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Review of the EU soil strategy and Proposal for a Directive on Soil Monitoring and Resilience

Recommendations for an Aotearoa New Zealand national soil strategy

Summary

The proposed EU Directive on Soil Monitoring and Resilience was studied through conversations with EU stakeholders. The development of a NZ soil strategy was explored.

The EU soil Directive proposes mandatory soil health monitoring for all EU member states, and aligns with the EU soil strategy's aim to reach 100% healthy soils in the EU by 2050.

Lessons learned are:

- Societal and environmental issues are urgently calling for sustainable soil management.
- The soil-water system can play a key role in societal transition by facilitating experimentation while providing support during the uncertain transition period.
- A soil strategy needs to be part of a wider framework, strengthening the importance of soil in a suite of environmental challenges and solutions.
- Every stakeholder needs to be involved. Only if every stakeholder stands behind the goals of a soil strategy will it be effective.
- Disconnect national scale monitoring from local soil management. National scale soil health monitoring needs to reliably assess soil resources and drivers and pressures. However, change happens locally and needs local knowledge and incentives.
- Land owners need support. Investment in knowledge transfer and financial security during a transition phase is imperative.
- Knowledge transfer is key, including education of soil advisors, regional stakeholder hubs, regional peer-to-peer collectives, and demonstration sites.
- Measures and policies need to be simple and incentivising, or they won't be effective.
- Address the whole food and agriculture supply chain, including processing plants, transport and distribution parties, retail industry, agrochemical industry, consumption, waste and disposal industries.

Recommendations for developing a national soil strategy:

- Form a soil strategy stakeholder working group,
- With the working group assess the costs, benefits, levers and incentives,
- Reset our thinking and reframe our goals for soils, including political priorities,
- Together with all relevant stakeholders draft a National Soil Strategy for Aotearoa New Zealand including:
 - A clear vision for soil health outcomes over time agreed by all stakeholders,
 - Recommended sustainable soil management,
 - Clear links to existing legislation, policies and guidelines,
 - A pathway for potential new legislation and policy,
 - Action plans for each stakeholder group.
- Expand on national soil quality/health monitoring.

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Purpose

To review the European Union (EU) soil strategy¹ and proposal for a Directive on Soil Monitoring and Resilience (the Directive)², and provide recommendations for developing Aotearoa New Zealand soil strategy. The report also provides lessons learned from the EU strategy and Directive.

This report is the outcome of a Chief Executive Scholarship. It is based on the strategy and proposed Directive, published comments on the proposed Directive, interviews with stakeholders in academia, lobby groups, EU agencies and Dutch government organisations, and participation in conferences.

Why develop a soil strategy now?

Globally and in Aotearoa New Zealand soil productivity underpins the food and economic systems, and can cause environmental and societal problems. However, increasingly soil is recognised as the solution rather than the problem. Sustainable soil management can provide long-term food and economic security, while also addressing major environmental issues. Indeed calls and initiatives from society³⁴ and the scientific community⁵⁶ in Aotearoa New Zealand ask for a food strategy, which would have close links to a national soil strategy. MfE is involved in the interagency discussions around a food strategy.

In 2014 a series of reports was published by the Ministry for Primary Industries, with the goal of developing a national soil strategy⁷. For various, undocumented, political and practical reasons no strategy was developed.

Regional Councils, the Land Monitoring Forum Special Interest Group and Manaaki Whenua Landcare Research have recently⁸ suggested that MfE and MPI develop a national soil strategy to better protect this resource for next generations. A national soil strategy could provide clear objectives for improving soil health across multiple land uses including a resilient production system, climate change adaptation, nature protection and restoration, integrating te ao Māori and mātauranga Māori, and recognising the key role that people play in improving the health of all soils.

Method

The proposed EU Directive on soil monitoring and resilience was studied through a secondment with a research organisation in the Netherlands (Wageningen University & Research, [Soil, Water & Land Use team](#)).

¹ [Soil strategy \(europa.eu\)](#)

² [Proposal for a Directive on Soil Monitoring and Resilience \(europa.eu\)](#)

³ [Help Fix Our Food System - Sign the Petition! — Eat New Zealand](#)

⁴ [Mana Kai Initiative — The Aotearoa Circle](#)

⁵ [NSC NationalFoodStrategy_Brief.pdf \(ourlandandwater.nz\)](#)

⁶ [Directors of six National Science Challenges call for a National Food Strategy | High-Value Nutrition \(highvaluenutrition.co.nz\)](#)

⁷ [Future Requirements for Soil Management in New Zealand \(mpi.govt.nz\)](#)

⁸ [LandCare Report \(envirolink.govt.nz\)](#)

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This included:

- Stakeholder interviews and discussions:
 - European Commission Directorate General for Environment (responsible for the proposed Directive)
 - EU soil science community (engaged on joint response letter and alternative monitoring options to the European Commission on the proposed Directive)
 - European Commission Joint Research Centre – European Soil Data Centre (coordinate soil monitoring and data)
 - Environmental lobby
 - Agricultural lobby
 - Dutch Ministry for Agriculture, Nature and Food safety
 - Dutch Ministry for Infrastructure & Water Management
 - Executive agency of the Ministry for Infrastructure & Water Management (Rijkswaterstaat, formerly translated to Directorate General for Public Works and Water Management)
 - Dutch National institute for Public Health and the Environment (instrumental in soil contaminants human health thresholds and remediation, now focussing more broadly on soil health)
 - Dutch Provinces (North Holland, Gelderland) soil experts
 - Farmers
 - Researchers (experts in soil biology, soil monitoring systems, soil legislation, soil indicators)
 - Soil consultancy staff
 - Farm advisor on nature-inclusive agriculture
- Participation in research:
 - Amsterdam urban soil health indicators identification and threshold selection (in collaboration with the Amsterdam municipality)
- Conference attendance
 - Wageningen Soil conference (in person)
 - UN-FAO soil & water conference (online)
 - European Mission Soil Week (in person)

Background soil health

Soil is a natural capital that underpins life on land, including human life. Soil directly benefits us through providing food, fuel and fibre, and indirectly by purifying and storing water, cycling nutrients, capturing and degrading contaminants, regulating climate, harbouring biodiversity. Globally and in Aotearoa New Zealand soil supports the economy, both through primary production and tourism.

Soil is also the solution to many environmental and societal problems, such as nutrient and sediment pollution of freshwater, estuaries and coastal waters, human nutrition and health

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issues, adaptation to climatic extremes. Therefore, various initiatives promote the sustainable use of soils as an opportunity to address global issues. Such initiatives have led to:

- Improved soil data and maps⁹¹⁰¹¹
- Funding for integrated soil research¹²¹³
- Collaborations¹⁴
- Guidance, education and outreach on sustainable soil management¹⁵¹⁶¹⁷
- Soil strategies, laws and policies¹⁸¹⁹²⁰

What is a healthy soil?

The EU directive uses the following definition: ‘soil health’ means the physical, chemical and biological condition of the soil determining its capacity to function as a vital living system and to provide ecosystem services.

What exactly a healthy soil is, depends on the environmental conditions and its intended use. Not all soil types can support all soil uses. A healthy soil for a specific use may also pose environmental or societal problems, such as naturally highly erodible soils threatening human infrastructure, or high producing agricultural soils leaching nutrients into freshwater.

“There needs to be a shift in how soil policy and management [in Aotearoa New Zealand] is approached to achieve international calls to manage soils sustainably” (Stronge et al. 2023²¹)

Overview EU soil strategies

Soil strategy 2006

The European Commission proposed a soil strategy in 2006²², with the overall objective of protection and sustainable use of soil. The strategy was built around four pillars:

1. harmonised legislation with protection and sustainable use as principal aims
2. integration of soil protection in national and EU policies
3. closing the knowledge gap through national and Community supported research
4. increase public awareness of the need to protect soil.

⁹ [ISRIC](#)

¹⁰ [Soil Maps and Databases | FAO SOILS PORTAL | Food and Agriculture Organization of the United Nations](#)

¹¹ [S-Map](#)

¹² [EU Mission: A Soil Deal for Europe](#)

¹³ [Our Land & Water National Science Challenge](#)

¹⁴ [FAO Global Soil Partnership](#)

¹⁵ [the international decade of soils, 2015-2025](#)

¹⁶ [FAO-GSP Voluntary Guidelines for Sustainable Soil Management](#)

¹⁷ [Waikato soil management and erosion control](#)

¹⁸ [Australia National Soil Strategy](#)

¹⁹ [Safeguarding our soils: a strategy for England](#)

²⁰ [Future Requirements for Soil Management in New Zealand](#)

²¹ [Achieving soil health in Aotearoa New Zealand through a pluralistic values-based framework: mauri ora ki te whenua, mauri ora ki te tangata](#)

²² [Thematic Strategy for Soil Protection 2006](#)

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The strategy proposed a Framework Directive as legislative means to ensure soil protection. This means EU member states will be required to take action to address soil threats but have freedom on how to implement.

The Commission's proposal for a European Soil Framework Directive was blocked by the UK, France, Germany, the Netherlands and Austria and formally withdrawn in 2014. Reasons for blocking the proposal were:

- Fear of interference with national soil policies
- Farmers and industry who were against additional legislative controls over soil protection
- Fear of disproportionate costs and negligible environmental benefits, particularly around contaminated sites identification and remediation.

Soil strategy 2021

In 2019 the European Green Deal²³ was published: a new growth strategy for a resource-efficient and competitive economy without net greenhouse gas emissions and economic growth decoupled from resource use. The Green Deal is a response to commitment to tackling climate change and other environmental challenges. The Green Deal provided a new incentive for a Soil strategy, anchoring soil to the EU Biodiversity strategy²⁴ and the Farm to Fork Strategy²⁵ (for a fair, healthy and environmentally-friendly food system). The 2021 EU soil strategy²⁶ is thus much more anchored in other EU strategies and related policies than the earlier attempts, and soil is now seen as a solution to many of the environmental and climate challenges.

The vision of the 2021 EU soil strategy is “by 2050 all EU soil ecosystems are in healthy condition and are thus more resilient, which will require very decisive changes in this decade”. Medium-term (2030) and long-term (2050) objectives are all related to existing EU policies on climate, biodiversity, farming, environmental pollution:

Medium-term objectives by 2030:

- Combat desertification, restore degraded land and soil
- Significant areas of degraded and carbon-rich ecosystems, including soils, are restored
- Achieve an EU net greenhouse gas removal of 310 million tonnes CO₂ equivalent per year for the land use, land use change and forestry (LULUCF) sector.
- Reach good ecological and chemical status in surface waters and good chemical and quantitative status in groundwater by 2027.
- Reduce nutrient losses by at least 50%, the overall use and risk of chemical pesticides by 50% and the use of more hazardous pesticides by 50% by 2030.
- Significant progress has been made in the remediation of contaminated sites.

²³ [The European Green Deal](#)

²⁴ [EU Biodiversity Strategy for 2030](#)

²⁵ [A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system](#)

²⁶ [EU Soil Strategy for 2030 Reaping the benefits of healthy soils for people, food, nature and climate](#)

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Long-term objectives by 2050:

- Reach no net land take.
- Soil pollution should be reduced to levels no longer considered harmful to human health and natural ecosystems.
- Achieve a climate-neutral Europe and, as the first step, aim to achieve land-based climate neutrality in the EU by 2035.
- Achieve for EU a climate-resilient society, fully adapted to the unavoidable impacts of climate change by 2050.

The soil strategy also announced the European Commission would table a dedicated legislative proposal on soil health by 2023 to enable the objectives of the strategy to be met and good soil health achieved across the EU by 2050. This resulted in the proposed Directive on Soil Monitoring and Resilience.

Overview proposed EU Directive on Soil Monitoring and Resilience

The Soil Monitoring and Resilience Directive was proposed on 5 July 2023. A Directive requires member states to propose national legislation. As soils vary geographically throughout the EU, member states are better suited to prescribe and adopt legislation and policies than the EU. The shift of focus from “soil health” (as proposed in the strategy) to “soil monitoring” shows the vast data gaps that need to be addressed before soil health management practices can be legally and practically prescribed.

The overarching objective of the directive is “to put in place a coherent soil monitoring framework that will provide data on soil health in all member states and to ensure that EU soils are in healthy condition by 2050 at the latest, so that they can supply multiple services at a scale sufficient to meet environmental, societal and economic needs and to reduce soil pollution to levels no longer considered harmful to human health. The directive contributes to preventing and mitigating the impacts of climate change, increasing resilience against natural disasters and ensuring food security.”

The Directive lays down measures on:

a) Monitoring and assessment of soil health:

Member states will have to ensure they can monitor and report on soil health. A coherent soil monitoring framework across all member states and all soils is proposed to provide data on soil health, and criteria to assess whether a soil is healthy.

A soil is considered healthy when it meets all the criteria for all soil descriptors given in the monitoring framework, the so-called “one out all out” principle. Some of these criteria are set at EU level, while others can be set by member states individually.

Soil health must be assessed in soil districts: areas that are homogenous in terms of soil type, climatic conditions, environmental zones and land use

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b) Sustainable soil management:

A **list of general sustainable soil management practices** is given for member states to expand and provide more context specific detail on.

c) Contaminated sites:

Member states must make **registers of contaminated and potentially contaminated sites** that are kept up to date and publicly available. Member states must carry out risk assessments on contaminated sites and take appropriate risk-reduction measures, restoration or remediation actions.

d) Land take and soil sealing mitigation:

Principles are given to avoid, reduce or compensate land take, to ensure the loss of ecosystem services is minimised.

Responses to Directive

Central governments/Member states

Generally, member states²⁷ think soil monitoring and management is important. Most member states question whether the Directive will create more costs and administrative burden and how the Commission would assist with costs and administration. Other common comments are:

- A general dislike of the “one out all out” method of evaluating soil health, it is found too strict and makes “healthy soils by 2050” unattainable.
- Questions on the alignment and potential overlap with the Common Agricultural Policy (CAP).
- Questions on alignment with other policies, specifically the Water Framework Directive.
- Questions on details, e.g.:
 - what are voluntary or mandatory obligations,
 - how exactly will monitoring in soil districts work,
 - to what extent will member states be flexible in determining indicators and thresholds,
 - how, where and by whom will data be stored and how will privacy be guaranteed?

Local (Provincial) government

Dutch Provinces are aware of the Directive but not yet actively involved in implementation. Similarly, several other member state municipalities have soil initiatives, but are awaiting central steering on the Directive. Urban centres are generally facing challenges and trade-offs in addressing sustainable soil and land management for housing, biodiversity goals, climate change resilience and human health.

²⁷Agriculture and Fisheries Council 18 September 2023 [Public session AM part II \(europa.eu\)](https://european-council.europa.eu/media/en/press-operations/infoboxes/item-detail/-/press-releases/123456789)

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Farming & forestry industry, landowners

Generally, the farming²⁸²⁹ and forestry³⁰³¹ sectors and landowners³² are in favour of sustainable soil management, although some organisations don't think an EU Directive is needed. The forestry and farming industries warn that soil management is context specific, and that strict legislation, restrictions, assessments and principles are unlikely to work when they don't take local knowledge and conditions into account.

All forestry and farming feedback analysed for this report advise against the 'one out all out' evaluation of healthy soils. There are also some concerns on the descriptors chosen as they may not represent soil health in all contexts, and the assessment criteria may be either too strict or not strict enough across member states, the latter would still not allow for a "level-playing field".

Some agricultural organisations think land take should be more strictly managed than currently in the proposed directive, some suggesting a certain amount of agricultural land per member state should be maintained.

Most organisations in the farming and forestry sectors are concerned about soil health data being publicly available as this is private data, and it may have consequences for land value. Therefore, also some organisations are concerned about the article ensuring access to justice for particularly eNGO's to be able to sue landowners if their soil isn't considered healthy.

There is a general sentiment that landowners, land users, farmers, foresters should be part of the local discussions for solutions. It is unclear to these sectors how the directive would practically be implemented, what monitoring costs landowners would have to pay themselves, and the administrative burden.

Scientific community

The scientific community in Europe wrote a joint scientific response letter to the proposed Directive³³.

In their letter the European scientific community welcomes the proposal for a Directive as a crucial mean to legally protect soils as essential part of the ecosystem. The scientific community also supports the proposal's focus on three main pillars:

- 1 monitoring of soil health
- 2 promotion of sustainable soil management practices
- 3 reducing risks related to contaminated land

²⁸ [Feedback from: LTO Nederland \(europa.eu\)](#)

²⁹ [Feedback from: European Council of Young Farmers \(CEJA\) \(europa.eu\)](#)

³⁰ [20231103_CEPF_feedback_soil.pdf \(cepf-eu.org\)](#)

³¹ [Feedback from: Stora Enso \(europa.eu\)](#)

³² [Feedback from: European Landowners' Organization \(europa.eu\)](#)

³³ [Feedback on proposed soil Directive on behalf of a large consortium of soil scientists, scientific projects and institutions from across the EU](#)

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The scientific community also have concerns and proposed the following recommendations:

- **Indicator framework.** In addition to the harmonised minimum dataset for soil health, the development of a fit-for-purpose flexible indicator framework is proposed. This would provide member states with additional context specific soil health indicators.
- **Soil biodiversity indicators.** The proposed soil biodiversity indicator (basal respiration) is extremely sensitive to temporal, temperature and moisture variations and thus does not provide a good measure of soil biodiversity, Instead the scientific community recommends the directive would require member states to include at least three more biodiversity indicators by e.g. 2025, and provide for large scale data collection on soil biodiversity.
- **Indicators on ecosystem services.** Rather than indicators focussing on soil threats, the scientific community proposed indicators or indicator bundles describing ecosystem services and soil functions. To be better aligned to EU green deal strategies and business initiatives
- **One out – all out principle is too stringent.** If one soil scores “unhealthy” in one soil category (currently one indicator per soil threat, so a single indicator score below/above a threshold), it is considered unhealthy. (Note this is similar to how currently in NZ Environmental Reporting soil quality is reported, e.g. 80% of sites were outside soil quality target ranges for at least one indicator). Other scoring systems could be a traffic light system or multi-indicator value scoring system.
- **Sustainable soil management practices should be further developed.** Further elaboration (guidance) is required for member states to further develop proposed sustainable management practices and make them context dependent.
- **Obligations need to be clear and binding.** The proposed directive does not provide a clear action plan for when soil health targets are not met by a landowner.
- **Intermediate steps and realistic objectives.** The proposal presently focuses on the 2050 target of 100% healthy soils, but without intermediate objectives. Experiences from the Water framework directive show the importance of setting clear intermediate steps to ensure efficient implementation.
- **Needs for monitoring beyond heavy metal contamination.** Recommend that contaminated soil site investigations should also include: chemical hazards like organic pollutants such as polycyclic aromatic hydrocarbons, volatile organic pollutants, pesticides, pharmaceutical residues and persistent organic pollutants like the highly toxic fluorinated chemicals called ‘PFAS’ or ‘Forever Chemicals’, and physical hazards like plastics (nano, micro to macro), and biological hazards like pathogens.
- **Defining ‘acceptable levels’: risk assessment approach harmonization across EU.** An improvement is needed in the consistency across member states of risk assessment tools for human health and ecological risk. Defining clear acceptable levels based on concentrations, exposure and cumulative effects on human health, soil ecosystems and ecosystem services.

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- **Stronger accounting of diffuse and chronic sources of contamination.** The directive should make a distinction between local and diffuse pollution and include systematic monitoring and risk assessment.

Chemical/fertiliser industry

There is uncertainty on the “one out all out” principle, specifically regarding contaminated soils and the associated costs to remediate. The industry welcomes alignment to the water framework directive, and notes that nitrogen and phosphorus in soils aren’t always directly related to those elements in water³⁴³⁵.

Environmental NGOs

These organisations³⁶ generally think the directive isn’t clear enough in establishing intermediate targets. They are also in favour of rewarding land managers for sustainable practices and to have mechanisms for when soil health isn’t reached. To be more specific in reaching targets soil district health plans are proposed, where each soil district needs to establish their own targets and actions to reach them.

They also question the choice of soil biodiversity descriptor and the absence of clear guidelines for management of peatlands and wetlands³⁷.

Environmental NGOs also believe EU level soil sampling should be coordinated with monitoring networks tailored to local conditions, as soil health is a local challenge needing local solutions. Monitoring results should be communicated to landowners directly.

Environmental NGOs call on both society and science to safeguard soil health and biodiversity, and argue an extended producer responsibility scheme for the entire life cycle of a product (polluter pays principle, where the polluter can also be further in the cycle or chain than the landowner).

They suggest mandatory EU wide thresholds for contaminants. Set deadlines to investigate potential polluted sites and assess risks. Clear rules for soil investigations, risk assessments and management of contaminated sites.

Further process

The European Commission is currently (late 2023) consulting with member states, the public and stakeholders and redrafting the Directive. No timeline is published, but a decision on the Directive is expected before European Parliament elections in June 2024.

³⁴ [Feedback from: Cefic \(europa.eu\)](#)

³⁵ [Feedback from: ESPP \(European Sustainable Phosphorus Platform\) \(europa.eu\)](#)

³⁶ [Feedback from: EEB - European Environmental Bureau \(europa.eu\)](#)

³⁷ [Joint Statement on the European Commission’s proposal for a Soil Monitoring Law - Wetlands International Europe](#)

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Current redrafting³⁸ is considering comments received with among others the following amendments:

- Instead of the “one out all out” assessment of soil health, a more nuanced approach is suggested, assessing “soil ecological status”, resulting in 5 categories ranging from “critically degraded soils” to “high soil ecological status”. Soils classified with good or high ecological status would be considered healthy.
- The overall goal of all EU soil to be healthy by 2050 is suggested to be binding, to give more weight to the Directive.
- The setting of intermediate targets for 2040 where necessarily
- Soil districts will be empowered to adopt soil district plans. This shall be an inclusive process with local stakeholders and include targets to achieve measurable improvements in soil health.
- The EU Land Use/Cover Area frame statistical Survey (LUCAS) will sample and analyse at least 20% of each member state’s national sample size
- A framework for emerging contaminants to be included in monitoring of soil contaminants must be established, in the form of watch list and policy mechanisms to detect and assess substances of emerging concern.
- A tiered monitoring framework, with EU wide indicators and criteria in tier 1, and more freedom for context-specific indicators and a 20% deviation from criteria in tier 2.
- A better link to the common agricultural policy on the use of Good Agricultural and Environmental Conditions for sustainable soil management.
- The establishment by the Commission of a soil management toolbox that provides soil managers with practical information on the use of sustainable soil management practices.
- Better assessment by the Commission of funding necessary to implement the Directive.

EU Political implementation

The Directorate General Environment of the European Commission (EC) drafted the Directive in close collaboration with other directorates, and the whole Commission agreed to the Directive. If the Directive is accepted, the next steps for its implementation would be:

- Member states would develop and implement national legislation for soil monitoring
- The EC supports member states, for example by providing guidance, assistance in sampling, monitoring and administration, by providing science funding and generating and communicating knowledge
- The EC (via the EU Joint Research Centre) would collate the results and monitor soil health on EU scale
- The EC can then also facilitate exchange of knowledge and practices via monitoring results and science findings

³⁸ [DRAFT REPORT on the proposal for a directive of the European Parliament and of the Council on Soil Monitoring and Resilience \(Soil Monitoring Law\)](#)

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- In six years the Directive would be evaluated
- Next steps would be discussed/taken on making soil health outcomes legally binding and prescribing sustainable soil management practices

EU political opportunities

Level playing field

The Directive would provide a level playing field, initially for soil monitoring and subsequently potentially also for soil management practices. Particularly in the identification, management and remediation of contaminated sites and the sustainable management of agricultural soils a level playing field would benefit equitable and fair use of soils in the EU.

Aligning with other (international) legislation

Major opportunities exist in addressing and aligning related legislation (international, EU and national), particularly for climate change mitigation and adaptation, supporting biodiversity, improving water and broader environmental quality, safeguarding primary production and protecting and enhancing human health and wellbeing. To connect all these themes and their legislation, it is very important the Directive aligns to existing legislation and doesn't duplicate efforts or increase administrative and financial burdens.

The soil Directive, as well as other EU Directives and national strategies and legislation, also link to the UN Sustainable Development Goals (SDGs). Although the SDGs are not legally binding, they provide context of all the interrelated societal and environmental issues and trade-offs between them. Progress is monitored globally.

Examples of where the Directive should align with existing legislation and regulations are given below.

The EU Common Agricultural Policy (CAP)

The CAP is a partnership between agriculture and society, between Europe and its farmers. The CAP aims to:

- support farmers and improve agricultural productivity, ensuring a stable supply of affordable food;
- safeguard EU farmers to make a reasonable living;
- help tackle climate change and the sustainable management of natural resources;
- maintain rural areas and landscapes across the EU;
- keep the rural economy alive by promoting jobs in farming, agri-food industries and associated sectors.

2023-2027 strategic plans from member states for the CAP are designed to make a significant contribution to the ambitions of the European Green Deal, Farm to Fork Strategy and Biodiversity Strategy.

The CAP prescribes good agricultural and environmental conditions standards for agricultural areas (GAECs): these are requirements to be met by farmers as conditions for

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support. The GAECs are highly aligned to sustainable soil management principles as proposed in the Directive.

EU Biodiversity Strategy and Nature Restoration Law

The EU biodiversity strategy has clear links to the EU soil strategy, and the proposed EU Nature restoration law explicitly refers to the soil Directive for targets on soil biodiversity. It must be noted that the soil biodiversity monitoring of the Directive is weak as no mandatory soil biology or biodiversity indicators are proposed, which is also due to the lack of data and knowledge on soil biodiversity and its monitoring.

The lack of soil biodiversity data, monitoring and knowledge is also a recognised issue in New Zealand. The New Zealand biodiversity strategy³⁹ does mention soil, but much clearer and more direct links could be made. The lack of soil focus in the NZ biodiversity strategy is likely due to limited capability with the implementing agency, and could be strengthened by improving collaborations.

Climate Change obligations

Objectives of the Directive are complementary and in synergy with the European Climate Law and will contribute to the EU climate change adaptation objectives. The soil Directive is also complementary and synergistic with the Land Use, Land Use Change and Forestry (LULUCF) regulation. Finally, the United Nations Framework Convention on Climate Change considers soil both a source and a sink of carbon, and the EU have committed to promote sustainable management, conservation and enhancement of carbon sinks and reservoirs.

Water-related directives

The capacity of healthy soils to absorb, store and filter water means the soil Directive is expected to also contribute to objectives of the Water Framework Directive and the Groundwater directive, the Nitrates Directive, and the Floods Directive.

EU political barriers

A soil strategy and potential legislation was initially blocked in 2006 and completely abandoned in 2014. Reasons were fear of interference with national policies, a strong farmer and industry lobby against EU soil policy, and fear of costs. Although the political climate and the rationale for an EU soil Directive have changed, similar concerns have been raised by member states and lobby groups. Several member states fear the Directive is neither proportionate (i.e. soil threats are local issues that don't need EU-wide legislation) nor follows the subsidiarity principle (i.e. would not sufficiently allow member states to take their own decisions and actions).

Differences with NZ political situation

The EU soil strategy and Directive are written from a single cultural perspective, whereas a New Zealand soil strategy would be written from both te ao Māori (Māori worldview) and pākehā (non-Māori) perspectives.

³⁹ [Te Mana o te Taiao – The Aotearoa New Zealand Biodiversity Strategy \(doc.govt.nz\)](#)

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Member states of the EU face additional political and administrative layers compared to New Zealand. The EU Directive obliges each member state to develop their own national law and policies to monitor soil health. In some cases existing national soil monitoring does not comply with the EU directed soil monitoring and requires extra investment of resources.

New Zealand has a simpler political administrative system compared to EU member states. However, through the Treaty of Waitangi Aotearoa New Zealand has additional obligations in governing land and soil.

The barriers of farmer and industry lobby and administrative costs and burdens to implementing soil legislation and policy in Europe are also relevant to New Zealand.

EU Technical implementation

The Directive requires each member state to develop their own national legislation to develop a soil monitoring network. The Directive gives specific guidelines that each national monitoring network needs to follow to allow upscaling and reporting of soil health at EU level. The Directive also provides a tiered list of soil indicators and their methods to be used. It gives four tier 1 descriptors that need to be measured everywhere with blanket threshold values, three descriptors to be measured everywhere without threshold values, and four descriptors that can be measured depending on the local context. Member states are also free to use additional descriptors.

Member states are expected to set up monitoring within two years from acceptance of the Directive (tentatively early 2024 ahead of European Parliament elections in June 2024) and routinely measure every 5 years. The Directive will be reviewed 6 years from acceptance, with the intent to add components to legislate more strictly for soil health outcomes and using sustainable soil management practices.

The EU Joint Research Centre (JRC) will provide monitoring and measuring support, and will routinely set up and monitor 20% of sites in each member state. The JRC also assists in harmonising methods, descriptors (indicators) and criteria (thresholds). The JRC collects all the monitoring data and publishes aggregated results on the soil health dashboard⁴⁰.

EU opportunities for technical implementation

More soil data available for decision-making

All stakeholders agree there is a lack of soil health data, that this data is needed to understand the extent and drivers of soil threats, and to make informed decisions on sustainable soil management practices and as a basis for legislation and policies.

Harmonising data gathering

Available soil monitoring data in the EU are not harmonised, and not all member states have a soil monitoring network in place. Therefore, an EU wide soil monitoring network would greatly benefit data collection and knowledge generation.

⁴⁰ [EU SOIL OBSERVATORY \(europa.eu\)](https://europa.eu)

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Community-led local solutions

There is great opportunity to align the Directive with existing legislation and policy on climate, environment and biodiversity at local scale by community-led groups. Several stakeholders commented on successful pilot studies involving regional groups addressing environmental issues with landowners.

An example is the Dutch system for Nature and Landscape Subsidies⁴¹ that handles the Agricultural Nature Management policies. This system ensures that international, EU and national nature protection legislation and policies are realised. The management operates on habitat-scale. Provinces set up ambitions for nature protection and management together with stakeholders, and incorporate the ambitions into provincial nature management plans. These plans are executed by agricultural collectives, who create management plans together with local stakeholders such as nature organisations and water boards.

There are 40 agricultural collectives in The Netherlands covering the whole country. The collectives are certified and represent 11.000 farmers. Farmers can only get subsidies for EU legislated (nature & biodiversity) practices through these certified collectives. The collectives also assist farmers and other landowners in determining which nature measures they can best use, where and when, and ensure the measures are successful. Although the collectives cover nearly the whole country, not all agricultural practices are part of the collectives, and in for example Zeeland Province only 1% of the land area is part of the collective.

Such collectives could also be useful for implementing soil legislation and sustainable soil management incentives. Some collectives are already implementing sustainable soil management practices in anticipation of climate legislation to increase soil carbon.

EU barriers to technical implementation

Aligning with existing monitoring networks

Member states that already have a (comprehensive) soil monitoring network in place, sometimes for several decades, may find that it doesn't align with the Directive guidelines and requirements. Abandoning such networks would break long-term trend analyses. Adding sites, indicators or methods to existing monitoring networks creates additional costs.

For example, France monitors soil health nationally along an 8 km grid, this would not be sufficient for the EU Directive that requires monitoring sites to be stratified according to climate, soil type/district and land use. Germany also monitors forest⁴² and agricultural soils along an 8 km grid, and agricultural soils are only monitored for carbon⁴³ The Netherlands have had various monitoring networks predominantly for agricultural soils⁴⁴, and monitoring different aspects, e.g. soil biology, nitrates (for the EU Nitrate Directive), carbon,

⁴¹ [Subsidies system for Nature and Landscape, the Netherlands](#) (in Dutch only)

⁴² [Forest soil in Germany, results from the second soil inventory \(in german\)](#)

⁴³ [German Agricultural Soil Inventory](#)

⁴⁴ [Soil indicators for agricultural fields in the Netherlands](#)

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contaminated sites. Such existing networks would have to be aligned with the Directive's requirements.

Access to privately owned land

The practical access to soil sampling sites often depends on the goodwill and cooperation of private landowners, both in the EU and in Aotearoa New Zealand. Anecdotally the relationship with private landowners can be a major barrier to sample and monitor soils over time. It is often time-consuming to contact landowners, especially when sampling teams and landowners change. It is not always communicated and understood well why soil sampling is requested and what will happen to the sample and the data. On the one hand landowners are not generally in favour of having soil data from their land publicly available, as it may affect land value, their social license, and fear of regulations. On the other hand, landowners are generally interested in the data generated from their soil, but this is not often communicated to them at all or in a way that explains what the data mean for their land and soil use.

The issue of regularly accessing privately owned land for EU legislation is not addressed in the Directive. From interviews with science stakeholders in charge of monitoring there is sometimes considerable difficulty to access privately owned land for reasons mentioned above. No practical solution was mentioned, although it is generally recommended to only share soil data in aggregated, anonymised form, which is counter to the Directive. It is also recommended to clearly communicate to landowners the value of having soil data and understanding what it means for their management and profitability.

Differences with NZ technical implementation situation

Aotearoa New Zealand also has a mostly standardised monitoring network following the standardised methods of the National Environmental Monitoring Standards (NEMS) for Soil Quality and Trace Elements. Nevertheless, the rollout of a more comprehensive network (more sites) is needed, and although the NEMS give recommendations for stratified sampling, this is not always followed in practice. A nationally coordinated monitoring network, statistically stratified according to climate, soil type and land use, taking into account Management Units (for example Freshwater Management Units from the National Policy Statement – Freshwater Management or similar), is still missing. The current soil quality monitoring sites also aren't coordinated with MfE and the Department of Conservation's LUCAS monitoring sites (8 km grid of forested sites, also for UNFCCC) even though soil samples are taken from these sites.

Access to privately owned land is similarly difficult in Aotearoa New Zealand and overseas, and there is no good solution apart from much improved communication, and the use of aggregated data only for reporting and legislative purposes.

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Lessons learned from EU soil strategy and Directive

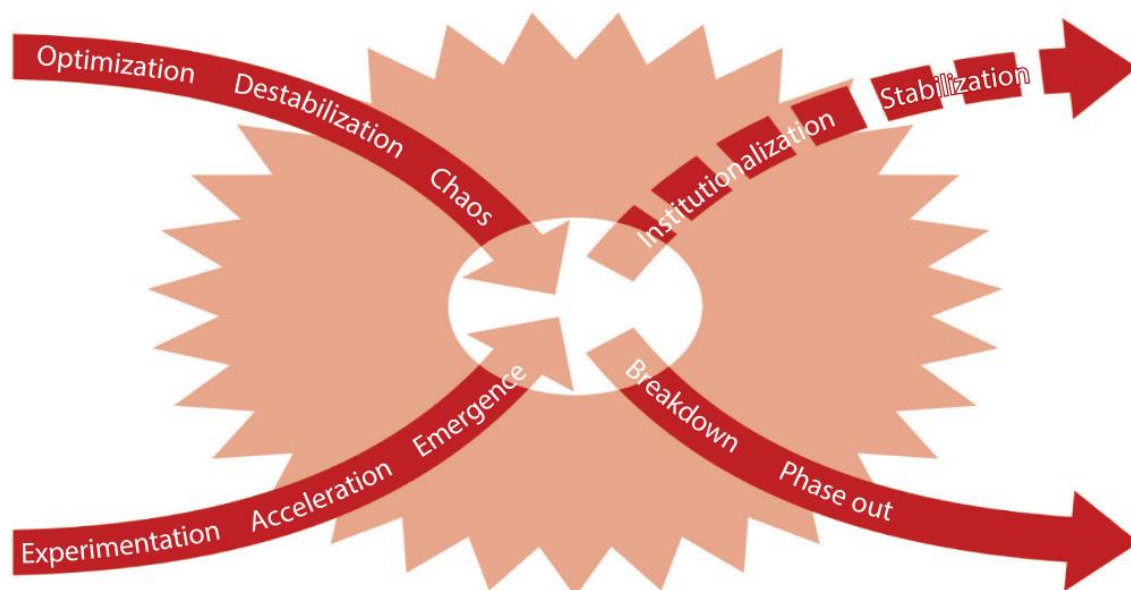
Societal and environmental issues are urgently calling for sustainable soil management

The societal, political and environmental conditions need to call for soil solutions. In Europe in 2014 when an earlier soil directive was blocked the urgency of many environmental problems associated with soil weren't recognised and communicated as prominently as they are now.

Similarly in Aotearoa New Zealand a soil strategy was proposed in 2015 but not followed up. Now, extreme weather events, environmental issues such as water quality, and the importance of the food system for economic resilience are top societal and environmental issues, and stakeholders are calling for a soil strategy.

The soil-water system can play a key role in societal transition

Transitions to a new system, such as required to address climate change and environmental crises, have been described through an X-curve: the destabilisation and phase out of business-as-usual crossing with the experimenting, institutionalising and stabilising of new ways to do things⁴⁵⁴⁶.



Stakeholders in the soil-water system can map on the curve where they are, and understand what next steps in the transition could be for them and their stakeholders and connections. A national or regional soil strategy can provide boundary conditions to facilitate the transition towards sustainable soil management. For example, a soil strategy can facilitate experimentation with radical new ways of doing and thinking, accelerate alternative soil

⁴⁵ [Sustainability Transitions Research: Transforming Science and Practice for Societal Change](#)

⁴⁶ [Soil as a Basis to Create Enabling Conditions for Transitions Towards Sustainable Land Management as a Key to Achieve the SDGs by 2030](#)

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management practices and improve visibility of new structures, and regulate harmful practices while providing support during the uncertain transition period.

Transitions take time, and letting go of the status-quo (systems and practices that no longer serve new goals) will create a sense of loss⁴⁷. Part of a successful transition needs to also acknowledge what the old systems have provided, what we have learned and gained, and why it is time to say goodbye. This applies to all sectors in the transition, such as policy-makers, scientists, land managers.

A soil strategy, legislation and policy need to be part of a wider framework

The EU Soil Strategy and Directive are part of the overarching Green Deal to transform the EU economy to be sustainable and resilient. This gives much more weight to the Directive as an important instrument for a larger goal.

Similarly a dedicated NZ soil strategy could strengthen the importance of soil in a suite of environmental challenges and solutions (notably water quality and climate change resilience), and link to other strategies such as for biodiversity and the food system.

Every stakeholder needs to be involved

The EU soil strategy and Directive were drafted by the Directorate-General of Environment, but other Directorates-General, particularly for Agriculture, agreed with “every word”. In the drafting experts from all member states, and lobby groups from all stakeholders were consulted extensively and the strategy and directive amended following these and public consultations.

In NZ the MPI reports also involved stakeholder across the sectors and received support from all stakeholders, also for the development of a national soil strategy. However, the involvement of Māori iwi, interest groups and landowners should be more prominent in a future strategy.

Disconnect national scale monitoring from local soil management

National scale monitoring of soil health is important to reliably assess soil resources and understand drivers and pressures to the soil system. However, developing national legislation and policy to address soil threats often fails because soils vary even locally (within parcels or fields), and best management practices are strongly context-dependent on soil type, climate and land use. Therefore, national blanket regulations are often unworkable and unenforceable.

Local knowledge is often neglected in national policy, and difficult to take into account nationally. In Aotearoa New Zealand traditional Māori mātauranga (knowledge) and tikanga (practices) are particularly absent from solutions to sustainable soil management.

Within a national framework for soil health, general recommendations on management practices and soil health goals can be formulated. To enable local solutions, it is recommended to support knowledge transfer to local communities and between local

⁴⁷ Margot de Cleen et al. 2023 “Requiem for the transition to a new soil era – A good start needs a dignified farewell” (in Dutch)

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landowners and land managers (peer to peer). This ensures the latest scientific and technological knowledge and innovations are shared with land managers, and they can adapt this knowledge and innovation to their local conditions.

Oversight is needed to ensure sustainability goals are met. However, rather than regulate to rules, oversight should focus on reaching outcomes and goals. For example, instead of punishing for overuse of particular fertiliser nutrients, measures taken against nutrient pollution of soil itself and the wider environment should be demonstrated.

Land owners and land managers need support

To transition or transform to a sustainable soil management system, many landowners and land managers will need various types of support. Investment in knowledge transfer is needed, for example the education and employment of soil advisors (see section Knowledge transfer is key). Financial security during a transition phase is imperative for the change to sustainable systems, this may mean providing financial rewards for ecosystem services other than production to maintain landowners' income if production or yield is lower due to the transition to sustainable management.

Knowledge transfer is key

Long-term knowledge transfer to landowners is seen as the key to success in EU soil management. This includes:

- the formal education of soil advisors,
- the formation of regional hubs for all stakeholders (landowners, environmental groups, communities, policy-makers),
- the formation of regional collectives for peer-to-peer knowledge transfer,
- the establishment of living labs (sub-regional communities trialling sustainable (soil) management) and lighthouse farms/forests (single farms/landowners who trial sustainable management closely advised by science) as local demonstrations of the benefits of sustainable management.

In the EU and in NZ a lack of soil professionals is noted, particularly for local non-commercial farm and soil advice. This requires changes and funding to the education system (e.g. setting up dedicated programs for certification), funding for regional groups of advisors and peer-to-peer knowledge transfer groups.

Also a global opportunity remains to provide stable funding to long-term monitoring of basic indicators of soil health. Without baseline monitoring and data, without trends, without knowledge on soil management effects it will remain very difficult to communicate the urgency of soil solutions, and the efficiency of management and policy.

Measures and policies need to be simple and incentivising.

The regulatory burden on European landowners is large and complex, and even highly engaged frontrunners are “lost” and impeded to transition to sustainable practices. For policies to reach their goals, they need to be easy to implement and to manage or enforce. If regulations require extra physical work, have a high administrative burden and are not readily enforceable, it is unlikely they will have effect. Additionally, if the reasons for

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regulations aren't clearly communicated and the benefits to a land manager or wider society aren't evident, compliance will be low. Easy, cost-efficient and obvious sustainable solutions are likely to be adopted. For example, it is more incentivising to make unsustainable options difficult and sustainable options easy⁴⁸.

Address the whole supply chain

Several stakeholders mentioned the need to regulate (parts of) the chain rather than or in addition to regulations on land use and soil management. This refers predominantly to the food and agriculture supply chain, including processing plants, transport and distribution parties, retail industry, agrochemical industry (fertilisers, pesticides), consumption, waste and disposal industries.

The European Commission adopted the Directive on corporate sustainability due diligence in February 2023. This Directive obliges companies to identify, end, prevent, mitigate and account for negative human rights and environmental impacts of their operations, including their subsidiaries and value chains. Certain large companies also need to ensure their business plans are in line with the Paris Agreement limiting global warming to 1.5°C⁴⁹. Similarly, the New Zealand government passed legislation requiring some large financial market participants to make climate-related disclosures⁵⁰.

Such legislation has the potential to influence trade agreements such as between NZ and the EU (NZ-EU FTA). For example, the European Green Deal, particularly the Farm to Fork strategy to make food systems fair, healthy and environmentally-friendly, is likely to challenge New Zealand's export sector. New Zealand's regulatory regime currently lags behind the EU's standards for sustainable trade. Nevertheless, there is significant potential for some major New Zealand export products to increase the export value and volume through increasing the proportion of certified organic export products⁵¹.

Recommendations for developing a national soil strategy

- Form a soil strategy stakeholder working group including:
 - Māori iwi (tribes), landowner and Mātauranga (knowledge) representatives,
 - Community representatives
 - Industry representatives,
 - Farmer, forestry and landowner representatives,
 - Central and local government representatives,
 - Scientists and experts.
- With the working group assess:
 - The pro's and cons (or costs & benefits) of a soil strategy,
 - How other strategies are given effect to, and how effective that has been,
 - Regulatory levers, economic incentives, education/guidance

⁴⁸ [Magnetic law: Designing environmental enforcement laws to encourage us to go further](#)

⁴⁹ [Corporate sustainability due diligence - European Commission \(europa.eu\)](#)

⁵⁰ [Mandatory climate-related disclosures | Ministry for the Environment](#)

⁵¹ [EU Green Deal: Impact on New Zealand's Land-based Primary Producers](#)

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- Reset our thinking and reframe our goals for soils:
 - What is the current legislative and scientific framework, does it deliver soil health?
 - How would a NZ soil strategy align with the government's priorities?
 - Do we know enough?
 - Soil health challenges in NZ including state and trends?
 - Effectiveness of existing legislation and policy to deliver healthy and resilient soils?
 - What factors are influencing soil health? External drivers?
 - Whom are we engaging with? Who is involved in soil health?
 - Internally, especially in new operating model
 - Externally, existing partners and better efforts at including local communities
 - What do future generations need from soil?
- Together with all relevant stakeholders draft a National Soil Strategy for Aotearoa New Zealand including:
 - A clear vision for soil health outcomes over time agreed by all stakeholders,
 - Recommended sustainable soil management practices per soil type, climatic region and land use,
 - Clear links to existing legislation, policies and guidelines, including (international obligations) on climate change, biodiversity, land use and planning, water quality and environmental issues,
 - A pathway for potential new legislation and policy,
 - Action plans for each stakeholder group to:
 - Communicate the strategy to their networks
 - Educate their networks on how to implement the strategy
 - Establish peer-to-peer local networks
 - Engage with the science and innovation sector
 - Transfer knowledge
 - Establish best practice
 - Incentivise best practices
- Expand on national soil quality/health monitoring
 - Fund and implement a statistically stratified monitoring network according to climate, soil type and land use
 - Expand existing monitoring network to more sites as statistically relevant
 - Expand to more land uses, including urban and unmanaged/natural
 - Align with other environmental monitoring, especially freshwater
 - Ensure data privacy and only report aggregated data on regional or national level

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- Province Gelderland
- Dutch Agriculture and Horticulture Organisation (LTO)
- European Environmental Bureau
- Dutch Soil Science Society
- Agricultural collective “BoerenNatuur Veluwe”