Food and Agriculture Organization of the United Nations

FAO COVID-19 Response and Recovery Programme

Boosting smallholder resilience for recovery
Restoring soil health and productivity for safe, nutritious and resilient agri-food systems

The issue

Soil is an essential natural resource for food production, well-functioning of ecosystems and for human wellbeing. Soils provide 95 percent of the food we eat (FAO, 2015a), but they are not only the physical support for plants, they also provide them with the macro- and micronutrients they need to grow and to meet the nutrient demands of all organisms, including humans. Soils are the largest terrestrial reservoir of carbon and have great potential to store atmospheric carbon, being a key ally in global efforts to mitigate climate change (FAO, 2017). Soils also host up to a quarter of the planet's biodiversity, and represent a unique reservoir of genes with great potential for humanity (FAO *et al.*, 2020). Soil organic carbon and soil biodiversity are key components in other critical ecosystem services provided by soils, such as water regulation, purification and supply, and pollution filtering, buffering and degradation. As such, soils provide us with clean water and safe food, and contribute to ecosystems' resilience to extreme climate-related events such as droughts or floods (FAO, 2015b).

However, all these services are provided only by healthy soils that preserve all their functions intact. Despite their importance, approximately 33 percent of the Earth's soils are already degraded (FAO and ITPS, 2015). Soils are under increasing pressure due to urban sprawl, competing land uses, rising food demands, climate change, land degradation and natural hazard-induced disasters, such as floods and droughts. All of these pressures on the world's soil resources have been exacerbated by the current pandemic of COVID-19. Agricultural soils are forced to produce more and faster to ensure food security and nutrition in many countries, undermined by barriers to international trade, with the risk of reversing the sustainable management and development achievements that had been made so far (Poch *et al.*, 2020)both for the production of food and for ensuring a healthy, biodiverse environment, among other functions. COVID-19 is threatening food availability in many places of the world due to the disruption of food chains, lack of workforce, closed borders and national lockdowns. As a consequence, more emphasis is being placed on local food production, which may lead to more intensive cultivation of vulnerable areas and to soil degradation. In order to increase the resilience of populations facing this pandemic and future global crises, transitioning to a paradigm that relies more heavily on local food production on soils that are carefully tended and protected through sustainable management is necessary. To reach this goal, the Intergovernmental Technical Panel on Soils (ITPS. COVID-19 is also putting great pressure on urban and peri-urban soils in countries that have seen their agri-food imports limited. The urgency to bring these soils into production to meet local demand can lead to unsustainable practices such as high agrochemical use, canopy burning or crop intensification. It is therefore essential to carry out specific actions to raise awareness and adopt SSM to ensure that soil degradation is not aggravated and that food demand is met. Conventional unsustainable agricultural practices such as the misuse/overuse of fertilizers and agrochemicals, mono-cropping and excessive tillage, removal of vegetation cover, absence of organic matter, lack of well-designed drainage systems, irrigation without considering soil suitability and

Budget

USD 10 million

Time frame

2021–2024

SDGs

Related FAO policy briefs

- Sustainable crop production and COVID-19
- Integrated agriculture water management and health
- The dual threat of extreme weather and the COVID-19 crisis: Anticipating the impacts on food availability

inadequate waste management and disposal are accelerating soil degradation processes and exacerbating food insecurity and social inequalities worldwide. Although people get enough calories from conventionally produced foods, these often lack the necessary nutrients and are in many cases unhealthy. Hidden hunger caused by micronutrient deficiencies in soils, and thus in food, accounts for an estimated 1.1 million of the 3.1 million undernutrition-related deaths each year (IFPRI, 2014). Ingestion of contaminated food produced in polluted soils is also the main route of exposure to a wide range of soil contaminants and a cause of acute and chronic illness and even death. Soil health is therefore a key element for the production of healthy food that will nourish animals and humans for a correct and complete development.

Soil degradation also has a major impact on ecosystems, worsens water availability and quality, leads to loss of above and below ground biodiversity, and results in increased greenhouse gas emissions. Consequently, planetary health or One Health cannot be achieved without ensuring soil health.

Lack of awareness of the importance of soil resources and scarce knowledge and reliable data on the status of soil health further aggravates the situation and holds stakeholders back from developing informed policies and promoting the adoption of sustainable soil management.

The action

The Food and Agriculture Organization of the United Nations (FAO) Members established the Global Soil Partnership (GSP) in 2012 as a collaborative mechanism to ensure soil governance and promote sustainable soil management. Since its inception, the GSP has developed technical and policy tools to adapt sustainable soil management (SSM) principles and practices to local needs and stakeholders. The revised World Soil Charter (FAO, 2015) adopted by all FAO members set out the basic principles of SSM and the actions to be taken by each soil-related stakeholder. Soil management is sustainable if the supporting, provisioning, regulating, and cultural services provided by soil are maintained or enhanced without significantly impairing the soil functions that enable those services or biodiversity.

In 2015, FAO published the Status of the World's Soil Resources report, in which ten major threats to soil health were identified, named loss of soil organic carbon and soil biodiversity, soil erosion, soil pollution, soil acidification, nutrient imbalance, soil salinization and alkalinization, soil compaction, soil sealing and waterlogging. All these threats are present in all regions of the world, albeit with varying degrees of relevance, and all lead to the loss of soil productivity and its capacity to provide key ecosystem services. The principles set in the revised World Soil Charter were applied to address these soil threats and translated into concrete actions in the Voluntary Guidelines for Sustainable Soil Management (VGSSM) (FAO, 2017). The International Code of Conduct for Sustainable Use and Management of Fertilizer (Fertilizer Code) (FAO, 2019) is a specific tool that builds on the principles of the VGSSM and provides clear guidance to all stakeholders for the judicious use of fertilizers to ensure soil health and maintenance of productivity. The Global Soil Partnership is also devoting major efforts to raising soil awareness at all levels and improving soil data and information, key to the development of informed evidence-based policies.

Sustainable soil management, including practices adapted to local climatic conditions and existing soil types, as well as oriented to address the main threats existing in each location, is therefore a cost-effective and nature-based tool to ensure the resilience and sustainability of agriculture and food systems. FAO and its Global Soil Partnership are in a privileged position to advance the adoption of SSM and soil governance from the local to the global level, through the following key actions:

1. Develop capacities at the national level in sustainable soil management, soil data collection and analysis, digital soil mapping and monitoring.
2. Implementation of the Voluntary Guidelines for Sustainable Soil Management and the Fertilizer Code at national level.
3. Adoption of targeted SSM practices aimed at preventing major soil threats, ensuring the sustainability and resilience of agriculture and food systems, and producing sufficient safe and nutritious food, thus contributing to food security and nutrition.
4. Scale up interventions to prevent soil degradation, enhance soil productivity, avoid GHG emissions, sequester carbon and restore degraded soils in light of the recovery of COVID-19.
5. Implement the approach of Soils4Nutrition in order to boost soil productivity for more nutritious food (particularly micro-nutrient content of food), safer food (free of soil borne diseases and pathogens and soil contaminants).

Expected results

Sustainable soil management practices are adopted by farmers through the Soil Doctors programme in order to enhance crop yields, soil fertility, water retention, soil biodiversity and reduce soil pollution, especially in those areas affected by COVID-19-derived pressures.

1. Resilience of agriculture and food systems is enhanced by adopting SSM practices that contribute to prevent soil degradation and to restoring degraded soils while simultaneously reduce greenhouse gas emissions and sequester soil organic carbon (mitigation co-benefits).
2. Degraded soils are rehabilitated for providing ecosystem services including crop production following soils for nutrition approach.

3. Capacities of national institutions on sustainable soil management are built and strengthened using EduSoils and other tools.

4. Global and national soil information systems are established and soil laboratories strengthened in order to support evidence-based decision making.

Partnerships

This action will be implemented by the Global Soil Partnership and its multi-stakeholder partners including governments, civil society, Non-Governmental Organization (NGO), academia and United Nations (UN) partners that are grouped in its eight Regional Soil Partnerships.

The project will work in collaboration with national soil institutions, Ministries of Agriculture and Environment, farmers' associations, soil science societies, the three UN Conventions (United Nations Convention to Combat Desertification, Convention on Biological Diversity, United Nations Framework Convention on Climate Change), United Nations Environment Programme and UN Panels including the Intergovernmental Technical Panel on Soils, the Science Policy Interface and the Intergovernmental Panel on Climate Change to guarantee solid science behind the interventions. It also includes other international initiatives such as 4per1000, Global Soil Biodiversity Initiative, International Committee on Contaminated Land, etc.

Programme links

This project has strong links with some of FAO's most relevant programmes and initiatives:

1. In relation with robust data and technical tools, global and national soil information systems soil data and information to the Hand-in-Hand Initiative, facilitating an informed decision-making process for sustainable soil management.

2. GSP is supporting countries to access faster and more cost-effective measurements of soil properties for digitized and informed agriculture. By recognizing the potential of spectral technology in soil analysis and soil mapping and monitoring, Global Soil Laboratory Network (GLOSOLAN) aims to address the limitations that still hinder the widespread adoption of this technology and supports digital agriculture.

3. Soils filter, buffer and degrade soil contaminants, preventing their entry into the food chain, their seepage into groundwater and their transport to surface water through runoff. Soils also provide plants and animals with essential macro- and micronutrients. Soil health relies on soil biodiversity and food safety is directly linked to it because of soil borne diseases. Soil is therefore at the heart of environmental health and should therefore be considered within the One Health approach.

4. With the shift of the world's population from rural to urban environments and disruptions in global food chains due to emergencies such as COVID-19, food production in urban soils is receiving more attention. However, urban soils are particularly sensitive to degradation processes, especially soil pollution. Therefore, sustainable soil management in urban environments plays a key role in the development of green and sustainable cities.

5. Drylands are also very sensitive ecosystems and must follow an integrated restoration approach. Improving soil organic carbon and soil biodiversity helps to increase water retention in the soil and to favor the establishment of plant species, so the FAO drylands restoration initiatives must take into account the state and needs of the soil, for which this project provides data and good practices adapted to each context.

Regional and country focus

The resilience of agro-ecosystems to climate change and other global challenges, and the production of sufficient, safe, and nutritious food are global priorities. Sustainable soil management is able to provide solutions adapted to all contexts and therefore well suited to all existing agriculture and food systems. Sustainable soil management is a practical framework that encompasses multiple agricultural practices applicable in agroforestry, livestock and small, medium and large-scale crop production.

SSM consists of simple, low-tech practices adaptable to all agro-ecosystems and is therefore relatively easy to adopt if supported by awareness and knowledge of the state of the soil, to ensure that the practices adopted will have a positive effect in the short, medium and long term. SSM is applicable by small, medium and large producers, as well as in urban agriculture as it involves site-specific practices.

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