 Report by the chairperson on main activities and outcomes of the work programme 2016-2017

1. During its past year of work, besides providing continuous scientific support to the Secretariat and more generally to the implementation of approved GSP activities, the ITPS carried out the following actions:

- Participation in the selection committee of the Glinka World Soil Prize;
- Preparation and implementation of the first Global Symposium on Soil Organic Carbon (more details presented in section 2.4.1 below);
- Organization of the preparation process for the second “Status of the World’s Soil Resources” report to be released at the end of 2020;
- Initiation of the assessment at global level of the impact of Plant Protection Products on soil functions and soil ecosystems;
- Initiation of the assessment at global level of the potential of soil protection to increase resilience in the context of climate change;
- Supporting, as appropriate, the implementation of the GSP Plans of Action and the development of Regional Implementation Plans;
- Collaboration with the Livestock Environmental Assessment and Performance Partnership (LEAP) for developing guidelines on soil carbon stock changes in grasslands and rangelands;
- Ensuring cooperative links with other scientific panels, such as the Science Policy Interface (SPI) of UNCCD, the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) and the Intergovernmental Panel on Climate Change (IPCC), as well as assisting with the implementation of the SDGs as appropriate (more details presented under section 2.4), including:
 - Contribution of a soil chapter to the Global Land Outlook of the UNCCD;
 - Review of the land degradation and restoration assessment (LDRA) of the IPBES.

A. Participation in the selection committee of the Glinka World Soil Prize

2. The ITPS Chair participated as a member of the Glinka World Soil Prize selection committee in the evaluation of the candidates. The Secretariat provided an electronic evaluation tool to facilitate this work, while assisting with maintaining the necessary rigour. The winner was selected according to the endorsed criteria (see specific item).

B. Preparation of the first Global Symposium on Soil Organic Carbon (GSOC17)

3. An extended report is presented in section 2.4.1 below.

C. Preparation of the 2nd “Status of the World’s Soil Resources” report 2020

4. As mandated by the PA, the ITPS started the necessary preparatory work for the development of the 2nd “Status of the World’s Soil Resources” (SWSR20) report. An editorial board (EB) has been established with the following assignments as coordinating lead authors (CLA) for the various report chapters:

Introduction – All EB members.

Section 1: Soil organic carbon – Miguel Taboada (Argentina)

Section 2: Soil erosion – Gunay Erpul (Turkey)

Section 3: Nutrient depletion – Gary Pierzinski (USA)

Section 4: Soil biodiversity – Peter de Ruiter (The Netherlands)

Section 5: Soil information challenges – Neil McKenzie (Australia)

Section 6: Regional dimension.

Africa - Botle Mapeshoane (Lesotho)

Asia – Brajendra (India)

Europe – Rainer Horn (Germany)

Latin America and the Caribbean – Juan Comerma (Venezuela)

Near East & North Africa – Talal Darwish (Lebanon)

North America – Dan Pennock (Canada)

South West Pacific (and Antarctica) – Siosiua Halavatau (Tonga)

Conclusions – All EB members.

5. A first order draft of the report will be presented to the sixth Plenary Assembly in 2018 and a revised version to the seventh session in 2019. The final report will be submitted for information to the eighth Plenary Assembly in 2020. The SWSR20 is planned to be released to the general public during the celebration of the World Soil Day 2020.

D. Assessment at global level of the impact of Plant Protection Products on soil functions and soil ecosystems

6. The ITPS has been explicitly mandated by the PA to undertake this important assessment. Work to this end is under way (Lead author: D. Pennock, Canada) and should be finalized by the end of 2017. More information on the scope and present status of this assessment can be found in Annex 1 of the present document.

E. Assessment at global level of the potential of soil protection to increase resilience in the context of climate change (water retention, soil organic matter, soil biodiversity, carbon storage, soil fertility, etc.)

7. The ITPS has also been explicitly mandated by the PA to undertake this assessment. However, not much could be done so far due to a lack of resources.

F. Collaboration with the Livestock Environmental Assessment and Performance Partnership (LEAP)

8. Following a request from LEAP Secretariat on supporting them on soil organic carbon (SOC) in grasslands and rangelands, the ITPS positively responded as two ITPS members are part of the Technical Advisory Group (TAG) on SOC and agreed to review the draft guidelines for soil organic carbon stock changes in grasslands and rangelands.

G. GSP Plans of Action and Regional Implementation Plans

9. The ITPS remains fully conscious of the importance of maintaining the highest scientific and technical standards during the implementation phase of the five GSP Plans of Action at both global and regional levels. In this light, the Secretariat sought to ensure to the maximum extent possible that ITPS members from a given region participate in the workshops of the pertinent regional soil partnerships.

10. It is recalled that five working groups of the ITPS have been established to pool the necessary competencies and put them at the service of implementation requirements. These groups are particularly mandated to closely follow the implementation of the Global Implementation Plans (GIPs) and, through members from the pertinent regions, provide advice and support to the implementation of Regional Implementation Plans (RIPs).

11. During the fourth PA, the ITPS was tasked to develop a Global Soil Organic Carbon map by the end of 2017. This task is part of the Pillar 4 implementation plan and therefore closely linked with the related ITPS Pillar 4 Working Group. This group has been closely monitoring the development of the new map by providing the necessary scientific and technical support to the GSP Secretariat. It will ensure final quality control during the seventh ITPS working session in October 2017 before the release of the map on World Soil Day 2017. A more detailed report can be found under item 3 of the PA agenda.

2.2 Work programme for 2017-18

12. The ITPS work plan until mid-2018 would consequently include the following:
- the five working groups assigned to each pillar addressing global and regional implementation plans from the perspective of the ITPS;
 - four working groups (WGs) to prepare reports on the progress made in addressing the four priorities identified in the SWSR report; also WG1 and WG2 to support the SPI-UNCCD; WG2 and WG4 to participate in the follow-up of the joint ITPS-IPCC-SPI-UNCCD GSOC symposium;
 - all ITPS members to review the second order draft of the LDRA from IPBES;
 - to complete the new Global Soil Organic Carbon Map (GSOCMap) by 2017;
 - the ITPS to compile the first order draft of the second edition of the SWSR for information of the PA in 2018;
 - to complete, in time for the PA 2018, the two outstanding global assessments on: the impact of Plant Protection Products on soil functions and soil ecosystems; and the potential of soil protection to increase resilience in the context of climate change; and
 - in support of the Voluntary Guidelines for Sustainable Soil Management, the ITPS is committed to organize events to build scientific evidence around the ten soil threats identified by the SWSR. One of these threats is related to **soil pollution**. The ITPS has started to evaluate the impacts of agricultural inputs in soils and the ecosystem services provided by them. As part of this work, the ITPS, together with other UN panels and organizations, will organize a Global Symposium on Soil Pollution to be held in March 2018. Soil pollution remains largely unaddressed in global fora and the ITPS constitutes the appropriate body to fill the large knowledge gaps that persist at the global level in collaboration with existing initiatives and organizations. Linked to the symposium will be the preparation of a report to reduce knowledge gaps on soil pollution, including on the anthropogenic sources of soil pollution. This report could also evaluate the risks from and impacts of soil pollution on food security and nutrition, health and environment. Based on this evaluation, the GSP could identify prevention and management measures linked to soil pollution that could be promoted, thereby contributing to the SDG3.

2.3 Modification of the Rules of Procedure

13. The ITPS is in its second two-year period of activity. It is now a well-recognized instrument at the service of international cooperation. The transition from the first to the second period was relatively smooth, i.e. without major disruption of working procedures, due to the partial renewal of the previous membership, thus allowing for sufficient continuity

14. However, in light of the experience gained since its establishment in 2013, ITPS members unanimously felt that the terms of office should be increased from two to three years in order for the Panel to be able to bring projects and activities to completion or near completion in an orderly manner. Indeed, the ITPS chairperson reported to the last Plenary Assembly that it was a challenge to address all the activities assigned by the Assembly within the current two-years terms of members. This is particularly due to the fact that several important activities (e.g. preparation of the Status of the

World's Soil Resources Report) require a minimum of three years of intersessional work, also taking into account the fact that regular ITPS working sessions are held on a yearly basis. In this regard, the 4th Plenary Assembly recognized (<http://www.fao.org/3/a-bl812e.pdf>) the need for longer terms and requested the Secretariat to pursue the necessary actions in order to extend the term of ITPS members from two to three years.

15. Further to this request from the 4th GSP Plenary Assembly, Annex 2 provides a proposed amendment to Rule VI/1/b of the Rules of Procedure for consideration by the present Plenary Assembly. In view of previous discussions on the matter, the Secretariat did not issue a call for new ITPS members in view of the expected extension for a third year of the present membership.

2.4 Interface with other pertinent bodies and initiatives

16. The ITPS has been explicitly mandated to provide scientific and technical advice to other UN organizations and bodies with interest in soils.

17. Therefore, the GSP Secretariat has worked towards consolidating the ongoing collaboration between the ITPS and other relevant panels. Structured collaboration arrangements exist with the SPI of UNCCD, IPBES and the IPCC. The most recent expression of joint work was made during the GSOC17 which coincided with the sixth ITPS working session (March 2017) with participation of representatives of these organizations.

Collaboration with the SPI of UNCCD

18. Beyond the Global Symposium on Soil Organic Carbon in March 2017, the ITPS has contributed a soil chapter to the Global Land Outlook that will be released by the UNCCD secretariat during the UNCCD COP 13. The SPI Chair was invited to the 6th ITPS working session and collaboration for the next year was agreed. In brief:

- the ITPS is delivering a new global soil organic carbon map by end 2017, supporting the indicator 15.3.1 of the SDGs and the UNCCD endorsed metrics for the assessment of land degradation neutrality (LDN);
- a joint global assessment of soil erosion has been performed under the leadership of the Working Group 1 “Sustainable Soil Management” of the ITPS (Lead G. Erpul, Turkey) and will be presented at UNCCD COP 13;
- on invitation by the UNCCD secretariat, the ITPS chair presented the status of collaboration between ITPS and SPI during the last SPI plenary session (27th-28th of May). The organization of the GSOC17 was especially highlighted while stressing the importance of follow-up activities to the major action items listed in the symposium outcome document. The SPI should forward the outcomes of the symposium to the next Committee on Science and Technology and COP of UNCCD for decision. Future collaboration is foreseen in connection with the Global Soil Erosion Assessment by the ITPS, the new Global Soil Organic Carbon map and the 2nd Status of World's Soil Resources report.

Collaboration with IPBES

19. It is recalled that the ITPS Chairperson is co-chair of the IPBES Land Degradation and Restoration Assessment (LDRA); thus, cooperation between ITPS and IPBES has been developing. The ITPS has provided a detailed review of the first order draft of the assessment. The ITPS is also reviewing the second order draft of the LDRA. Furthermore, the ITPS and the GSP Secretariat will host the 3rd and final LDRA Authors Meeting (17-21 of July 2017) at FAO headquarters.

Collaboration with IPCC

20. This collaboration, after an initial period of difficulties, is now more effective, also due to the increased attention to soils within the climate change debate and negotiations. The ITPS has been

formally admitted as observer organization within the IPCC and is therefore empowered to propose experts for the various IPCC assessments relevant to soils. Especially the recently launched IPCC Special Report on Climate Change and Land will require extensive soil related expertise that can be provided by the ITPS. In addition, IPCC took part in and was co-organizer of the Global Symposium on Soil Organic Carbon in March 2017.

2.4.1 Report of the Global Symposium on Soil Organic Carbon (GSOC17)

21. The GSOC17 was jointly organized with:

- the Intergovernmental Panel on Climate Change (IPCC);
- the Science-Policy Interface (SPI) of the United Nations Convention to Combat Desertification (UNCCD);
- the World Meteorological Organization (WMO).

22. The symposium was held at FAO headquarters from 21 to 23 March 2017 and attended by 488 participants (33% women, 67% men) from 111 countries including representatives from FAO member states, the organizing institutions, relevant panels, private sector and civil society, as well as scientists and practitioners working in soil organic carbon and related fields.

23. The GSOC17 was a milestone event organized together with other UN panels following a very collaborative and inclusive approach. The major conclusions and recommendations as well as the way forward can be found in the report: <http://www.fao.org/3/b-i7268e.pdf>

24. Important conclusions are:

- to prevent SOC losses by maintaining current stocks (especially in carbon-rich soils) as the minimum action in SOC management;
- to prioritize soils with the highest carbon stocks in the development of national and regional policies on soil conservation;
- to identify and specify the tangible short- and long-term benefits for farmers resulting from management practices for SOC sequestration in order to trigger their adoption, and introduce mechanisms to incentivize the adoption of such practices;
- in estimates of the potential for SOC sequestration, include the full GHG balance and consider possible interactions between the carbon and nitrogen cycles that could affect the climate change mitigation potential of applied practices;
- to foster capacity development and training for countries to develop national reference values for SOC stocks, as well as the necessary data management capabilities and facilities;
- to establish a working group to develop feasible and regionally contextualized guidelines for measuring, mapping, monitoring and reporting on SOC that can be adapted locally to monitor SOC stocks and stock changes and support management decisions;
- to establish a working group for refining the Voluntary Guidelines for Sustainable Soil Management to provide guidelines on the sustainable management of SOC at the national and local scales to encompass site-specific conditions.

25. The ITPS sought to ensure the essential scientific and technical underpinning of the symposium, jointly with the other two scientific panels co-organizing this event, i.e. the IPCC and the SPI of UNCCD.

Annex 1: Status report on the Assessment at Global Level of the Impact of Plant Protection Products on Soil Functions and Soil Ecosystems

Introduction

The Plenary Assembly of the GSP requested at its 2016 session that the Intergovernmental Technical Panel on Soils (ITPS) complete “an assessment at global level of the impact of Plant Protection Products on soil functions and soil ecosystems”.

In effect, the increasing use of plant protection products has led to widespread concerns about their effect on the environment and human health. In response to these concerns, international agreements and national regulatory frameworks have been developed to regulate the use of plant protection products. For example, the Stockholm Convention on Persistent Organic Pollutants has banned or severely limited the production and use of 12 insecticides and one fungicide since it came into force in May 2004. Despite these regulatory safeguards, the introduction of new plant protection products and the adoption of existing ones in new regions continue to cause public concern.

Given the role of plant protection products in many agricultural production systems, it is essential that regulatory systems be based on current and reliable scientific evidence. The goal of this assessment is to provide a high-level, global-scale scientific opinion on the effects of plant protection products on soil functions and biodiversity. This opinion is to be solely that of the ITPS and not an official statement by the Global Soil Partnership.

This evaluation builds upon previous initiatives of the ITPS, GSP and FAO. The revised World Soil Charter establishes a definition for sustainable soil management that can be applied to the assessment of plant protection products. The Status of the World’s Soil Resources report synthesized current knowledge about a key component of the assessment, soil biodiversity, and about soil contamination. Finally, the recent Voluntary Guidelines for Sustainable Soil Management provide global-level guidance on sustainable soil management practices.

The scope of the assessment is consistent with the above mandate given to the ITPS. The definition of plant protection products used in the assessment is as follows:

A plant protection product means a pesticide product intended for preventing, destroying or controlling any pest causing harm during or otherwise interfering with the production, processing, storage, transport or marketing of food, agricultural commodities, wood and wood products. The term includes products intended for use as a plant growth regulator, defoliant, desiccant or agent for thinning fruit or preventing the premature fall of fruit, and substances applied to crops either before or after harvest to protect the commodity from deterioration during storage and transport. [FAO, 2006]

The components of the soil system to be assessed are determined by the definition of sustainable soil management from the World Soil Charter adopted by the FAO Conference in 2015:

Soil management is sustainable if the supporting, provisioning, regulating, and cultural services provided by soil are maintained or enhanced without significantly impairing either the soil functions that enable those services or biodiversity.

Therefore, it follows that the application of plant protection products is unsustainable if their use significantly impairs soil functions or biodiversity. It is important to note that in this definition, biodiversity is recognized for its intrinsic value in addition to the role that soil organisms may play in the delivery of ecosystem services.

Tentative Structure of the Report

- 1 Introduction and Scope
- 2 Pesticides and Plant Protection
- 3 Major Perspectives on the Assessment of Pesticides on Soil Organisms

- 3.1 Biodiversity perspective
- 3.2 Ecotoxicology perspective
- 4 Methods for the Assessment of Pesticides on Soil Organisms
- 5 Review of Assessments of Impact of Pesticides on Soil Organisms
 - 5.1 Soil Microorganisms: Soil Bacteria, Archaea, and Fungi
 - 5.1.1 Indicators of Pesticides Effects on Soil Microorganisms
 - 5.1.2 Pesticide Effects on Enzyme Activity of Microorganisms
 - 5.1.3 Pesticide effects on Microbial Abundance and Community Structure
 - 5.2 Soil Fauna: Earthworms, Collembolans, Mites, Enchytraeidae
 - 5.2.1 Earthworms
 - 5.2.2 Collembolans, Mites, Enchytraeidae
 - 5.3 Scientific Opinion: Pesticides, Soil Biodiversity and Soil Functions
- 6 Pesticide Fate and Water Quality
 - 6.1 Factors Controlling Pesticide Fate and Behaviour in Soils
 - 6.2 Soil Management and Pesticide Fate
 - 6.3 Soil Management and the Control of Runoff
 - 6.4 Scientific Opinion: Pesticide Fate and Water Quality
- 7 Pesticides and Erosion Control
 - 7.1 Scientific Opinion: Pesticides and Soil Erosion
- 8 References Cited

Timelines

- 1) Completion of first draft: November 2016 to May 17, 2017
- 2) Review of the first draft by ITPS drafting sub-committee: May 18 to June 23.
- 2) Compilation of comments by GSP Secretariat: June 26 to 30.
- 3) Completion of 2nd draft: July to August 31.
- 4) Circulation of second draft to full ITPS: September 1.
- 5) Consideration and finalization at seventh ITPS meeting: October 23 to 27.
- 6) Release of report on World Soil Day 2017

Annex 2: Modified Rules of Procedure

The only clause that required modification is as presented below:

“Members of the ITPS shall be experts appointed by the GSP Plenary Assembly for a term **of 3 years renewable for one additional term** (with agreement of the Plenary Assembly).”