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Global Forum on Food Security and Nutrition • FSN Forum

PROCEEDINGS

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<http://www.fao.org/fsnforum/forum/discussions/soilguidelines>

Online consultation for developing the Voluntary Guidelines for Sustainable Soil Management



Collection of contributions received

in collaboration with



**GLOBAL SOIL
PARTNERSHIP**

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Topic note

Dear all,

We are tasked with the unique opportunity to mould the future of soils sustainability.

The 'Zero draft' of the Voluntary Guidelines for Sustainable Soil Management (VGSSM), developed in order to promote sustainable soil management effectively in all regions, needs your contribution. Your input is necessary to allow the Intergovernmental Technical Panel on Soils to better frame the multifaceted needs of all the stakeholders.

This online consultation invites you to address the following questions:

- **Does the zero draft sufficiently outline a way to achieve sustainable soil management worldwide?**
- **Have all the key technical elements to achieve sustainable soil management been included in the guidelines?**
- **Do the guidelines take into account the great variety of ecosystem services provided by soils?**
- **Will the results of the guidelines, once implemented be sufficient enough to achieve the Sustainable Development Goals (SDGs)?**
- **Do the guidelines identify activities that should be avoided to achieve multiple benefits through sustainable soil management?**

The consultation will be facilitated by **Dan Pennock**, Intergovernmental Technical Panel on Soils, and **Ronald Vargas**, Global Soil Partnership Secretary.

Thank you very much for engaging in this critical process.

We look forward to receiving your valuable inputs to make these guidelines a reality.

Eduardo Mansur, Director Land and Water Division, FAO

Background and process

The recently published Status of the World's Soil Resources report identified ten major threats to our soils that need to be addressed if we are to achieve the Sustainable Development Goals. Therefore, urgent efforts must be made to enable and engage with sustainable soil management at all levels. Achieving sustainable soil management will generate large benefits for all, therefore the availability of comprehensive guidelines on SSM is of major importance.

The revised World Soil Charter - developed under the Global Soil Partnership by the Intergovernmental Technical Panel on Soils - already contains carefully drafted principles and guidelines for action to implement sound sustainable soil management. However, the World Soil Charter may be complemented by the preparation of more detailed technical guidelines for the sustainable management of soil resources.

In December 2015 - during the celebration of the International Year of Soils - the 153rd FAO Council supported the development of Voluntary Guidelines for Sustainable Soil Management (VGSSM) with

the aim of facilitating the implementation of the World Soil Charter and promote effective and sustainable soil management in all regions.

The Intergovernmental Technical Panel on Soils was tasked to develop a zero-draft of the VGSSM. This draft will now be subject to a comprehensive e-consultation process with all interested partners and stakeholders. These contributions will directly feed the VGSSM first draft prepared by the Intergovernmental Technical Panel on Soils; the process will then continue and the 'first draft' will be submitted to an Open-Ended Working Group for its finalization and submission to the Global Soil Partnership Plenary Assembly, the Committee on Agriculture (COAG) and, if endorsed, to the FAO Council.

Contributions received

1. Prakasa Rao, India

Please see in the attachment a few suggestions made on track-mode for consideration.

Best regards,

E.V.S.Prakasa Rao,
Ph.D, FNAAS, FISA, FISS

Formerly Head, Central Institute of Medicinal and Aromatic Plants, Research Centre, Bengaluru, India;
ex- Chief Scientist and Advisor, CSIR- Centre for Mathematical Modelling and Computer Simulation,
Bengaluru, India;
Assoc. Editor-in-Chief, Indian Journal of Agronomy;
Advisor and Consultant (Medicinal and Aromatic Plants, Sustainable Agriculture)

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/Prakasa_Rao_Zero_Draft_VGSSM.docx

2. Daniel Dale, FAO Regional office for Near East and North Africa

Dear Moderator

It is a very good start. I am very pleased to provide my comments on the Draft VGGSM in track, attached.

With regards

Daniel Danano Dale

Land Management and Tenure Officer

FAO Regional office for Near East and North Africa

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/Daniel_Dale_Zero_Draft_VGSSM.docx

3. Emile Hougbo, Agricultural University of Ketou, Benin

This document on the guidelines for sustainable soil management is interesting as far as I'm concerned but, it can be improved. First, I suggest that there's no section named 1.0, 4.0, 5.0, 6.0. Just name them 1., 4., 5., 6. Second, I think it's important to present the causes of bad soil management observed through the world. For, the guidelines should indicate how to face the obstacles to sustainable soil management worldwide.

In fact, human life is highly dependent on soil quality. That's why the quality of soil management is very complex. It's linked not only to the level of land pressure, but also to the farmers economic status, and their knowledge on agricultural techniques of soil conservation, such as natural fallow, improved fallow technologies, planting perennial crops, agroforestry, cover crop use, drip irrigation, lowland crop development, salt tolerant crop adoption, etc. Sustainable land management has been the focus of

my thesis presented in November 2008. This thesis, entitled “**Poverty Dynamics and Agricultural Practices for Environment Conservation in African Rural Area: The Case of Adja plateau in Southern Benin**”, (see <https://tel.archives-ouvertes.fr/tel-00680042>), has developed a complementary theory to the two former theories on soil management in the situations of high land pressure; the theory of Malthus (1798), and that of Boserup (1970).

On one hand, the pessimists, mainly represented by Malthus (1798), think that land pressure is associated to negative effects on agricultural production and leads to famine, soil degradation and rural exodus. On the other hand, the optimists, mainly represented by Boserup (1970), think that land pressure is an essential factor for technological change and sustainable soil management. Although in general the demographic and food evolution in Africa presents a Malthusian trend, like the cases of Yatenga in Burkina Faso, Serer district in Senegal and Adja plateau in Benin Republic, it was even though observed some Boserupian evolutions like the cases of Bamileke district in Cameroon and that of Machakos district in Kenya. One wonders if it's still possible to presage in Africa a generalised optimistic evolution of Boserup (1970) and in which conditions. This thesis, from a temporal analysis of 122 households on the Adja plateau in the southern Benin, developed a theoretical intermediary position between Malthus theory and that of Boserup. It's demonstrated that in land pressure situation, the farmers' welfare state was an important determinant of sustainable soil management and agricultural productivity improvement. Land pressure does not induce *ipso facto* technological change and agricultural development. The Malthus spectrum and the optimistic vision of Boserup represent the extreme situations induced by a higher chronic poverty rate in the first case and a lower chronic poverty rate in the second case.

In order that the farmers can develop sustainable agriculture, sustainable soil management techniques in land pressure situation, it's necessary to reduce significantly (or eliminate) chronic poverty among them by facilitating a truly profitable agriculture. The situation on the Adja plateau, where the chronic poverty rate is estimated at 28.7 %, followed the Malthusian spectrum. The Zero draft proposed should then take into account actions for chronic poverty elimination among the farmers. Efficient agricultural policies are then necessary

4. Mubarak Abdalla, Sudan

Dear Intergovernmental Technical Panel on Soils,

1. In general, very useful, worldwide acceptable and we can built on it.
2. I have some few comments.

Please some comments in the uploaded file (track changes)

Thanks

Mubarak A. Abdalla (PhD)

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/Zero_DraftSSM_0.doc

5. Bernard Vanlawe, iita, Kenya

This is an excellent initiative that needs all possible support. That said, this initiative will only deliver if it sticks to its laudable objectives. The draft document appears to consist of two parts: one part

objectively describing what are good soil management principles and practices, based on a good analysis of available knowledge (pages 1-15), followed by a political part, 'pushing' CA as the ultimate sustainable soil management paradigm, whereby facts and figures are often interpreted to suite one's purpose (pages 16-end).

As mentioned in the introductory paragraphs, the voluntary guidelines should apply globally so why then try to push CA to all farmers? Fortunately in Sub-Saharan Africa, most policy-makers recognize the need for fertilizer (used efficiently) and varieties, in combination with good agricultural practices, including recycling or crop residues as is or via farmyard manure, and even tillage. After all, why has tillage been adapted nearly everywhere as a land management practice? The above is often summarized as Integrated Soil Fertility Management (which the document summarizes quite well on page 17), a paradigm promoted by major investors in African Agriculture and rightfully so!

Another – minor – observation is related to the selective use of publications. While CA is quite prominent in the reference list, papers such as Giller et al (2009) stressing competition for organic resources or Vanlauwe et al (2014) proposing a fourth principle to assure sufficient biomass production to kick-start CA are lacking.

Minor comments:

- There's very often talk of improving the use efficiency of nutrients – which I fully support – but equally important is to use appropriate rates; the fertilizer industry refers to the 4Rs: the right type at the right place at the right rates and the right time.
- Page 4: Principle 3: peculiar statement for a definition: '...is a particular concern'.
- Page 9: Fertilizers are not acidic – ammonium-containing fertilizers can acidify the soils.
- Page 9: Acidification through N fixation is a minor process and never a reason not to promote legumes.
- Page 16: Pls add a 4th principle: appropriate fertilizer management (the 3 principles as such are 'masked' CA principles).

6. Olegario Muñoz Ugarte, Soil Institute, Cuba

Dear colleagues:

Please find below (en español) my comments in relation to the Zero Draft of the documents VGSSM.

Kind regards

Dr Olegario Muniz Ugarte

Soil Institute, Havana, Cuba

President of Steering Committee of RSP for Central America, Mexico and The Caribbean

Crterios acerca del Borrador Cero (Zero Draft) del documento "Directrices voluntarias para el Manejo Sostenible de los Suelos (DVGSS)".

Considero que constituye un valioso y detallado documento de gran utilidad para la promoción y apoyo de las prácticas para el Manejo Sostenible del Suelo (MSS), que trata en detalle las características que deben reunir los suelos y establece directrices generales para preservar las mismas

mediante prácticas que posibilitan la conservación y rehabilitación de este recurso natural. Sin embargo, pienso que debe incluir también de forma explícita, vías concretas para lograr alcanzar el MSS y, muy importante, poder evaluar su impacto. En mi opinión, la primera, lograr un **Marco Regulatorio Legal Internacional Mínimo** que comprometa a los gobiernos a la conservación de los suelos; ya que son muchos los países y regiones, fundamentalmente los menos desarrollados, que no cuentan con el mismo.

Otras: **el establecimiento de Programas Locales, Regionales o a mayor escala**, con financiamiento gubernamental, privado y/o con participación de organismos internacionales, que subvencionen a aquellos pequeños agricultores u obliguen a los grandes productores, al financiamiento de las prácticas que permitan alcanzar el MSS; el establecimiento de **Bases de Datos Armonizadas Regionales y a más amplia escala** que posibiliten el seguimiento y monitoreo de la calidad y productividad de los suelos; la permanente **capacitación de los productores y formación y/o actualización de especialistas de suelo en los principios del MSS mediante programas establecidos a ese efecto.**

No menos importante, es la necesidad del establecimiento de **metodologías armonizadas que permiten evaluar mediante indicadores verificables, el impacto tanto biofísico como socioeconómico de la introducción del MSS.**

Entiendo que la inclusión de un acápite en el documento que incluya este aspecto, le dará al mismo mayor integralidad.

Dr. Olegario Muñiz Ugarte

Instituto de Suelos, Cuba

Presidente del Comité Directivo de la Alianza Regional por el Suelo para Centro América, México y El Caribe.

[ENGLISH TRANSLATION BELOW]

Comments on the Zero Draft of the Voluntary Guidelines for Sustainable Soil Management (VGSSM)

I think it is a valuable and detailed document, highly useful for promoting and supporting the Sustainable Soil Management (SSM) practices. It addresses the features that soils must meet in detail and establishes general guidelines to preserve these by means of practices enabling the conservation and rehabilitation of this natural resource. However, I think specific ways of achieving SSM and, very importantly, assessing its impact, must also be explicitly detailed in the document. In my opinion, one way should be setting an international regulatory minimum framework committing governments to soil conservation as many countries and regions, majorly the least developed, lack one.

Another way is developing local, regional or larger-scale programs, privately or governmentally funded and/or involving international organizations, that subsidize small farmers or enforce large producers to finance those practices leading to SSM; or establishing regional harmonized databases -and on a larger scale- to monitor the soils quality and productivity; or continuously training producers and soil specialists in SSM guidelines by means of specific programmes.

The need to establish harmonized methodologies to assess the biophysical and socio-economic impact of SSM introduction using verifiable indicators is equally important.

I believe the inclusion of a section addressing this aspect will yield a more comprehensive document.

Dr. Olegario Muñiz Ugarte

Soil Institute, Cuba

Chairman of the Steering Committee of the Regional Soil Partnership for Central America, Mexico and the Caribbean

7. Yoganath Adikari, FAO, Italy

Hello!! A few comments and / or clarifications on the draft.

1. Page 2. The current state of soil degradation was examined..... where was it examined?
2. Page 5. Table 1.1 Soil regulation, I don't get the clear meaning
3. Page 8. First bullet. I think the addition of the term "**soil aggregation**" might be more specific because OM aggregates soil particles.
4. Page 10. 2nd bullet point. Is it related to fragipan?
5. Page 13. 2nd bullet point. Construction of mini-catchment- I don't get the meaning how we could do that.
6. Page 13. 3rd bullet point- enough growing plants- does this mean increase in biomass or something else.
7. Page 15. 3rd bullet- rising ground water tables- I think we need to mention the location

Yoga

Yoganath ADIKARI (PhD)

Forestry Officer, Forest Protective Functions

Soil & Water Conservation

Global Forest Resources Assessment

FAO Forestry Department

Viale delle Terme di Caracalla

Rome 00153, Italy

8. José Luis Rubio, Centro de Investigaciones sobre Desertificación (CIDE), Spain

Dear Friends,

Please find attached my comments to the Zero Draft on Voluntary Guidelines for Sustainable Soil Management

Best regards

José Luis Rubio

Vice Chair of the European Soil Bureau Network - ESNB (JRC, EC)

Immediate Past President of the European Society for Soil Conservation - ESSC

Centro de Investigaciones sobre Desertificación- CIDE
(CSIC, Universitat de Valencia, Generalitat Valenciana)

CIDE Web: <http://www.uv.es/cide>

ESSC Web: <http://www.essc.sk>

Personal Web: <http://www.uv.es/~jlrubio>

Link to the Zero Draft with comments in track change mode:

[http://www.fao.org/fsnforum/sites/default/files/resources/Jose Luis Rubio Zero Draft VGSSM.docx](http://www.fao.org/fsnforum/sites/default/files/resources/Jose_Luis_Rubio_Zero_Draft_VGSSM.docx)

9. Patrick Bhekisisa Dlamini, Ministry of Agriculture, Swaziland

Link to the Zero Draft with comments in track change mode:

[http://www.fao.org/fsnforum/sites/default/files/resources/Patrick Bhekisisa Dlamini Zero Draft V GSSM.docx](http://www.fao.org/fsnforum/sites/default/files/resources/Patrick_Bhekisisa_Dlamini_Zero_Draft_V_GSSM.docx)

10. C John Baker Baker, No-Tillage Ltd, New Zealand

Dear Moderator,

As a start, here is a recent article I wrote that has not been published but is aimed at focusing would-be no-tillers on what is required to make no-tillage most effective

(<http://www.fao.org/fsnforum/sites/default/files/resources/The%20dangers%20of%20short-cutting%20the%20practice%20of%20no-tillage%20120216.docx>)

I applaud the objectives of your forum because there is so much “woolly” thinking and so many sub-standard practices around at present that anyone starting out could be excused for becoming totally confused.

All of the statements made in my article are backable by solid science, but I will be interested in your opinion as to whether or not this is the sort of material you are seeking in a less popular press form.

My CV and publications list are also attached if it helps.

CV:

<http://www.fao.org/fsnforum/sites/default/files/resources/CJB%20CV%20%28updated%20081215%29.doc>

Publications list :

<http://www.fao.org/fsnforum/sites/default/files/resources/CJB%20publications%20list%20230710.docx>

Kind regards

John Baker

11. Prem Bindraban, VFRC-IFDC, USA

Dear ITPS and GSP secretariat

Thank you for taking this initiative of the voluntary guidelines for sustainable soil management, with soils being an essential global ecological good that should be judiciously utilized.

Therefore please find some suggested text recommendations with track changes.

I look forward to the advancement of this document.

Please do not hesitate to contact me for questions of additional information.

Prem

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/Zero_Draft_VGSSM_PSB.docx

12. Pieter Ploeg, Common Soil, Sweden

Dear colleagues,

Please find my comments to the Zero Draft in the form of tracked changes in the attached file. Thank you for the important work.

Kind regards,

Pieter Ploeg
founder Summer of Soil & Common Soil
Msc in Strategic Leadership towards Sustainability

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/Zero_Draft_VGSSM%20PP.docx

13. Ykhanbai Hijaba, FAO, Mongolia

Dear Colleagues,

Thank you for the Draft of VGSSM.

My comment :

In page 2 on Goal2 , after ...soil functions add "and the proper assessment and management of socio-ecological production landscapes at local level".

Thank you,

Best regards,

Hijaba Ykhanbai,
National Project Coordinator,
FAO project GCP/MON/008/GFF "Mainstreaming biodiversity conservation, SFM and carbon sink enhancement into Mongolia's productive forest landscapes" project
Ulaanbaatar, Mongolia,
Bayangol district, 2nd khoroo,
Chingunjav street,
State owned bldg. II

14. Theodor Friedrich, FAO, Cuba

Dear colleagues,

I have gone through the voluntary guidelines – I have chosen to work on the English version, hence my comments in English. Attached the document with my suggested changes in track change mode inserted in the text. In general I think this is a very important long overdue exercise for FAO – congratulations. In the substance, I have to criticise that the document is still written from a point of view “before sustainable intensification”, i.e. with an agricultural paradigm accepting soil tillage as necessary practice and soil degradation as unavoidable consequence.

If we are serious about sustainable soil management, this is not acceptable. It is scientifically proven, that any kind of mechanical soil disturbance (tillage) applied in a regular way leads to soil degradation at rates very much higher than the natural soil formation processes. Therefore, only with strict no-till approach a truly sustainable soil management will be possible. This should be clearly stated.

The representation of such no-till systems, as characterized by conservation agriculture, in the end of the document, is still full of prejudices from sources with limited practical CA experience. For the problems mentioned there is in the meantime sufficient literature available confirming feasible solutions to these problems. With this in mind, the literature list should be extended and the last chapter might be rewritten, reflecting the experiences from actually implemented CA systems around the world. References such as the FAO 2008 soil health workshop report should be included in the document along with other books on CA, published in the recent past.

I am copying this comment also to Amir Kassam, moderator of the CA-CoP, for further inputs. I hope, these comments and contributions are found useful and will be taken up.

With best regards,

Theo

Dr. Theodor Friedrich
Representante en Cuba
Organización de las Naciones Unidas
para la Alimentación y la Agricultura
Calle 154 y 3ra, #301, Rpto. Náutico, Playa
La Habana, Cuba

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/Theodor_Friedrich_Zero_Draft_VGSSM.docx

15. Theodor Friedrich, FAO, Cuba

Dear Colleagues,

In addition to my previous message I suggest to consult and refer in the review of the guidelines the attached FAO Policy Support Guidelines for the Promotion of Sustainable Production Intensification and Ecosystem Services, particularly the last chapters with the practical guidelines, which include specific recommendations for soil management, including compaction, input application and irrigation.

Policy Support Guidelines for the Promotion of Sustainable Production Intensification and Ecosystem Services

<http://www.fao.org/fsnforum/sites/default/files/resources/CA-policy%20book.pdf>

In any way, a coherence should exist between the new voluntary guidelines and these previously published FAO policy guidelines.

With best regards,

Theo

Dr. Theodor Friedrich
Representante en Cuba
Organización de las Naciones Unidas
para la Alimentación y la Agricultura
Calle 154 y 3ra, #301, Rpto. Náutico, Playa
La Habana, Cuba

16. Ian Hannam, University of New England, Australia

Dear FSN-moderator,

I attach for your consideration some comments on the VGSSM.

Best regards,

Ian

Ian Hannam PhD
Adjunct Associate Professor
Australian Centre for Agriculture and Law
University of New England, Armidale 2351 NSW, Australia
IUCN World Commission on Environmental Law
Chair Specialist Group, Sustainable Use of Soil and Desertification

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/Hannam%20comment%20-%20Zero_Draft_VGSSM.docx

17. Floria Bertsch, Asociación Costarricense de la Ciencia del Suelo, Costa Rica

Dear Eduardo Mansur,

I represent the Asociación Costarricense de la Ciencia del Suelo and also I belong to the Alianza Regional de Centroamérica, México y Caribe.

I would like to give some opinions about the document.

I will write in Spanish, but at the end I will try to translate.

[SPANISH VERSION]

En general, me parece un documento muy bueno, pero considero que es muy extenso.

Creo que los capítulos 1 y 2 son un resumen de definiciones y justificaciones ya presentes en documentos anteriores. Estas secciones consumen las 12 primeras páginas del documento, y la Guía, que comienza en esa página está constituida solo por 8 páginas más. Creo que se lograría más impacto concentrándose en la GUIA.

Yo trataría de resumir el capítulo introductorio empezando prácticamente en el “Scope of the Guidelines” y en el momento en que se hace referencia a que “las directrices se centrarán en los aspectos técnicos y biológicos” del MSS haría referencia a un APENDICE 3, que se ubicaría en la parte posterior del documento, en el que incluiría todo el capítulo 2.

Me parece que este capítulo 2 debe servir de referencia pero no ser el centro del documento como está ahora. Al nivel de este Guía no creo que sea necesario repasar las bases con ese detalle, basta con decir que fueron el soporte, referirlas al APENDICE y concentrarse en las directrices. Colocado en la parte de atrás se conservaría todo lo valioso de su información, que está muy adecuadamente organizada, pero sin interferir en la fluidez del documento.

Además, al ponerlo en el Apéndice sería coherente con el resumen que se presenta en el otro APÉNDICE, el 2, en el que se resume la situación mundial que también se tomó como base.

These are only some opinions related with the structure of the document. In other hand, I support also the comments sent by Olegario Muñoz Presidente del Comité Directivo de la Alianza Regional por el Suelo para Centro América, México y El Caribe.

Thanks a lot to take in account my opinions,

[ENGLISH TRANSLATION]

I think it is a very good document, but very extensive.

Chapters 1 and 2 are a summary of definitions and justifications already present in earlier documents. These sections consume the first 12 pages of the document and the Guide, which begins on that page, comprised only 8 pages more. I think a biggest impact would be achieved by focusing on the guide.

I try to summarize the introductory chapter starting practically in the "Scope of the Guidelines" and at the time referred to "the guidelines will focus on technical and biological aspects" of the MSS you could refer to Appendix 3, (located on the back of the document), which could include all chapter 2.

This chapter 2 serve as a good reference but it is not the center of the document, as it is now. It is not necessary to review the basis in detail. It will be enough to say that support the guide, refer them at the appendix, and focus on the guidelines. Placed in the back we preserve this valuable information but without interfering with the flow of the document.

In this way, all the documents that support the guidelines will be at the end: (Appendix 2 the world situation, Appendix 3 Technical bases)

18. Lal Manavado, University of Oslo affiliate, Norway

Comments on the Proposed Voluntary Guidelines on Soil Management.

The draft is refreshingly technical and is comprehensive with respect to the areas it has taken into consideration. I find it well-structured, nicely reasoned, and very useful to anyone who understands and cares about the vital role the soil plays in our lives.

I wonder whether its authors chose 'cultivated soil' with a dash of the soil in urban areas in order to keep within the scope of 'management', which is obviously unavoidable in this context. However, I would like to draw your attention to an aspect of soil conservation, which is very important but does not quite fit into the categories of soil guidelines are intended to cover.

They represent what we might call 'ruins of soil', i.e., abandoned strip mines (USA and Pacific), large tracts of forest destroyed by uncontrolled logging (Burma and Indonesia), unfilled abandoned mines (Cornwall, Eastern Europe, South Africa, etc), aftermath of forest clearance of thin top-soil to 'create' grazing grounds (Amazon basin) and forest fires (Indonesia), and advancing desert (Sub-Saharan Africa), etc.

These ruins of soil are often contiguous with arable lands or some kind of forest. Their interaction with less ruined soils, though not fully understood, can only have an adverse effect on the qualities of the soil the guidelines are intended to preserve.

I think it would be wise to describe in the guidelines some actions the authorities may take not only to mitigate the ill effects of ruined lands on its more fortunate counterpart, but also to reclaim it in order to increase the available ecosystem services.

Of course, how this may be achieved will vary according to climate, geography and the composition of the ruined soil involved. But, as we are not talking about agricultural cultivation here, a comparatively small investment in resources may enable us to harvest many a climatic and ecosystem service benefit.

Cheers!

Lal Manavado.

19. Ronald Vargas and Dan Pennock, facilitators of the consultation

Dear all,

We are grateful for the comments received to date. Our task as to compile the comments so that they can be fully considered by the **Intergovernmental Technical Panel on Soils** (when it meets in mid-March). They will review the comments and will prepare a first draft of the **Voluntary Guidelines on Sustainable Soil Management** based on these inputs. Therefore, we kindly expect further comments so that all issues are well addressed by the different communities of soil users.

The following section briefly summarizes the comments received until the 19 February 2016. Subsequent contributors may wish to consult previous contributions to the Forum.

Again, our thanks to all of those who have taken the time to respond to the e-consultation.

- The current version is focused on agricultural soils only and if to be useful for achieving SDGs, its scope should be wide to other land uses as well.
- There is need of reduce the introductory part and expand further the guidelines per se.
- Specific ways of achieving SSM and, very importantly, assessing its impact (using verifiable indicators) must be included.
- In the VGSSM emphasis should be placed on designing and developing fertilizers with well-balanced amounts of all plant nutrients, including micronutrients, adjusted to the location specific soil conditions in order to meet the needs of the plants and improve food quality.
- As mentioned in the introductory paragraphs, the voluntary guidelines should apply globally so why then try to push CA to all farmers? Fortunately in Sub-Saharan Africa, most policy-makers recognize the need for fertilizer (used efficiently) and varieties, in combination with good agricultural practices, including recycling or crop residues as is or via farmyard manure, and even tillage.

- The need to include land use planning and the need to adapt land use to land agroecological capacity. Restoration of degraded lands.
- The need to eliminate or drastically reducing burning of stubble and plant residues.
- The document is weak in urban and periurban soil aspects (urban orchards, urban soils, sealing,..) which are important and emerging subject.
- First, I suggest that there's no section named 1.0, 4.0, 5.0, 6.0. Just name them 1., 4., 5., 6. Second, I think it's important to present the causes of bad soil management observed through the world. For, the guidelines should indicate how to face the obstacles to sustainable soil management worldwide.
- More emphasis on the mitigation capacity of soil in relation to climate change should be more highlighted.
- Indicating benefits of no-till: "There are no short-cuts to minimum-disturbance no-tillage".
- Strongly advocates necessity of no-till adoption:" It is scientifically proven, that any kind of mechanical soil disturbance (tillage) applied in a regular way leads to soil degradation at rates very much higher than the natural soil formation processes. Therefore, only with strict no-till approach a truly sustainable soil management will be possible. This should be clearly stated."
- Suggests making VGSSM consistent with FAO Policy Support Guidelines for the Promotion of Sustainable Production Intensification and Ecosystem Services.
- Attention to an aspect of soil conservation, which is very important but does not quite fit into the categories of soil guidelines are intended to cover. They represent what we might call 'ruins of soil', i.e., abandoned strip mines (USA and Pacific), large tracts of forest destroyed by uncontrolled logging (Burma and Indonesia), unfilled abandoned mines (Cornwall, Eastern Europe, South Africa, etc), aftermath of forest clearance of thin top-soil to 'create' grazing grounds (Amazon basin) and forest fires (Indonesia), and advancing desert (Sub-Saharan Africa), etc.
- Would guidelines for use of marginal soils, soils on steep slopes, wetlands and the soils capability as related to land use could be of use.
- Extension education on soils is inadequate at present; needs enhancement.

20. Timothy Krupnik, CIMMYT, Bangladesh

I appreciate the opportunity to contribute to this important discussion. My main comments are detailed in the attached document. I summarize two key points below that I flag for further consideration.

1. Many of the guidelines are based on principles, which is fine in theory, but they can be quite subjectively interpreted. I would suggest adding a section on relatively easy to measure and monitor indicators of sustainable soil management, that can be implemented by practitioners. Simply applying principles to one's farm or lands is a great start, but in order to assure that soils are being well managed and contributing to the flow of ecosystem services, simple indicators and monitoring is necessary, and I believe should be made a policy objective in many countries, particularly where soils are fragile, and where farmers rely heavily on them (in low-input situations) for their subsistence.
2. As others have commented, there appears to be a very strong emphasis on conservation agriculture and no-tillage, with only a brief discussion of the trade-offs and limited adoption of CA by smallholders at the end of the document. To be more balanced, a number of other soil-building approaches and

techniques could also be highlighted, to give practitioners a suite of options to choose from should CA or no-till be less feasible in their respective environments. I believe it is useful to present a complete toolbox of different methods that can be used to maintain and improve soil quality, which in addition to CA and no-till may include techniques like agroforestry, smart livestock integration practices, stonelines (as used in the Sahel), more emphasis on green manures where appropriate, and so on.

With that said, congratulations on the zero-draft. I hope that these and others' valuable comments will help improve this important document substantially.

Regards,

Tim

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/160213%20Zero_Draft_VGSSM.docx

21. Hernán Figueredo, Ministry of Rural Development and Land, Bolivia

I greatly appreciate the opportunity to contribute with some aspects to the discussion Guidelines for Sustainable Soil Management document.

According to the structure of the document, I think that the guidelines, should be highlighted in the document and the theoretical scientific bases, which are introductory way. They should go in annexes and by this way the document would emphasize the purpose of the document.

In terms of the content of the document, there isn't much to refine since it takes into account very general guidelines (globally) and also it does not emphasize actions at the local level. As a matter of fact, I consider that the component of soil information might be highlighted because of the importance that it deserves in the knowledge of this resource. To have soil information could give technically sustainable strategies to address management, conservation and recovery for productive purposes as well as soil degradation. Moreover, Government policies about soil should focus on the actual and potential land use planning based on updated soil information according to an appropriate scale. This is a great weakness that developing countries have.

An important aspect which is not clearly visible is to emphasize some recommendations to implement social, cultural and political strategies according to the local projects. In many cases these are major limiting factors to implement, appropriate and go with the actions to care the soil resource by the stakeholders.

I hope these comments would be useful.

22. Alexandr Kaigorodtsev, East Kazakhstan state university, Kazakhstan

You are absolutely right, suggesting to concretize recommendations. It will make them available to farmers. Besides, the uniform system of indicators of implementation of these recommendations is necessary.

Regards, Alexander Kaigorodtsev.

23. Gurpreet Singh, Aga Khan Rural Support Programme, India

Dear Forum Members

Greetings !

I congratulate you for the efforts being taken to formulate the guideline in consultation with people across globe. I am a professional associated with Aga Khan Rural Support Programme- India (a part of Aga Khan Development Network) working along the coast in a salinity prone region of India. We in a team are working to promote Conservation Agriculture and other sustainable agriculture practices including "System of Crop Intensification"

Kindly find the attached track change document for the suggestions.

With best hope to save the soil

Thanks and Regards

Gurpreet Singh

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/Zero_Draft_VGSSM_Gurpreet_Singh.docx

24. James Breen, FAO, Ireland

Dear Sir,

I have made some comments on the VGSSM guidelines which I have attached. I feel very strongly that until farmers have a real incentive to look after their land, i.e. when they have proper title to it, they will not have either the means or the incentive to implement the Guidelines.

with best regards,

James Breen.

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/James_Breen.docx

25. Jeroen Huising, IITA, Nigeria

Forum members,

This is a nice initiative that I fully support. These guidelines give a comprehensive account of the ecosystem services of agricultural soils (especially!) and the principal ways on how the soil should be managed to maintain and even improve the ecosystem services provided. It reads more like set of principles than actual guidelines, 'maintain soil cover', for example. Whether SSM is achieved or whether these guidelines are enough to achieve the SDG of course depends on the implementation. And maybe some general observations could be included on how to implement these guidelines in the face of the many challenges mentioned in the document. These general guidelines/principles seem to apply to situations in which the ESS are intact and need to be maintained, but less to those situations in which these services are compromised and need to be restored. I would like to see reference to soil degradation as one of the major challenges to implement these guidelines and achieve SSM. It seems that Conservation Agriculture is seen as the major mechanism to implement SSM, and like others have remarked I also do not agree with that. See further comments in the attached document.

Regards, Jeroen Huising

Link to the Zero Draft with comments in track change mode:

<http://www.fao.org/fsnforum/es/sites/default/files/resources/Comments%20to%20the%20VGSSM%20%E2%80%93%20Jeroen%20Huising.docx>

26. Amir Kassam, United Kingdom

Dear Colleagues,

I commend the Global Soil Partnership for a well-meaning working draft of the Voluntary Guidelines for Sustainable Soil Management. I feel that the draft is on the right track, building on earlier work done by FAO on soil health, Save and Grow, Conservation Agriculture etc.

The draft makes an excellent case, in the first half of section 4, for sustainable soil management to be based on soil and landscape health management and implemented for production through the linked agroecological principles of Conservation Agriculture along with complementary practices of crop, nutrient, pest, water, farm power and mechanization management.

The draft unwittingly turns on itself in the second half of section 4 (the last four paragraphs) and casts doubts on what it has proposed in the first half of section 4. The draft would be helped considerably from inputs from colleagues who have actual field experience of implementing the adoption of soil health management through Conservation Agriculture which is now spreading at an annual rate of 10 Mha globally including in Africa and Asia. The constraints mentioned are made out to be much stronger than they actually are.

The first half of section 4 is based almost verbatim on the text from Save and Grow (FAO, 2011) and Kassam et al (2011), but cites references 8 and 9 which have had little to do with this text which was originally drafted in 2010 when FAO was preparing the Save and Grow publication. Section 4 needs to be redrafted. The Guidelines are not a record of an inconclusive debate, but an informed desired 'road map' of engagement to be followed by all stakeholders.

Section 5 seems to me to be too restricted and weakest. It is the job of all concerned (institutions, groups and individuals) in the public, private and civil sectors, and particularly the farmers and their rural communities to implement the Guidelines and not just through the GSP.

In addition to the references that are cited, several more references should be cited which provide more evidence and support to the Guidelines. Reference 10 has been discredited for several reasons but mainly because the dataset compiled for the meta-analysis is a mixed bag of decontextualized data from conservation tillage, minimum or reduced tillage, no-till and Conservation Agriculture. The data is mainly from the USA, and the meta-analysis is a good example of how not to do meta-analysis.

I have tried to edit the draft and have suggested references that could be considered for inclusion. I have used the marked up copy from Theodor Friedrich which I attach herewith, along with a book chapter on sustainable soil management

(<http://www.fao.org/fsnforum/sites/default/files/resources/Ch%2014%20Principles%20of%20SSMA.pdf>), and a paper on the global spread of Conservation Agriculture

(<http://www.fao.org/fsnforum/sites/default/files/resources/factsreports-3966-vol-8-overview-of-the-worldwide-spread-of-conservation-agriculture.pdf>). I will forward two other papers (regarding

sustainable intensification, and policy and institutional support for CA adoption and uptake) in a separate contribution.

I will be happy to provide any clarification needed on any suggested changes made in track mode.

Thank you for the opportunity for sharing ideas and making an input into this very important Guidelines.

Sincerely,

Amir Kassam

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/Amir%20Kassam%20-%20Zero_Draft_VGSSM-2-ak.docx

27. Amir Kassam, United Kingdom

Dear Colleagues,

Further to my earlier contributions, I attach two more papers which expand on the topics of:

Production systems for sustainable intensification relevant for the first half of section 4,

A. Kassam, T. Friedrich, F. Shaxson, T. Reeves, J. Pretty and J.C.de Moraes Sa. (2011). Production Systems for Sustainable Intensification: Integrating Productivity with Ecosystem Services. Technikfolgenabschätzung – Theorie und Praxis 20. Jg. Heft 2: 38-45. Juli.

(<http://www.fao.org/fsnforum/sites/default/files/resources/kassam%20et%20al-production%20system%20for%20sustainable%20intensification.pdf>)

and,

Policy and institutional support for adoption and uptake of Conservation Agriculture relevant for section 5.

A. Kassam, T. Friedrich, F. Shaxson, H. Bartz, I. Mello, J. Kienzle and J. Pretty (2014). The Spread of Conservation Agriculture: Policy and institutional support for adoption and uptake. Field Science Research Reports, Vol 7. (<http://factsreports.revues.org/3720>)

I also include herebelow a link for the FAO publication on soil health.

FAO (2008). Investing in sustainable crop intensification: The case for improving soil health. Integrated Crop Management Vol. 6. FAO, Rome.

(<http://www.fao.org/ag/ca/doc/WORKSHOP-LR.pdf>)

Sincerely,

Amir Kassam

28. Ana Paya Perez, European Commission Joint Research Centre, Italy

Dear Members of the Global Forum and the Intergovernmental Technical Panel on Soils,

These Guidelines are a good start to promote and support the global adoption of sustainable soil management practices. The input to further complete and develop these guidelines requires multidisciplinary competences which may need an extension of the on-line consultation. Alternatively these guidelines could be considered a lively document to be revised while the various Regions develop the five pillars of action's implementation plans.

For consistency these VG for Sustainable Soil Management need also to address other SDGs (please see a mapping of the SDGs in soil and land in the attached file) for example:

i) **SDG Goal 3. Ensure healthy lives and promote well-being for all at all ages**, and its corresponding Target 3.9: by 2030 substantially reduce the number of deaths and illness from hazardous chemicals and air, water and soil pollution and contamination,

and

ii) **SDG Goal 12. Ensure sustainable consumption and production patterns** and its corresponding target 12.4: by 2020, achieve the environmentally sound management of chemicals and all wastes through their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and environment.

These Guidelines focus mainly on the sustainable management of agricultural soils while is neglecting the high impact of the local soil contamination on the human health and the environment. As indicated in the Chapter 6.3 of the "Status of World Soil Resources" both aspects of local and diffuse contamination should be covered.

Specific comments

On page 15 (Zero draft VGSSM) on section 3.8 Guidelines for neutralization of soil contamination last phrase...*"This requirement is consistent with principles 2 and 5 of the World Soil Charter"*. When reading the World Soil Charter **Section II. Principles** the numbering does not correspond with the reference in page 15 (Zero draft VGSSM). I do not understand the intention of the authors, I propose to quote paragraph 6. *"The implementation of soil management decisions is typically made locally and occurs within widely differing socio-economic contexts. The development of specific measures appropriate for adoption by local decision-makers often requires multi-level, interdisciplinary initiatives by many stakeholders. A strong commitment to including local and indigenous knowledge is critical."*

Disclaimer *"This is my personal opinion and does not represent the opinion of the European Commission"*.

29. Kuruppacharil V.Peter, World Noni Research Foundation, India

Soil is a living entity harbouring microbes-fungi, bacteria, viruses, algae, micro animals and plants. Obviously the soil plane has water, oxygen, carbon dioxide, nitrogen and above all energy for existence. The single error committed by soil science books was treating soil as a physical entity and soil structure, texture and chemical and physical properties over emphasised. Chemical analysis of soil for micro and macro nutrients and pH alone may not reflect the biological properties of soil. The present soil testing cards are limited in scope and value to that extent. Organic carbon content is very important. The whole issue of soil as a living entity needs to be emphasised. Top soil erosion, mining, urbanization without caring top soil and export of soil are leading to infertility and zero productivity of soils.

30. Francis Shaxson, United Kingdom

In the attachment you will find my thoughts about the VGSSM.

attd: [Notes III re FAO's VGSSM.docx](#)

I have now been retired for some years, but since soil conservation and land-use planning were the focus of my career (short CV at the head of the doc.) I found the paper resonates with my experiences in the field, and in FAO HQ in Rome on various long/short occasions, and felt bound to respond.

I hope these comments may be helpful, and I would be happy to respond to any queries, confusions etc. that this response may stir-up!

With best wishes,

Francis Shaxson.

31. Carlos Henríquez, University of Costa Rica. Centro de Investigaciones Agronómica, Costa Rica

Does the zero draft sufficiently outline a way to achieve sustainable soil management worldwide?

This document is a very good start point for this so important document at global level like this. The idea of gather in a brief way the key factors for a sustainable soil management is necessary.

I would suggest that it could be good to point out what are the ten major threats so soil functioning or enumerate them at least. Also the five Pillars of Action of the Global Soil Partnership should be indicated. It is important to take into account that this document will be read by people that are not familiar with the GSP. One option for not to be very extensive in this document is to put all of this information in annex, appendix or glossary, as decided.

Have all the key technical elements to achieve sustainable soil management been included in the guidelines?

I think it is necessary to include or to point out a couple of concepts:

- a) Soil Quality (It is not mentioned at all).
- b) Porosity of the soil related with air flux into the soil. Balanced soil porosity lead to a good structure and an adequate flux of air for permitting a good state for microorganisms life besides the water status on soil.
- c) Building up Soil Organic Matter into the soil. The major reference in the text related with it is focused on organic cover, but less emphasis has been given in the importance for increasing the carbon pool into the soils.

On the other hand, the soil governance concept deserve to be explained more. In this type of document is better to be clear in some key concepts and to avoid the misunderstandings.

Furthermore, the soil conservation structures (engineering point of view) are not mentioned clearly. I think those are still very important soil management practices in areas with high steps and high risk of erosion.

Do the guidelines take into account the great variety of ecosystem services provided by soils?

In a broad sense it does.

Will the results of the guidelines, once implemented be sufficient enough to achieve the Sustainable Development Goals (SDGs)?

I think it is necessary to think in other collateral strategies simultaneously beyond its achievement. There is no doubt there are many additional aspects that should be taken into account besides the VSSM. For instance...how the VSSM reach people in general and different social strata?, Who will be in charge of deliver the VSSM? What will be the processes involved in this delivery?....

Do the guidelines identify activities that should be avoided to achieve multiple benefits through sustainable soil management?

This subject is not clear as others mentioned in the document. Could be good idea to put more emphasis in what are the “bad practices” that should be avoided.

32. Adam O'Toole, Norwegian Institute of Bioeconomy Research, Norway

I think the document lacks a section in the document for the soil's role as a store of carbon and climate stabilizer. It is briefly mentioned but needs explicit description alongside the other functional roles of soil.

Carbon stocks in soil represent both a risk and opportunity for climate change. A risk if areas still high in carbon are mismanaged or temperatures rise causing increased mineralization to CO₂. But also an opportunity in that major agricultural countries such as Australia have emptied much of their original carbon stores and have now the opportunity to increase them towards original levels.

The French 4 permille initiative launched at COP-21 describes well the opportunity and win win situation for increasing carbon in soils and buying us more time while we transition from a fossil to a bioeconomy.

Also I think biochar should be mentioned in this section as a innovative method for stabilizing soil organic carbon. The discovery in Mao et al. 2012 that 40-50% of soil organic carbon in a Mollisol was prairie-fire derived carbon underlines the role that biochar may play in long term fertility in soils and is an important finding. This article also explains the how biochar helped to create the enduring fertility in Terra preta soils.

The IPCC has included in their models that in order to keep global temperatures under 2 degrees, we will require the use of carbon negative solutions, and thus carbon capture by plants and long term storage in soil with biochar can be one such carbon negative solution, that more people should be aware of (Smith, 2016).

Abundant and Stable Char Residues in Soils: Implications for Soil Fertility and Carbon Sequestration

<http://www.fao.org/fsnforum/sites/default/files/resources/Mao%20et%20al.%20-%202012%20-%20Abundant%20and%20stable%20char%20residues%20in%20soils%20Implications%20for%20soil%20fertility%20and%20carbon%20sequestration.pdf>

Soil carbon sequestration and biochar as negative emission technologies

http://www.fao.org/fsnforum/sites/default/files/resources/Smith-2016-Global_Change_Biology.pdf

Biochar and its effects on plant productivity and nutrient cycling: a meta-analysis

<http://www.fao.org/fsnforum/sites/default/files/resources/biederman%20review%20biochar%20yield%20and%20nutrient%20cycling%202013.pdf>

33. Georges Bazongo, Self Help Africa, Burkina Faso

Well done for developing a guidelines for SSM promotion in all the countries.

Regarding the current draft, I have some remarks:

1 - I have a concern about that the guideline is voluntary. For me we cannot waste time to talk about the responsibilities of the countries. It's time to push all the countries and the development organisation to adopt these guidelines and use it to development national and/or continent policies or strategies to promote SSM. In most of the countries, the development activities present a lot of threats for the soil stability and fertility even if it's to create wealth for the population like for the global environment and climate change we are talking about now. In the same way, it's good you linked the guidelines with the SDGs 1 and 15 but it will be better to show also the link with the environment degradation and climate change and not a separate guidelines. So for me the guidelines should be an obligation for all the countries and development and UN bodies to take account in their actions and strategies.

2 - For me, the guide even if it should focus on objectives could describe some key strategies and/or approaches which contribute to SSM. Then the countries and others will decline the actions and activities according to their agroecological realities.

3 - In the point five, I will propose to keep it for Communication and advocacy and add a point six (6) for Monitoring, Evaluation and Learning. Most of the guidelines, policies and strategies failed because lack of a proper monitoring, evaluation and learning process to inform to guide the decision and key actions.

I would like to share with you the summary of the learning event of SHA on SLM in 2014.

<http://www.fao.org/fsnforum/sites/default/files/resources/SHA%20-%20Sustainable%20soil%20management%20session%202014.pdf>

34. Chris Grose, Department of Primary Industries Parks Water and Environment, Australia

The guidelines set an aspirational target towards which we should all be working. However, we need more than guidelines for SSM, we need action on the ground. On ground action is occurring in some more developed areas of the world but a range of pressures in less developed areas make SSM a virtual impossibility. Poverty/starvation, drought/flood, conflict/politics, population growth all impose constraints on the ability of governments and people to implement even the guidelines let alone on ground action. Achieving SSM may be impossible in some areas of the world and, in others, may result in a reduction of the productive capacity of the land thereby leading to other issues of short term food supply.

Need a means for measuring and documenting how implementation of the guidelines results in improved SSM. Need to identify factors that are indicative of improved SSM that can be measured and monitored. Need some case studies that demonstrate how implementing the guidelines can result in

real improvement to SSM. Such case studies should not be confined to better developed areas but should include more challenging parts of the globe where conflicting priorities of SSM, drought and the immediate need for short term food production occur.

While the guidelines do outline a way to achieve SSM they are unlikely to achieve SDGs as, for reasons discussed above, they are unlikely to be effectively implemented in large parts of the world. I applaud the foresight and vision of the guideline developers but my cynical hat would suggest that there are far greater world issues to be resolved before SSM is achievable.

35. Nesrin Yildiz, Ataturk University. Agriculture Fac. Dept Of Soil Science And Plant Nutrition. Erzurum, Turkey

Dear all,

Fertilizers are the most important input in crop production.

To determine the appropriate dose, type of fertilizer depends on proper (plant available nutrient concentration) soil analysis.

Unfortunately, were not developed (selection) proper soil testing methods to different soil properties.

The method selected for a region are used for all over the different regions ecological use, thus this fertilizer type will not be economic and ecological

For this reason, as a priority, appropriate soil testing methods for different soil (and climatic) conditions should be selected (extraction method, availability index)

36. Jean-Thoma Cornelis, Gembloux Agro-Bio Tech, ULg, Belgium

Dear,

The concept of resilience is of prime importance when the magnitude of a disturbance implies that a return to the preliminary environmental state will increase the functioning of the system and its environmental functions.

In terrestrial environments, Soil is an interface between the lithosphere, hydrosphere, biosphere and atmosphere where the bio-physico-chemical processes occurring will strongly govern the biogeochemical cycles of elements at the global scales. Soil is by its very nature integrated in terms of components and mechanisms. In this regard, sharing knowledge about factors and processes (natural and anthropic) that will influence the evolution of soil properties in the landscape is of utmost importance to get an integrated understanding of the ecosystem functioning of the natural environments.

Soil resilience is defined as the intrinsic ability of a soil to recover from degradation and return to a new equilibrium similar to the antecedent state, to recover its functional and structural integrity (Blanco and Lal, 2010; Principles of Soil Conservation and Management). The environmental factors controlling soil resilience are the factors that control the soil-forming processes: rock, vegetation, climate, topography, time and human influence. We therefore welcome initiative sharing knowledge for an integrated understanding of soil-forming processes that control their properties and, in fine, their functions. In this regard, an initiative such as the Earth's Critical Zone Observatories (<http://criticalzone.org/national/>) can augur a promising future in terms of inter-disciplinary

research and knowledge sharing about how bio-physico-chemical processes, and their interactions, affect the evolution of soil systems.

Cheers

Jean-Thomas

37. Ranila Jayasinghe, University of Peradeniya, Sri Lanka

Most of developing countries are mainly concerning of self sufficiency of selected few crops at any cost. That is why most of developing countries are mainly concern about fertilizer subsidy program for poor farmer. as a result of these kinds of subsidy programs farmers tend to use very higher (few times of recommendations) amount of chemical fertilizer. Year by year they are experiencing reducing yield from their farm lands. Again they tend to use more fertilizer than previous. Finally these kinds of programs become huge political problems to the developing countries. unfortunately billion of dollars have spent to destroy the good soil? We have to think again about fertilizer subsidy program carefully otherwise we will lose our soil soon.

38. Mr. Juan Carlos Rey Brina, Sociedad Venezolana de la Ciencia del Suelo, Venezuela

[SPANISH CONTRIBUTION]

En el documento adjunto, estamos enviando una carta de parte de la Sociedad Venezolana de la Ciencia del Suelo (SVCS), con los comentarios de un grupo de expertos de Venezuela sobre el Borrador Cero de la "Guías Voluntarias para el Manejo sostenible de los Suelos.

Desde la SVCS creemos que es muy importante la construcción de estas Guías y hemos consultado a 4 expertos en Física, Química, Biología y Conservación de Suelos; bajo la coordinación del Dr. Juan Comerma y mi persona, como presidente de la sociedad.

Esperamos que estos comentarios sean útiles para ser considerados en la elaboración final de las Guías.

Saludos cordiales

- See the attachment: [VGSSM_compilacion_definitivo_SVCS.docx](#)

[ENGLISH TRANSLATION]

In the attached document, we are submitting a letter on behalf of the Venezuelan Society of Soil Science (known in Spanish as SVCS) featuring the comments shared by a group of Venezuelan experts on the Zero Draft of the Voluntary Guidelines for Sustainable Soil Management.

The SVCS considers the drafting of these guidelines highly important. Coordinated by Dr. Juan Comerma and myself, as the chairman of the society, four experts in physics, chemistry, biology and soil conservation have been consulted.

We hope these comments are useful for the final drafting of the Guidelines.

Best regards

39. Sociedad Boliviana de la Ciencia del Suelo, Dirección de Investigación del Centro de Investigación Agrícola Tropical

[SPANISH CONTRIBUTION]

Distinguidos Señores;

Muy agradecidos por darnos la oportunidad de participar en esta importante labor como es la redacción de la Guía Voluntaria para el Manejo Sostenible de Suelos del mundo.

Con relación al documento, nos parece muy completo, aunque debido a la gran variabilidad que existe entre las diferentes regiones, siempre habrá algún problema o recomendación que no esté incluida en la Guía.

Consideramos que la palabra “Voluntaria” es muy débil y que probablemente no tenga la fuerza necesaria para que los gobiernos municipales, departamentales y nacionales tomen decisiones para inducir a los usuarios a implementar prácticas de manejo sostenible del suelo.

La información que se encuentra en el capítulo 2, Bases Científicas para la Gestión Sostenible de Suelos, que incluye definiciones y conceptos contribuyen a un mejor entendimiento de la importancia del recurso suelo y el manejo sostenible, sin embargo consideramos que para darle mayor énfasis a la Directrices para la Gestión Sostenible del Suelo, este capítulo debería ser presentado posterior al capítulo 5 o bien en los anexos.

A continuación emitimos algunas sugerencias para las Directrices, con base a las características de nuestros suelos y las practicas más comunes de su uso:

1. Directrices para la conservación de suelos agrícolas

- En los países en vías de desarrollo, es necesario contar con normas que regularicen el uso eficiente de suelos urbanos, con ello se evitaría el uso de suelos con potencial productivo. Debe ser de responsabilidad de los gobiernos Municipales la aprobación del cambio de usos de suelos agrícolas a urbanos, con un respaldo técnico realizado por universidades o centros de investigación mediante observación in situ y análisis físico químico de suelos.
- Los Gobiernos deben considerar la aptitud del suelo para autorizar la habilitación de nuevas tierras para uso agrícola, un ejemplo de ello es la habilitación de tierras con alta susceptibilidad a inundación o suelos con elevado contenido de arena.

2. Directrices para la creación de una superficie estable del suelo a través del control de la erosión del suelo

- Sería conveniente incluir algunas prácticas tendientes a disminuir los riesgos de erosión, por ejemplo el uso de cortinas rompevientos, ya sean implantadas o de vegetación nativa, sobre todo en áreas de topografía plana con vientos fuertes por varios meses del año.
- En áreas de valles donde las pendientes son fuertes y las parcelas para producción agrícola son pequeñas, es necesario el uso de barreras vivas para evitar la erosión del suelo por escorrentía.
- Sería conveniente incluir en el documento sugerencias sobre normas legales que contemplen medidas coercitivas o de incentivo; en algunos casos sancionando el uso de suelo sin prácticas de manejo sostenible y en otros, que premien la producción en suelos manejados de forma sostenible.

3. Directrices para el mantenimiento y mejora de una cubierta orgánica suficiente
 - Pequeños productores agrícolas y pecuarios de zonas con baja precipitación, por la falta de alimento para sus animales durante la época de invierno, luego de la cosecha introducen al ganado para el consumo de los residuos, dejando al suelo desprovisto de todo material orgánico. Sería conveniente *incluir alternativas viables para producir forraje, manteniendo la cubierta orgánica del suelo.*
 - Sería conveniente enfatizar que para obtener los beneficios de la siembra directa, es necesario realizar todas las prácticas (rotación de cultivos, cultivos de cobertura, fertilización) y no solamente la siembra con la maquina específica.
4. Directrices para subsanar los desequilibrios de nutrientes
 - Se sugiere adicionar la corrección de algunos desequilibrios de nutrientes como la relación invertida de Ca:Mg.
5. Directrices para el mantenimiento o mejora de la biodiversidad del suelo
 - Incluir prácticas para incrementar la población de microorganismos benéficos del suelo como el uso de inoculantes, micorrizas y promotores de crecimiento.
6. Directrices para el mantenimiento o la mejora de las propiedades físicas del suelo
 - En este punto no se tienen observaciones.
7. Directrices para el uso eficiente del agua de riego y la minimización de la salinización del suelo
 - Sería importante sugerir a los gobiernos municipales o departamentales para que en zonas bajas se considere realizar un plan nacional de drenaje. En nuestras condiciones, ocurre que el productor que cuenta con los recursos mejora el drenaje de su parcela pero afecta a sus vecinos, provocando frecuentes encharcamientos o inundaciones.
8. Directrices para la neutralización de la contaminación del suelo
 - En este punto no se tienen observaciones.
9. Directrices para la creación y aplicación de la información de suelos
 - Es común que diferentes instituciones realicen estudios detallados de suelos, identifiquen los principales problemas e investiguen y propongan diferentes prácticas para el manejo sostenible de los suelos. Sin embargo, gran parte de la información queda en las bibliotecas y no llega a los usuarios de la tierra. Es importante que en este documento se remarque la importancia de informar a los usuarios y en lo posible se haga un seguimiento de las prácticas que realizan los productores.

Reciban un cordial saludo del equipo de funcionarios de la Dirección de Investigación del Centro de Investigación Agrícola Tropical que también forma parte de la Sociedad Boliviana de la Ciencia del Suelo.

[ENGLISH TRANSLATION]

Dear Sir(s);

We appreciate the opportunity to participate in the important task of drafting the Voluntary Guidelines for Sustainable Soil Management.

The document seems comprehensive. However, due to the high variability of the different regions, the Guidelines will always lack a specific issue or recommendation.

We believe that the term “voluntary” has no binding force and probably won’t be vigorous enough for local, departmental and national governments to take measures encouraging the implementation of sustainable soil management practices.

The information included in Section 2, Scientific Basis for Sustainable Soil Management, features definitions and concepts contributing to a better understanding of the importance of soil resources and sustainable management. However, to place greater emphasis on the Guidelines for Sustainable Soil Management, this chapter should go after chapter 5 or be included in the annexes.

Several suggestions for the Guidelines, based on the soil features and most common land use practices, are detailed below:

1. Guidelines for the preservation of agricultural soils

- In developing countries, standards to regularise the efficient use of urban areas are required, avoiding in this way the use of potentially productive soils. Local governments should take responsibility for the approval of land-use change from agricultural to urban purposes, technically supported by universities or research centres with on-site observations and chemical and physical soil analyses.*
- Governments should take soil suitability into consideration to authorise the granting of new land for agricultural use. For example, when granting flood-prone land or soils with high sand content.*

2. Guidelines for creation of a stable soil surface through control of soil erosion

- Including some practices to reduce erosion risks, such as the use of cultivated or natural windbreaks, particularly in flat areas lashed by strong winds throughout the year, would be advisable.*
- In valleys where slopes are steep and agricultural plots are small, live barriers are necessary to prevent runoff and soil erosion.*
- Including suggestions on legal regulations considering coercive or incentive measures would be advisable; in some cases, sanctioning non-sustainable soil use management practices and, in others, rewarding production in sustainably managed soils.*

3. Guidelines for maintenance and enhancement of a sufficient organic cover

- Due to food shortage during the winter season, small agricultural and livestock producers in rainfed areas feed their animals with post-harvest waste, leaving the soil with no organic material. Including feasible alternatives to produce fodder whilst maintaining the organic soil cover would be desirable.*
- Stressing the need of conducting all practices (crop rotation, cover crops, fertilization), and not only sowing with specific machinery, to benefit from direct seeding would be advisable.*

4. Guidelines for addressing nutrient imbalance

- We suggest including a reference to the correction of some nutrient imbalances like the Ca: Mg ratio.*

5. Guideline for maintenance or enhancement of soil biodiversity

- We suggest including practices to increase the population of beneficial soil microorganisms like the use of inoculants, mycorrhiza and growth promoters.
6. Guideline for maintenance or enhancement of soil physical properties
- We have no comments on this section.
7. Guidelines for efficient use of irrigation water and minimization of soil salinization
- Suggesting local or departmental governments the implementation of a national drainage plan in lowland areas would be important. In our case, producers who have the resources to improve the plot drainage impair their neighbours, causing frequent flooding.
8. Guidelines for neutralization of soil contamination
- We have no comments on this section.
9. Guidelines for the creation and application of soil information
- Different institutions typically conduct detailed soil studies, identifying major issues and investigating and proposing different practices for sustainable land management. However, most of the information is stored in libraries and does not reach the farmers. Stressing the importance of informing the farmers and, if possible, monitoring their practices, is key.

Best regards,

Team of officials of the Tropical Agricultural Centre Research Division (also part of the Bolivian Society of Soil Science)

40. Ms. Phyllis (PhiPhi) Kaplan, Yayasan Konservasi Sawah Bali, Indonesia

Thank you for opening up participation for input: (suggestions are in *italic*)

Suggestions

1.0 - Goal 2 "without maintenance of soil function": without "**rehabilitation**" and maintenance.....

"ensure stable or increasing production" ensure "*healthy*", stable

1.3- Objectives: I strongly suggest that there should be a clause that identifies "*disseminates information to small family farms*" either in stakeholder clause as well as a separate clause that identifies, "*climate change mitigation (Goal 15) that has disrupted food security*"

2.1 Definition: Principle 3, include "*eradication of soil/food pollutants and contaminants such as chemical fertilizers, pesticides and herbicides*"

Table 1.1: Soil Formation: please insert the word "*compost*" and accumulation of organic and "*biodegradable*"

and "*uncontaminated*" organic matter.

Aesthetic and use the word "*conservation*" instead of preservation and insert cultural "*heritage*" landscape

Refugia : Providing and "*restoring*" habitat

2.2 2) please insert "*compost*" also

page 7 : the soil is "*maintained fully as agricultural land*"

page 8 : Flow of nutrients within should include a highlighting of Goal 15,

Biodiversity should be present in soil as this is what creates the complexity of natural microbial + nutritional additives, humus, aeration and tith to make the flow of nutrients within the soil

Also : I believe that beginning of this statement is incorrect ; Our understanding of the relationships between biodiversity and specific soil functions is limited but the availability of a variety of new tools suggests that significant progress in this area may be imminent. Given the significant public concerns about the possible linkage between pesticide use and biodiversity, a focus in this area is to draw attention of users to existing international codes for pesticide use.

Please perform due diligence before remitting that statement

Page 10: Poor management : *Misuse and allocation for other purposes : Competing uses such as building for tourism on prime agricultural lands.*

(I will refrain from editorializing too much, but Bali now experiences a major water crisis due to this. All of this was projected and scientifically studies by academics, but it was "development at all costs". Human rights have been violated: more that 65% of the indigenous people no longer have access to water.)

Page 11: **The area of current agricultural soils is maintained:**

Zoning laws ,planning tools, build outs must be utilized, adhered to and legally followed. Sprawl is continually fragmenting and degrading prime agricultural land and soil Land trusts should be adopted; cooperation between public + private .

3.1 if better suited use the above suggestion: Governments and policy makers.....

3.4 Riparian buffers; *and mangrove forests*

3.8 : Guidelines for.... as well as **Appendix** Pg 22 +table 23 : Should Identify "Contamination" as chemicals.

And why is there no mention of the potential GMO seeds and plants for contamination?

Because "contamination" can also be defined at areas taken over by invasive plants, Direct and Indirect Effects of Invasive Plants on Soil Chemistry and Ecosystem Function Jeffrey D. Weidenhamer & Ragan M. Callaway

4.0 higher rates of efficiency in the use of key inputs, including water, nutrients, pesticides, energy, land and labour:

I strongly disagree with the inclusion of portion of 2011 blueprint. By including pesticides you are undermining the entire new voluntary recommendations (I have been an organic gardener/farmer for over 40 years) Look at your own 2013 report! ("Wake up before it's too late" UNCTAD)

Thank you for this invitation.

I am saddened and disappointed for the human species that all of these guidelines are "voluntary". Between water wars and food insecurity we'll all be at each other's throats within 25-50 years. I do not believe that technology will get us out of this one. Too many people. Population: the basic root of all our problems. And of course, there is the binary aspect of humans/corporations: greed.

Sincerely,

Phiphi (Phyllis) Kaplan

41. Rachel Guimarães, Federal University of Technology - Paraná, Brazil

Dear Madam/Sir

We are responding to an invitation for contributions, to the online consultation for the development of the Voluntary Guidelines for Sustainable Soil Management. As current Chairperson of Working Group F “Visual Soil Examination and Evaluation (VSEE)” of the International Soil Tillage Research Organisation (ISTRO), together with Lars Munkholm (Aarhus University Denmark (ISTRO Assistant Secretary General), we believe that the activities conducted by this group would be of great relevance to be included in section 3.9 of the document proposed.

The ISTRO Group F (VSEE) is formed by an international group of soil scientists, with different backgrounds, from various continents, who work together on the development and application of Visual Soil Evaluation methods. The activities of the group follow on from early meetings in Peronne France (2005), initiated by Tom Batey, David McKenzie and Hubert Boizard at the 2003 Brisbane ISTRO conference and in Flakkebjerg Denmark (organised by Lars Munkholm and Bruce Ball), which led to publication of a Soil & Tillage Research Special Issue: Applications of Visual Soil Evaluation, published in 2013, and the development of a new methodology to evaluate the subsoil structural quality (SubVESS procedure, Ball et al, 2015).

Recently, as a result of the activities of this group, a book was published by CABI, which synthesised the state of art of Visual Soil Methods: Visual Soil Evaluation: Realizing Potential Crop Production with Minimum Environmental Impact, edited by Bruce Ball and Lars Munkholm. This book, which describes the main methods for Visual Soil Evaluation (VSE) of soil structure and soil-related properties, is extensively illustrated so as to give clear visual images of the variation of soil quality. In the book VSE is placed in the context of future sustainable intensification of agriculture including factors of soil loss, resilience, climate change, scarcity of water and other resources, nutrient retention and increased risk of degradation.

Currently we are editing a new special Issue for Soil and Tillage Research on the topic “Refinement and Potential of Visual Evaluation Methods and Soil Compaction Prevention Strategies”, which follows on from the VSEE group’s workshop, held in Maringá Brazil in 2014.

Most of the Visual Soil Evaluation methods covered by the group’s research and outputs are inexpensive, easily repeatable and can be used to access soil quality information in remote areas with limited infrastructure, as they do not require large or expensive equipment or laboratory analysis. The results from them can be obtained directly in the field, giving the user instant access to the result.

The group believes that the information regarding visual soil assessment contained in the Soil & Tillage Research special issues and the CABI book is highly relevant and that the inclusion of them in the text of the key documents and reference lists would be of benefit to the dissemination of the knowledge.

References

Ball, B.C. and Munkholm, L. R. (eds). Visual Soil Evaluation: Realising Potential Crop Production with Minimum Environmental Impact. CABI, Wallingford, UK, 2015.
<http://www.cabi.org/bookshop/book/9781780644707>

Soil and Tillage Research, volume 127, Pages 1-100 (March 2013)

Special issue: Applications of Visual Soil Evaluation
<http://www.sciencedirect.com/science/journal/01671987/127>

On behalf of the ISTRO Visual Soil Examination and Evaluation working group, I would like to reaffirm that we are available to provide further contributions towards the document. If you have any questions do not hesitate in contacting us.

Yours faithfully,

Rachel Guimarães
Researcher/Lecturer in Soil Physics
Federal University of Technology - Paraná
Agronomy Department
Via do Conhecimento, km 1 Pato Branco – PR, Brazil
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42. Laura Bertha Reyes Sánchez, Universidad Nacional Autónoma de México

[SPANISH CONTRIBUTION]

Estimados Drs. Ronald Vargas y Dan Pennock

Adjunto mi contribución a las Directrices Voluntarias para la Gestión Sostenible de los Suelos (DVGSS), esperando sea de alguna utilidad.

Agrego igual dos artículos en los que ya he remarcado para alectura rápida en color AMARILLO, el ¿qué es la química verde? pues la menciono en mis propuestas para el logro de la sostenibilidad.

Me fue difícil en estos días participar en línea, pero afortunadamente también dieron esta posibilidad.

Les menciono que fue MUY BUENO que den la opción de que el FORO se realizara en varios idiomas, pues el tener que traducir todo al inglés, dificulta el extenderse en propuestas y quizá estas no quedarían bien traducidas.

Gracias por su invitación a participar.

Cordialmente, Laura Bertha Reyes Sánchez

Attachments:

- [Laura Bertha Reyes Sánchez GLOBAL FORUM DVGSS.doc](#)
- [Reyes-Sánchez-232-qver.pdf](#)
- [Qu tan verde es un experimento \[1\].pdf](#)

[ENGLISH TRANSLATION]

Dear Dr. Ronald Vargas and Dr. Dan Pennock,

Kindly find attached my contribution to the Voluntary Guidelines for Sustainable Soil Management (VGSSM). I hope you find it useful.

I am also enclosing two articles. For ease of reading I have highlighted in YELLOW the definition of green chemistry as I have mentioned this concept in my proposals to achieve sustainability.

Participating online was difficult for me these days but, luckily enough, there was an option.

Offering the possibility of participating in the FORUM using several languages has been VERY HELPFUL. Translating all the contributions into English hinders long proposals which might not be properly translated.

Thank you for your invitation to take part in this process.

Cordialmente, Laura Bertha Reyes Sánchez

43. Farah A.Ebraheem, Environment Public Authority, Kuwait

Comment on consultation for developing the Voluntary Guidelines for Sustainable Soil Management

Guide line: Controlling severe soil losses (deflation by wind) using natural friendly materials, lessons learnt from Kuwait:

A large scale field experiment was recently conducted on soil losses control under very harsh conditions (wind speed from 40-50 km/hour and temperature ranging between 45-50 degrees Celsius.). Within 8 weeks ,vegetation cover was enhanced and the soil moisture was remarkably increased .The soil was stabilized after mulching by a mixture of organic materials (humus), out-washed silt and manure.

Mrs. Farah A.Ebraheem

Director of Coastal & Desertification Monitoring Dept.
Environment Public Authority

44. Pradip Dey, Indian Society of Soil Salinity and Water Quality, India

Dear All,

Good day!

Soil quality has become an internationally accepted science-based tool for advancing the assessment, education, understanding and management of soil resources. Two of the most important factors associated with the soil quality concept are that (1) soils have both inherent and dynamic properties and processes and that (2) soil quality assessment must reflect biological, chemical, and physical properties, processes and their interactions. In general, SQI is a useful assessment tool that may help in soil conservation and resource management apart from assessments of soil erosion and changes in productivity. SQI can thus provide the necessary information for planners and decision makers to make informed decisions against SQ degradation using the introduction of appropriate interventions. Despite such importance of SQI in combating SQ degradation, only few studies have been reported in relation to various land use and soil management systems. This indicated that research on SQI has been mostly neglected for unknown reasons, with the most probable reason which could be technical and financial limitations. Adoption of targeted yield approach provides the scientific basis for balanced fertilization not only between the fertilizer nutrients themselves but also that with the soil available nutrients for sustaining soil health.

With warm regards,

Pradip Dey

45. Pradip Dey, Indian Society of Soil Salinity and Water Quality, India

Dear All,

Good day!

Ensuring food security for burgeoning population necessitates the production of additional food grain from the same land without losing the production potential of the soil. This, in turn, requires extensive research to provide a scientific basis for enhancing and sustaining food production as well as soil productivity with minimum environmental degradation. In general, soil quality and soil health are often used interchangeably and are considered synonymous. Soil health describes biological integrity of the soil community the balance among organism within a soil and between soil organism and their environment. Soil quality is a term that more often is used to describe physical attributes of a soil. The term “soil quality” literally emphasizes on three important aspects, viz., (i) focus on dynamic rather than inherent characteristics of soil, (ii) soil fitness rather than just preventing degradation, and (iii) interactions among soil processes rather than soil components.

With warm regards,

Pradip Dey

46. Pradip Dey, Indian Society of Soil Salinity and Water Quality, India

Dear All,

Good day!

Climate change is a defining moment of our time with major negative implications on ecology, human culture, livelihoods and food security. Carbon sequestration is considered one of the remedial measures to arrest climate change. The principal way of carbon storage in soil is through formation of soil organic matter. Soil organic matter is a complex mixture of carbon compounds consisting of decomposed plant and animal tissues, microbial biomass and carbon associated with soil minerals. Among all these soil organic carbon (SOC) is most important one. The soil organic carbon can remain stored in soil for infinite period or may quickly released back to the atmosphere depending on various conditions. Soil organic carbon acquires a steady state at its potential value, where CO₂ loss and SOC sequestration is at the equilibrium.

With warm regards,

Pradip Dey

47. Pradip Dey, Indian Society of Soil Salinity and Water Quality, India

Dear All,

Good day!

A high aggregation on account of increased silt and clay protects SOC from decomposition by trapping them between the aggregates. Soil organic carbon is essential for enhancing soil quality, sustaining and improving food production, maintaining clean water, reducing CO₂ in the atmosphere and an effective soil quality indicator. Its concentration influences physical, chemical and biological qualities of soils, quality and quantity of biological produce. Soil organic carbon (SOC) is the predominant parameter

that affects other physical, chemical, and biological properties of soils. Cultivation generally depletes one third to half SOC, depending upon soil texture, erosion, and vegetative cover, management regime, initial concentration, period of fallowing and inorganic carbon accumulation. Available phosphorus and potassium were reported to increase with the stability of organic carbon and vice versa. Sodium adsorption on clay complex increased with SOC depletion. Thus soil organic carbon is dynamic and a widely accepted indicator, changing with land use and management history.

With warm regards,

Pradip Dey

48. Pradip Dey, Indian Society of Soil Salinity and Water Quality, India

Dear All,

Good day!

Moisture conservation enhances soil organic carbon by increasing period of vegetative cover, vegetative input to the soils and microbial population. This altogether leads to increase water stable aggregates that offer protection mechanism for longer residence time to soil organic carbon. In situ moisture conservation including inter row water harvesting, field bunding, mulching, deep ploughing and other agronomic practices such as drought tolerant cultivars, optimum plant density, and proper sowing time, balance fertilization, use of sprinklers and drips for irrigation on the undulated topography may have beneficial effect on soil organic carbon build up. Integrated and balanced use of nutrient and adoption of conservation agriculture also helps in soil carbon sequestration. Gene mining for drought avoidance is another aspect which helps in soil carbon sequestration. There are several species which have very extensive root system for mining water from large volume of soils and can survive very low water, such as *Prosopis Juliflora* surviving in the rainfall zone ranging from of 200 mm in Bhuj to 1000 mm around Ramnathpuram of east coast. Genetically modified plants can manage a biotic stress of droughts, salinity, heat and cold waves and such attempts may be beneficial for averting the impact of fallowing on soil organic carbon depletion. Finally, adoption of agroforestry system of land use combining agriculture, forestry, horticulture, livestock management and agrostology increases total productivity of food, feed and fuel and thereby reducing the risk of farming besides improving soil carbon sequestration. Further, region-specific amalgamated technological prescriptions refined with targeted policy analysis are required for effective implementation and obtaining positive outcomes within a finite time horizon.

With warm regards,

Pradip Dey

- See the attachment: [Indian J Traditional Knowledge.pdf](#)

49. Pradip Dey, Indian Society of Soil Salinity and Water Quality, India

Dear All,

Good day!

Nutrient management in India over time has specific syndrome which can be summarised by abuse of nitrogen, disuse of potassium, and generally coupled with overuse of phosphorus. It suggests inherent

flaws in fertilizer application practices adopted by farmers that probably promotes imbalance in nutrient applications. The ICAR project on soil test crop response (AICRP-STCR) has used the multiple regression approach to develop relationship between crop yield on the one hand, and soil test estimates and fertilizer inputs on the other, can be effectively used to tackle such flaws. The future line of work should include, development of soil health assessment and management protocols on the basis of farming systems after superimposing agro-ecological regions, soil type, yield targeting and resource availability with broader commitment of improving soil health and reducing carbon-footprint; development of decision support tool which can be used for judicious agricultural resource management and periodic soil quality monitoring; evaluation and propagation of customized and speciality fertilizers, nano plant nutrient products; development and calibration of soil sensors for soil test crop response. Residue burning need to be addressed holistically including energy consideration and dynamics of active / resistant pool of soil organic carbon. For salt affected soil, controlled drainage-subirrigation systems for recycling nitrate leaching from the soil profile and reduce nitrate lost in tile drainage may be advocated to all land reclamation corporation. Also there is a need to harness and manage the indigenous technical knowledge and fine-tune them to suit the modern needs. Notwithstanding the uncertainty over Kyoto commitments and instruments, the twin aspect of devising strategies for leveraging resources to tackle the challenge of low carbon transformation and strategies to enhance soil health and carbon sequestration will help in combating climate change without compromising economic development.

With warm regards,

Pradip Dey

50. Pradip Dey, Indian Society of Soil Salinity and Water Quality, India

Dear All,

Good day!

Soil health is often intricately related with spread of invasive alien species which also should be a factor to reckon with. International Union for Conservation of Nature and Natural Resources (IUCN) defines Invasive Alien Species as an alien species which becomes established in natural or semi-natural ecosystems or habitat, an agent of change, and threatens native biological diversity. These invasive species are widely distributed in all kinds of ecosystems throughout the world, and include all categories of living organisms. Invasive species are good at exploiting bare soil and empty niches. Invasive species are generally non-natives that infest natural ecosystems, including forest, rangelands, and pastures. One way to avoid invasive species is to choose the ones that are native to the area. Natives often are adapted to a specific environmental niche, and have natural controls that keep them in balance. Invasive species, on the other hand, are tolerant against environmental extremes and possess greater flexibility for survival in wide range of conditions with high water, light and nutrient use efficiencies. Some of the invasive species also exhibit fire resistance besides better competitive ability and allelopathy.

With warm regards,

Pradip Dey

51. Mr. Wilfredo Alfaro, Ministry of Agriculture, Chile

Dear colleagues congratulations for the proposal of the Voluntary Guidelines for Sustainable Soil Management (VGSSM). These guidelines should be a significant contribution to the Objectives for Sustainable Development. I get access to the document just today, nevertheless I will be very pleased to provide some first comments, strictly as a professional with a long experience in soil and water conservation.

These guidelines are an appropriate response to the Revised World Soil Charter. Merits and demerits of the proposal are consistent with the approach of the revised charter. Thus, the greater input delivered by the guidelines is the concept of ecosystem services provided by soils to ecosystems and human well being. Also, the focus on "soil" rather on "land" is remarkable. This focus provide a new value that is the specific treatment to a basic element of the nature as is soil, rather the most complex concept of land that includes soil as well as vegetation, other biota, hydrological and ecological process, as defined in the text of the United Nations Convention to Combat Desertification (UNCCD). This more specific approach provide some elements for weakness in the proposal, for example: (a) lack of an accepted definition of soil included in the text, and; (b) emergence of a new legal object, soil, that it seems may requires "integrity preservation" per se, despite law of mass conservation operating under a more integrated approach.

Lack of an accepted definition of soil may produce confusion or not, especially when term "soil" may be misused to make reference to the more ample term "land". In addition, the definition of Land Degradation Neutrality adopted by the XIIth session of the Conference of the Parties to the UNCCD has the same structure of the definition for Sustainable Soil Management included in the voluntary guidelines. This situation also may create confusion or not, but someone may considered that there is a parallel process where duplication of efforts may arise. Inclusion of a glossary may facilitate clarification, especially in terms like "soil resistance" or "soil resilience".

Concerning the issues of loss of a more integral view that may arise due to the underlying idea of soil preservation per se, it may be seen in the treatment of the erosion processes. The guidelines propose to get erosion rates to a minimum. In this idea erosion may be seen as a pervasive process because is intrisecaly contrary to soil preservation. But erosion is a natural process essential to landscape modelling, as well as river, stuarine a coastal biology. Minimum erosion eventually may create impacts quite similar to the construction of a dam in a river. Pressumably, a more appropriate concept in this case should be "accelerated erosion" that of course may require proper definition, but it may provide a concept for differentiation with erosion in an ecosystem approach.

There are many other comments that I would like to provide, but pressumably a revised text with change control may be more appropriate. I would appreciate very much somebody can indicate me the deadline to provide a revised text with control of changes.

Thank you very much for your attention.

Wilfredo H. Alfaro.

Forestry Engineer, M.Sc.

52. Alex Gittelson, International Cryosphere Climate Initiative

Dear FSN Moderator(s),

On behalf of the International Cryosphere Climate Initiative (ICCI) and its partners, I would like to first of all thank you for the opportunity to contribute toward this document. We agree that this document is well thought out and well argued and provides reasonable solutions and suggestions.

Below and also attached to this message, you will find several comments/suggestions on soil management based on our experience and research.

Comment 1 by Dr. Jessica McCarty, Adjunct Assistant Professor, School of Technology, Research Scientist II, Michigan Tech Research Institute:

Page 7, Section 2.2 - This draft is missing a specific opportunity to call out types of organic matter/residue removal and disturbance (which is needed to identify activities of importance to soil and important to SDGs related to soil health). I propose that a modification to the second bullet under 'Surface Soil Stability' read: "The removal of materials, mechanically, by hand, or via open burning, from the soil surface reduces the organic and mineral nutrient pool available for microbial processing and plant uptake and reduces the soil organic carbon store of the soil."

Comment 2 by Dr. McCarty:

Page 13, Section 3.3 - I propose a bullet be added to the section on 'Guidelines for maintenance and enhancement of a sufficient organic cover' to cover all key technical aspects of soil management:

Open burning of excess residues should be avoided to maintain sufficient organic matter as well as to prevent fire damage to the topsoil, which will result in further nutrient depletion and increased potential for erosion.

Comment 3 by Mr. Alex Gittelson, ICCI Eurasia Program Manager:

Page 10, Section on water retention - Removal of residue and materials negatively affects water retention by removing shading and protection from wind erosion. I propose a bullet be added on this threat:

The removal of residue or materials, mechanically, by hand, or through agricultural burning, negatively affects shading and water retention in soil, which contributes toward nutrient depletion, reduction of soil moisture, and wind erosion.

I hope you find these comments/contributions useful.

Best regards,

Alex

Alex Gittelson

ICCI Eurasia Program Manager

- See the attachment: [ICCI Zero Draft VGSSM.docx](#)

53. Dr. Robert (Bob) Evans, Anglia Ruskin University, United Kingdom

As far as I am aware the ways to achieve sustainable soil management worldwide are sufficiently outlined and the key technical elements to achieve sustainable soil management are included and take account the great variety of ecosystem services provided by soils. However, I do not think that with our present state of knowledge implementing the guidelines will be sufficient to achieve the Sustainable Development Goals. The guidelines do identify activities that should be avoided but it seems to me, it will be very difficult without addressing social, economic and political factors to bring them about, for example reducing the number of animals grazing the land to stabilise the land surface or addressing the demand for land, especially land to be used sustainably, as population continues to grow. My main concern is with the section on Surface Soil Stability.

Although we know in general terms the causes and impacts of land degradation it seems to me from reading the FAO's 'Status of the World's Soil Resources' we do not know in many countries what is the prime cause of degradation because the land can be degraded in one, or more ways not often adequately identified. I note that erosion, especially water erosion, is the main cause of degradation in many localities, but other than plot studies what is the evidence for that? It may well be that wash erosion does remove a veneer of soil without leaving any trace, but in my experience that is rare. Indeed, when I have seen wash in action, and that can be turbid flow over a fully vegetated but saturated soil surface, the amounts moved are small and where water has ponded and then evaporated only a very thin (< 1 mm) veneer of fine textured deposits can be seen. Only where rills and gullies form is there significant loss of soil from one location to another and deposits of coarse silt and sand particles seen. I question the assumption that wash erosion strips off a veneer of soil without leaving any evidence.

Rainsplash erosion may move large amounts of soil short distances, but it is flowing water which transports soil particles longer distances, so redistributing soil rapidly within a field/landscape/catchment. I note that in the GLASOD assessment of degradation wash erosion (Wt) is distinguished from the rills and gullies of terrain deformation (Wd). Moreover, from the images that often accompany assessments of what is termed wash erosion as assessed by the Universal Soil Loss Equation, or some form of it, small rills can be seen, but because of the size of the plot, not large ones. A key question it seems to me is how large and how long does a rill have to be before it is put in the wash or the deformation/rill class? As there is also in plot experiments a driver, or pull factor in the experiments, i.e. an increase in velocity of flow at the base of the plot where runoff is collected, and that it is accepted that plot experiments often overestimate erosion at lower rates, how much does the USLE overestimate erosion rates? This is important when it appears that most figures of erosion loss (rates of erosion) are based on the equation. In other words, is the importance of erosion over-stated and that the factor that is most degrading the soil is, for example, loss of organic matter, loss of fertility or an increase in acidity?

The above comments relate to cultivated land. Bare soil can be initiated by animals on very gentle slopes. Erosion of bare soil initiated and maintained by grazing animals is more difficult to assess than water erosion of cultivated land, especially if the edges of the bare soil are not sharply defined. Very often, in my admittedly limited experience of semiarid land, where sheet flow from a compacted grazed surface meets bare soil initiated in some way by animals, flow is concentrated often forming a very low 'micro-cliff' there. Very often however bare soil once initiated by animals is also eroded by the hooves of animals, by wind, and in colder climates by frost action, and the constant disturbance of the bare soil surface stops colonisation of the surface by vegetation. It seems to me estimates of erosion of grazing land using the USLE are not appropriate. Indeed, the equation was not devised to do that, it was devised to estimate water erosion of cultivated land.

Some form of field assessment and monitoring of erosion is needed. Much fieldwork - mapping and monitoring - is needed to gain knowledge of soils, their distribution and properties, identify where soils are compacted, identify contaminated sites and sites susceptible to contamination, and assess erosion. It is unlikely that remote sensing techniques will do the job adequately. The designs of the mapping and monitoring schemes are topics for discussion, but the schemes will need many workers/researchers going into the field.

Two other points come to mind. Firstly, and it is rightly noted in the draft document, local users of the soil are important. That cannot be stressed enough. Very often changes in how the land is managed appear to be imposed top down without the views of the indigenous farmer being taken into account. Any changes will have to be done with great care and sensitivity and with the cooperation of the local farmer. It seems to me we need to know what the indigenous farmer thinks, s/he may not think there

is a problem, especially if soils are inherently infertile and yields are not trending in a markedly downward direction. Secondly, I support disturbing the soil as little as possible when drilling crops, but only if herbicides are not key to controlling weeds, there are too many other environmental factors at risk, for example weed resistance and pollution of water courses if herbicides are to be used to control weeds.

Dr R Evans

Visiting fellow,
Global Sustainability Institute,
Anglia Ruskin University, East Road, Cambridge, UK

54. Alessia Cogliandro, European Seed Association, Belgium

Dear Sir/Madam,

Please find enclosed to this email the ESA contribution to the draft guidelines. On behalf of ESA I congratulate for the draft, it was developed taken into account all the threats for a sustainable soil management. We just underlined on one point the possibility to make use of breeding as tool to develop useful solutions when it comes to issues related to crop nutrients intake and a comment on the dissemination paragraph.

You will find more in the second file, especially in regards to the involvement of stakeholders and communication. I work for ESA in Brussels and simultaneously I am following a Master Degree in Food Security, and the paper attached focuses on the potential contribution of the seed and plant breeding sector towards a more sustainable soil management. The topic is approached from a very EU perspective and it was developed as final paper of a module on soil management I took, but I think it is a different and therefore interesting viewpoint for you.

I remain at your disposal for any further questions you might have.

Kind regards,

Alessia Cogliandro

Attachments:

- [esa_16.0129.docx](#)
- [How can a sustainable soil management improve your business.pdf](#)

55. Danielle Charbonneau, Canada

and I continue to highly recommend world leaders of your caliber to meet with Mr. Dave Ewoldt of Tucson, Arizona, about the cohesive framework required, across areas of expertise, to finally elevate your understanding of true sustainability, and receive additional knowledge that can clarify, generate momentum, and help build in continual inspiration from powerful ongoing informative feedback and assessments, confident collaborative efforts and sustainable results.

I know how difficult it is to step out of established cadres; however, when a community of the size of Tucson -- described by Dr. Jonathan Overpeck of the University of Arizona as ground-zero for climate change in the United States -- understands seasoned expertise at its finest, it would seem to support the recommendation I make in regards to FAO's online consultation for developing the Voluntary Guidelines for Sustainable Soil Management.

Thank you for admitting this submittal for timely expert consultation, to vitally enhance the Guidelines and provide support and missing understanding to everyone involved.

Myself, an ongoing cheerleader, including on matters of Conservation Agriculture, keep hoping for this consultation to take place soon. On behalf of People and Planet.

Sincerely and with respectful regards,

Danielle Charbonneau

Community and Environmental Advocate
volunteer, non-affiliated
Granby, Québec, Canada

- See the attachment: [Dave Ewoldt.docx](#)

56. Dr. Pascal Rushemuka, Rwanda Agriculture Board (RAB), Rwanda

Please find attached my comments as track changes in the document.

My many comment is that the user guide should emphasize the need to understand the soil as (1) a natural body like animal, crop, three: the implication is that we need to understand it clearly and to communicate it not only in a systematic classification but also in a live language (e.g. farmers' soil nomenclature). The farmers' soil nomenclature should be used in agriculture planning and extension. (2) a set of soil properties well explained with soil forming factor equation and the soil landscape relationship. We can only achieve sustainable soil fertility management if we understand the soil properties and their spatial distribution.

Kind regards,

Pascal

Pascal N. Rushemuka (PhD).

Agri-Environmental Senior Soil Scientist at Rwanda Agriculture Board (RAB).

Tel: +250783471871

- See the attachment: [Pascal Rushemuka.docx](#)

57. Mark Kibblewhite, Emeritus Professor at Cranfield University, United Kingdom

Dear Colleagues

Please find attached a response to the consultation. I hope this is useful and please do contact me should you need any clarification or assistance.

Kind regards

Mark

Mark Kibblewhite MBA PhD CSci CChem FRSC CEnv FIAgrE FISoilSci

Emeritus Professor, Cranfield University

Director - MK Soil Science Ltd

President - Institution of Agricultural Engineers

Emeritus Research Associate, Landcare Research New Zealand

- See the attachment: [Mark Kibblewhite.docx](#)

58. Dr. Diana Sietz Wageningen, University, Netherlands

Dear FSN-Team,

I commend you to this concise, carefully framed and very useful document! It clearly presents an outstanding piece of thought that can well foster pathways towards sustainable soil management in the future.

Regarding your first question “Does the zero draft sufficiently outline a way to achieve sustainable soil management worldwide?”, I have noted that the second part of section 4 is largely focussed on conservation agriculture. Broadening this perspective to other important agronomic and structural conservation practices may help to provide a more differentiated outlook on sustainable soil management. In line with this comment I included a few suggestions about potentials for broadening the scope of the guidelines. Pleased find my track changes (starting from p. 17) and a supporting publication attached to this email.

I hope these suggestions may be helpful.

Best regards, Diana Sietz

=====

Dr. Diana Sietz
Soil Physics and Land Management
Wageningen University

Attachments:

[sietz van dijk 2015 swc adopt drivers west africa dryland.pdf](#)

Link to the Zero Draft with comments in track change mode:

[Zero Draft VGSSM Diana Sietz.docx](#)

59. Elena Havlicek, Federal Office for the Environment FOEN, Switzerland

Dear Ronald and Dan

We thank you for giving us the opportunity to comment the zero draft of the VGSSM. We are aware that our task was quite easy, as we don't have to develop a new document/note but just to comment on what was already done. Some of our suggestions are directly included in the document, some more global comments are here below.

We thank you for the work you accomplished so far and we're looking forward to contributing to the next version.

For the Swiss team, Elena

Does the zero draft sufficiently outline a way to achieve sustainable soil management worldwide?

This document is mainly/only focused on agricultural use of soils and in that, it is not sufficient for the SSM worldwide. Forest and organic soils should be added (at least, based on our perception, probably soil scientists from other regions may have another point of view)

Have all the key technical elements to achieve sustainable soil management been included in the guidelines?

For agricultural soils: probably the main elements are included. We added some other possible elements (e.g. hedgerows for soil biodiversity).

Do the guidelines take into account the great variety of ecosystem services provided by soils?

Globally yes. Some services such as flood mitigation, drinkable water purification (forest soils) could be more prominent. It would allow promoting the multifunctionality of soils (e.g. healthy agricultural soils not only provide food but also flood security)

Will the results of the guidelines, once implemented be sufficient enough to achieve the Sustainable Development Goals (SDGs)?

The target 15.3 (restore degraded soils) is not sufficiently taken into account. The current guidelines seem to be mainly focused on goal 12 (food security).

Do the guidelines identify activities that should be avoided to achieve multiple benefits through sustainable soil management?

No

Sometimes the guidelines are drafted as goal (Plant growth on the field should produce enough growing plants and plant residues for a sufficient cover to exist) while others are meant as measure (Sufficient crop and other organic residues must be left on the field and not removed for other purposes)

The level of the guidelines (“flight altitude”) is very diverse. Some have a very high policy relevance (Governments and policy makers need to review and adapt existing policies for development of settlements and infrastructure to take account of the value of soils, particularly where subsidies or other incentives are driving unplanned land take and soil. Wherever possible, preservation of productive agricultural land should be a priority), other are very concrete, at user’s level (When mechanized tillage is used for field operations, the implements used must leave a proportion of the plant residues on the soil surface).

Dr Elena Havlicek

Scientific Officer

Federal Office for the Environment FOEN

Soil and Biotechnology Division

Worbentalstrasse 68, 3063 Ittigen

Postal address : CH-3003 Bern

Link to the Zero Draft with comments in track change mode:

[Zero Draft VGSSM Switzerland.docx](#)

60. Lionel Mabit, International Atomic Energy Agency, Austria

Dear FSN-Team, dear Colleagues,

I believe that this guideline should include an introduction to highlight why we need sustainable soil management and how to convince key decisional people to act. If solutions are proposed (again) but never adopted then.....

Indeed, urgency to take care of our soils has always been underestimated. One of the main problems to convince key decisional people (e.g Governments and policy makers) is the cost of soil degradation/soil erosion, very difficult to put a number on this.... will be nice that one part of this document is dedicated to “officially” estimating the cost of soil loss based for e.g. on soil fertility/nutrient loss estimation...and an official way to calculate it (at least the on-site impact) ; or adding other important social-economic factors..difficult I know.

I do believe that Prof. Dan Pennock based on his background and experience could add such important info in the final document.

Best regards, LM

Dr. Lionel MABIT | Ph.D Soil Scientist |
Soil and Water Management & Crop Nutrition Laboratory |
Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture |
Department of Nuclear Sciences and Applications |

61. Mr. Co Molenaar, Ministry of Infrastructure and Environment, Netherlands

Dear colleagues,

With great interest I have read the voluntary guidelines on sustainable soil management. Soil is indeed a limited resource with evidently high societal value. Therefore I want to contribute in sharing views about sustainable soil management.

On headlines I want to make some comments and suggestions to improve this draft version.

Integrated approach of the **soil-sediment-water system**;

In reality it is a system which is more complex instead of a sectoral approach by soil. Agricultural production and security is also depending on the availability of water. And there for the document should not be limited to rural areas, but also extended to the urban areas. Groundwater use in urban areas might have an influence in agricultural areas.

Sustainable use of land should be done in 4 or 5 dimensions (3 D and a long term vision and sufficient data)

The guidelines describe processes in a qualified matter without mentioning the **instrument** to use by the stakeholders. For example, farmers want to have the instruments to contribute in reducing greenhouse gas emissions. So it is more a strategic document for policymakers and not meant for farmers on an operational basis.

The link between agriculture and the reduction of the effects of climate change is important and could be more emphasized.

Especially in urban areas starting point is that the quality of the land should be suitable for the function and use of the land. In urban areas with often a legacy of contamination the approach is risk based and not a multifunctional remediation. The cost are too high to make this possible. Moreover this fits within the definition of sustainability: a balance between the three P's of people, planet and profit. The starting point is to **use land in a sustainable way** and not only the focus on soil preservation and prevention.

In the guidelines seems not **costs** to be involved.

For more detail comments see the attachment. If needed I am willing to clarify and explain the above mentioned points.

Kind regards,

Ing. N.J. Molenaar (Co)
Senior advisor soil and water

.....
Ministry of Infrastructure and the Environment
Rijkswaterstaat, WVL Soil plus
Griffioenlaan 2, 3526LA Utrecht (visiting address)
Postbox 2232, 3500GE Utrecht

Link to the Zero Draft with comments in track change mode:

[Zero Draft VGSSM comments NL.DOCX](#)

62. Prof. Keith, Gouling Rothamsted Research, United Kingdom

I am pleased to submit the attached comments on behalf of the Sustainable Soils and Grassland Systems Department at Rothamsted Research.

Attachments:

- [Response to the VGSSM from Rothamsted Research](#)

Link to the Zero Draft with comments in track change mode:

[Annotated Zero Draft VGSSM](#)

63. Grazia Masciandaro, CNR-ISE, Italy

Dear colleagues

I have read with great interest the Guidelines for Sustainable Soil Management. I think that the document is mainly based on agricultural soils and the problems derived from agricultural practices. In my opinion, a draft about "Sustainable Soil Management" should include also other impacts which

should cause problems to the soils, such as erosion, salinization, contamination, etc, which are just mentioned or briefly described. In addition, the information about key technical elements to achieve sustainable soil management are few, already known, and again referred mainly to agricultural soils.

About the variety of ecosystem services provided by the soils, they are too general, barely incisive, and are quite distant from the classical definition.

Finally, the guidelines if appropriately improved should be very useful for soil scientists experts in order to achieve the Sustainable Development Goals.

Kind Regards,

Grazia Masciandaro

Dr. Grazia Masciandaro
CNR-ISE
Pisa (Italy)

64. Martin Kaupenjohann, TU Berlin, Germany

Dear colleagues,

I appreciate the initiative for "Guidelines for sustainable Soil Management".

Since soil structure is an integral parameter of soil fertility and soil health I would recommend to add some arguments considering this aspect to the current draft (see attached text).

Kind regards

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/Zero_Draft_VGSSM-KI.docx

65. António Perdigão, Portugal

- **Does the Zero draft sufficiently outline a way to achieve sustainable soil management worldwide?**

In principle in general yes, nevertheless in what concerns the statement "The Guidelines will address sustainable management of soils in all types of agricultural systems and the maintenance or enhancement of ecosystem services they provide" on the thematic approach Sustainable Soil Management and Sustainable Production systems, namely capacity of adaptation to Climate change, extreme weather accidents like drought and Flooding and Improvement of Land and soil quality are not enough detailed and adapted to the situation we face in Mediterranean Regions, specially in semi-arid and dry sub-humid conditions.

In what regards Ecosystem services, for Supporting Systems, soil functions listed are rather generalized, in what concerns Regulation Services and Provisioning Services, they should be in accordance for Europe, with European Environmental Directives.

In what concerns the management of impacts on soil functions and ecosystem services, there is a sound basis to have good capability information of the soils to achieve sustainable soil management on agricultural soils.

On the subject of major threats for water cycle, they are not only associated with soil compaction but also to the type of soils with high content of shrinking clays. On other way waterlog is not only a result of poorly implemented drainage programs, but also a result of bad agricultural and farming management practices.

- **Have all the key technical elements to achieve sustainable soil management been included in the guidelines?**

One of the threat that is substantially increasing in Europe and is reducing strongly the availability of soils is the one related with soil sealing and Land take, mostly not only on urban areas, but also in what concerns networks of transport infrastructure and Logistic platforms, in the case of Portugal, affecting high productive agriculture soils.

Another question is related with the reduction of soil filter capacities, mainly the so-called diffuse soil chemical contamination with phosphates due to forest fires, through transport and deposition of sediments on water bodies, representing a substantial threat for human health.

- **Do the guidelines take into account the great variety of ecosystem services provided by the soil?**

In what concerns the orientations assumed on the Guidelines for Sustainable Soil Management, from the VGSSM, having as basis Principles 8 and 9, from the World Soil Charter, we think that the strategy that has been assumed does not fits precisely with the requirements of soils from the semi-arid and dry sub-humid regions, mainly in what regards themes related with maintenance and restoration on agricultural soils, mainly the following ones:

- Conservation of agricultural soils;
- Improvement of soil stability through erosion control;
- Nutrients imbalance;
- Maintenance and valorisation of the soil, biodiversity;
- Maintenance or valorisation of soil physical properties;
- Efficient use of irrigation water and minimization of soil salinization;

Ecosystem services provided by the soils of greatest relevance to agriculture and soil functions that support these services, reflects the opinion of the Intergovernmental Technical Panel on Soils, as part of the European Soil Partnership, expressed on the main Report “Status of the World’s Soil Resources”. Tacking into account the geographical extension of Europe and Eurasia, the themes and the approach is much towards the problems and threats, mostly Supporting and Regulation services, not really covering the reality of Southern European soils.

- **Will the results of the guidelines, once implemented be sufficient enough to achieve the Sustainable Development Goals (SDGs)?**

The guidelines in accordance with Principles 8 and 9 of the World Soil Charter are either ambitious or insufficient in what concerns restoration of soil functions in agricultural as for Europe in what concerns value of soils and their dependence on subsidies or other incentives, depending in Europe on political strategies and priorities for agriculture and preservation of productive agricultural land.

In what regards soil erosion and efficient use of water, it is not clear how farmers will go on the way to conservation techniques and no till, Tacking into account that in what concerns watershed scale at European scale this deals with the strategy of the Directive 2000/60/EC establishing a framework for Community action in the field of water policy (WFD), managed at watershed level, so-that they do not go at level of the choice by the farmers of cover crops and by other hand, the trend for crop selection is made by economical reasons, not only local, but also at global level.

In what concerns nutrients imbalance at European level, it should be taken into account the content and the rules of Council Directive 1/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources.

There is a really need of a more detailed approach, is the setting-up and improvement of the Soil Information System, that should be improved on the basis of strategies and infra-structures defined on the basis of Pilar 4 of the Global Soil Partnership, as they are enough developed on GSP documents.

- **Do the guidelines identify activities that should be avoided to achieve multiple benefits through sustainable soil management?**

As the approach organizes the strategy in terms of farming systems and their suitability for sustainable crop production intensification is in accordance with FAO publication “Save and grow. A policymaker’s guide to the sustainable intensification of smallholder crop production” the farmer practices proposed as follows do not cover all the situations, in Europe as for example the following conservation practices:

- To minimize soil disturbance by minimizing mechanical tillage;
- To enhance and maintain a protective organic cover on the soil surface;
- Cultivate a wider range of annual and perennial plant series (including trees, shrubs, pastures and crops) in associations, sequences and rotations.

Also a question can be highlighted for the strategies for the management practices, based on “Performance and Potential of conservation agriculture for climate change adaptation and mitigation in Sub-Saharan Africa”, and its adaptation to European conditions, as in what concerns the requirements for Conservation Agriculture.

A more detailed approach should be supplied in accordance with five pillars of the GSP, of the strategy for **Communication, Outreach, Advocacy, promotion, Monitoring and Evaluation**, tacking into account that the discussion and the state of the art of the pillars of the GSP, enough material and strategies are available.

66. Marco Flores Maldonado, Dirección de Conservación de Suelos, Argentina

- ¿Describe adecuadamente el borrador cero una forma de alcanzar la gestión sostenible de los suelos en todo el mundo?

Reúne los elementos esenciales y están descritos de forma adecuada, sin embargo el punto 5 es muy pobre pues más allá de la importancia que representan los 5 pilares de la AMS (que uno puede remitirse a un anexo) este punto por lo menos debería dar pautas sobre como la Comunicación, Difusión, Defensa, Promoción, Monitoreo y Evaluación, ayudarían a alcanzar una gestión sostenible del suelo, sobre todo considerando su trascendencia cuando bajamos de lo global a lo local

- ¿Se han incluido en las directrices todos los elementos técnicos clave para lograr la gestión sostenible de los suelos?

Todos no, pues una gestión sostenible de los suelos tiene relación, como el documento mismo indica, con el uso sostenible del agua. En este sentido, las directrices no abordan nada sobre el tema de uso de aguas residuales para una agricultura sustentable. En lo mínimo debería indicarse que los gobiernos deben hacer esfuerzos para el mejor aprovechamiento de estas aguas a partir de sistemas adecuados de tratamiento.

- ¿Tienen en cuenta las directrices la gran variedad de servicios ecosistémicos que aportan por los suelos?

Si, una gran variedad de servicios ecosistémicos aportados por los suelos son tomados en cuenta en las directrices, sin embargo el principal no está resaltado, el cual tiene relación con la vida misma, pues caso no hubiera suelo...cuántas especies dejarían de existir?

- Una vez implementados los resultados de las directrices, ¿serán suficientes para alcanzar los ODM?

Hasta el 2030 definitivamente no. Esto obedece a un cambio generacional donde el pilar del mismo constituye la educación. Es plantar hoy para cosechar mañana. A la niñez del día de hoy se la debe convencer de la importancia del recurso suelo y su manejo sostenible para que el día de mañana vivan bajo esta línea.

Por otro lado, si bien la gestión sustentable del suelo es relevante para el logro de los ODS 2 y 15 es necesario notar que además esta gestión sustentable del suelo se relaciona con otros ODS. Sin embargo, lo que plantean las metas del ODS 2 para el 2030 son utópicas de alcanzar. Es solo reflexionar en cuanto se avanzó en base a acuerdos de las partes desde la Cumbre de Río y lo que se pretende alcanzar en 14 años. Suelos es una temática que aún no está posicionada como debería en la mentalidad de la gente (especialmente en la niñez) y el trabajo que se está realizando en esto es notable, lo cual va a demandar un proceso largo de concientización (cambio generacional en el modo de pensar sobre el recurso suelo). En este sentido se ve imposible duplicar la productividad y eliminar el hambre para 2030.

Una guía de manejo sustentable debería contar con indicadores de desempeño mínimos (fertilidad, superficie agrícola en pequeñas propiedades, %de producción para autoconsumo, diversidad de cultivos, migración por hambre, etc) pueden ser indicadores de arraigo en el medio rural justamente cuando pensamos en la gente más vulnerable. Indicadores generales pueden ayudar a los países a ver dónde están parados y hacia donde caminan con las intervenciones que realizan a través de políticas, inversiones, proyectos etc. Indicadores (como los usados en LADA) o el informe PRAIS de la UNCCD son interesantes en este sentido, sin embargo dependen de las capacidades institucionales para su implementación. Indicadores puntuales y sencillos contribuir a la necesidad de que hacia el 2020 los países puedan saber si van a cumplir o no con estos ODS en el 2030.

Finalmente, Como sabe un país si está en el camino correcto para lograr un mundo neutro de degradación? Aquí deberían proporcionarse dos o tres indicadores de monitoreo que muestre una radiografía clara hacia el 2020 (de aquí a 4 AÑOS!!), pues para el 2030 realmente va a quedar en el "tratar de lograr". Esta cruda realidad podría llegar a mostrarnos el desarrollo de estos dos o tres indicadores claves.

- ¿Identifican las directrices actividades que deben evitarse para lograr múltiples beneficios mediante la gestión sostenible de los suelos?

Si, identifica las principales actividades a ser evitadas pero no están todas

67. Ministerio de Ambiente y Desarrollo Sostenible, Colombia

1. ¿El borrador cero detalla suficientemente, una manera de lograr un manejo sostenible de los suelos en todo el mundo?

El borrador cero expone y desarrolla el conjunto de características físicas, químicas, biológicas que deben presentar -en forma simultánea- los suelos agrícolas bajo un manejo sostenible:

1) el suelo tiene una superficie estable; 2) una cobertura orgánica suficiente; 3) un flujo de nutrientes suficiente y eficiente; 4) organismos y funciones biológicas; 5) captura eficiente de precipitación y de agua suplementaria; 6) neutralización de contaminantes.

Advierte sobre una séptima característica: 7) su uso agrícola no es totalmente transformado (infraestructura, minería).

Dichas características se abordan desde los aspectos de sus beneficios y de las consecuencias de su deterioro, así como de las directrices técnicas para alcanzarlas y conservarlas. Se enuncian también, principios e indicaciones técnicas para un manejo sostenible de los suelos bajo agricultura intensiva. Las directrices para alcanzar estas siete características de los suelos agrícolas bajo manejo sostenible suponen que éstos podrán suplementarse en agua y en nutrientes en forma suficiente y balanceada (acceso a recursos, tecnología) y que mantener y mejorar el uso agrícola de los suelos es un aspecto fundamental de la planificación.

El borrador cero, lo enuncia en su introducción, es un complemento del documento FAO 2015 Status of the World's Soil Resources. En este último se desarrollan más ampliamente dichas características, por lo que el borrador cero constituye más bien una síntesis de ellas.

Las directrices para el manejo sostenible de los suelos se basan en los principios 8 y 9 de la World Soil Charter (revisión 2013), carta de principios en la que se define manejo sostenible.

El borrador cero es un desarrollo divulgativo de elementos provenientes de estas dos fuentes.

2. ¿El documento incluye elementos técnicos clave para una gestión sostenible de los suelos?

El documento hace una síntesis de elementos técnicos (físicos, químicos, biológicos) de las características de los suelos agrícolas que deben alcanzarse, como resultado del proceso de introducción y desarrollo de prácticas sostenibles de manejo.

Precisa que, dada la escala de trabajo y la diversidad suelos y de prácticas agrícolas, no tratará procesos particulares de manejo sostenible. No obstante, es importante que se desarrollen guías den una línea más clara sobre los diferentes procesos de manejo sostenible del suelo.

3. ¿Las directrices tienen en cuenta la gran variedad de servicios de los ecosistemas proporcionados por los suelos?

Se sugiere que el borrador cero, recoja la definición de servicios ecosistémicos y desarrolle de manera más precisa la Tabla de servicios ecosistémicos y funciones del suelo que se presenta. Es necesario que se resalte la relación suelos-biodiversidad, de modo que el manejo sostenible del suelo encuentre sinergias entre la gestión integral de la biodiversidad, el cambio climático y la lucha contra la degradación de tierras.

En este sentido, se sugiere relacionar de manera más directa los factores de degradación con amenazas sobre las funciones del suelo y los servicios ecosistémicos y ubicar los suelos como un subsistema de los ecosistemas.

Dado que estas funciones son procesos naturales que ocurren en el tiempo e involucran la evolución del suelo, se sugiere no emplear el término creación, al tiempo que describir con mayor precisión (y la misma sencillez) los procesos involucrados en la formación del suelo.

4. ¿Los resultados de las directrices, una vez ejecutados son suficientes para alcanzar los Objetivos de Desarrollo Sostenible (ODS)?

El borrador cero desarrolla, como se ha expuesto arriba, las características finales que debe presentar un suelo agrícola bajo un manejo sostenible. En este sentido, contribuiría al cumplimiento de los objetivos de desarrollo sostenible, entre ellos el relacionado con degradación neutral de la tierra. En este sentido, es importante que se reconozca que cada país debe establecer un objetivo voluntario de degradación neutral y que en el marco de la Convención de Naciones Unidas de Lucha contra la Desertificación y la Sequía – UNCCD, este objetivo se enfoca además, a la reducción de los procesos de degradación del suelo en ecosistemas secos.

Sin embargo, se requiere que establecer mecanismos para que los países miembros de la Alianza Mundial de los Suelos logren aplicar en la formulación de políticas y programas nacionales, así como en el desarrollo de proyectos, los lineamientos generados en las guías voluntarias.

5. ¿Las directrices determinan las actividades que se deben evitar para lograr beneficios a través de la gestión sostenible de los suelos?

El borrador cero expone actividades a evitar en el manejo técnico de los suelos, para lograr las características físicas, químicas y biológicas de las que trata.

De igual manera, se observó que el documento borrador de la guía tiene una visión generalizada sobre el manejo sostenible del suelo agrícola, por lo que se sugiere incluir suelos que tengan otro tipo de vocación además del uso agrícola.

Asimismo, es importante que la guía se relacione con el conocimiento (taxonomía y capacidad de uso) e investigación del suelo, teniendo en cuenta que la zonificación plasmada en el documento es muy genérica, por lo que recomienda que las directrices voluntarias se desarrollen acorde a las condiciones de cada región. Un ejemplo de esto, es que en Latinoamérica, uno de los principales problemas de degradación del suelo es la erosión, por lo que las acciones que se desarrollen en torno al manejo y uso sostenible, deben estar orientadas a la reducción de dicha problemática, de una forma integral que aborde diferentes dinámicas del desarrollo como es lo social, lo político, lo económico y lo ambiental y su contribución a la reducción del cambio climático.

68. LANDMARK consortium

Preamble

The LANDMARK consortium welcomes the opportunity to provide feedback and comments to the Voluntary Guidelines for Sustainable Soil Management V0 (VGSSM), produced and circulated for consultation by the Global Soil Partnership. In this short submission, we aim to:

- i) Briefly explain the aims and scope of the LANDMARK project;
- ii) Summarise the scientific concept on sustainable land management, called 'Functional Land Management', that underpins the LANDMARK project;
- iii) Provide an appraisal of the VGSSM in the context of this concept, for consideration by the Global Soil Partnership and
- iv) Provide specific comments on the V0 draft.

What is LANDMARK?

LANDMARK (LAND Management: Assessment, Research, Knowledge base) is a European Research Project on the sustainable management of land and soil in Europe. The question that Landmark aims to address is: 'how can we make the most of our land?' How can we ensure that our soils deliver on the many expectations we have of our land? These expectations (or 'demands') include:

1. Primary productivity: the capacity of a soil to produce plant biomass for human use, providing food, feed, fibre and fuel within natural or managed ecosystem boundaries;
2. Water purification and regulation: the capacity of a soil to remove harmful compounds from the water that it holds and to receive, store and conduct water for subsequent use and the prevention of both prolonged droughts and flooding and erosion;
3. Carbon storage and regulation: the ability of soils to store carbon for a) partial offsetting of GHG emissions and b) regulation of biological and physical soil processes;
4. Provision of a habitat for biodiversity, both below-ground and above-ground diversity: the multitude of soil organisms and processes, interacting in an ecosystem, making up a significant part of the soil's natural capital, providing society with a wide range of cultural services and unknown services;
5. Cycling and provision of nutrients, specifically the ability of soils to receive nutrients in the form of by-products, to provide nutrients from intrinsic resources or to support the acquisition of nutrients from air or water, and to effectively carry over these nutrients into harvested crops.

Landmark is a consortium of 22 partner institutes from 14 EU countries plus Switzerland, China and Brazil. These include universities, applied research institutes, Chambers of Agriculture, an SME and the European Commission. Landmark is supported by COPA-COGECA, and led by Teagasc, the Irish Agriculture and Food Development Authority. LANDMARK will produce three outcomes:

- I. For farmers: a Soil Navigator that provides advice on the sustainable management of soils on 'my farm';
- II. For legislators: a framework for monitoring of soil quality and soil functions that is applicable across Europe;
- III. For policy makers: an assessment of policies that can ensure that we 'make the most of our land', from both an agronomic and environmental point of view.

LANDMARK receives €5m in funding from the European Commission, as part of the Horizon 2020 Call for 'Sustainable food production systems' (Topic SFS-4-2014: Soil quality and function).

What is Functional Land Management?

Soil protection: experience to date in Europe

In 2006, the European Commission published the EU Thematic Strategy for Soil Protection (European Commission, 2006a), which outlined the suite of functions that soils perform for humankind, as well as the threats to this functionality. The subsequent proposal for a Soil Framework Directive (European Commission, 2006b) built on the concept of threats to soil quality, which included erosion, contamination, loss of organic matter, loss of biodiversity, compaction, salinization, flooding,

landslides and sealing. The Directive proposed a suite of actions to mitigate against these threats, aimed at maintaining soil quality throughout the EU. However, this exclusive focus on threats, while only hinting at soil quality as a prerequisite for the utility function of soils, led to resistance from stakeholders, including the farming community (COPA-COGECA, 2008). This, as well as a multitude of unrelated political considerations, ultimately resulted in the withdrawal of the proposed Directive in 2014 as part of the EU REFIT initiative (European Commission, 2014).

Making the most of our land: towards a utilitarian approach

In response, we developed the concept of Functional Land Management, which is aimed at optimising “what soils can do for society”, specifically in the context of the five aforementioned overarching soil functions.

The Functional Land Management framework is based on the concept of multifunctionality of soils: all soils perform all of the five aforementioned functions simultaneously, but some parts of the land (scape) perform some functions better than others (Schulte et al., 2014; O’Sullivan et al., 2015). Central to the concept of Functional Land Management is that it neither seeks to maximise a unique soil function, nor all soil functions of all soils at the same time. Indeed, the latter has proven to be impossible, given that not only synergies, but also trade-offs exist between some of the soil functions (Power, 2010). Instead, Functional Land Management constitutes a systems approach aimed at managing soils (and in a wider context: managing land) in such a way that the demands for soil functions are balanced and met everywhere, thus building on the recommendations by Bouma et al. (2012) and Kibblewhite et al. (2012). In light of the spatial variation of both the supply and demand for soil functions, this involves a process of ‘optimising’, rather than ‘maximising’ soil functions, subject to the balances of local demand and supply.

From threats to functions: relevance to the VGSSM

In summary, past approaches to soil management that focussed on reducing ‘threats to soil quality’ implicitly pursued the protection of ‘soil quality’ as an intrinsic value per se. This led to resistance by land managers, most of whom are already fully aware of the value of their soil as a resource. As a result, they considered the mandatory requirements to minimise threats as unnecessarily restrictive. Instead, land managers are seeking guidance and information on how they can sustainably optimise the functionality of their land, be it for the production of food, fibre and feed, the delivery of clean water, the provision of an offsetting mechanism for greenhouse gas emissions, or for the provision of a home for biodiversity and organic nutrients.

In response, we propose that, rather than protecting the intrinsic value of soils per se, soil management and guidelines for soil management should focus on sustainably optimising the utility function of soils for society.

Further reading

Read our open access paper: Making the most of our land: managing soil functions from local to continental scale.

Frontiers in Environmental Science, 3, 00081. DOI 10.3389/fenvs.2015.00081

Appraisal of the VGSSM

The LANDMARK consortium welcomes the formulation of the Voluntary Guidelines for Sustainable Soil Management and welcomes the opportunity to contribute to these. We would like to offer the following observations to the consideration of the Global Soil Partnership:

1. Need to clarify the objective of sustainable soil management.

In the context of our discussion above, there is a need to clarify the objective of ‘Sustainable Soil Management’ in the VGSSM. The current V0 draft contains mixed messages in this respect. For example, on page 4 we read the following definition:

“Principle 3: 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. The balance between the supporting and provisioning services for plant production and the regulating services the soil provides for water quality and availability and for atmospheric greenhouse gas composition is a particular concern.”

This definition is clearly formulated in line with the ‘new’ narrative that soil management should be aimed at sustainably optimising the utility function of soils for society. However, this definition is preceded by a statement of the ‘overarching goal’ on Page 2, that appears to revert to the ‘old’ narrative of protection soil quality as an end point in itself:

“The overarching goal for all parties is to ensure that soils are managed sustainably and that degraded soils are rehabilitated or restored.”

We suggest that the VGSSM can provide clarity by including a section, up front, that defines:

- The functionality of soils (in the context of ecosystem services and/or the Sustainable Development Goals)
- Threats to this functionality (in V0, threats are only specified in passing on pages 9 and 10)
- Recommendations for sustainable soil management in negating threats and optimising the functionality of soils with a view to meeting societal demands for ecosystem services.
- Synergies and trade-offs between recommendations – and therefore the need to customise recommendations for local farm conditions, to respond to the most pertinent local challenges.

2. Need to recognise trade-offs and constraints to implementation.

The VGSSM recognise that there are trade-offs between soil functions, and that hard choices may be required. For example, on Page 18 we read:

“The major constraint to leaving organic residues on the soil surface is the competing uses for residues and other organic material, including their use as fodder for livestock, as fuel, and as building materials [8,9]. These competing uses contribute in obvious ways to human well-being, whereas the benefits of residue cover in erosion control and the creation of soil organic matter are largely invisible and occur over a long term. Residue retention will occur only if alternative sources of fodder, fuel, or building materials are made available and affordable to users.”

This means that the choice of a particular soil management for one function has trade-offs with the ability of soils to deliver other functions (in this case the provision of fodder, fuel, or building materials).

Similarly, the VGSSM recognise that there are constraints to the widespread adoption of some of the management options, e.g. Page 17:

“Although some farming systems have successfully adopted some or all of the requirements for Conservation Agriculture, significant impediments exist in many regions to their adoption.”

However, in the current version of the VGSSM, the discussion of these trade-offs and barriers to adoption appear to be almost an afterthought, added on the very last few pages.

Instead, we suggest that these trade-offs and barriers should be the starting point of the development of the guidelines. The relevance and potential impact of the VGSSM could be significantly enhanced if the VGSSM would be explicitly aimed at addressing the following two questions:

1. How can sustainable soil management optimise the trade-offs between the many functions that soil delivers to society?
2. How can we minimise barriers to the adoption of sustainable soil management?

3. Need to identify stakeholders early.

The VGSSM are written for an audience that consists of “A wide variety of stakeholders”. However, these are only defined on Page 3:

“A wide variety of stakeholders – ranging from policy developers, government officials, extension officers, farmer associations, private investors and others – will be able to appropriately use these guidelines.”

We suggest that the key audience should be identified upfront in the document, to give a clear answer to readers that may ask: “should I read this document? Is this for me?”

In addition, we are a bit puzzled that the list of stakeholders does not include farmers or land managers. Is this a deliberate decision (in which case there is a need to explain this decision) or a significant oversight?

4. Need to ‘soften’ the language.

In the current version, the VGSSM can be considered unduly prescriptive. The word ‘should’ is used 32 times. Even stronger, section 3.2 uses the word ‘must’ twice, for example:

Sufficient crop and other organic residues must be left on the field and not removed for other purposes (e.g. fodder, fuel, infrastructure etc.).

The prescriptive nature of the VGSSM leaves little room to consider trade-offs or barriers to implementation or to farm-specific constraints, as discussed in our comment 2 above. In addition, it provides little flexibility to the farmer / land manager as the ultimate decision maker, who typically has to consider multiple objectives (soil management is only one of many aspects to sustainable farming).

It is possible to write guidelines without resorting to the words ‘should’ or ‘must’. A good example is in fact provided on page 14 of the VGSSM:

“Managing soil compaction can be achieved through appropriate application of some or all of the following techniques:”

We recommend that the guidelines are rephrased accordingly.

Specific comments

Page 4: “Principle 3: 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.” The use of the words “or biodiversity” inadvertently implies that biodiversity has no role in “enabling those services”. Rephrase?

Page 5 (Table 1.1): Re Nutrient Cycling: the present wording “transformation and mineralization of organic materials by soil organisms” is too limited. Nutrient cycling and the associated role of soils also includes the capacity of soils to receive and accommodate nutrients in the first place, to make and keep nutrients plant- available (of which mineralization is merely one of many aspects), and to support the uptake and subsequent harvestability of those nutrients. Too much focus on mineralization and soil organisms alone can be misleading as it advertently suggests that nutrient cycling is functioning once there are signs of mineralization. This topic is the subject of a forthcoming review paper by the LANDMARK consortium.

Page 6 (Section 2.2): “however at the end of each pathway, agricultural soils with a common set of characteristics can be found.” The meaning of sentence is not clear – rephrase?

Page 7 (Soil surface stability): “A stable soil surface indicates that the rates of soil erosion by water, wind, and tillage have been reduced by sustainable management to the minimum possible under the soil, terrain, and climatic conditions in which the soil occurs.” We contend that “minimising erosion” is too strong an objective, as this may rule out arable farming in most regions. We recommend that this is rephrased or softened, or at least includes the clause “under the soil, terrain, climatic and farm system specific conditions”.

Page 8: The statement “The microbial biomass and transformed organic materials are key elements of the soil organic carbon stores and the regulation of CO₂ emissions to the atmosphere” is difficult to understand. Microbes play a role in both the humification and mineralisation of carbon; therefore their role in “supporting carbon sequestration” (page 9) is more complex and multifold than the VGSSM appear to suggest.

Page 11: “The area of current agricultural soils is maintained.” While we understand (and agree with) the tenet of this paragraph, there may be merit in rephrasing this title. The current wording leaves room for ambiguity and multiple interpretations. For example, it could be inadvertently interpreted as “we must ensure that the current area of agricultural soils does not decline – therefore we must convert semi-natural habitat into agricultural land.”

Page 12 (Section 3.1): “Where policy aims to minimize land take, measures should be implemented by decision makers to encourage re-use of existing urban areas such as derelict areas, brownfields and upgrading of degraded neighborhoods after appropriate reclamation measures have been implemented. Measures promoting densification of existing urban areas can also contribute to the reduction of land take.” We urge caution: here, the VGSSM are straying well outside the core area of expertise of the Global Soil Partnership. Surely, urban planners, economists and sociologists would have expertise to add here... we suggest that the wording here is turned around: the VGSSM could recommend that urban planning should account for potential knock-on effects on the functionality of the hinterland. The VGSSM may even recommend that urban planning should therefore include soil scientists / agronomists / geographers.

Page 13 (Section 3.2): “In grazing lands, especially on steep slopes, minimizing the creation of bare soil and ensuring sufficient organic cover by reducing stocking rates on vulnerable land.” This wording is too strong, because there may be no need to reduce stocking rates where these are already low. Suggestion: replace “reducing” with “optimising” or: “ensure that stocking rates do not exceed the local carrying capacity of the soil”.

Page 13 (Section 3.2): the word “mini-catchments” needs a definition.

Page 13 (Section 3.4): “In all agricultural soils, the efficiency of plant uptake of nutrients should be increased.” The phrase “in all agricultural soils” is too strong. We suggest rephrasing as: “In many agricultural soils, there is significant scope for increasing the efficiency of plant uptake of nutrients”. Such a statement would be more accurate, less value-driven (i.e. it does not use the word “should” – see also our generic comment 4 above) and therefore more scientific.

Page 14 (Section 3.6): “Surface disturbance and destruction of aggregation by tillage operations should be minimized through adoption of reduced tillage or no-till.” Again, the use of the word “should” makes this statement too strong, particularly since the trade-offs are discussed on page 18. While there is certainly a role for reduced tillage in sustainable soil management, the scientific literature shows that the benefits range from many to none for contrasting environments. Rephrase?

Page 14 (Section 3.6): “In grazing systems, a sufficient cover of growing plants should be maintained to protect the soil from trampling and erosion; cattle stocking is a key factor to be managed.” Is this statement too simplistic? For example, it does not consider: i) the role of sheep on upland peats (not cattle); ii) the role of overwintering horses; iii) the role of dynamic grazing management, rather than the average annual stocking rate per se.

Page 14 (Section 3.6): “Macrofauna and microbial (especially fungal) activity should be promoted to create of pores and channels for water infiltration and root growth”. There appears to be a word missing between “create” and “pores”?

Page 17: “These practices are entirely consistent with the guidelines for sustainable soil management presented above.” To what extent is this statement aspirational? Has an assessment been conducted that shows this consistency, and if so, could this be referenced?

Page 21: Glossary: in 2015, LANDMARK has completed a Glossary on Soil Functions and soil management, which may be of use to the VGSSM. We would be pleased to make this available, if required.

69. Frans Tijink, IRS (institute of Sugar Beet Research), Netherlands

Dear all,

Concerning traffic-induced soil compaction it is good to focus on prevention strategies and practises as explained in for example:

Alakukku L, Weisskopf P, Chamen WCT, Tijink FGJ, Van der Linden JP, Pires S, Sommer C, Spoor G. (2003) Prevention strategies for field traffic-induced subsoil compaction. A review. Part 1. Machine/soil interactions. *Soil Tillage Res.*, 73: 145-160

Chamen WCT, Alakukku L, Pires S, Sommer C, Spoor G, Tijink FGJ, Weisskopf P (2003) Prevention strategies for field traffic-induced subsoil compaction. A review

. Part 2. Equipment and field practices. Soil Tillage Res., 73: 161-174

Spoor G, Tijink FGJ, Weisskopf P (2003) Subsoil compaction: risk, avoidance, identification and alleviation. Soil Tillage Res., 73: 175-182

Tijink FGJ, Spoor G (2004), Technical guidelines to avoid soil compaction, Zuckerindustrie 129 (2004): 647-652

VDI Guideline 6101 (2014) Machine operation with regard to the trafficability of soils used for agriculture.

http://www.vdi.eu/nc/guidelines/vdi_6101-maschineneinsatz_unter_beruecksichtigung_der_befahrbarkeit_landwirtschaftlich_genutzter_boeden/

The best approach is voluntary because every field needs a specific approach to prevent soil compaction that cannot be fitted in legal/compulsory guidelines and schemes. And the driver and incentive for farmers is better soil management practises resulting in better soil structures, better soil transport qualities, and better and higher yields that improve farm income.

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IRS (Institute of Sugar Beet Research)
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The Netherlands

70. István Sisák, University of Pannonia, Georgikon Faculty, Hungary

Dear Moderators,

In my view, the authors of the voluntary guideline have done a good job: they combined existing and binding policy documents with the state-of-the-art of science on soil protection and distilled a set of rules and procedures which can be applied in any agricultural production systems to ensure sustainable soil management. The questions that prompted the consultation can be positively answered with good conscience.

The scope of the presented work includes: „The guidelines will focus on technical and biological aspects” From this standpoint, the normative nature of the proposal is understandable: all soil degradation processes are equally important everywhere on earth. Although I can gladly accept this starting point, I still agree with many of the contributors who emphasize the importance of social aspects.

The 4th principle of the revised World Soil Charter says: „The implementation of soil management decisions is typically made locally and occurs within widely differing socio-economic contexts. The development of specific measures appropriate for adoption by local decision-makers often requires multi-level, interdisciplinary initiatives by many stakeholders. A strong commitment to including local and indigenous knowledge is critical.”

Any soil threats except contamination with man-made organic compounds produced by the chemical industry have both natural and human induced causes. Even such events like pollution with crude oil, heavy metals or radionuclides have their natural parallels: tar sand or ores with high radionuclide or heavy metal content may occur at or near to the land surface posing imminent effect on the ecosystem

including humans. Other soil degradation processes (acidification, salinization) are mainly natural phenomena and involve millions of hectares of agricultural land. Water erosion has always been present on slopes in areas with some precipitation nevertheless, human activity increased it by several magnitudes.

Societies and local communities have existed in the vicinity of these soil degradation processes for long and people have learned how to cope with the harmful effects. Communities have developed certain sensitivity and a certain tolerance to those threats. However, societal and economic driving forces have changed the whole game: intensity of soil degradation processes have been altered but tolerance and sensitivity of the societies have changed, too. In my view, this framework should be comprehensively understood to formulate proper policy targets.

What hurts and why? - this question should be answered including the explanation for why some of the soil degradation processes do not exceed tolerance level of the societies in spite of their clear detrimental effects on soil functions.

However, this was not the scope of the presented guideline and the aimed exercise to elaborate technical and biological aspects was clearly and elegantly solved by the authors.

Best regards

István Sisák

University of Pannonia, Georgikon Faculty

16 Deák F. st., H-8360 Keszthely, Hungary

71. Marjoleine Hanegraaf, Nutrient Management Institute NMI, Netherlands

Dear Colleague,

Thank you inviting us to contribute to the online consultation for the development of the Voluntary Guidelines for Sustainable Soil Management.

Please find enclosed the combined response of Soil Cares Research and the Nutrient Management Institute, both in Wageningen, the Netherlands.

A major point from us is that farmers should have access to reliable and affordable soil analysis techniques on which they can decide which fertilizers and/or lime are to be used.

Best wishes with your future activities and we are looking forward to hearing from you.

Kind regards,

Marjoleine Hanegraaf

<http://www.soilcares.com/en/research/>

Marjoleine C. Hanegraaf

Soil Scientist

Nutrient Management Institute NMI BV

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/Zero_Draft_VGSSM_SoilCaresResearch_NMI.docx

72. Dominique Darmendrail, Common Forum

Dear colleagues,

Thanks for inviting us to participate in the public consultation on the voluntary guidelines sustainable soil management. This topic is particular relevance in the current context and we are welcoming any initiative targeting solutions for more efficient soil management approaches.

The Common Forum on Contaminated Land (www.commonforum.eu) is a network organisation of policy-makers and regulators, created in 1993, from National government and agencies from 18 European Member States who are dealing with contaminated land and groundwater Issues, and for some of them with land management as a whole. The Common Forum has the following missions:

- being a platform for exchange of knowledge and experiences, for initiating and following-up of international projects among members,
- establishing a discussion platform on policy, research, technical and managerial concepts of contaminated land.

Since its creation in 1993, Common Forum gained a formal status as initiators of new concepts for redevelopment contaminated sites and brownfields such as the Risk Based Land Management concept (2000). Common Forum members are also partners of the International Committee on Contaminated Land (www.iccl.ch).

The proposed draft guidelines seem to address several stakeholder communities (“p.3 - policy developers, government officials, extension officers, farmer associations, private investors and others”).

- They have been developed in the context of the UN SDGs which have been adopted in September 2015 and will have to be implemented by all signing country partners.
- The different levels of actions are not clearly identified and therefore it could be challenging for a successful implementation even on a voluntary basis. The connection to existing policies should be at least mentioned when existing.
- The different targeted stakeholder communities are acting at different decision-making level (from governmental to local – parcel levels). Clear responsibility / roles are key for a successful implementation.

The draft references the definition of the revised World Soil Charter (see chapter 2.1, p.4). This definition explicitly provides a focus on ecosystem services. This might be understood as limiting the term “sustainable” to ecological considerations. Therefore it could be helpful to provide some lines (or a note) for explaining the connection to a generally accepted definition of “sustainable development” (e.g. Brundtland report) aiming on the integration of the ecological, economic and social dimension (see also three P’s: people, planet and profit).

To underpin the importance of appropriate soil and land management as addressed by chapter 2.2, it could be worth to consider a report published by the ELD initiative (www.eld-initiative.org) on the economics of land degradation, its Summary of Findings and the estimate that “Globally, annual ecosystem service value losses of USD 6.3 to 10.5 trillion occur, representing 10-17 per cent of the world’s GDP and highlighting the importance of combating land degradation”

As mentioned by our Dutch colleagues, the **soil-sediment-water system** (vs. the application to sustainable soil management in agricultural areas) needs an integrated approach:

- This system is more complex and need more than a soil sectoral approach. Agricultural production and food & feed security are also depending on the water resources availability. Groundwater use in urban areas might have an influence in agricultural areas and vice-versa.
- Managing the “transition areas” with the agricultural areas (peri-urban areas) is also a key challenge. Our experiences at national and regional levels have shown the limits of acting with a sectoral approach.
- So that’s why we consider that the document should not be limited to rural areas and should also address the different geographical dimensions to consider in soil & land management. There are needs and key actors at local, catchment / river basin, regional, national, Europe / large world regions scales. Not considering the broader perspective could generate more challenges in the implementation of the guidelines.[1]

Considering the time dimension in sustainable use of land also with regard to global and perspective changes in societal expectations, not really developed in the proposed guidelines, is also fundamental in terms of efficient management of this system.

The draft guidelines describe processes in a qualified matter for (national / regional) policy-makers. But we are missing the connections to the existing **policy instruments which are used** by the stakeholders.

- The link between agriculture and the reduction of the effects of climate change is important and could be more emphasized. Farmers play a role in climate change Policy (reduction of GHG emissions and carbon storage in soils). The current draft guidelines are not designed for being operational for farmers.
- For policy-makers, how to combine “mandatory policy instruments” with this “voluntary guidelines” will also be critical.

In most countries having a soil / land protection or soil / land pollution policy, there is a distinction between: i) prevention of new threats (protection issues), ii) new threat situations and iii) legacy threat situations.

- This is why the first policy principle is prevention (avoidance, mitigation or at least limitation to minimum impact).
- For new threat, in particular pollution, the principle is zero tolerance. If any damage, it should be recovered immediately.
- For legacy contamination the approach is risk based and not a multifunctional remediation. The starting point is that the quality of the land should be suitable for the function and use(s) of the land.
- This can only be achieved by integrated approaches, which link the statutory regulations for industries and agriculture, with environmental media protection (e. g. water soil air) and the environmental damage regulations in a more consistent way.

Accordingly we suggest the following amendments (set italic) with regard to chapter 3.8 (Guidelines for neutralization of soil contamination):

- Local soil contamination caused by nowadays economic activities and production processes asks for a complementary approach on prevention and contingency plans for immediate clean-up.
- Management of local soil contamination as a legacy of abandoned activities and production processes requires surveys to seek out sites that are likely to be significantly contaminated, site investigations where the actual extent of contamination and its human and environmental impacts are defined, and identification of a suitable management approach, in particular remedial and after-care measures rehabilitating sites for beneficial use. Soils that are susceptible to the harmful effects of diffuse pollutants (e.g. acidification due to atmospheric deposition on highly weathered ancient soils) should be identified and special measures on a local scale undertaken to reduce atmospheric deposition of pollutants onto these soils.

Finally, an important dimension is missing: the **costs for implementing such guidelines** are not mentioned. This is a critical question in particular if the sustainability principle should apply: a balance between the three P's of people, planet and profit. The starting point is to **use land in a sustainable way** and not only the focus on soil preservation and prevention.

If any question or need for clarification, please do not hesitate to contact us.

Dominique DARMENDRAIL Common Forum General Secretary

73. Peter John Opio, FAO, Uganda

Dear Sir,

Apology for responding late to the content of the above subject.

The guidelines are comprehensive addressing critical concerns to sustainable soil management.

My fear is that it mentions little on the direction of research in soil management., Concerns of research are that there is little investment by some countries on the same; and where it is financed it is enterprise and not farm system based.

Secondly on conservation and or rehabilitation of soils at watershed level, some funds are required to demonstrate and or establish physical soil and water conservation structures, a practice that is labour intensive. Most interventions at such a scale ignore financing such activities.

I would thus be happy to see aspects like;

Research

Research on soil management should be participatory and recognize components of the farm system so as to come out with information that may not impede adoption of technologies promoted

Financing

Governments and or private sector should invest in practices that are labor intensive

Gender experts may be consulted to enrich on extension information/technologies that may not be gender sensitive.

Thank you

74. Patrick Binns, Westbrook Associates LLC, USA

Thank you for the opportunity to comment on the Global Soil Partnership's draft Voluntary Guidelines for Sustainable Soil Management. I applaud the breadth of expertise and effort that has gone into its preparation. The ITPS has produced a useful set of guiding principles to inform and encourage farmers, public policy makers and private stakeholders to restore and steward our planet's soils.

However, as the major objective of the VGSSM is "to promote and support the global adoption of sustainable soil practices"; I believe these Guidelines should be much more direct in advocating actionable practices appropriate to local conditions and circumstances that enable field-to-landscape scaled soil stewardship. Although the draft VGSSM presents an extensive list of soil functions and processes; it fails to provide cohesive propositions and integrated practice examples that could guide decision making by farmers, input suppliers and public policy makers.

More discussion is needed of the soil building benefits of diversified crop rotations that deliver organic carbon inputs; biological nitrogen fixation; weed management; root penetration of compacted soils; pest pressure disruption; and other supportive functions. Attention should be given to advancing private sector and public policy initiatives that would develop local, regional and national capacities for producing varietal seeds; reduced tillage and direct seeding mechanical equipment; large volume organic composting; and supplying other farming system resources and technical support services.

While beneficial soil microbes and fungi are briefly mentioned in the draft VGSSM; there should be much more discussion of the importance of establishing healthy soil biota through crop residue retention; inoculating seed and soil with beneficial microbial and fungal treatments; and measures that promote the production of Glomalin and other exudates that enrich soil tilth and structure. The Guidelines should also draw attention to the value of increased research in the fields of beneficial soil biota and their symbiotic interrelationships that promote plant growth and improved resilience. Global agricultural research efforts significantly focus on developing improved commodity crops; with extremely limited research underway to discover and leverage the biological dynamics of soil fertility and microfauna biodiversity. This research imbalance must be corrected.

The GSP aspires to promote soil management practices that contribute to achieving the UN's Sustainable Development Goals concerning food security, ecological balance and improved social and economic equity. These important additional dimensions of beneficial outcomes of soil management would be advanced if the Guidelines acknowledged and recommended practices and implementation strategies that are particularly applicable to smallholder farmers; promote rural development; and advance reliance on sustainably sourced soil nutrients and other agronomic resources.

The VGSSM should explicitly promote soil management actions that encourage formation of rural enterprises that supply sustainably sourced inputs or convert and recycle organic wastes into restorative soil amendments and nutrients. It would also be useful to recognize and advocate innovative agricultural and land use policies that provide incentives to invest in improved soil management; or that regulate practices that damage or degrade soils or diminish fresh water availability and quality.

The Guidelines should also more clearly describe and encourage practices and technologies that enable soil carbon and biochar sequestration to be implemented as high potential measures for reducing Greenhouse Gas levels (e.g. see Dr. Pete Smith's recent paper in *Global Change Biology*, 2016 http://www.fao.org/fsnforum/sites/default/files/resources/Smith-GCB_soil%20carbon%20sequestration%20and%20biochar%20as%20negative%20emission%20technologies_2016.pdf). As nations struggle to adapt to climate change and reduce their GHG emissions; it is critically important that the global community develop and implement agricultural practices that

reduce emissions while increasing productivity and resiliency. Sustainable soil management and organic carbon sequestration pathways should be included in national climate action plans. The Guidelines should help increase public awareness of these cost effective GHG mitigation opportunities.

I hope that my comments are useful to further strengthen and improve the utility and impact of the Voluntary Guidelines for Sustainable Soil Management.

With best regards,

Patrick Binns

Westbrook Associates LLC

Seattle, WA USA

Peter

75. Jordi Domingo, Calabuig Fundación Global Nature, Spain

Dear moderator

Please find below the comments from Fundación Global Nature (Spain) to the *Online consultation for developing the Voluntary Guidelines for Sustainable Soil Management*. Apologies for not addressing specifically the questions included in your invitation, but we think that our comments would better contribute to the improvement of the draft. Here is our contribution:

In general terms (but also specifically for point 5.0), we miss a part in the text for identifying the stakeholders to which these guidelines are addressed. It is stated that these guidelines shall be generalist, non specific to crops or regions, etc., as all this require a multi-scale assessment and further work. These guidelines are said to be addressed to governments and other institutions. In our opinion, a higher effort should be made in the document to identify "multipliers", that is, stakeholders on the ground that could potentially reach farmers and farmer communities (let's not forget that farmers are the responsible for implementing all this) to spread this document. At least defining their profile would be interesting. We are pretty sure NGOs, consumers and society-based organizations would fit these requirements and would be happy to contribute. Agrifood companies could be addressed and for most of them, it could be a good inspiration.

Point 3.1. We think a much more emphasis should be placed to highlight the importance of suburban agricultural areas. At least in the Mediterranean basin, the best soils are beside rivers where cities have been historically located. Urban growing has sealed these soils forever, leaving the worst soils for agriculture. The problem is somehow stated but no practical recommendations are given (urban land planning according to soil relevance, longterm strategies to preserve and/or restore soils, agricultural areas included inside cities, etc.)

Point 3.2. Non-tillage and conservation agriculture is mentioned as a good practice with multiple environmental benefits. However, it should be stated that this practice is only sustainable if it is combined with other practices, specifically cover crops and longterm rotations. Otherwise, non-tillage techniques lead to a massive use of herbicides and fungicides.

Point 3.4. It should be clearly stated that a nitrogen balance should be the appropriate decision tool to ensure an appropriate nutrient management. Farmers should at least try a rough approximation to its calculation based on realistic yields and baseline information on the crop.

Point 3.5. We would go further and include that appropriate training shall exist for using pesticides. Also that soil disinfection shall be banned (and alternative solutions used such as diverse and long rotation).

Point 3.7. We would recommend to include a comment for enhancing the use of decision-support tools for better irrigation (tensiometric probes and similar equipment, software, etc.)

Finally there is a point with which we disagree: in 4.0 there is a whole section devoted to “Sustainable Intensification”. The fact is that all what is mentioned in section 4.0 is a repetition of the good practices mentioned before, that leads to a better management of the soils, and obviously to a better yield thanks to reduction of risks: erosion, pests, soil depletion, nutrient excess, loss of soil structure. Therefore, the use of “intensification” is completely unnecessary and the word “efficient management for better yields” or “competitive and friendly agriculture” is much more appropriated. However this section is directly linked to a document approved before... so we are not sure if it makes much sense to come into this aspect.

We also miss the following points:

- recommendations for governments to deliver to multipliers soil maps as a basis for agricultural decision*
- recommendation for having records of soil operations, as a training methodology for continuous improvement*
- recommendation on regular soil analysis as a baseline for decision-making in terms of fertilization*
- promoting the use of legumes for cover crops, crop rotations, winter crops, catch crops, intercrops, etc.*
- conduct regular soil machinery maintenance for better performance*
- continuous training for understanding agricultural soils*

For further details and/or comments, please do not hesitate to contact us.

Cheers,

Jordi Domingo Calabuig
Fundación Global Nature
C/ Real, 48. Las Rozas (Madrid)
E-28231 Spain
www.fundacionglobalnature.org

76. Patrick Trötschler, Bodensee-Stiftung, Germany

Dear Sir or Madam,

we thank you for having the opportunity to contribute to your online consultation on the voluntary guidelines for sustainable soil management.

Here are our comments and suggestions:

It would be very helpful to specify the stakeholders to which the guidelines will be addressed. To address governments and other institutions will not be sufficient in our opinion.

We think that it is necessary and important to identify and address multipliers which are close to farmers and farmers associations, e.g. food business, food standards, consumer organisations, environmental NGOs.

3.2 Non-tillage and conservation agriculture is mentioned as a good practice with multiple environmental benefits. It should be added this practice is only sustainable if it is combined with other

practices, especially cover crops and longterm crop rotation. If not, non tillage can lead to a massive use of herbicides and fungicides.

3.4 It should be clearly stated that a nitrogen balance should be the decision tool to ensure an appropriate nutrient management. Farmers should at least try a rough approximation to its calculation based on realistic yields and baseline information on the crop.

3.5 We recommend to include appropriate training for using pesticides. Also that soil disinfection shall be banned (and alternative solutions used such as diverse and long rotation).

3.7. We recommend to include a comment for enhancing the use of decision-support tools for better irrigation (tensiometers, software, etc.).

4.0 We don't understand the use of the term "Sustainable Intensification" and recommend to better use a term like e.g. "efficient management for better yields".

Furthermore we recommend to include the following aspects into the guidelines:

- recommendations for governments to deliver to multipliers soil maps as a basis for agricultural decision
- recommendation for having records of soil operations, as a training methodology for continuous improvement
- recommendation on regular soil analysis as a baseline for decision-making in terms of fertilization (farm-gate-balance)
- promoting the use of legumes for cover crops, crop rotations, winter crops, catch crops, intercrops, etc.
- continuous training for understanding agricultural soils

Kind regards

Patrick Trötschler

Bodensee-Stiftung

Dipl.-Ing. agr. Patrick Trötschler

stellv. Geschäftsführer

Fritz-Reichle-Ring 4

77. Hans-Wolf Zirkwitz, Municipality of Stuttgart , Germany

Dear Moderator,

The Department for Environmental Protection as part of the municipality of Stuttgart highly appreciates the Voluntary Guidelines for Sustainable Soil Management (VGSSM).

The guidelines are focused on the crucial aspects of soil protection.

The City of Stuttgart made excellent experiences implementing the municipal Soil Protection Concept since 2006. This concept is in line with the chapters 3.1, 3.8 and 3.9 of the VGSSM.

Therefore we expect positive impacts of the guidelines on soil protection.

As a completion of chapter 1 we propose to highlight that the guidelines aim at an equal ranking of soil protection compared with the protection of other environmental compartments. .

Until today the relevance of soil as a basis for life is considerably underestimated compared with water, air, flora and fauna.

Best regards

Dr. Hans-Wolf Zirkwitz

Landeshauptstadt Stuttgart

Amt für Umweltschutz

Dr. Hans-Wolf Zirkwitz

Amtsleiter

78. Claire Chenu, AgroParisTech, France

Dear Colleagues,

Thank you inviting us to contribute to this online consultation on Voluntary Guidelines for Sustainable Soil Management. This draft is a very good first stone to build upon a better soil management.

• Does the zero draft sufficiently outline a way to achieve sustainable soil management worldwide?

I appreciated the step by step construction of the document. Technical aspects (i.e. management practices) are present (see below), however communication, outreach advocacy ect.. are uncovered : 3 lines in section 5, with only mention of GSP, while GSP is not the only actor there.

• Have all the key technical elements to achieve sustainable soil management been included in the guidelines?

No.

1- Most of the document focuses on agricultural soils : more should be devoted to pasture and forest soils, as well as organic soils, rangeland, and even urban soils. For example in P 5 "Given the global diversity of soils and of agricultural management practices there are many pathways to achieving sustainable soil management". Forest management practices are also relevant here.

2- Regarding agricultural practices, nearly all the attention is given to conservation agriculture / no tillage, while there are technical actions which are not mentioned or paid enough attention. Conservation agriculture is recommended without any caution (recommendation for reducing or suppressing herbicides use for example...). Practices such as agroforestry or cover crops and infrastructures such as hedges are nearly absent from the document. E.g add hedges in p 17 bullet point 8 as measures at the landscape scale to combat erosion, increase SOC and promote biodiversity. Organic agriculture is absent from the document: much can be said/discussed about the potential of organic agriculture to sustain food security, but it is curious that it is absent. It is, at least, a form of

agriculture that reduces pesticides inputs to soils, promotes N fixation and organic fertilization and seeks to increase the organic C content of soil. The use of legumes to fix N is not very present in the document either (e.g. add it p 17 bullet point 4 about nutrients).

3- More precisely, concerning soils organic matter, it often appears under the umbrella of soil cover, but if this is one of the most efficient ways to increase SOC contents, it is not the only one (e.g. agroforestry, e.g. organic wastes from cities). Soil organic matter is absent from the guidelines to control soil erosion (p12 3.2) (increasing soil organic matter content increases aggregate stability and hence decreases soil erodibility).

4- There is no mention of techniques to restore severely degraded soils.

• Do the guidelines take into account the great variety of ecosystem services provided by soils?

Yes in general, although it is present in the first part of the document and little thereafter. I propose to use the term multifunctionality : soils would be better managed if all users were aware that they are multifunctional (provide multiple services).

• Will the results of the guidelines, once implemented be sufficient enough to achieve the Sustainable Development Goals (SDGs)?

These will be a good start.. There is little development on the need of policies at the landscape, territory scales to avoid deforestation, agricultural land take for urbanization. Quantitative or qualitative criteria for judging of point 3.6 (p 14) will be needed.

• Do the guidelines identify activities that should be avoided to achieve multiple benefits through sustainable soil management?

Not really, the document is not build to identify them clearly. One topic that is not clear enough and sufficiently covered enough for me is that dealing with contaminants.

79. Evangelos Koumentakos, Copa and Cogeca, Belgium

Dear Sir or Madam,

Please find attached our comments on the 'Zero draft' of the Voluntary Guidelines for Sustainable Soil Management.

Thank you for considering and please do not hesitate to contact me if need be for further clarifications.

Best wishes,

Evangelos Koumentakos

Link to the Zero Draft with comments in track change mode:

[http://www.fao.org/fsnforum/sites/default/files/resources/Zero Draft VGSSM%20comments%20Copa%20and%20Cogeca.docx](http://www.fao.org/fsnforum/sites/default/files/resources/Zero%20Draft%20VGSSM%20comments%20Copa%20and%20Cogeca.docx)

80. Brajendra, ICAR-Indian Institute of Rice Research, Hyderabad, India

Dear Contributors

It is highly illuminating to get so many diverse views in this platform. My kudos to all of you. One of my request is, if the land practitioners also are involved, then, it will be highly desirable to have their viewpoints. Soil use is eventually, actually a land use and we know, land use patterns are not uniform, so are our soils. My take is, can we think of or involve many land practitioners on following viewpoints:

How, for example, will be a suitable VGSSM for a city called a smart city?

How for example, will be a suitable VGSSM for Peri Urban Farming Systems?

How , for example, will be a suitable VGSSM for mountain soils?

How , for example, will be a suitable VGSSM for soils that are below sea level (Kuttanad region of Kerala, India)?

How for example, will be a suitable VGSSM for Intensive Integrated Farming Systems?

How for example, will be a suitable VGSSM for Crop Livestock integration Systems?

How for example, will be a suitable VGSSM for Agro Forestry Systems?

Of course, we all are primarily focussed and concentrated on VGSSM for our Crop based land use patterns.

But there are

etc etc etc..... based land use patterns

Let us reorient ourselves a little more towards these facts also, to invite more discussions and viewpoints.

Nevertheless, the discussions, till date have been so enlightening, and my congratulations to Ronald and Den for moderating so beautifully and all the contributors.

Brajendra

ITPS- India

81. Carlo Jacomini, ISPRA, Rome, Italy

Dear colleagues,

A small contribution focused on soil biodiversity, its role and function in the SSM.

My best congrats to the moderators and the whole working group who drafted this very interesting document..

Cheers

Carlo Jacomini

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/ZeroDraft_VGSSM_revCJ.docx

82. Fiorenzo Fumanti, ISPRA, Italy

1) Does the zero draft sufficiently outline a way to achieve sustainable soil management worldwide?

The guidelines only consider agricultural soils; it would be better therefore to clarify it and to speak of agricultural soil management. On the contrary, other types of heavily impacted by human activities (forest soils, mining soils, organic soils, urban soils etc.) soil should be considered. Moreover, we consider better to refer to all soil functions and typologies, including environmental ones.

2) Have all the key technical elements to achieve sustainable soil management been included in the guidelines?

We suggest to better clarify, enumerate and outline all the elements menacing the soils and the actions dealing with their protection/restoration.

For example, in hilly and mountainous environments, protection of agricultural soils cannot be separated from the continuous control and proper maintenance of the territory, fundamental for mitigation of hydrogeological risk and preservation of soil ecosystem services in forest and other non-agricultural land.

From this point of view, actions to limit the triggering of mass movement, particularly surficial landslides (debris flow, mud flow, soil slip etc.), to prevent the collapse of the terrace walls, to control the stormy water run-off should be included. In these cases, the correct application of bioengineering techniques on steep slopes coupled with Agricultural Conservation Practices or classical good agricultural practices for soil conservation in cropland (eg. temporary drainage ditches, grass strips) can greatly reduce not only surficial soil erosion, but are useful to prevent mass movement.

Regarding soil and water contamination, the natural high concentration of contaminants in some soils due to the bedrock geology should also be taken into account.

The more serious threat of soils functionality, desertification, as sum of soil threats, is not considered.

3) Do the guidelines take into account the great variety of ecosystem services provided by soils?

Table 1.1 listed the classical ecosystem services provided by soil. They are exhaustive for agricultural soils but should be stressed as their decrease in croplands can be linked also with loss of functionality of non-agricultural soils, especially when nearby (see question 1).

We would like to highlight the need to stress also the useful functions and services provided by soil biodiversity, the intimate engine of soil. Most of the ecosystem services are provided by soil biodiversity, directly or indirectly.

4) Will the results of the guidelines, once implemented be sufficient enough to achieve the Sustainable Development Goals (SDGs)?

VGSSM are useful to address the international or national policies on soil, while in the absence of a mandatory or binding legislation they hardly could participate in the process. Nevertheless, they are useful to provide further insight into soil threats management and sustainability. We consider these guidelines not exhaustive of SDG 15, especially target 15.3 because the land degradation is more complex and articulated than SSM. We should consider all the dimension included on this definition, taking also into account that we do not capture the desertification phenomena, widely recognized,

considered as the extreme land degradation degree, often associated with no soil management. We underline also that the concept of land is wider than the concept of soil.

5) Do the guidelines identify activities that should be avoided to achieve multiple benefits through sustainable soil management?

A detailed review of effects coming from activities that should be avoided is not present in the document to date. It could be helpful to list and assess soil threats and to rank and sort negative practices according to their relative contribution to soil degradation (so as to prioritize the limits to be posed to certain unsustainable human activities).

In addition, the climate change threats on land and soil should be taken into account, considering also the recent scientific development at international level.

Fiorenzo Fumanti, Anna Luise, Carlo Jacomini – EioNet Soil NRCs, ISPRA-ITALY

83. Emilio Gonzalez, University of Cordoba, Spain

Thank you for the opportunity to make inputs to the draft. It is a valuable document, that could be improved by some additional paragraphs about the crucial role of Conservation Agriculture on the topic.

Sincerely,

Prof. Dr. Emilio J. González-Sánchez

Ad. Professor

ETSIAM- Universidad de Córdoba

emilio.gonzalez@uco.es

Secretary General

European Conservation Agriculture Federation

www.ecaf.org

Executive Director

Asociación Española Agricultura de Conservación Suelos Vivos (AEAC SV)

www.agriculturadeconservacion.org

Link to the Zero Draft with comments in track change mode:

<http://www.fao.org/fsnforum/sites/default/files/resources/VGSSM%20E%20Gonzalez.docx>

84. Jim Boak, Salford Group Inc, Canada

I really don't see anything in the suggestions that actually creates a change. We are going to talk this earth to death.

Something as simple as growing broadcast planted crops could actually effect an immediate change. Something as simple as using water from dishwashers, laundry and showers to flush toilets and water lawns could effect an immediate change.

It seems to me everyone is talking about doing something but nobody has actually suggested something that would make a difference overnight.

We can so what is stopping us?

Best regards and I will continue to do my best.

Jim

85. CDE-WOCAT

Dear colleagues

Thank you for the elaboration of this zero draft of the Voluntary Guidelines for Sustainable Soil Management and for inviting us to contribute.

We think that this is a very good start and already contains many very valuable principles of soil management worldwide. However, we have some comments and suggestions for improvements which you all find in the attached document. We have addressed the general questions and made some detailed remarks into the draft text.

With kind regards

Rima Mekdaschi Studer and Gudrun Schwilch

CDE-WOCAT

General questions:

- Does the zero draft sufficiently outline a way to achieve sustainable soil management worldwide?

It is a very good start and already contains many very valuable principles of soil management worldwide. However, in order to become applicable to any soil/land use, it should not only focus on agricultural land (and therein mainly on cropland with very little on grazing land), but also forest land and any other land uses. Soil management is in the centre, but currently the guidelines are only touching water, vegetation and fauna via the ecosystem services. However, the trend is towards more integration of management of all 'land' resources than separation. There is the need to put soil management in a 'context'; in other words sustainable land management cannot be achieved by only considering sustainable soil management but needs to consider the other natural resources (and the human aspects).

- Have all the key technical elements to achieve sustainable soil management been included in the guidelines?

Most key elements are there, especially for croplands. However, there is a strong bias towards conservation agriculture and the guidelines would benefit from being more neutral in suggesting a broader variety of effective soil management measures. See some comments in the document.

- Do the guidelines take into account the great variety of ecosystem services provided by soils?

In principle yes, however cultural services are not well taken into account. Additionally, trade-offs among services are insufficiently addressed.

- Will the results of the guidelines, once implemented be sufficient enough to achieve the Sustainable Development Goals (SDGs)?

If really implemented, then yes. The question remains on how their implementation can effectively be promoted and that is where the guidelines are lacking advices. See also detailed comments in the document.

- Do the guidelines identify activities that should be avoided to achieve multiple benefits through sustainable soil management?

Partially yes. But the guidelines are written in a way that they sometimes advice on what to do and sometimes on what to avoid and thus not in a consistent way. However, this might be more practical than being too consistent....

Link to the Zero Draft with comments in track change mode:

[http://www.fao.org/fsnforum/sites/default/files/resources/Zero Draft VGSSM CDE-WOCAT.docx](http://www.fao.org/fsnforum/sites/default/files/resources/Zero_Draft_VGSSM_CDE-WOCAT.docx)

86. Ministry of Agriculture, Forestry and Fisheries, Japan

Dear FSN-Moderator for VGSSM consultation,

I would like to send the comments from the Government of Japan.

We have two types of comments (see the respective files):

- 1) The general comments applicable to the whole document
- 2) Specific comments applicable to the specific part of the documents

Thank you.

Yoji Matsui

Ministry of Agriculture, Forestry and Fisheries, Japan

General comments:

1. Concrete examples in Chapter 2 would be useful for those who are not familiar with soils

Chapter 2.2 enlists some functions of soils which might contribute not only to crop production but also to environmental sustainability. Since the keywords highlighted would be placed in different contexts, description should be clear and pragmatic.

The present description might be good enough for those who have sufficient knowledge and interest in soils, for example, at least those having already read the Technical Summary of the Status of the World's Soil Resources. However, if the purpose of the VGSSM is to promote actions of various stakeholders towards soil conservation, supporting information on the scientific base should be added.

In this regard, following information would be worth being included:

- examples of surface run-off at upland vegetable farm of Andosols in Japan, of Ferralsols in Thailand, Acrisols in Philippines;

- examples of losing effective soil depth at upland Cambisols in China, Korea; and
- examples of eutrophication at small watershed and so on.

2. 'Tsuchizukuri' as a model practice from Asia.

In Japan, farmers have traditionally put efforts in holistic improvement of soil by applying well fermented animal and plant byproducts. This long-term positive approach is called "Tsuchizukuri", which is an unique concept with no exact corresponding English word. Disseminating this practice would well suit the objective of VGSSM.

We are looking forward to contribute intelligible description about this practice in subsequent drafting process.

3. The importance of synchronized work with Pillar 2 of the GSP.

Dissemination of good practice and the philosophy of soil conservation in the world might be one of the important target of Pillar 2 of GSP's action ("Encourage investment, technical cooperation, policy, education awareness and extension in soil"). VGSSM should be a tangible tool to accomplish the implementation plan of the Pillar 2. GSP secretariat should aggressively coordinate and activate Pillar 2 activities through preparing VGSSM. Especially, legislative fundamentals of member countries are diverse. It would be helpful that VGSSM become a support tool for preparing soil conservation policy in national and regional level.

4. Attention to the forestry and forest soils

Despite forestry is explicitly mentioned here, attention to ecosystem services of forests and forest soils looks insufficient in this guidelines under the Chapter 3. It should be considered to include mention to conservation of forest, forest soils and forestry paralleled agricultural soils. At least, in the paragraph starting from "At the watershed scale" in the subsection 3.2 should mention forest management.

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/20160304%20Gov%20Japan_Zero_Draft_VGSSM.docx

87. Manuel Gómez Ariza, Asociación Española Agricultura de Conservación, Spain

Estimado señor/ra:

Desde hace años trabajo en temas relacionados con la agricultura de conservación y en mi opinión si se quieren alcanzar los objetivos para el 2030, toda la cadena (desde los gobiernos hasta los agricultores, pasando por las instituciones), deben hacer un esfuerzo tanto técnico como humano.

Para alcanzar estos objetivos en primer lugar hay que plantear metodologías y herramientas para la evaluación y auditoria de la situación real (uso de indicadores, etc.), y así poder evaluar y contrastar la evolución y mejora del sistema. Otro aspecto fundamental es la educación y formación de la población

ya que para conseguir un manejo sostenible de los suelos es necesaria una mayor tecnificación tanto de maquinaria como de conocimientos de los agricultores y la población en general.

Agradeciendo su atención, reciba un saludo

Manuel Gómez Ariza

Asociación Española Agricultura de Conservación

Suelos Vivos (AEAC/SV)

88. Marco Falconi, ISPRA, Italy

First of all, thank you for the opportunity to comment this Voluntary Guidelines for Sustainable Soil Management.

It is a good way to share the preliminary draft and collect comments and input from many experts from different countries AND expertise.

My comments will answer mostly to question n.2, "Have all the key technical elements to achieve sustainable soil management been included in the guidelines?" suggesting additional elements that could be included in VGSSM.

Thank you again, see you soon.

Marco Falconi

Soil Protection Department

1. UNFAIR DISPOSSESS (or LAND GRAB)

Changes

Page 12, between 2nd and 3rd bullet point under paragraph 3.1.

- Governments and policy makers need to avoid that local authorities dispossess farmers of their vegetable gardens in favor of multinational corporation just because the cadastre have not been implemented in their region.

Rationale:

In some regions/provinces with middle-low GDP, the institutions are very young and a cadastre has not been implemented yet. By the way, farmers practice agriculture from centuries leaving their piece of land from father to son, till global market and land global demand came out in the late 90ies. Sometimes they are able to demonstrate they are the real owner, but justice takes long time and most important for soil quality, multinational excavators have already prepared (someone says "destroyed") the old vegetable gardens.



Fig.1: Cartoon showing land grabbing¹

2. CRUSTACEAN FARMS Changes

Page 15, between 2nd and 3rd bullet point under paragraph 3.7.

- The use of brackish or marine water for creating fish or crustacean farms should be limited to river deltas or other wetland areas in the seaside and not entailing soils not affected by salinity.

Rationale:

The rationale for this inclusion is that soil salinization is more or less difficult and time-consuming to reverse. I don't know if my proposed change is too strong, however I believe that those farms should be limited to environments where soils and groundwater has been already influenced by sea salinity "by nature", so the river deltas and other wetland areas near the sea.

¹ <http://wordpress.clarku.edu/id252-southsudan/2014/12/03/ramifications-of-land-grab-in-south-sudan/>



Fig. 2a and 2b: Shrimps farms²

3. NON FOOD CROPS

Changes

Page 15, new fourth bullet point under paragraph 3.8.

- The presence of local and diffuse contamination may lead to non-food crops to avoid contaminant magnification through the food chain. The limitation to non-food crops could be an opportunity to revitalize some contaminated marginal areas but it should not spread into other fertile areas thus limiting food crops.

² <http://www.fishfarming.com/shrimp.html>

Rationale:

There are a high percentage of non-food crops in developing countries with low GDP: non food crops are used for fabricating different products in several fields. As an example, look to the following table.

Function:	Products:	Examples of crops used:
Biofuels and bioenergy (energy crops)	Bioethanol, biobutanol, biodiesel, syngas and bioenergy	Algae, Buchloe dactyloides, Jatropha and Switchgrass
Building and construction	Hemp-lime building materials, Straw building materials, Insulation, Paints, varnishes	hemp, wheat, linseed (flax), bamboo
Fiber	Paper, cloth, fabric, padding, string, twine, and rope	coir, cotton, flax, hemp, manila hemp, papyrus, sisal
Pharmaceuticals (traditional) and therapeutic proteins (novel)	Drugs, botanical and herbal medicines, nutritional supplements, plant-made pharmaceuticals	Borage, Cannabis sativa, Echinacea, Artemisia, Tobacco
Renewable biopolymers	Plastics and packaging	Wheat, maize, potatoes
Speciality chemicals	Essential oils, printing ink, paper coatings	Lavender, oilseed rape, linseed, hemp

Tab.1: Non food crops³

So these products may help the economic growth and in case of soil contamination, these crops can be a solution better if in the frame of institutional control from local government. They should not spread widely into other soils thus causing locally or globally the rise of food prices.

**4. CONTAMINATED SITES MANAGEMENT
Changes**

Page 15, second bullet point under paragraph 3.8.

Original text:

- Management of local soil contamination requires surveys to seek out sites that are likely to be contaminated, site investigations where the actual extent of contamination and its human and environmental impacts are defined, and implementation of remedial and after-care measures.

Proposed modification:

- Management of local soil contamination requires surveys to seek out sites that are likely to be contaminated, site investigations where the actual extent of contamination, **risk assessment and**

³ https://en.wikipedia.org/wiki/Non-food_crop

where its human and environmental risks are not acceptable, implementation of remedial and after-care measures, giving priority to most sustainable techniques where applicable.

Rationale:

Risk assessment procedure is world-wide used to evaluate if the risk are acceptable for human and environmental receptors and to determine the residual contaminant concentration that don't pose a risk on a site specific basis. So it is preferable to quote it here and suggest the use of such methodology in case of contamination.

As for the second proposed modification, there are many stakeholders that realized that some remediation techniques are more impacting to the environment than others. There are some freeware instruments to evaluate them such as SEFA 4 or Sitewise⁵. Generally speaking, "Dig and Dump" is not sustainable in the long term as it wastes two not renewable resources: 1. Soil 2. Volume in landfill.



Fig.3: Landfill construction⁶

5. GUIDELINES FOR SOIL SEALING

Changes

Page 16, after paragraph 3.9, create another 3.10 called "Guidelines for limitation of soil sealing" or alternatively include those concepts better in paragraph 3.1.

3.10 Guidelines for limitation of soil sealing

4 <https://clu-in.org/greenremediation/methodology/>

5 <http://www.sustainableremediation.org/news/2013/10/24/sitewise-version-3-now-available.html>

6 <http://pintocs.com/company-overview/pinto-project-gallery/environmental/>

- Governments should establish and implement regulations to limit the soil sealing requiring a fee dependent on the quality of the soil and possibility of irrigation.
- Local authorities should evaluate the option to demand the removal of valuable topsoil in cases of conversion of agricultural land in order to increase the fertility of other soils or to further the reclamation of degraded land somewhere else.

Rationale:

Soil sealing is one of the major threats for soil function as already expressed in the first part of VGSSM (page 10 to 12). What are missing are the guidelines for limit soil sealing. They can be more than two bullet points, they can be formulated in a sharper way than I do, and nevertheless they are worth to be taken into account. It should be stressed also that soil sealing affect agriculture indirectly also if it is non agricultural area that is sealed as the quality of groundwater decreases, the runoff intensity increases, no water storage function.



Fig.4: Soil sealing would affect agriculture also indirectly⁷

89. UNCCD, Germany

Comments to Voluntary Guidelines for Sustainable Soil Management (VGSSM)

⁷ <http://www.greenews.info/rubriche/soil-sealing-leuropa-contro-limpermeabilizzazione-del-suolo-20140120/>

We would like to congratulate the author for the effort to synthesis in a brief document the main principles that should guide a sustainable use of the soil resources.

The comments are mainly dealing with question number 4: **Will the results of the guidelines, once implemented be sufficient enough to achieve the Sustainable Development Goals (SDGs)?**

The guide refers to SDG Goals 2, target 2.4 and Goal 15 target 15.3, and claims that “The latter can be provided only under sustainable soil management practices that would ensure stable or increasing production from arable lands, pastures and forestry systems (including agroforestry). Combating soil degradation requires introduction of sustainable soil management systems that reflects the challenges of Goal 15” . We would like to highlight that the scoping of target 15.3 is wider than soil management as it refers to “reverse **land**” and particularly **target 15.3** to restore “degraded **land** and soil and achieve a **land-degradation neutral world**”. While recognizing that the sustainable soil management is an essential element, meeting Goal 15 is not achievable without considering the broader concept of land management. Meaning land as defined by FAO/UNEP: 1997

***Land and Land Resources** refer to a delineable area of the earth's terrestrial surface, encompassing all attributes of the biosphere immediately above or below this surface, including those of the near- surface, climate, the soil and terrain forms, the surface hydrology (including shallow lakes, rivers, marshes and swamps), the near-surface sedimentary layers and associated groundwater and geohydrological reserve, the plant and animal populations, the human settlement pattern and physical results of past and present human activity (terracing, water storage or drainage structures, roads, buildings, etc.) (FAO/UNEP, 1997).*

Or as UNCCD states (art 1):

Land means the terrestrial bio-productive system that comprise soil,vegetation other biota and the ecological and hydrological processes that operate within the system

The reasons that back up our comment are the following:

Many of the guidelines proposed encompass not only soil management but also vegetal/cover and water management practices. So, for example guidelines 3.2 for creation of a stable soil surface through soil erosion control contains practices of plant cover and residues managements, reduction of surface runoff volume and velocity or modification of terrain topography that cannot be considered “sensu stricto” only soil management practices but land management since they affect vegetal and water components of the land system. Similar for guidelines 3.3 for maintenance and enhancement of a sufficient organic cover, when crop residues management tended to left on surface and not taken them out) is mentioned as one desirable and recommended practices. Also for the efficient use of irrigation water and minimization of soil salinization ,3.7, many of the guidelines proposed are concerned the management of water resources (increasing of irrigation efficiency) in conjunction with soil management. Indeed the authors quite often interchangeably use the terms land and soil along the text. For instance

In page 3 when, explaining the proposed scope of the VGSSM, is said that: “ The global scope of the proposed guidelines will complement the Status of the World’s Soil Resources report, which provides a source of locally-specific examples of soil management and information. It also complements existing regionally focused documents such as TerraAfrica’s (2011) guidelines and best practices for sustainable **land** management in Sub-Saharan Africa”

Or in page 12 speaking about the Guidelines for the preservation of agricultural soils, it is stated that “Wherever possible, preservation of productive agricultural **land** should be a priority”

We hope these comments can be useful for improving later version of the document

90. Gaius Eudoxie, University of the West Indies, Trinidad and Tobago

Dear Moderators,

Firstly, I commend the authors and contributors on the effort extended in developing the draft VGSSM. Please find below a few comments on the document;

§ I note that the scope indicates that the guideline will address sustainable management of soils in all types of agricultural system and wonder why the agriculture was the only land use targeted. I appreciate the role of agriculture in soil degradation but it might be beneficial to include other land uses such as horticultural (landscaping), and other transformations of land that do not result in permanent cover.

§ I document would also benefit from including a glossary. For example, I was unaware of what the term “brownfields” referred to. This is said in the context that the guideline are intended to service a wide variety of multi-hierarchal stakeholders.

§ In reviewing the document, I could not help but get the feeling that the guidelines were based on the assumption that agriculture (cropping systems) were at least had some mechanical input. Many of the guidelines focused on erosion control under conventional tillage. However, for many SIDS manual or small scale mechanised production may be limited by residue presence, especially where transplant production is the norm. I don't think the guideline has focused on small scale farming in relation to examples and strategies presented.

§ Guideline 3.4 which addresses nutrient imbalance can be improved with inclusion of firstly ensuring that diagnostic testing (soil) is performed to guide nutrient inputs.

§ Under the current global scenario, I think that a guideline that addresses climate change implications on sustainable soil management should be included.

I would like to wish the panel success in this needed initiative and look forward to the implementation of these guidelines.

Regards,

Gaius Eudoxie

Lecturer, Soil Science

University of the West Indies

St. Augustine

Trinidad and Tobago

91. Birgit Wilhelm, WWF Germany, Germany

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/Zero_Draft_VGSSM_BWI.docx

92. Fernando O. Garcia, IPNI, Argentina

Dear facilitators,

I congratulate you for the Voluntary Guidelines, a well complete set in fact, and for the opportunity in discussing them in the forum.

Just to add my support to the comment of Timothy Krupnik on "...adding a section on easy to measure and monitor indicators of sustainable soil management that can be implemented by practitioners and including a toolbox of different methods that can be used to maintain and improve soil quality."

My view is that providing a guide of indicators would greatly help practitioners, framers, consultants, and others on the search for a sustainable management of soils. These should not be set for regulatory purposes.

Best regards,

Fernando

Ing. Agr. Fernando O. García, Ph.D.

Director Regional

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(B1641ABO) Acassuso - Buenos Aires

Argentina

93. Rainer Horn, IUSS, CAU Kiel, Germany

Dear all I added a few comments and altered some links from the soil physics point of view. All the best

Rainer

Link to the Zero Draft with comments in track change mode:

http://www.fao.org/fsnforum/sites/default/files/resources/Zero_Draft_VGSSM.docx

94. Dan Pennock & Ronald Vargas, facilitators of the discussion

Dear colleagues/contributors

The e-consultation is now closed, and we would like to thank you all for your participation in the on-line consultation for developing the Voluntary Guidelines for Sustainable Soil Management (VGSSM). During the course of the discussion, it has been fantastic to read the comments and thoughts of the various range of soil users, from farmers organizations to NGOs, universities, soil societies, research institutes, private and public sector, and individuals too.

The quantity and especially the quality of the thoughtful comments received from more than 30 countries are fundamental and will now enable the Intergovernmental Technical Panel on Soils (ITPS), the main advisory body to the Global Soil Partnership, to prepare the first draft of the VGSSM (end of

March 2016). This draft will then be submitted to an Open-Ended Working Group for its finalization and submission to the Fifth Global Soil Partnership Plenary Assembly (23-25th May 2016). If endorsed by the Plenary Assembly, the draft VGSSM will be submitted to the Committee on Agriculture (COAG) for its review, and if endorsed to the FAO Council.

The full proceeding will be posted shortly on this website, while you are invited to follow the next steps of the VGSSM development process on the Global Soil Partnership webpages. You may also contact the GSP Secretariat for any further questions.

So, many thanks to all of you for your insights and the passion you bring to achieve sustainable soil management worldwide!

Key Messages from E-Consultation

The guidelines should not be limited to agriculture alone: Many submissions stressed the need to expand the guidelines to include non-agricultural land uses and pointed out the disparity between the World Soil Charter and the Guidelines in this regard.

Need to develop indicators for SSM and monitor adoption: Many submissions emphasised the need to develop a suite of indicators that can be applied to assess SSM; specific measures such as Visual Soil Evaluation, Soil Quality Assessment, and erosion assessment were suggested.

Lack of clarity about stakeholders and governance: There were a number of comments about the need to clarify the stakeholders this document is targeted at. This is also linked to concerns about governance – policy instruments to increase adoption of SSM have to be targeted at the relevant stakeholder.

Expand SSM approaches beyond Conservation Agriculture: There were a wide range of SSM measures beyond Conservation Agriculture (CA) suggested by commentators. There were also concerns that the zero-order draft had been too negative about CA and that it had been too positive about CA.

Concerns about the voluntary nature of the Guidelines: Several commentators expressed the hope that the guidelines could be made more binding rather than voluntary.

There were a large number of suggestions for concepts that should be added or highlighted in the VGSSM. Some of those that were endorsed by multiple commentators were:

Trade-offs: Societies need to make choices about the ecological services offered by soils, and these should be highlighted in the document; this links the definition of SSM more with the classical definition of sustainability.

Soil resistance and resilience: These related concepts are mentioned in the document but should be promoted as the basis for SSM assessment.

Land Capability and Land Use Incapability Classification: It was noted that degradation occurs when land use is not linked to land capability. This is also linked to the governance question raised by others – who decides on the use of the soil?

Soils and climate regulation: Several commentators felt that the guidelines were weak on the link between SSM and climate regulation.

Biodiversity and SSM: The section on protection of biodiversity was felt to be particularly weak, although the difficulty of assessment was also acknowledged.

Role of soil structure and SSM: Several commentators felt that the role of soil structure needed to be highlighted.

An integrated soil-sediment-water system approach should be used: The very strong link between SSM and water resources was emphasised by many commentators.

Dan Pennock, Intergovernmental Technical Panel on Soils

Ronald Vargas, Global Soil Partnership Secretary

95. France

Réponse de la France à la consultation en ligne portant sur l'avant-projet de Directives volontaires pour une gestion durable des sols

Nota bene: en complément de la réponse au questionnaire, quelques suggestions rédactionnelles préliminaires dans le texte des directives sont également proposées.

La version zéro présente-t-elle un schéma suffisamment complet pour parvenir à une gestion durable des sols dans le monde entier?

Cet avant-projet est une bonne base de discussion. Il pourrait cependant très utilement être complété en particulier sur les points suivants :

- **approfondir les questions agronomiques** dont l'analyse reste assez partielle (voir ci-dessous). Il manque aussi des références aux services relatifs au **cycle de l'eau** (il n'y a pas d'évapotranspiration sans végétaux... et pas de végétaux sans sols vivants et fonctionnels).
- **La principale pratique agronomique recommandée est le « sans labour ». Il existe pourtant de nombreuses autres approches qui devraient également être décrites : agriculture biologique, agro-écologie, agroforesterie, intérêt des rotations...**
- **La gestion de la fertilité et des flux de nutriments est trop centrée sur l'azote au détriment d'autres éléments qui ont un impact également très important**
- **La sécurité alimentaire est abordée au point 4 de manière trop partielle : la production et la productivité ne sont qu'une partie des 4 piliers de la sécurité alimentaire. Les questions d'accès, de nutrition, de qualité sanitaire restent des défis pourtant très prégnants encore aujourd'hui. Cette définition partielle amène à se centrer de manière excessive sur les questions de rendements (« high-yielding varieties ») et occulter d'autres critères importants dans la prise de décision des producteurs : comment gérer la structure des sols, comment limiter la pression des insectes, parasites (exemple nématodes, taupins..) et autres maladies, comment gérer les risques (climatiques, économiques), l'adaptation au changement climatique... Répondre à l'ensemble de ces préoccupations et défis requiert une approche plus globale.**
- La question cruciale des **pollutions et contaminations des sols** n'est quasiment pas traitée. Or, si l'utilisation de composts, de déchets urbains... peuvent être des options très intéressantes, **il convient d'aborder la question de la bonne gestion des risques sanitaires ou de contamination possible** si elle n'est pas réalisée dans de bonnes conditions : des recommandations en ce sens devraient être ajoutées.
- Il conviendrait de mentionner la bioéconomie au sens large (il n'est question dans le texte que

de "fibre and fuel supply" ce qui semble limitatif).

- Le tableau 1.1 est assez incomplet. Par exemple la partie « *provisioning services* » mentionne dans habitat l'intérêt pour les oiseaux et **ne mentionne pas explicitement les organismes et microorganismes du sol comme de tous les organismes dépendant de la production primaire terrestre**, dont le lien avec le sol et les services rendus sont pourtant essentiels
- Enfin, la dernière partie (communication, plaidoyer, suivi...) est incomplète : d'une part **le GSP n'est pas le seul acteur à mobiliser, on peut mentionner le CNUCCD, l'initiative 4 pour 1000....** De même la question du suivi (dans le titre) n'est pas traitée dans cette partie 5.
- Ces directives contiennent-elles les éléments techniques pour parvenir à la gestion durable des sols ?

De nombreux éléments techniques sont mentionnés mais ces éléments sont souvent trop partiels, les approches proposées ne sont pas suffisamment intégrées. Par exemple :

- les flux de nutriments n'abordent pratiquement pas la question des **exportations de nutriments par les cultures** (seulement au quatrième point du 3.4), l'essentiel de la question des nutriments porte sur l'azote, qui peut être fixé à partir de l'atmosphère, mais ce raisonnement ne peut pas être appliqué pour des éléments tels que P ou K dont le cycle n'a pas de passage par l'atmosphère : ce qui est exporté par les cultures doit être compensé par des apports, la seule altération des roches n'étant pas en mesure de compenser des exportations importantes.
- Ainsi par exemple au 3.4 portant sur le cas où des excédents de nutriments sont apportés, les bandes enherbées ou zones humides ne peuvent en résoudre qu'une partie (azote) mais pas la totalité (le phosphore et le potassium ayant un cycle terrestre exclusivement)
- les mesures d'équilibrage des nutriments mentionnées au 3.4 point 2 ne mentionnent pas du tout les risques de contamination inhérents à l'utilisation de composts incluant des déchets urbains (ordures ménagères - household refuses - et/ou boues, fussent-ils compostés)
- les paragraphes portant page 11 sur *The soil filters and neutralizes any added pollutants* sont à revoir. Le titre est inapproprié et doit être revu : en effet, alors que le contenu développé évoque plutôt (à juste titre) des démarches préventives, ce titre laisse croire que le sol peut éliminer les polluants, message qui nous semble dangereux: **il ne s'agit pas de neutraliser des polluants ajoutés.... mais bien d'éviter d'en ajouter**. Il manque également dans ce titre un point d'alerte sur la qualité des matières organiques apportées aux sols agricoles en fin de cycle de vie des produits organiques issus de zones urbaines.

De plus le document peine à mettre en relief l'importance / la proportion des phénomènes. Ainsi la structure de la partie 3, dont le chapeau reprend les principes 8 et 9 de la charte peut laisser croire que les principes 8 et 9 peuvent avoir le même poids, alors que **le 8 (démarche préventive) est essentiel pour avoir un effet important**, le 9 (réhabilitation), s'il reste un enjeu majeur dans bien des contextes (zones dégradées et /ou désertifiées) concernant des surfaces moindres. Paradoxalement, dans la suite de la partie, la question de la réhabilitation des sols n'est quasiment pas abordée. Une partie spécifique pourrait être incluse (point 3bis).

- Les directives tiennent-elles compte de la vaste gamme de services fournis par les ressources en sols ? Les services cités sont nombreux mais **pas complets** (en particulier les services sociaux peuvent paraître très incomplets puisque les fonctions de supports d'aménagements ne sont pas ou peu mentionnées), **les fonctions culturelles semblent très largement sous-estimées** (paysages,

cultures gastronomiques, tourisme, archéologie, mémoire...).

- Les résultats des directives, une fois celles-ci appliquées, suffiront-ils pour réaliser les objectifs de développement durable (ODD)?

Pas certain, en particulier pour ce qui concerne la prévention des risques de pollutions diffuse et contamination des sols, pour ce qui concerne le maintien de la fertilité des sols (équilibre des nutriments), ou encore pour lutter contre la déforestation et l'artificialisation des sols -> impacts possiblement défavorables sur la sécurité alimentaire par minimisation de la difficulté d'atteinte simultanée de l'ensemble des objectifs par les moyens proposés

- Les directives définissent-elles les activités à éviter pour tirer le meilleur parti d'une gestion durable des sols ?

Pas encore suffisamment :

- même si la question de l'artificialisation est mieux traitée que dans des documents précédents, elle devrait être davantage mise en relief ;
- la question de l'économie circulaire et des **précautions à prendre quant à la qualité des matières organiques à accepter ou refuser sur les terres agricoles pour effectuer un retour de matière organique et de nutriments n'est pas posée du tout**. Cela favorise le risque de contaminations diffuses importantes et irréversibles.
- La fin de la partie 4 est curieusement pessimiste sur le « sans labour » pourtant promu tout au long du document, ce n'est pas très incitatif...
- La partie 5 est très embryonnaire

96. International Fertilizer Industry Association (IFA)

The zero draft of the guidelines is paving the way to sustainable soil management, a goal shared by IFA and its members. We would like to congratulate the Global Soil Partnership (GSP) for taking the lead on this important topic and would like to offer the following comments as contribution to the revision process of the zero draft.

Since 2009, IFA has been promoting a global framework for developing and delivering fertilizer best management practices that meet social, economic and environmental expectations of the stakeholders, or more practically improve productivity, profitability, cropping system durability and environmental health. This framework is known as the “**4R Nutrient Stewardship**”, the 4Rs standing for “**Right source of nutrient** at the **Right rate**, at the **Right time**, in the **Right place**”. Nutrient stewardship is further explained in the IFA toolkit published in March 2015, and in materials developed by the International Plant Nutrition Institute (IPNI - <http://www.ipni.net/4R>). This suggests tracking nutrient management performance using a blend of indicators reflecting efficiency and effectiveness.

Nutrient Use Efficiency (NUE) is often quoted as indicator of efficiency but rarely defined. In 2015, the Global Partnership on Nutrient Management (GPNM) released a position paper in which they define how to best calculate NUE (as input/output ratio) and monitor it, and the need for a series of complementary indicators, such as yield and soil fertility for properly interpreting

this indicator. IFA, in its position adopted in 2014 also emphasizes the need to track leading indicators such outreach to farmers. NUE measured as input/output ratio indicates the potential for nutrient losses to the environment (if too low NUE) and soil nutrient mining (if too high NUE). It is why:

- It makes more sense talking about **‘improving** NUE’ vs. ‘increasing NUE’ (cf. the first paragraph of the 3.4 guideline, p. 13 of the draft);
- Interpretations of NUE measurements must be done taking relevant complementary indicators into account.

Two recent studies, by Lassaletta *et al.* (2014) and Zhang *et al.* (2015) provide more precise and detailed estimates of NUE than de Vries *et al.* (2013). Lassaletta *et al.* and Zhang *et al.* have calculated global NUE levels of **47%** and **42%**, respectively vs. 38% according to de Vries *et al.* (cf. the first paragraph of the 3.4 guideline, p. 13 of the draft).

In celebration of **World Soil Day** and in anticipation of the **International Year of Soils in 2015**, IFA joined hands with six experts on the topic of soils and fertilizers to raise public awareness on the relationship between fertilizers and soils, and published in December 2014 a paper called **“Soil & Fertilizer: Expert Views”**. Each one of them underlined the critical importance of soils in agricultural production, the complexity of their operation, and the importance of reaching a balanced application of nutrients, proportionally to the needs, and at appropriate periods of the crops cycles.

Aiming at achieving SDG2 and SDG15, the fertilizer industry actively contributed to the establishment of the **“Principles for Sustainable Soil Management”** that will be published in a few days by the **United Nations Global Compact**. These principles are coherent and complementary with the ones listed in the revised World Soils Charter. They go as follows:

- Protect soils from physical, chemical and biological degradation, limit erosion and avoid deforestation;
- Restore soils on degraded, stranded and marginal lands;
- Maintain soil-based ecosystem services, water availability and quality;
- Enhance soil productivity according to its natural capacity;
- Develop extension services, knowledge systems and promote innovation;
- Communicate the importance of soil.

As the zero draft document focuses on maintenance and enhancement of a sufficient organic cover, as well as addressing nutrient imbalance, IFA would like to underline the primordial importance of integrated plant nutrient management (IPNM) to achieve sustainable soil management. This concept is developed in the book published in 2009 **“The Role of Fertilizers in Integrated Plant Nutrient Management”** (IPNM), co-authored by Alley & Vanlauwe. The two scientists describe the necessity of maintaining soil fertility in order to ensure robust plant growth, and focus on the complementarity of both organic and mineral nutrient sources to improve soil properties such as soil aggregate stability, soil structure, soil organic matter, water infiltration and water retention.

IPNM calls for using available organic sources of nutrients available on the farm or in its vicinity, and supplement them with mineral fertilizers to achieve the farmer's yield goal.

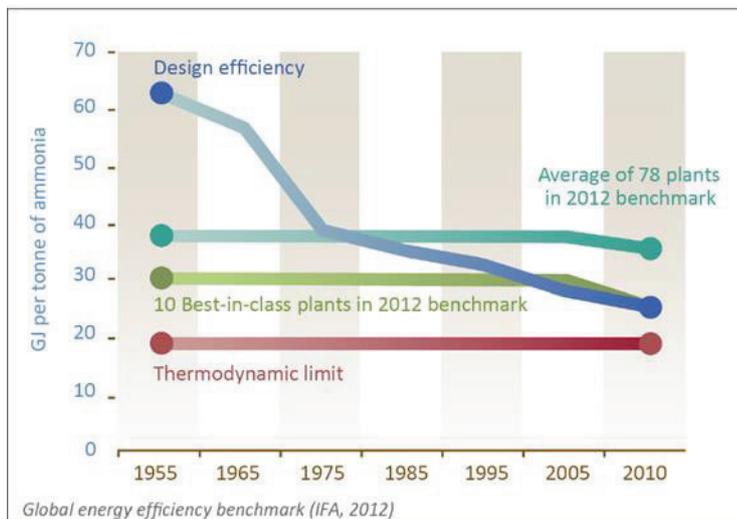
In their 2015 publication "**Managing Fertilizers to Enhance Soil Health**", Singh & Ryan also point out the positive effect that a regular and adequate fertilizer use has on soil organic matter, as a result of increased root biomass (despite the popular misconception that nitrogen use leads to decreased soil organic matter). They also insist on the fact that while fertilizer use has been associated with reduction in some soil organisms, these effects are relatively short-lived and only at the site of the fertilizer band. Significant increases in microbial biomass have been shown by long-term application of fertilizers in non-acid soils.

The zero draft proposes guidelines for an efficient use of irrigation water, but does not explicitly link it with nutrient use by soil and plants. In 2015, IFA took part in the publication of the book "**Managing Water and Fertilizer for Sustainable Agricultural Intensification**", jointly with the International Water Management Institute (IWMI), the International Plant Nutrition Institute (IPNI) and the International Potash Institute (IPI). This work showed that fertilizer and water management go in pair in order to achieve sustainability. Indeed, the processes of nutrient accumulation or depletion are often related to transport processes in water. The interaction of water and nutrients in soil fertility management is governed by many considerations:

- Soil water stress will limit soils nutrient use at the plant level;
- Soils-supplied nutrients can be taken up by plants only when sufficient soils solution allows mass flow and diffusion of nutrients to roots;
- Soils water content is the single most importance factor controlling the rate of many chemical and biological processes, which influence nutrient availability

Moreover, poor soil fertility limits the ability of plants to efficiently use water. Lack of nutrients can negatively impact healthy root growth, provoking a low utilization of the available water in the soil (the crops cannot access it). In terms of solutions, it appears that fertigation can be a way to simultaneously optimize water and nutrient use efficiency. In their book "**Fertigation – A Tool for Efficient Fertilizer and Water Management**" released in 2011, Kafkafi & Tarchitzky demonstrate that when properly performed, fertigation has consistently increased fertilizer use efficiency and crop growth by closely matching the rate and timing of water and nutrient delivery with crop's requirements.

The zero draft addresses the consequences of excess nutrient additions on carbon dioxide release due to the production of synthetic nitrogen fertilizers. It is important to note that fertilizer manufacturers across the globe have taken substantial measures to continually improve their energy efficiency and reduce their carbon footprint. Global nitrogen fertilizer production has become increasingly more efficient over the last several decades, with best performing plants approaching the thermodynamic limit, as shown by the graph below.



If we take a life cycle approach, studies have demonstrated the positive role of enhanced agricultural productivity in reducing overall total greenhouse gas (GHG) emissions. Analyzing the evolution of GHG emissions from agriculture between 1961 and 2005 under three different agricultural scenarios, Burney *et al.* (2010) show that increased emissions from rising fertilizer production and use have largely been offset by lower emissions associated with cropland expansion, demonstrating the positive impact of yield improvement and sustainable fertilizer use.

The zero draft finally mentions health issues as a negative consequence of the presence of nitrogen into groundwater. However, nitrogen, in its nitrate or nitrite form (in fruits and vegetables, for instance), also has proven health benefits. Nitrate and nitrite are also present in some medical therapeutics. That is why these positive impacts need to be weighed against the more uncertain negative health impacts of chronic exposure to high nitrate in drinking water for susceptible subpopulations (Bryan & Van Grinsven, 2013).

As demonstrated above, it clearly appears that Nutrient Stewardship and Integrated Plant Nutrient Management (IPNM) have a decisive role to play in order to achieve Sustainable Soil Management. In fact, both Nutrient Stewardship and IPNM are components of the wider concept of Integrated Soil Fertility Management (ISFM). By promoting and advocating a wide and generalized adoption of these practices, the fertilizer industry takes its responsibilities and actively helps farmers all around the world to improve their soil management practices.

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