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# CONFERENCE

## Fortieth Session

Rome, 3-8 July 2017

## Report of the 25<sup>th</sup> Session of the Committee on Agriculture (Rome, 26-30 September 2016)

### Executive Summary

The 25<sup>th</sup> Session of the Committee on Agriculture brings to the attention of the Council and the Conference its findings and recommendations.

### Matters requiring the attention of the Council

The Council is invited to endorse the findings and recommendations of the Committee on Agriculture, and attention is drawn in particular to:

- *Strategy for FAO's Work on Climate Change*, paragraphs 12 and 14
- *Second International Conference on Nutrition (ICN2) Follow-up: Nutrition-related Implications for Agriculture and Livestock Development*, paragraph 18
- *Update on FAO's Work on Antimicrobial Resistance*, paragraphs 20, 21 and 22
- *FAO's Work in the Food and Agriculture Sector under the Strategic Framework*, paragraphs 24 and 25
- *The Global Agenda for Sustainable Livestock*, paragraph 27
- *Reports of the 3<sup>rd</sup> and 4<sup>th</sup> Session of the Plenary Assembly of the Global Soil Partnership (GSP), including "Draft Voluntary Guidelines for Sustainable Soil Management"* (paragraphs 30, 31 and document in Appendix C for consideration)
- *The Globally Important Agricultural Heritage Systems*, paragraphs 33 and 34
- *The International Year of Pulses: Nutritious Seeds for a Sustainable Future*, paragraph 35 b) and c)
- *Achieving Sustainable Rural Development through Agricultural Innovation*, paragraphs 37 and 38
- *The World Programme for the Census of Agriculture 2020*, paragraphs 40, 41 and 42
- *Agriculture and the 2030 Agenda for Sustainable Development*, paragraph 44 b) and d)
- *Report on Implementation of the Recommendations of the 24<sup>th</sup> Session of the Committee on Agriculture*, paragraph 45 a), b), c), d), e) and f)
- *Multi-year Programme of Work of the Committee*, paragraph 47



- *Observance of the World Bee Day*, paragraph 48
- *International Year of Plant Health*, paragraph 50
- *International Year of Camelids*, paragraph 52

### **Matters requiring the attention of the Conference**

The Conference is invited to endorse the findings and recommendations of the Committee on Agriculture, and attention is drawn in particular to:

- *Strategy for FAO's Work on Climate Change*, paragraph 13
- *Update on FAO's Work on Antimicrobial Resistance*, paragraphs 20 and 21
- *Reports of the 3<sup>rd</sup> and 4<sup>th</sup> Session of the Plenary Assembly of the Global Soil Partnership (GSP), including "Draft Voluntary Guidelines for Sustainable Soil Management"*, paragraph 30
- *The International Year of Pulses: Nutritious Seeds for a Sustainable Future*, paragraph 35 b) and c)
- *Agriculture and the 2030 Agenda for Sustainable Development*, paragraph 44 c)
- *Observance of the World Bee Day*, paragraph 48 (draft resolution on the establishment of observance of a World Bee Day to be celebrated on 20 May of each year)
- *International Year of Plant Health*, paragraph 50 (draft resolution on the establishment of observance of 2020 as the International Year of Plant Health)
- *International Year of Camelids*, paragraph 52

### **Suggested action by the Council and Conference**

The Council and Conference are invited to endorse the Report of the 25<sup>th</sup> Session of the Committee on Agriculture.

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## Introduction

1. The Committee on Agriculture (COAG) held its 25<sup>th</sup> Session at FAO Headquarters from 26 to 30 September 2016. Of the 129 Members of the Committee<sup>1</sup>, 115 were present at the Session, including seven Ministers. Five Members of the Organization, the Holy See, Palestine, the Sovereign Order of Malta, three United Nations Organizations, five Intergovernmental Organizations and seven Non-governmental Organizations (NGOs) participated as observers. The list of participants and the list of documents are available at <http://www.fao.org/about/meetings/coag/coag-25/en/>.
2. Mr José Graziano da Silva, Director-General, addressed the Committee. The Honourable Monty Patrick Jones, Minister for Agriculture, Forestry and Food Security, delivered a keynote address on behalf of H.E. Ernest Bai Koroma, President of the Republic of Sierra Leone, followed by the address of Professor Joachim von Braun, Director, Centre for Development Research (ZEF), Germany, who delivered a keynote address on the world's agriculture and food transformations, sustainable development goals and innovation.
3. The Committee was informed that the European Union was participating in accordance with paragraphs 8 and 9 of Article II of the FAO Constitution.
4. The Committee was assisted by a Drafting Committee composed of Afghanistan, Australia, Brazil, China, Congo, Costa Rica, Cyprus (Chair), France, Indonesia, Iraq, Japan, Malaysia, Romania, the Russian Federation, the United States of America and Zambia.
5. The Committee agreed to include item 16.3 "Proposal for an International Year of Camelids" in the Agenda, as proposed by the Plurinational State of Bolivia and adopted the Agenda and Timetable for the Session.
6. The Committee also agreed to discuss under item 19 the following documents: a) issues related to biodiversity in light of the 13<sup>th</sup> Meeting of the Conference of the Parties (COP) to the Convention on Biological Diversity (CBD); and b) introduction of the proposal to establish a subcommittee for livestock.
7. The Agenda is reproduced in Appendix B.

## Strategy for FAO's Work on Climate Change<sup>2</sup>

8. The Committee welcomed the strategy for Climate Change, noting that it reflected the unique global role for FAO at the nexus between its scope of work in food and agriculture and the challenges posed by climate change.
9. The Committee looked forward for the strategy to encompass issues relating to biodiversity, exploring synergies between adaptation and mitigation, as well as fostering collaboration among countries.
10. The Committee noted that the Plan of Action related to the Climate Change Strategy would be incorporated within the reviewed Strategic Framework. FAO's staff capacities and resources required for implementation of the strategy will be spelled out in the plan of action to be prepared.
11. The Committee stressed the importance for FAO, in collaboration with relevant stakeholders, to assist countries, upon their request, to strengthen institutional frameworks and processes and technical capacity to ensure sound agriculture and integrated cross-sectoral approaches to climate

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<sup>1</sup> See Appendix A

<sup>2</sup> COAG/2016/7/Rev.1

change, including addressing the adaptation needs and mitigation potential of agriculture as identified in their Nationally Determined Contributions (NDCs) to the implementation of the Paris Agreement.

12. The Committee requested FAO and countries to mainstream biodiversity in agriculture, including livestock to promote its contribution to ecosystem services and to climate change adaptation and mitigation. The Committee requested that the issues of mainstreaming biodiversity be addressed by COAG, but also by COFI and COFO, as a cross-cutting issue at the next meetings in 2018.

13. The Committee requested FAO Conference to consider, at its next regular session, decisions taken by the 22<sup>nd</sup> Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC-COP 22) and the 13<sup>th</sup> Meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD-COP 13) relevant to FAO's work, including in its deliberations on the next Medium Term Plan and Programme of Work and Budget.

14. The Committee agreed to consider the possibility of a future *ad hoc* sub-committee relating to climate change to be discussed within the context of the COAG Bureau for presentation at the next COAG.

15. The Committee requested the Secretariat to take into account comments presented on the Climate Change Strategy.

### **Second International Conference on Nutrition (ICN2) Follow-up: Nutrition-related Implications for Agriculture and Livestock Development<sup>3</sup>**

16. The Committee, in follow up to ICN2 in the agriculture and livestock sector, recognized the important contribution of agriculture in meeting the nutritional requirements of populations and endorsed the sustainable nutrition sensitive agriculture approach taking into account all stages of the food system.

17. Acknowledging its importance, the Committee encouraged countries to mainstream nutrition into national and regional agricultural policies and programmes, including through South-South Cooperation, and also asked FAO to produce regular progress reports through the Programme Implementation Report (PIR).

18. The Committee requested FAO, in collaboration with other UN Agencies and relevant stakeholders, and within the framework of the 2030 Agenda, to support the strengthening of capacity of government institutions and of local communities to promote and integrate nutrition into agriculture management and training programmes.

### **Update on FAO's Work on Antimicrobial Resistance<sup>4</sup>**

19. The Committee took note of the "update on FAO's work on Antimicrobial Resistance (AMR)" as called for by Conference Resolution 4/2015 and welcomed the development of the five-year Action Plan with regular updates on implementation through the PIR.

20. The Committee encouraged FAO to continue its active collaboration with the World Health Organization (WHO) and the World Organisation for Animal Health (OIE) and other relevant stakeholders in implementing the UN Declaration on antimicrobial resistance (AMR), including strengthening the capacity of countries and regions using One Health and multi-sectorial approaches.

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<sup>3</sup> COAG/2016/5

<sup>4</sup> COAG/2016/16

21. The Committee requested FAO and relevant partners to develop new and affordable tools and approaches for countries and to assist in the development and implementation of national action plans with a focus on strengthening awareness and surveillance, improving governance and best practices.
22. Recognizing the effort of FAO to find sustainable funding mechanisms to support its work on AMR, the Committee encouraged FAO to give priority to AMR activities in the next PWB 2018-19.

### **FAO's Work in the Food and Agriculture Sector under the Strategic Framework<sup>5</sup>**

23. The Committee took note with appreciation of the achievements in food and agriculture during 2014-2015, and acknowledged the developments and trends identified that are likely to influence FAO's future work with respect to the food and agriculture sector.
24. The Committee welcomed the main priorities identified for FAO's work in food and agriculture, and presented comments to the document COAG/2016/2 to be taken into account in the review of the Strategic Framework and the preparation of the Medium-Term Plan 2018-2021.
25. The Committee called on FAO to continue to strengthen its normative and science and evidence-based work with particular attention to agroecology, biotechnology, sustainable production, climate change, biodiversity, mechanization, statistics, food safety, nutrition, youth and gender. This work will be delivered through multi-stakeholder and cross-sectoral partnerships with particular attention to South-South cooperation and the engagement with the private sector and civil society organizations.

### **The Global Agenda for Sustainable Livestock<sup>6</sup>**

26. Given the evolving nature of the Global Agenda for Sustainable Livestock, the Committee considered the proposed governance structure appropriate.
27. The Committee called on FAO to play a greater role as an intergovernmental stakeholder, and as a programmatic collaborator in providing technical expertise, as well as to strengthen its role as the Secretariat, promote stronger cooperation among countries, as well as better regional balance.
28. Considering the sustainable livestock sector development as the prime objective of the Global Agenda, the Committee confirmed the appropriateness of its linkages with the Sustainable Development Goals (SDGs).

### **Reports of the 3<sup>rd</sup> and 4<sup>th</sup> Session of the Plenary Assembly of the Global Soil Partnership (GSP), including "Draft Voluntary Guidelines for Sustainable Soil Management"<sup>7</sup>**

29. The Committee took note with appreciation of the reports of the 3<sup>rd</sup> and 4<sup>th</sup> GSP Plenary Assemblies, and the progress made in the fight against soil degradation and in promoting sustainable soil management. It further requested GSP to continue reporting progress to COAG.
30. The Committee welcomed the document "Draft Voluntary Guidelines for Sustainable Soil Management" (VGSSM), which presents scientifically and evidence-based principles to promote sustainable soil management as adopted at the 4<sup>th</sup> GSP Plenary Assembly.

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<sup>5</sup> COAG/2016/2

<sup>6</sup> COAG/2016/9

<sup>7</sup> COAG/2016/10

31. The Committee endorsed the document “Draft Voluntary Guidelines for Sustainable Soil Management”, for consideration by the FAO Council in December 2016 (see document in Appendix C).

32. The Committee supported the establishment of the Global Soil Information System and the preparation of the Global Soil Organic Carbon Map by 2017, and called on GSP to pursue its resource mobilization efforts.

### **The Globally Important Agricultural Heritage Systems (GIAHS)<sup>8</sup>**

33. The Committee supported the work of FAO and countries on GIAHS for its contribution to sustainable agriculture, the conservation of biodiversity, food security and environmental sustainability.

34. The Committee took note of the information presented, including the establishment of the Scientific Advisory Group of GIAHS. It encouraged FAO to further align the GIAHS programme and activities within its Strategic Objectives through country and regional level delivery mechanisms.

### **The International Year of Pulses: Nutritious Seeds for a Sustainable Future<sup>9</sup>**

35. The Committee:

- a) Acknowledged the contribution of pulses to sustainability, food security, nutritional health, environmental protection and climate change adaptation and mitigation.
- b) Encouraged governments to use the opportunity of the International Year of Pulses (2016) to engage in raising public awareness on the multiple benefits of pulses and to develop and implement appropriate policies for promoting the improved production and consumption of pulses.
- c) Requested FAO, Members and all relevant stakeholders to continue their work on pulses, including their promotion beyond 2016.

### **Achieving Sustainable Rural Development through Agricultural Innovation<sup>10</sup>**

36. The Committee recognized the importance of agricultural innovation in achieving sustainable rural development, particularly for addressing the challenges of employment for youth and rural women to alleviate rural poverty. The Committee recognized the need for an enabling environment at country level for success.

37. The Committee encouraged FAO to continue its work on Agricultural Innovation Systems in accordance with the areas identified in the document (COAG/2016/6) and to further integrate it into the Strategic Framework.

38. The Committee recommended that FAO play a greater role in assisting countries and local communities in the development of their Agricultural Innovation System strategies through comprehensive diagnosis and needs assessments in partnership with farmers, academia, private sector, research, extension institutions and other relevant stakeholders, and to provide regular progress reports to the Committee.

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<sup>8</sup> COAG/2016/11

<sup>9</sup> COAG/2016/3

<sup>10</sup> COAG/2016/6

## **The World Programme for the Census of Agriculture 2020<sup>11</sup>**

39. The Committee supported FAO's leading role in the development and promotion of the World Programme for the Census of Agriculture (WCA) 2020 that will guide the implementation of agricultural censuses in countries in the period 2016-2025.

40. The Committee appreciated the content of Volume I of the WCA 2020, published in all FAO official languages, and welcomed the inclusion of new themes such as Environment/Greenhouse Gases emissions (GHG) and Intra-household distribution of managerial decisions on the holding. It further invited FAO to publish soon Volume II of the WCA 2020 in order to provide countries with harmonized guidelines on the operational aspects of census taking.

41. The Committee encouraged FAO Members to use the WCA 2020 guidelines, so as to ensure that census results are harmonized and internationally comparable, and to share census materials and detailed results with FAO.

42. The Committee recognized that the lack of resources is one of the major constraints in carrying out the agricultural census in developing countries, with negative effects on evidence-based decision-making. In this regard, the Committee encouraged FAO to provide technical assistance and training, as well as to share technologies and methodologies, including through South-South Cooperation. It further invited partners to provide support to developing countries in conducting the agricultural census.

43. The Committee highlighted the importance of a stronger linkage between the Population and Housing Census and the Agricultural Census to exploit synergies, reduce costs and to enable comprehensive analysis of rural household livelihoods.

## **Agriculture and the 2030 Agenda for Sustainable Development<sup>12</sup>**

44. The Committee:

- a) Recognized the key role agriculture plays in achieving the Sustainable Development Goals (SDGs) and stressed the need to promote actions that balance the three dimensions of sustainability – economic, social and environmental – and that are more integrated across agriculture, forestry and fisheries.
- b) Endorsed the five elements developed by FAO as a basis for the policy dialogue and governance arrangements needed to identify sustainable development pathways across the SDGs, across sectors and along related value chains.
- c) Invited the other FAO Technical Committees, the Rome-based Agencies, and other stakeholders, to continue enhancing collaboration and coordination towards a stronger and more effective contribution of agriculture, forestry and fisheries to the 2030 Agenda.
- d) Supported a greater role for FAO in providing the necessary data and information and building the capacities of countries, with due consideration to regional specific challenges, agreements and priorities, in the implementation of the 2030 Agenda.

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<sup>11</sup> COAG/2016/8

<sup>12</sup> COAG/2016/4

## **Report on Implementation of the Recommendations of the 24<sup>th</sup> Session of the Committee on Agriculture<sup>13</sup>**

45. The Committee:
- a) Noted with satisfaction the report on implementation of the recommendations of its 24<sup>th</sup> Session and requested the Secretariat to continue with such reporting in future.
  - b) Agreed to mandate its Bureau to create an informal open-ended Working Group to consider options for adequate and sustainable funding for WHO/FAO's Food Safety Scientific Advice Programme, building on the recommendations of the Codex Alimentarius Commission and to present its recommendations for consideration to an appropriate FAO Governing Body during 2017-18.
  - c) Requested FAO to intensify its food safety work and technical support to smallholders at local level concerning the safe use of fertilizers and pesticides.
  - d) Requested the Secretariat to report on the implementation of the *Peste des Petits Ruminants* Global Eradication Programme to the Programme Committee.
  - e) Requested FAO to strengthen its work on sustainable food systems in relation to the UN Ten-Year Framework of Programmes on Sustainable Consumption and Production (10YFP-SCP).
  - f) Requested FAO to continue reporting on the progress of its Family Farming activities.

### **Multi-year Programme of Work of the Committee (MYPOW)<sup>14</sup>**

46. The Committee took note of the 2014-2015 report and approved the proposed MYPOW 2016-2019.
47. The Committee noted that the MYPOWs should be improved with concrete targets and indicators.

## **Proposals for International Day/Year**

### **Observance of the World Bee Day<sup>15</sup>**

48. The Committee approved the proposal by the Government of Slovenia to establish observance by the UN System of a World Bee Day to be celebrated on 20 May of each year and endorsed the draft Conference Resolution, as contained in Appendix D, to be submitted for the consideration of the 155<sup>th</sup> Session of the Council and approval by the 40<sup>th</sup> Session of the FAO Conference.
49. Recognizing the critical role of bees in biodiversity, food security, agriculture, livelihoods and food supplies, and cognizant of the need to raise awareness of the decline of bees, the Committee encouraged the bee keeping activities of countries, including through South-South Cooperation.

### **International Year of Plant Health<sup>16</sup>**

50. The Committee approved the proposal by the Government of Finland to establish 2020 for observance by the UN system of the International Year of Plant Health (IYPH), and endorsed the draft Conference Resolution, as contained in Appendix E, to be submitted for the consideration of the 155<sup>th</sup> Session of Council and approval by the 40<sup>th</sup> Session of the FAO Conference.
51. Recognizing the critical importance of healthy plants on agricultural development, biodiversity, food security and nutrition, the Committee called for strong international collaboration,

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<sup>13</sup> COAG/2016/12

<sup>14</sup> COAG/2016/13

<sup>15</sup> COAG/2016/14

<sup>16</sup> COAG/2016/15



including through South-South Cooperation, harmonization, standards setting, and further called on FAO, the World Trade Organization (WTO), the Convention on Biological Diversity (CBD) and all other relevant stakeholders to support the IYPH and to contribute to its observance and the development of plant health.

### **International Year of Camelids<sup>17</sup>**

52. Recognizing the importance of Camelids for food security, poverty reduction and livelihoods, especially in arid lands, the Committee supported the principle of establishing an International Year of Camelids.

53. The Committee stressed the need to follow the procedures established in the 2013 FAO Policy on the Proclamation and Implementation of International Years.

### **Date and Place of Next Session**

54. The Committee noted that the 26<sup>th</sup> Session of COAG would take place in Rome in 2018 and that the exact date would be determined by the Director-General in consultation with the Chairperson and according to the appropriate process.

### **Election of the Bureau Members of the 26<sup>th</sup> Session of the Committee**

55. The Committee elected by acclamation Mr François Pythoud, Permanent Representative of Switzerland to FAO, as Chairperson of the Committee.

56. The Committee elected by acclamation the following six Members of the incoming Bureau of the Committee: Australia (South West Pacific), Cameroon (Africa), China (Asia), Cuba (GRULAC), Iran (Near East) and the United States of America (North America).

### **Any Other Matters**

57. The Committee noted the information provided on the forthcoming COP-13 of the Convention on Biological Diversity Meeting, which will take place in Mexico (COAG/2016/INF/8). It also noted that the issue of mainstreaming biodiversity in agriculture had already been addressed under the agenda item on Climate Change.

58. The proposal on the creation of a subcommittee on livestock was noted by the Committee, which requested that a background document be developed and presented to the next COAG session.

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<sup>17</sup> COAG/2016/17



## Appendix A - Members of the Committee on Agriculture

Afghanistan	Finland	Oman
Algeria	France	Pakistan
Angola	Gabon	Panama
Argentina	Gambia	Paraguay
Armenia	Germany	Peru
Australia	Ghana	Philippines
Austria	Greece	Poland
Bangladesh	Guatemala	Portugal
Belarus	Guinea	Qatar
Belgium	Haiti	Republic of Korea
Benin	Honduras	Romania
Bolivia (Plurinational State of)	Hungary	Russian Federation
Brazil	Iceland	Samoa
Bulgaria	India	San Marino
Burkina Faso	Indonesia	Saudi Arabia
Burundi	Iran (Islamic Republic of)	Senegal
Cabo Verde	Iraq	Sierra Leone
Cameroon	Ireland	Slovakia
Canada	Israel	Slovenia
Central African Republic	Italy	South Africa
Chad	Japan	Spain
Chile	Jordan	Sri Lanka
China	Kenya	Sudan
Colombia	Kuwait	Sweden
Congo	Latvia	Switzerland
Costa Rica	Lebanon	Syrian Arab Republic
Côte d'Ivoire	Lesotho	Thailand
Croatia	Liberia	The former Yugoslav Republic of Macedonia
Cuba	Libya	Togo
Cyprus	Lithuania	Tunisia
Czechia	Madagascar	Turkey
Democratic People's Republic of Korea	Malaysia	Uganda
Democratic Republic of the Congo	Mali	Ukraine
Denmark	Mexico	United Arab Emirates
Dominican Republic	Morocco	United Kingdom
Ecuador	Mozambique	United Republic of Tanzania
Egypt	Myanmar	United States of America
El Salvador	Netherlands	Uruguay
Equatorial Guinea	New Zealand	Venezuela (Bolivarian Republic of)
Eritrea	Nicaragua	Viet Nam
Estonia	Niger	Yemen
Ethiopia	Nigeria	Zambia
European Union (Member Organization)	Norway	Zimbabwe



## **Appendix B - Agenda of the 25<sup>th</sup> Session of the Committee on Agriculture**

### **Introductory Matters**

1. Adoption of the Agenda and Timetable
2. Nomination of Chairperson and Members of the Drafting Committee

### **Programme Matters under the Strategic Framework**

3. Strategy for FAO's Work on Climate Change
4. Second International Conference on Nutrition (ICN2) Follow-up: Nutrition-related Implications for Agriculture and Livestock Development
5. Update on FAO's Work on Antimicrobial Resistance
6. FAO's Work in the Food and Agriculture Sector under the Strategic Framework

### **Policy and Regulatory Matters**

7. The Global Agenda for Sustainable Livestock
8. Reports of the 3<sup>rd</sup> and 4<sup>th</sup> Session of the Plenary Assembly of the Global Soil Partnership (GSP), including "Draft Voluntary Guidelines for Sustainable Soil Management"
9. The Globally Important Agricultural Heritage Systems (GIAHS)
10. The International Year of Pulses: Nutritious Seeds for a Sustainable Future
11. Achieving Sustainable Rural Development through Agricultural Innovation
12. The World Programme for the Census of Agriculture 2020
13. Agriculture and the 2030 Agenda for Sustainable Development

### **Other Matters**

14. Report on Implementation of the Recommendations of the 24<sup>th</sup> Session of the Committee on Agriculture
15. Multi-year Programme of Work of the Committee (MYPOW)
16. Proposals for International Day/Year:
  - 16.1 Observance of the World Bee Day
  - 16.2 International Year of Plant Health
  - 16.3 International Year of Camelids
17. Date and Place of Next Session

18. Election of the Bureau Members of the 26<sup>th</sup> Session of the Committee
19. Any Other Matters
  - 19.1 Issues related to biodiversity in light of the 13<sup>th</sup> Meeting of the Conference of the Parties to the Convention on Biological Diversity
  - 19.2 Introduction of the proposal to establish a sub-committee for livestock
20. Adoption of the Report

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**Appendix C - Draft Voluntary Guidelines for Sustainable Soil Management**



Voluntary Guidelines for  
Sustainable Soil  
Management

- 1. Introduction ..... 3
  - 1.1 Background and rationale..... 3
  - 1.2 Objectives..... 4
  - 1.3 Nature and scope ..... 4
  - 1.4 Target audience ..... 4
  - 1.5 Definition of sustainable soil management ..... 4
- 2. Challenges for achieving sustainable soil management ..... 5
- 3. Guidelines for sustainable soil management ..... 7
  - 3.1 Minimize soil erosion..... 7
  - 3.2 Enhance soil organic matter content..... 7
  - 3.3 Foster soil nutrient balance and cycles ..... 8
  - 3.4 Prevent, minimize and mitigate soil salinization and alkalinization ..... 9
  - 3.5 Prevent and minimize soil contamination ..... 10
  - 3.6 Prevent and minimize soil acidification ..... 10
  - 3.7 Preserve and enhance soil biodiversity..... 11
  - 3.8 Minimize soil sealing ..... 11
  - 3.9 Prevent and mitigate soil compaction ..... 12
  - 3.10 Improve soil water management ..... 12
- 4. Dissemination, use and evaluation of the VGSSM ..... 13



## 1. Introduction

These Voluntary Guidelines for Sustainable Soil Management (VGSSM) were developed through an inclusive process within the framework of the Global Soil Partnership (GSP). They aim to be a reference providing general technical and policy recommendations on sustainable soil management (SSM) for a wide range of committed stakeholders. The guidelines were adopted by the 4<sup>th</sup> GSP Plenary Assembly (Rome, 25 May 2016), endorsed by the 25<sup>th</sup> session of the FAO Committee on Agriculture (Rome, September 2016) and finally approved by the \_\_\_<sup>th</sup> session of the FAO Council (Rome, \_\_\_).

### 1.1 Background and rationale

Soils are an essential and non-renewable natural resource hosting goods and services vital to ecosystems and human life. Soils are fundamental for producing crops, feed, fibre, fuel, and they filter and clean tens of thousands of cubic kilometers of water each year. As a major storehouse for carbon, soils also help regulate emissions of carbon dioxide and other greenhouse gases, which is fundamental for regulating climate. SSM is an integral part of sustainable land management, as well as a basis for addressing poverty eradication, agricultural and rural development, promoting food security and improving nutrition.

Soil is the world's largest terrestrial pool of carbon<sup>18,19</sup> and approximately 95% of global food is produced in soil<sup>20</sup>. SSM is a valuable tool for climate change adaptation and a pathway for safeguarding key ecosystem services and biodiversity. Due to the incalculable value soils provide to society through ecosystem services, SSM ensures a high return on investment by supporting and increasing these services. Widespread adoption of SSM practices generates multiple socio-economic benefits, especially for smallholder farmers and large scale agricultural producers worldwide whose livelihoods directly depend on their soil resources.

However, evidence recently provided in the Status of the World's Soil Resources (SWSR) report and other studies shows that about 33% of global soils are moderately or highly degraded<sup>21,22</sup>, *i.e.* due to unsustainable management practices. On a global scale an annual loss of 75 billion tons of soil from arable land is estimated to cost about USD 400 billion each year in lost agricultural production<sup>23</sup>. This loss also significantly reduces the soil's ability to store and cycle carbon, nutrients, and water. Annual cereal production losses due to erosion have been estimated at 7.6 million tonnes.

Growing concerns about the state of global soils resulted, amongst others, in the establishment of the Global Soil Partnership, the proclamation of the International Year of Soils (2015) by the UN General Assembly and the adoption of the revised World Soil Charter by the FAO Conference. In a broader context, the 2030 Agenda for Sustainable Development adopted a number of related targets in 2015, *i.a.* those aimed at restoring degraded soil, striving to achieve a land degradation-neutral world and implementing resilient agricultural practices that progressively improve soil quality and minimize soil contamination. SSM strongly contributes to collective efforts towards climate change adaptation and mitigation, combating desertification and promoting biodiversity, and therefore has specific relevance to the United Nations Framework Convention on Climate Change (UNFCCC), United Nations Convention to Combat Desertification (UNCCD) and United Nations Convention on Biological Diversity (UNCBD).

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<sup>18</sup> *Carbon sequestration in dryland soils*. FAO, 2004.

<sup>19</sup> *Land use, land use change, and forestry. Summary for policy-makers*. IPCC, 2000 (pp. 3-4).

<sup>20</sup> *Healthy soils are the basis for healthy food production*, FAO, 2015.

<sup>21</sup> *Status of the World's Soil Resources (SWSR). Main Report*. FAO and ITPS, Rome, 2015 (p. xix).

<sup>22</sup> *The state of the world's land and water resources for food and agriculture (SOLA). Managing systems at risk*. FAO, Rome and Earthscan, London, 2011 (p. 113).

<sup>23</sup> *The value of land: Prosperous lands and positive rewards through sustainable land management*. The Economics of Land Degradation (ELD) Initiative, 2015 (p. 80).

The revised World Soil Charter calls for the incorporation of SSM principles and practices into policy guidance. In response, the GSP decided to develop the present Voluntary Guidelines in line with its overall goal of promoting SSM.

### 1.2 Objectives

The objectives of the VGSSM are: to present generally accepted, practically proven and scientifically based principles to promote SSM and to provide guidance to all stakeholders on how to translate these principles into practice, be it for farming, pastoralism, forestry or more general natural resources management.

### 1.3 Nature and scope

The VGSSM are of voluntary nature and are not legally binding. They elaborate the principles outlined in the revised World Soil Charter, taking into account the evidence provided in the SWSR. The guidelines address technical aspects of SSM including core characteristics of sustainably managed soils, key challenges and potential solutions to address them. The VGSSM focus mostly on agriculture which is broadly defined as the production of food, fibre, feed, timber and fuel, although many of the principles described have a significant influence on ecosystem services provided by managed and unmanaged soil systems.

The guidelines are not expected to provide detailed recommendations, but are designed to inform strategic and context-specific decision-making at all relevant levels. They are intended to contribute to global, regional and national efforts towards the eradication of hunger and poverty due to the importance of soils in sustainable development.

### 1.4 Target audience

By providing an easily accessible and readily understandable reference to a wide range of stakeholders, the potential target audience of the VGSSM includes: government officials, policy makers, farmers, pastoralists, forest and land managers, extension services and agricultural advisors, development partners, civil society, private sector and, academia, etc.

### 1.5 Definition of sustainable soil management

In these guidelines, SSM is defined according to Principle 3 in the revised World Soil Charter as follows:

*“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”.*

The types of ecosystem services and the soil functions referred to in the definition can be elaborated as follows:

- Supporting services include primary production, nutrient cycling and soil formation;
- Provisioning services comprise the supply of food, fibre, fuel, timber and water; raw earth material; surface stability; habitat and genetic resources;
- Regulating services imply the regulation of aspects such as water supply and quality, carbon sequestration, climate regulation, control of floods and erosion; and
- Cultural services denote the aesthetic and cultural benefits derived from soil use.

SSM is associated with the following characteristics:

1. Minimal rates of soil erosion by water and wind;
2. The soil structure is not degraded (e.g. soil compaction) and provides a stable physical context for movement of air, water, and heat, as well as root growth;
3. Sufficient surface cover (e.g. from growing plants, plant residues, etc.) is present to protect the soil;
4. The store of soil organic matter is stable or increasing and ideally close to the optimal level for the local environment;
5. Availability and flows of nutrients are appropriate to maintain or improve soil fertility and productivity, and to reduce their losses to the environment;
6. Soil salinization, sodification and alkalization are minimal;
7. Water (e.g. from precipitation and supplementary water sources such as irrigation) is efficiently infiltrated and stored to meet the requirements of plants and ensure the drainage of any excess;
8. Contaminants are below toxic levels, i.e. those which would cause harm to plants, animals, humans and the environment;
9. Soil biodiversity provides a full range of biological functions;
10. The soil management systems for producing food, feed, fuel, timber, and fibre rely on optimized and safe use of inputs; and
11. Soil sealing is minimized through responsible land use planning.

## **2. Challenges for achieving sustainable soil management**

Soils have diverse chemical, physical and biological properties. As a consequence, they differ in their responses to management practices, their inherent ability to deliver ecosystem services, as well as their resilience to disturbance and vulnerability to degradation. The Status of the World's Soil Resources report identified ten key threats that hamper the achievement of SSM. These threats are: soil erosion by water and wind, soil organic carbon loss, soil nutrient imbalance, soil salinization, soil contamination, acidification, loss of soil biodiversity, soil sealing, soil compaction and waterlogging. These different threats vary in terms of intensity and trend depending on geographical contexts, though they all need to be addressed in order to achieve sustainable soil management.

SSM shall contribute to addressing global challenges, and meeting international commitments, including:

- the 2030 Agenda for Sustainable Development, where SSM could directly or indirectly contribute to achieving several of the agreed goals and targets;
- the Zero Hunger Challenge (to end hunger and malnutrition and assure food security for a growing population);
- climate change adaptation and mitigation, especially in the light of the [Paris Agreement](#) adopted at the UNFCCC COP21, which embodies a strong commitment to address climate change and give agriculture a prominent role in that process;
- the commitment to combat desertification and mitigate effects of drought, especially the strive to achieve a land degradation neutral world, taking note of the potential benefits for all as per the last UNCCD COP12;
- the Aichi targets which underline an important agenda to preserve biodiversity and the provision of ecosystem services;
- securing land tenure under the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT).

This context points to major opportunities to promote SSM. Taking the above into account, an enabling environment for promoting SSM is fostered by the following core actions:

- Establishing or strengthening inclusive SSM-supportive agricultural/environmental policies

Where appropriate, inclusive policies to promote SSM should be linked to agricultural and environmental policies, so that their implementation provides multiple benefits. If existing, these policies can be reviewed, as appropriate, to mainstream SSM.

- Increasing responsible investment and positive incentives aimed at promoting sustainable soil management

Where appropriate, responsible investment in SSM according to the Principles for Responsible Investments in Agriculture and Food Systems (CFS-RAI) should be increased. Provision of positive incentives to those stakeholders who implement SSM principles while recognizing the value of ecosystem services could be envisaged.

- Promoting secure land tenure rights according to the VGGT

SSM is affected by secure land tenure rights being in place or not. Access and tenure rights are an important factor for SSM to be properly implemented by land users and to enable long-term planning.

- Fostering and strengthening targeted soil research

It is imperative that investment in soil research is increased to enable national research programs and their partners to work with land users to identify and address the constraints they face in increasing the ecosystem services provided by soils (i.e. soil productivity).

- Preventing or minimizing soil degradation and restoring/rehabilitating degraded soils (including historically degraded soils)

Soil degradation shall be minimized using SSM, especially through soil conservation approaches that proved to be successful. Soil rehabilitation and/or soil restoration should also be a priority, returning degraded soils to productivity, especially in historically sound agriculture or other production systems currently under threat.

- Promoting effective education programmes

Where appropriate, education on soils (formal or informal) should be strengthened. That could start with the reflection of their importance in the school's curricula and extending to more professional levels. Capacity development on SSM should be enhanced so that more professionals are brought up-to-date on "state of the art" methods and tools.

- Ensuring adequate inclusion of SSM in extension services

Agricultural extension services should promote SSM principles and practices.

- Establishing/strengthening soil information systems

Considering the living nature of soils, the assessment of their status should be a pre-condition to planning any SSM intervention. Soil data and information (including local knowledge) are essential for understanding soil conditions and trends in soil functions, as well as for targeting interventions to increase productivity. Where appropriate, national soil information systems should be established

or strengthened in order to have solid monitoring capacities of soil condition in place. These systems would also contribute to the Global Soil Information System being promoted by the Global Soil Partnership.

- Fostering international cooperation/collaboration on soils

International cooperation on soils should foster the exchange of knowledge, technology and information. Various arrangements including “North-South”, “South-South” and “Triangular” cooperation could be used for that purpose.

- Promoting communication on SSM practices

Pursuing the efforts of the International Year of Soils 2015, SSM practices should be promoted and disseminated in view of their provisioning of important ecosystem services.

### **3. Guidelines for sustainable soil management**

The following constitutes technical guidelines to address soil threats that hamper SSM. They should not be viewed as a full list of good practices, but rather a technical reference to be applied on a context specific basis. Specific technical manuals may be developed later to provide complementary tools.

#### **3.1 Minimize soil erosion**

The SWSR report identified soil erosion by water and wind as the most significant threat to global soils and the ecosystem services they provide. Soil erosion causes the loss of surface soil layers containing organic and mineral nutrient pools, partial or complete loss of soil horizons and possible exposure of growth-limiting subsoil, as well as off-site impacts such as damage to private and public infrastructure, reduced water quality and sedimentation. Soil erosion is accelerated by human activities through, amongst others, reduced plant or residue cover, tillage and other field operations, and reduced soil stability leading to soil creep and landslides.

- Land-use changes such as deforestation or improper grassland-to-cropland conversion that cause removal of surface cover and loss of soil carbon should be avoided or carefully planned and appropriately implemented if unavoidable;
- A cover of growing plants or other organic and non-organic residues that protects the soil surface from erosion should be maintained through implementation of appropriate measures such as mulching, minimum tillage, no-till by direct seeding with attention to reduced herbicide use, cover crops, agro-ecological approaches, controlled vehicle traffic, continuous plant cover and crop rotation, strip cropping, agroforestry, shelter belts, and appropriate stocking rates and grazing intensities;
- Erosion by water on sloping and relatively steep lands should be minimized by measures that reduce runoff rates and velocity such as strip cropping, contour planting, crop rotation, intercropping, agroforestry, cross slope barriers (e.g. grass strips, contour bunds and stone lines), terrace construction and maintenance, and grassed waterways or vegetated buffer strips;
- Where appropriate, riparian buffers, buffer strips, wetlands, water harvesting and cover crops should be used/installed to minimize export of soil particles and associated nutrients and contaminants from the soil system and protect the downstream areas from damaging impacts; and
- Erosion by wind, including dust storms, should be minimized and mitigated through vegetative (trees and shrubs) or artificial (stone walls) wind breaks to reduce wind velocity.

#### **3.2 Enhance soil organic matter content**

Soil organic matter (SOM) plays a central role in maintaining soil functions and preventing soil degradation. Soils constitute the largest organic carbon pool on the Earth and play a critical role in

regulating climate and mitigating climate change through trade-offs between greenhouse gas emission and carbon sequestration. For this reason, SOM is strategic for climate change adaptation and mitigation, and global stores of SOM should be stabilized or increased. A loss of soil organic carbon (SOC) due to inappropriate land use or the use of poor soil management or cropping practices can cause a decline in soil quality and soil structure, and increase soil erosion, potentially leading to emissions of carbon into the atmosphere. On the other hand, appropriate land use and soil management can lead to increased SOC and improved soil quality that can partially mitigate the rise of atmospheric CO<sub>2</sub>.

- Increase biomass production by increasing water availability for plants using methods (e.g., irrigation with drippers or microsprinklers; irrigation scheduling; monitoring of soil moisture or loss of water via evapotranspiration) that maximize water-use efficiency and minimize soil erosion and nutrient leaching, using cover crops, balancing fertilizer applications and effective use of organic amendments, improving vegetative stands, promoting agroforestry and alley cropping, and implementing reforestation and afforestation;
- Protect organic carbon-rich soils in peatlands, forests, pasturelands, etc.;
- Increase organic matter content through practices such as: managing crop residues, using forage by grazing rather than harvesting, practicing organic farming, applying integrated soil fertility management and integrated pest management, applying animal manure or other carbon-rich wastes, using compost, and applying mulches or providing the soil with a permanent cover;
- Fire should preferably be avoided, except where fire is integral to land management, in which case the timing and intensity of burning should aim to limit losses of soil functions. Where fire is a naturally occurring event, steps to minimize erosion and encourage re-vegetation after fire should be considered, where practical.
- Make optimum use of all sources of organic inputs, such as animal manure and properly processed human wastes;
- Management practices such as cover crops, improved fallow plant species, reduced- or no-tillage practices, or live fences should be adopted to ensure the soil has a sufficient organic cover;
- Decrease decomposition rates of soil organic matter by practicing minimum or no-tillage without increasing the use of herbicides; and
- Implementing crop rotations, planting legumes (including pulses) or improving the crop mix.

### 3.3 Foster soil nutrient balance and cycles

The concepts of sufficiency and utilization efficiency apply especially to nutrient dynamics in the soil-water-nutrients-plant root continuum. Plant nutrition should be based on crop needs, local soil characteristics and conditions, and weather patterns. Plant nutrition can be enhanced through nutrient recycling or additions including mineral (chemical) fertilizers, organic fertilizers and other soil amendments including primary sources (e.g. rock phosphate) and secondary sources (e.g. phosphorus from sewage sludge). It is crucial to select an appropriate plant nutrient management system and approach alongside assessing the suitability of the land for a given land use.

The benefits of sufficient and balanced nutrient supply for plant needs are well-established and include: production of food, feed, fibre, timber, and fuel at levels at, or close to, the optimum potential in the specific geographical context; reduced need for pest control measures, external application of organic and inorganic amendments, and mineral fertilizers; less pollution resulting from inappropriate use of agro-chemicals; and enhanced soil carbon sequestration through biomass production and restitution to the soil.

The lack of basic nutrients leads to the underdevelopment of plants and decrease in yields and crop nutritional value. The consequences of excess nutrients in soils are a) the loss of excess nutrients (especially nitrogen and phosphorus) from agricultural fields, causing eutrophication and deterioration of water quality and terrestrial and aquatic ecosystems; b) increased release of the greenhouse gas nitrous

oxide from soils to the atmosphere; c) leaching of mobile forms of nitrogen to water used for human consumption, with potential human health impacts; and d) crop failure.

- Natural soil fertility and natural nutrient cycles should be improved and maintained through the preservation or enhancement of soil organic matter. Improved soil fertility can be attained through soil conservation practices such as the use of crop rotations with legumes, green- and animal manures, and cover crops in combination with reduced- or no-tillage with attention to reduced herbicide use, as well as agroforestry. Nutrient cycles are best managed in integrated systems such as crop-livestock systems or crop-livestock-forest systems;
- Nutrient use efficiency should be optimized by adopting measures such as applying balanced and context adapted soil organic and inorganic amendments (e.g. compost and liming agents, respectively) and/or innovative products (e.g. slow and controlled release fertilizers), as well as the recycling and reuse of nutrients;
- Fertilizer application methods, types, rates and timing should be appropriate to limit losses and promote balanced crop nutrient uptake. This should be based on soil and plant analyses and be a long-term endeavor rather than short term action;
- The addition of soil micronutrients should be considered when planning soil fertilization;
- Practical sources of plant nutrients should be used, including the precise and judicious use of organic and mineral amendments, inorganic fertilizers, and agricultural bio-products. These amendments and bio-products include liquid, semi-solid or solid manures, crop residues, composts, green manures, household refuse, clean ash generated during bioenergy production, soil amendments and inoculants. In order to increase their efficiency, such measures should be combined with the mitigation of other limiting factors (such as water deficiency). Safe use (including tolerable levels of contaminants and pollutants, and worker health) of these amendments should be ensured;
- Soil and plant-tissue testing and field assessments should be adopted and used. This provides valuable guidance in diagnosing and correcting limiting factors in crop production related to plant nutrients, salinity, sodicity, and extreme pH conditions. Such guidance is key for making informed decisions and monitor progress;
- Where appropriate, livestock movement and grazing should be managed to optimize manure and urine deposition;
- Application of liming agents in acid soils is a prerequisite for optimal nutrient use efficiency in such soils, while application of organic amendments such as compost, as well as appropriate soil-crop management should be considered for alkaline and other soils; and
- Naturally occurring mineral fertilizer resources like rock phosphate or potash should be allocated efficiently and strategically to ensure the continued availability of adequate amounts of mineral inputs for future generations.

### 3.4 Prevent, minimize and mitigate soil salinization and alkalinization

Salinization is the accumulation of water-soluble salts of sodium, magnesium and calcium in the soil. It is the consequence of high evapotranspiration rates, inland sea water intrusion, and human-induced (e.g. improper irrigation) processes. Salinization reduces crop yields and, above certain thresholds, completely eliminates crop production.

- Surface cover should be optimized to reduce evaporation losses;
- Efficiency of irrigation water use should be increased through improved conveyance, distribution, and field application methods. Application methods should be used that operate with low pressure and apply the water directly to the soil. Automization of water supply and application of water on top of crops should be avoided to reduce evaporation losses;
- Irrigation management should ensure sufficient water for plant growth and efficient drainage to avoid problems of salinization;

- Irrigation water quality should be tested and monitored; when feasible, water desalination should be performed;
- Surface and sub-surface drainage systems should be installed and maintained to control rising groundwater tables and control soil salinity. The design of these systems needs to be based on a thorough understanding of the water balance in these areas; and
- If soils are already degraded and prevention is no longer an option, reclamation of saline soils can be achieved using a variety of techniques such as direct leaching of salts, planting salt tolerant varieties, domestication of native wild halophytes for use in agro-pastoral systems, chemical amelioration and the use of organic amendments.

### 3.5 Prevent and minimize soil contamination

Soil may filter, fix and neutralize, but also release pollutants when conditions change (e.g. heavy metal release with lowering pH). Therefore, prevention of soil contamination remains the best way to maintain healthy soils and food safety in accordance to the Sustainable Development Goals.

Contaminants can enter soils from a variety of sources including agricultural inputs, land application of by-products, atmospheric deposition, flood and irrigation water, accidental spills, inappropriate urban waste and wastewater management, and other means. Accumulation and contamination occur if the rate of addition of a given contaminant exceeds its rate of removal from the soil system. Negative consequences may include plant toxicities and subsequent productivity declines, contamination of water and off-site areas through sediment transport, and increased human and animal health risks through accumulation in the food-chain.

- Governments are encouraged to establish and implement regulations to limit the accumulation of contaminants below established levels to safeguard human health and well-being, and facilitate remediation of contaminated soils that exceed these levels;
- Management of local soil contamination requires establishing background levels, followed by testing, monitoring and assessing contaminant levels to identify sites that are likely to be contaminated. Risk assessment, including total cost assessment, and remediation should be applied to reduce risks to humans and ecological systems;
- Identification of soils that are the most susceptible to the harmful effects of diffuse pollutants is needed. Appropriate attention should be given to reduce contaminant loads in these soils;
- Information on contaminated soil sites should be available to the public;
- Contaminated soils should not be used for food and feed production;
- Recycled nutrients originating from treated waste water or other waste materials that are used as soil amendments should be properly processed and tested to ensure they contain safe levels of contaminants and plant available nutrients. For instance, organic xenobiotics can pose a serious, incalculable and irreversible threat to soil fertility and human health; and
- Outflows of flood water from paddy rice cultivation after applying fertilizers and pesticides should be minimized to avoid off-site effects.

### 3.6 Prevent and minimize soil acidification

Human-induced acidification of agricultural and forest soils is primarily associated with removal of base cations and loss of soil buffering capacity or increases in nitrogen and sulfur inputs (e.g. legume pastures fertilizer inputs, atmospheric deposition). Soils with low pH-buffering capacity and/or high aluminium content are most prevalent when they have a low content of weatherable minerals (e.g. ancient, strongly weathered soils, and soils developed from quartz-rich parent materials).

- Monitoring soil acidity and minimizing surface and sub-surface soil acidity by using proper amendments (such as lime, gypsum and clean ash);



- Balanced fertilizer and organic amendment applications; and
- Appropriate use of acidifying fertilizer types.

### 3.7 Preserve and enhance soil biodiversity

Soils provide one of the largest reservoirs of biodiversity on earth, and soil organisms play key roles in the delivery of many ecosystem services. Little is known about the degree of biodiversity required to maintain core soil functions, but new tools for biochemical techniques and DNA analysis suggest significant progress in this area is possible.

- Monitoring programs for soil biodiversity, including biological indicators (e.g. community ecotoxicology) and *in-situ* early warning signals, should be undertaken;
- Soil organic matter levels supporting soil biodiversity should be maintained or enhanced through the provision of sufficient vegetative cover (e.g. cover crops, multiple crops), optimal nutrient additions, addition of diverse organic amendments, minimizing soil disturbance, avoiding salinization, and maintaining or restoring vegetation such as hedgerows and shelterbelts;
- The authorization and use of pesticides in agricultural systems should be based on the recommendations included in the [International Code of Conduct on Pesticide Management](#) and relevant national regulations. Integrated or organic pest management should be encouraged;
- The use of nitrogen fixing leguminous species, microbial inoculants, mycorrhizas (spores, hyphae, and root fragments), earthworms and other beneficial micro-, meso- and macro- soil organisms (e.g. beetle banks) should be encouraged where appropriate, with attention to limiting the risk of invasive processes by promoting the use of local biodiversity and avoiding the risk of disturbance in soil services;
- Restoring plant biodiversity in ecosystems, thereby favouring soil biodiversity;
- In-field crop rotation, inter-cropping, and preservation of field margins, hedges and biodiversity refuges should be encouraged; and
- Any land use change in areas with high biodiversity should be subject to land use planning and in line with the UNCBD, UNCCD and other relevant international instruments and with national law.

### 3.8 Minimize soil sealing

Land conversion and subsequent soil sealing for settlements and infrastructure affect all soils, but are of particular concern on productive, arable soils because of their importance for food production and food security and nutrition, and circular economy targets. In many places, urban sprawl affects the most productive soils adjacent to the cities and settlements. Soil sealing and land conversion causes a largely irreversible loss of some or all soil functions and the ecosystem services they provide.

- Considering the total value of soils and to ensure the preservation of productive, arable soils, existing policies, relevant laws and land use planning procedures for the development of settlements and infrastructure should be reviewed as appropriate;
- Where policy and legislation aim to minimize land conversion, measures should be implemented to encourage densification and re-use of existing urban or industrial areas such as abandoned areas and brownfields, and restoring degraded neighbourhoods after appropriate reclamation measures have been implemented. Ecological restoration of quarries and mining sites should be encouraged; and
- Soils with significant ecosystem services including high soil carbon stocks, high biological diversity or high agricultural suitability should be protected from land conversion for settlements and infrastructure by special legislation.

### 3.9 Prevent and mitigate soil compaction

Soil compaction is related to the degradation of soil structure due to imposed stresses by machinery and livestock trampling. Soil compaction (reduced or disrupted pore continuity) reduces soil aeration by destroying soil aggregates and collapsing macropore density, and reduces water drainage and infiltration, generating higher runoff. Compaction limits root growth and seed germination by high mechanical impedance, affecting soil biodiversity and causing surface soil crusting.

- Deterioration of soil structure due to inappropriate or excessive tillage should be prevented;
- Vehicular traffic should be minimized to the absolutely essential, particularly on bare soils, by reducing the number and frequency of operations, creating controlled traffic systems, and by performing agriculture/forestry operations only when the soil moisture content is suitable down to deeper depth;
- Machines and vehicles used in the field should be adjusted to soil strength and should be equipped with tyre pressure control systems or other means to reduce surface pressure (e.g. contact area), and use of heavy machinery should be avoided. During forestry operations, machine traffic should be restricted (e.g. controlled traffic) and brush mats used to help protect exposed soils from physical damage; on agricultural soils, controlled traffic and drive rows should be established, where possible;
- Cropping systems should be selected that include crops, pasture plants and, where appropriate, agroforestry plants with strong tap roots (dense and fibrous root systems) able to penetrate and break up compacted soils;
- An adequate amount of soil organic matter should be maintained to improve and stabilize soil structure;
- Macrofauna and microbial (especially fungal) activity should be promoted to improve soil porosity for soil aeration, water infiltration, heat transfer and root growth; and
- In grazing systems, a sufficient cover of growing plants should be maintained to protect the soil from trampling and erosion; livestock management should take into account grazing intensity and timing, animal types and stocking rates.

### 3.10 Improve soil water management

A sustainably managed soil has rapid water infiltration, optimal soil water storage of plant available water and efficient drainage when saturated. However, when these conditions are not met, waterlogging and water scarcity problems arise. On the one hand waterlogging, which is related to the saturation of soil with water, creates rooting problems for many plants, thereby reducing yields, and can cause contaminants such as arsenic and methylmercury to become mobile in the soil. On the other hand, water scarcity occurring in areas where water is lost by evaporation, surface runoff and percolation, can cause crop failure.

- In humid areas where precipitation exceeds evapotranspiration, additional drainage systems are needed to provide aeration for root functions like nutrient uptake. This is a concern especially in fine-textured soils which have high water retention capacity.
- Surface and sub-surface drainage systems should be installed and maintained to control rising groundwater tables in order to mitigate potential waterlogging;
- The efficiency of irrigation water use by plants should be increased through improved conveyance, distribution, and field application methods (e.g. scheduled drip or microsprinkler irrigation) that reduce evaporation and percolation losses of irrigation water, as well as through better soil water reserve estimation, better species or variety choices, and better computing of water loading periods and amounts;
- In dryland cropping systems, measures should be implemented to optimize water-use efficiency such as the management of soil cover (e.g. previous crops, forage and fallow) and water harvesting to increase soil water availability at sowing; reduction of runoff and evaporative losses from the soil surface; and ensuring that there is adequate water available at each stage of

crop development. These measures often involve trade-offs and risks that should be recognized and managed;

- Optimal soil water extraction by the crop through the selection of appropriate cultivars and careful timing of agronomic operation should be promoted; and
- Regularly monitor irrigation water quality for nutrients and potential harmful substances.

#### **4. Dissemination, use and evaluation of the VGSSM**

Without prejudice to the voluntary nature of the present guidelines, all stakeholders are encouraged to promote, support and use the guidelines according to their respective individual or collective needs, mandates, abilities, and relevant national contexts. The successful use of the guidelines needs a collective action of multiple stakeholders in an inclusive, participatory, gender sensitive, cost-effective and sustainable manner. In doing so, evidence-based scientific knowledge as well as local knowledge should be used as appropriate.

Acknowledging that States have the primary responsibility for achieving food security and nutrition of their population, they are encouraged to:

- Take the lead in promoting the use and evaluation of the VGSSM;
- Set up relevant platforms and frameworks, as appropriate, for collective action at local, national and regional levels, or use the existing facilities to promote these voluntary guidelines;
- Promote effective extension services that rely on proper research and education institutions and mainstream SSM in their activities; and
- Evaluate their use and the impact of improved soil management on food security, ecosystem services related to soil functions and on the efforts towards achieving the Sustainable Development Goals.

In this endeavour, States may seek technical support from FAO or other international and regional bodies, as appropriate. The Regional and Sub-Regional Soil Partnerships are instrumental in disseminating and promoting the use of the VGSSM.

Development partners, relevant specialized agencies and programmes of the United Nations, international financial institutions and regional organizations are encouraged to:

- Support the dissemination and implementation of these voluntary guidelines; and
- Facilitate, as appropriate, technical cooperation, financial assistance, capacity development, knowledge sharing and transfer of technology aimed at promoting SSM.

For other stakeholders, the following is suggested:

- Private sector enterprises involved in soil management are invited to promote the use of the guidelines with a focus on managing risks to maximize positive and minimize negative impacts on SSM, relevant to their context and circumstances;
- Civil society organizations with relevance to soil management are invited to integrate the guidelines in their policies and programmes, advocate for the appropriate use of the guidelines and assist with building capacity of their members with the aim of contributing to SSM; and
- Research organizations, universities, academia, extension organizations and/or programmes are invited to promote integration of the guidelines in their own policies, and facilitate knowledge exchange and skills development to contribute to SSM.

The GSP, hosted by FAO, presents a global forum where different stakeholders learn from each other's experiences and assess progress toward the implementation of these guidelines and their relevance, effectiveness and impact. The GSP Secretariat and the Intergovernmental Technical Panel on Soils (ITPS) as its advisory body will report to the GSP Plenary Assembly on the progress in the

implementation of the guidelines, as well as evaluate their impact and their contribution to the improvement of soil management.

Dissemination and promotion of the guidelines at the regional level should be supported by all stakeholders, particularly through the Regional Soil Partnerships.

In promoting the use of the VGSSM, possible synergies and collaboration with other relevant initiatives related to sustainable soil management could be explored.

## Appendix D - Observance of the World Bee Day Draft Conference Resolution

### The Conference,

**Considering** the urgent need to address the issue of worldwide decline of pollinator diversity and the risks this implies for agriculture sustainability, human livelihoods and food supplies;

**Recalling** the work of the Food and Agriculture Organization of the United Nations (FAO) on pollination services for sustainable agriculture, and the leading role played by FAO in facilitating and coordinating the International Initiative for the Conservation and Sustainable Use of Pollinators, established by the Convention on Biological Diversity (CBD) in 2002;

**Taking into account** the Thematic Assessment of Pollinators, Pollination and Food Production, released in February 2016 by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES);

**Noting** the dependence of global agricultural systems on pollination services and the significant contribution of bees and other pollinators to improving the production and yields of agriculture worldwide, and therefore their contribution to creating rural employment;

**Noting** the fundamental role and contribution of bees and other pollinators for sustainable food production and nutrition, thereby promoting food security for the world's growing population and contributing to poverty alleviation and hunger eradication;

**Noting** the contribution of the ecosystem services provided by bees and other pollinators to ecosystem health by safeguarding the state of biodiversity, species and genetic diversity, thereby promoting ecological and sustainable intensification of food production, and helping adaptation to climate change;

**Expressing concern** that bees and other pollinators are endangered by a range of factors, in particular due to the effects of human activities such as changes in land use, intensive agricultural practices and the use of pesticides, as well as pollution, pests and diseases and climate change, which threaten their habitat, health and development;

**Affirming** that bees and other pollinators are relevant to all three dimensions of sustainable development, namely, the economic, social and environmental dimensions;

**Cognizant** of the urgent need to raise awareness at all levels and to promote and facilitate actions for the protection of bees and other pollinators, in order to contribute to their health and development, bearing in mind that enhancing pollinator services is important for the achievement of the Sustainable Development Goals, in particular the goals to eradicate hunger, achieve food security and improved nutrition and promote sustainable agriculture, protect limited natural resources and stem biodiversity loss, as well as many other dimensions of the 2030 Agenda on Sustainable Development;

**Recognizing** that the observance of a *World Bee Day* by the international community would contribute significantly to raising awareness at all levels of the importance of bees and other pollinators, and promote global efforts and collective actions for their protection;

**Stressing** that additional costs of activities arising from the implementation of the World Bee Day be met through voluntary contributions, including from the private sector;

- 1) **Requests** the Director-General to transmit this Resolution to the Secretary-General of the United Nations with a view to having the General Assembly of the United Nations consider, at its next session, declaring 20 May each year as *World Bee Day*.



## **Appendix E - International Year of Plant Health Draft Conference Resolution**

### **The Conference,**

**Noting** that healthy plants constitute the foundation for all life on Earth, ecosystem functions, food security and are key to sustaining life on Earth;

**Recognizing** that plant health is key to the sustainable intensification of agriculture to feed the growing global population by 2050;

**Affirming** that plant health is critical to addressing the pressures of a growing population and that recognition, advocacy and support for the promotion of plant health is of paramount importance if the international community is to guarantee plant resources for a food secure world based on stable and sustainable ecosystems;

**Recognizing** that sustaining plant health protects the environment, forests and biodiversity from plant pests, issues of climate change and supports efforts to reduce hunger, malnutrition and poverty;

**Recalling** the urgent need to raise awareness and to promote and facilitate actions towards the management of plant health in order to contribute to the agreed United Nations Sustainable Development Goals for 2030;

**Trusting** that such a celebration would establish a platform and encourage actions to promote and implement activities in favour of the preserving and sustaining global plant resources, as well as raise awareness of the importance of plant health in addressing issues of global concern, including hunger, poverty and threats to the environment;

**Affirming** the urgent need of raising public awareness of the importance of healthy plants for food security and ecosystem functions;

**Stressing** that additional costs of activities arising from the implementation of the International Year of Plant Health be met through voluntary contributions, including from the private sector;

**Requests** the Director-General to transmit this Resolution to the Secretary-General of the United Nations with a view to having the General Assembly of the United Nations consider at its next session declaring the Year 2020 as the International Year of Plant Health.