

# FROM THE EU OFFICES IN BRUSSELS TO THE FIELDS OF KLEINHOLBACH

TURNING (INTER-)NATIONAL SOIL POLICIES INTO ACTION



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## PREFACE

Soils are the base of all terrestrial ecosystems, and agriculture and forestry provisioning ecosystem services. They provide a structural element for the Earth's biosphere and are essential for regulating ecosystem functions that humans depend upon (Ronchi et al., 2019). Soils are often deemed as non-renewable due to their very time-consuming rate of formation and slow and complex regeneration process after degradation (Ronchi et al., 2019a). It is estimated that 60-70 % of soils in the EU are currently in a non-healthy condition (European Commission et al., 2020).

Over the last years, issues of soil protection and combating land degradation have increasingly gained attention from scientists, politicians and the public, with the EU Commission's proposal for a Soil Monitoring Law (European Commission, 2023c), as part of the Soil Strategy 2030, as an outstanding attempt to combat these challenges on the EU level.

The aim of this report is to examine the question how (inter-)national policies with regard to soil and land, focusing on the proposed Soil Monitoring Law (EU-SML), are translated into concrete actions in Germany. We provide some background information on the EU-SML, and highlight the positions of stakeholders across various scales towards the law. Furthermore, we describe two local projects from the region of Rhineland-Palatinate and provide recommendations on how the translation of policy to practice could be optimised.

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## THE SOIL MONITORING LAW

### BACKGROUND AND STATUS OF THE PROPOSAL

In 2006, the European Commission has already attempted to introduce a legally binding framework on soil health by proposing the Soil Framework Directive. After two revisions, the proposal finally failed in 2014, due to its rejection by some Member States (MS), including Germany, under the premise that the proposal was not respecting the principle of subsidiarity, and financial and administrative burdens (Chen, 2019; Ronchi et al., 2019a). Since then, legislation and governance regarding soil is fragmented and soil protection on EU level is covered as an offshoot of other environmental legislation and non-binding strategies (see Table 1) (European Environmental Bureau, 2023a; Paleari, 2017).

Table 1 **EU laws and international agreements that link to soil and on what subject they do** (European Commission, 2023c, 2023f; Umweltbundesamt, 2014)

Law and agreements	Subject that links to SML
<i>EU</i>	
Environmental Impact Assessment Directive	Monitoring environmental impacts
Strategic Environmental Assessment Directive	Monitoring environmental impacts
Habitats Law Directive	Nature and biodiversity
Nature Restoration Law	Nature and biodiversity
CAP (Common Agricultural Policy)	Agricultural practices (including pollution, biodiversity, sustainable land management, and climate change)
Nitrates directive	Agricultural practices and pollution
Carbon Removal Certification Regulation	Agricultural practices and climate change
LULUCF	Climate change (carbon removal)
European Climate Law	Climate change (climate neutrality by 2050)
Environmental Liability Directive	Pollution ('polluter pays principle')
Mercury Regulation	Pollution
Industrial Emissions Directive	Pollution
Sewage Sludge Directive	Pollution
Waste Framework Directive	Pollution
Environmental Crime Directive	Pollution
REACH	Pollution
Fertilising products regulation	Pollution
Environmental Quality Standards Directive	Water management, pollution
Water Framework Directive	Water management
Groundwater Directive	Water management
Floods Directive	Water management
<i>International</i>	
UNCCD	Land degradation and land use
UNFCCC	Climate change
Convention on Biological Diversity	Biodiversity

This fragmentation and the lack of a coherent and binding legislative framework is not only defined as a major cause for the alarming state of the EU soils by both the commission (European Commission, 2021) and research (Montanarella & Panagos, 2021; Panagos et al., 2016), but also hampers reaching EU's objectives from different policy areas including climate, biodiversity, health and food security (European Commission, 2023c). Soil legislation is a crucial factor to connect soil health principles of all relevant policy areas, create coherence and achieve the target of the EU to reach climate neutrality by 2050 (European Commission, 2023e; European Environmental Bureau, 2023a). In addition, degraded soils cost the EU 50 billion euros annually (European Commission, 2023c; Montanarella & Panagos,

2021; Panagos et al., 2018). Altogether, on July 5<sup>th</sup> 2023, this resulted in the European Commission adopting the proposal for the legally binding Soil Monitoring Law (EU-SML) under the Soil Strategy for 2030 (European Commission, 2023c). The European Parliament and Council of the European Union still must discuss the proposal and vote for it, which is planned to take place in 2024.

## CONTENT OF THE PROPOSAL

The EU-SML is comprised of three pillars: soil monitoring, sustainable soil management and soil contamination. Besides that, it includes a (legally binding) definition of soil health.

The framework on monitoring soil health aims at reducing the knowledge gap regarding the status of soils. This will make comprehensive and harmonized data on soil health available on a European level. MS are responsible for the soil measurement and should report data every five years to the Commission. Additionally, MS should define soil health districts based on soil properties, including a governance body that will be responsible for the monitoring. Whilst monitoring will be legally binding, the law does not include legally binding targets or actions.

Moreover, the law defines principles for sustainable land management practices. MS should translate those principles to national practices and implement those in synergy with existing EU legislation, such as the CAP. National and local authorities, in collaboration with land managers (e.g. forest and farm managers), are responsible for identifying the most sustainable soil management practices in a specific context, based on the collected data. The EU has developed the Horizon Europe mission 'A soil Deal for Europe' to help MS develop sustainable practices, by creating a network of living labs and lighthouse projects and providing funding for research and innovation.

Lastly, the law takes a risk-based approach on contamination, limited to heavy metals. It states that MS are obliged to reduce contamination to levels that are not harmful to human and environmental health, which is based on identification, investigation, and management of contaminated sites. This includes improvement of "the polluter pays" principle (European Commission, 2023c, 2023e).

The proposal is based on the 'One out, all out' principle, which means that if a soil has an unhealthy score in one category, the soil is considered unhealthy in its total (European Commission, 2023c, 2023e).

After publication of the proposal, there has been a massive response from research (Kotschik et al., n.d.; van der Putten et al., 2023; Wageningen Environmental Research, 2023), NGOs (Dahm, 2023a; European Commission, 2023b; European Environmental Bureau, 2023a, 2023b; IFOAM, 2023), farmers' associations (Agroportal, 2023; CEJA, 2023; Dahm, 2023a; European Commission, 2023b), and industry (Dahm, 2023b; FoodDrinkEurope, 2023; YARA, 2021). They are supportive of the proposal of a framework to improve soil health, but their critiques and positions differ. NGO's and researchers have been critical of the lack of ambition in the Soil Monitoring Law in comparison to the announced Soil Protection Law under the Soil Strategy 2030, and the lack of a holistic view on soil health (i.e. little inclusion of soil biodiversity). The Food industry and farmers' representatives mostly point out the law's lack of flexibility, the financial burdens, and the lack of attention for land take.

## THE SITUATION IN GERMANY

### STATUS OF LAND DEGRADATION

Germany's soil, characterised by its comparatively young geological age and diverse regional conditions, plays a crucial role in the nation's land use and environmental health. Agriculture, spurred by the soil's high fertility, accounts for 52% of land use. The country also boasts the fifth-largest forest area in the EU, covering 32% of its territory (Milicevic, 2023). However, natural, and agricultural landscapes face challenges due to increasing settlement and traffic areas, with land take being as high as 55 hectare per day (Statistisches Bundesamt, n.d.). In a strategic response, The Integrated Environmental Programme of the Federal Environment Ministry set a target to reduce the increase in artificial land use to 30 hectares per day (Marahrens et al., 2015) but with this target set for 2020, Germany is behind schedule. Significant shifts in agricultural and management practices since 1990 have altered soil pollutant levels. Most inorganic pollutants have seen a reduction to 10-40% of their 1990 concentrations, except for rising levels of zinc and copper, whereas organic pollutants have uniformly decreased (Marahrens et al., 2015).

Concerning the issue of soil erosion, water erosion is prevalent in the southern regions, while wind erosion poses risks particularly in the north (see Figure 1). Also, soil compaction, exacerbated by heavy agricultural machinery, affects 10-20% of arable land, with potential soil function impairment in 50% of these areas (Marahrens et al., 2015). Soil organic matter varies regionally, with higher humus content in the North Sea coast, low mountain ranges, and the Alpine region (see Figure 1). There is a gradient of decreasing content which extends towards the east. Peat soils, constituting 5% of Germany's area and largely drained for agriculture, are significant carbon storages (Marahrens et al., 2015). Drainage degrades the peat soils and leads to the largest source of greenhouse gases in German agriculture, accounting for 7.5% of national emissions (Ministerie van Landbouw, 2023).

Climate change is poised to significantly impact biophysical factors in the coming decades. With a projected decrease in total precipitation and a marked increase in sunshine duration, soils are likely to become drier. These drier soils will be more susceptible to erosion, predictions suggest a tripling of soil loss in some regions (Routschek et al., 2014). Regenerative agriculture practices, including no-till, cover cropping, and diverse crop rotations, are seen as vital for enhancing soil resilience and reducing agricultural climate impacts. According to NABU's estimation, 15% to 25% of large-scale farm will adopt those practices by 2035 (Kurth & Subei, 2023). Currently, 34% of German farms have adopted reduced tillage, marking a significant increase compared to 40 years ago, when only a few pioneer farmers were using this practice. However, no-till practices are still limited to 1% of farms (Zikeli & Gruber, 2017). These methods could substantially reduce soil loss in a changing climate, with reductions of 75% for reduced tillage and 91% for no-till.

Cover cropping can be another effective technique to mitigate erosion, significantly enhance soil organic matter (SOM), and increase carbon storage in the soil. Presently, this method is utilised in only 10% of agricultural fields, but there is potential for rapid growth of its adoption. By utilizing the unused winter fallow areas, the use of cover cropping could potentially triple in the coming years (Seitz et al., 2023).



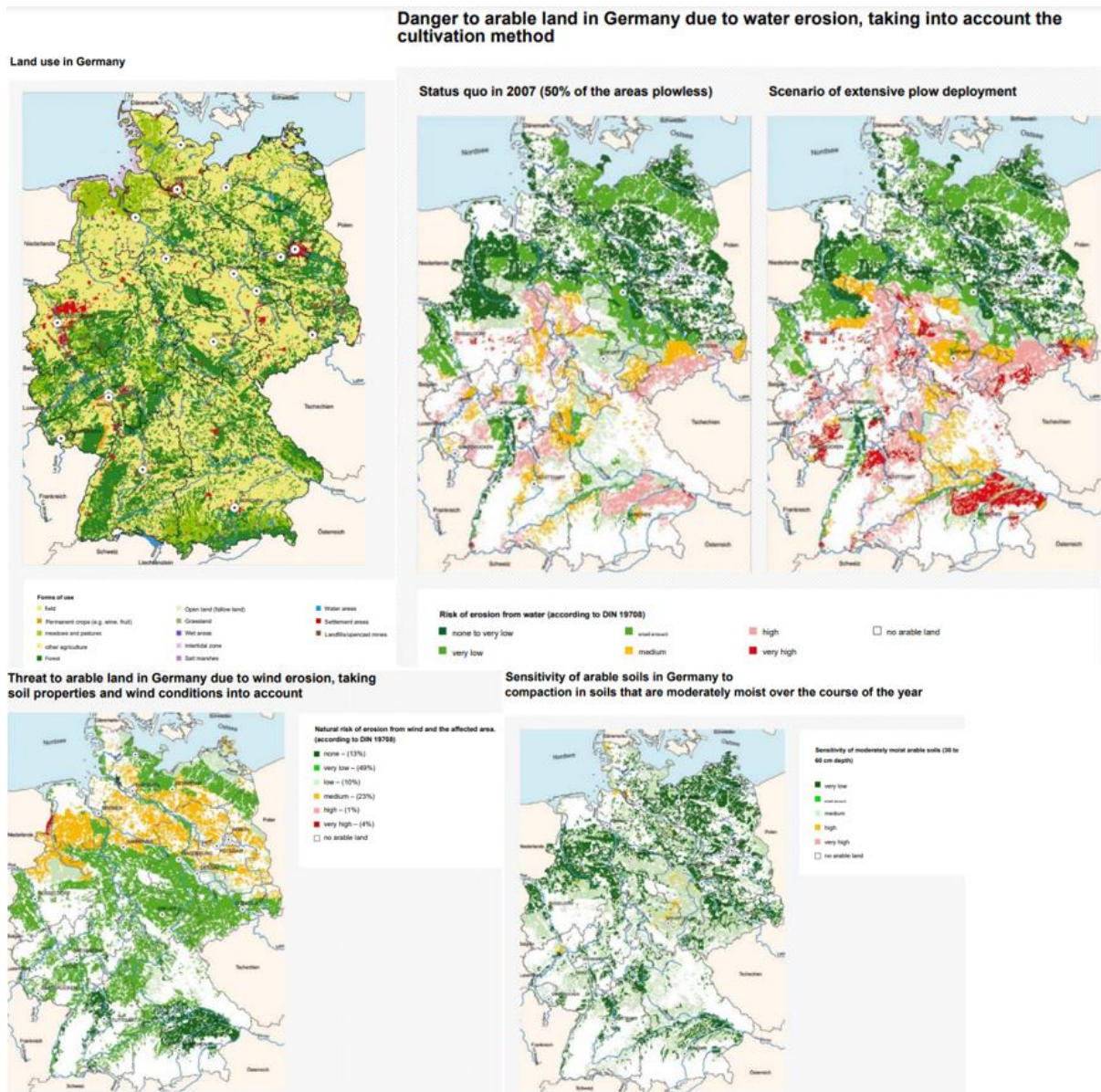


Figure 1 Land degradation status of Germany (Marahrens et al., 2015)

## NATIONAL POLICY

Germany already has a collection of laws and policies relating to soils in place, most notably the Soil Protection Act from 1998. However, this law focuses primarily on soil contamination, a large issue at the time, and not so much on other threats to soil health, such as soil erosion and loss of soil biodiversity. It especially targets cleaning up of polluted sites, instead of protecting healthy sites from pollution in the first place. Finally, it contains a provision stating the law is only applied in situations where there are no other policies on the subject in place. The current government intends to revise the act in the view of climate and biodiversity related challenges, laying focus on the aforementioned shortcomings (Ginzky, 2023).

The Soil Protection Act, combined with the more technical Soil Conservation Ordinance that was implemented a year later (UNEP Law and Environment Assistance Platform, n.d.), is the groundwork. However, Germany is a federation consisting of numerous states with their own legislative power. They all have a say in national and even European legislation, and quite some freedom when it comes to their

own policies (Hellfeld, 2021). Thus, when the national laws were accepted, every state had to translate them into their own laws and regulations regarding soil protection. Federal states help implementing the national laws on a slightly lower administrative level and can in turn be translated into more practical measures. For example, in Rhineland-Palatinate, the State Environmental Office (LfU) supplies generalised information sheets with precise requirements on soil protection to relevant parties throughout the state (Ministry for Climate Protection, Environment, Energy and Mobility of the State of Rhineland-Palatinate, n.d.).

Other national legislation on soil includes the Building Code, stating that land should be used sparingly, the Fertiliser Act, stating that soil fertility should be preserved and increased (Ronchi et al., 2019b), the Nature Conservation Act, stating that interventions in landscape and nature, including the soil, should be avoided, and a couple of laws on waste management that all relate to soil pollution to some degree (Lehmpful, 2014).

Germany's CAP Strategic Plan for 2023 to 2027 contains measures regarding soil health. This includes the pledge that around 1.7 billion euros will be made available to support biodiversity-related practices, such as the reduction of pesticides and fertilisers used in grasslands, and that 2.3% of the rural development budget will be spent on soil health (Scheid & Ittner, 2022). The 2035 Arable Farming Strategy aims to strengthen soil biodiversity, reach a stable humus content, and reduce land take to an eventual net zero, in line with the coalition accord of the current government. However, these aims lack specificity and a binding mechanism (Federal Ministry of Food and Agriculture, 2019).

To bring these laws into practice, Germany has some instruments for soil monitoring in place, such as the Boden-Dauerbeobachtung (BDF), a long-term monitoring programme to track soil conditions (Ronchi et al., 2019b) at over eight hundred permanent monitoring sites in all different soil types throughout the country (Umweltbundesamt, 2013). The states are responsible for the monitoring, assisted by extensive federal guidelines on site choice, measuring frequency, methods, and data analysis. The list of measured variables includes chemical components, water balance, soil biodiversity and even aboveground vegetation (Barth et al., 2022). Additionally, the Environmental Agency has issued a concept for a climate-impact-soil monitoring union that links different soil monitoring programmes of more than 50 institutions and more than 9000 measuring sites to gain insights on climate change impacts on soil water balance, soil biodiversity and organic substance (Kaufmann-Boll et al., 2022).

## POSITIONS OF STAKEHOLDERS

The implementation and declaration of soil policies in Germany is the origin of opinionated debates between diverse stakeholders, from institutions to NGOs and farmers. This section portrays some of these viewpoints.

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### LAND MANAGERS

German farmers have a substantial interest in the soil policy of the country. Several times, legislation for environmental protection or implementation of new practices to improve soil health resulted in a vehement reaction from a significant part of the agricultural communities (Maurin, 2023; Schulz, 2019).

The Deutscher Bauernverband (DBV), one of the largest and most influential farmer unions in Germany, states that the EU-SML will lead to an unnecessary double regulation without additional value and that land consumption is the priority. According to them the effort should not come from



farmers, as they are already conscious of the issues tackled by the law (Deutscher Bauernverband, 2023).

However, the DBV does not represent the views of every farmer, as some are willing to open the debate and are in favour of this implementation of more active soil protection. Still, those farmers believe that the legal framework misses the mark in enabling long-term ecological practices and is disconnected from practice (H. Pfeffer and P. Henning, personal communication, January 2024).

Forest agencies have a significant voice in the land manager debate, their statement focuses mostly on the importance of projects regarding soil compaction. Moreover, considering and allying with the existing law in the member state level (or even at a smaller regional level) is a necessity to ensure effective implementation good EU policy (HessenForst, personal communication, January 22, 2024).

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## NGO'S

The statement of multiple NGOs meets scientific recommendations. They emphasise the need for more concrete regulations to tackle questions of soil holistically (Freluh-Larsen et al., 2017; Glæsner et al., 2014). This would lead to precise agricultural practices enabling the translation of legislation into actions. Regarding the EU-SML, NGOs interviewed by the EU found it to “lack emphasis on soil protection” (European Commission, 2023a). The European Environmental Bureau (EEB) for instance, characterises the proposal as a starting point that requires a lot of improvement in order to reach the necessary healthy soils targets (European Environmental Bureau, 2023a), whereas the Deutscher Naturschutzring criticises the lack of legally binding mechanisms, targets, and inclusion of soil biodiversity (Deutscher Naturschutzring, 2023).

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## GOVERNMENTAL INSTITUTIONS

The main concerns of German public institutions with the EU-SML are on the coherence with other policy domains, the potential excessive administrative burden and the need for clear indicators and definitions. However, the government is in favour of the implementation of the EU-SML (German Environment Agency, 2023) and is willing to have more binding measures to reach the goal of healthy soils by 2050, as explained in the paragraph on national policy. The Minister of Agriculture added the condition that the diversity of soils shall be carefully considered and existing national instruments for soil protection and monitoring can be retained and integrated into the law (BMEL, 2023).

## BACKGROUND

The widespread practice of converting arable land and (semi-)natural areas on the outskirts of urban areas into industrial estates and residential areas brings about artificial sealing of the soil and jeopardises soil's ecosystem services and often affects fertile agricultural soils and semi-natural habitat (Figure 2). These urban development routines are often driven by municipalities' tendency to generate tax income by designating land as development area for e.g. industry (N. Steinbacher, personal communication, January 22, 2024). Moreso, it is often economically favourable to intervene in extra-urban environments rather than intensifying land use or restoring existing sites within space-restricted urban areas (Botticini et al., 2022).

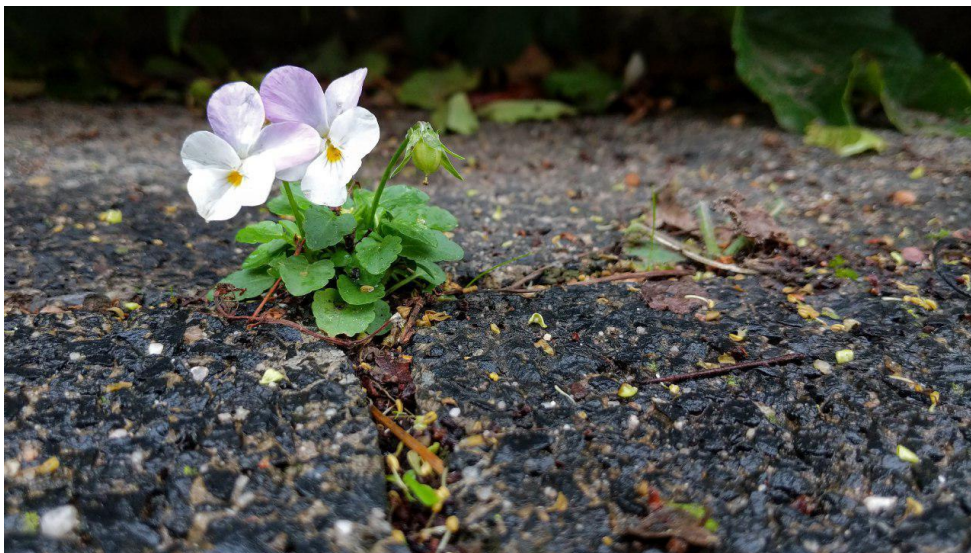


Figure 2 Nature is jeopardized by soil sealing in Rhineland-Palatinate (Follmann, n.d.)

As a response to these issues, the project “Boden schätze(n), Flächen schützen”, brought about by the regional organisation of BUND (Association for the Environment and Nature Conservation in Germany) in Rhineland-Palatinate, aims to raise awareness about the value and nature of soils among citizens and representatives of municipalities (BUND, n.d.).

The project entails producing a brochure on soil protection and space-saving municipality development, organizing an expert conference on soil protection, and training citizens to become “Soil Ambassadors” (BUND, n.d.). Essentially, these measures aim to direct attention towards land take reduction strategies like inner-city development and consolidation, the use of fallow land for development, naturalisation and restoration of conversion areas and establish the topic of soil protection in society (N. Steinbacher, personal communication, January 22, 2024).

Citizens are encouraged to approach municipalities and give statements on municipalities' development plans, such as new building site allocations. By publicly stressing that certain areas might be worth protecting, they can voice their demands, e.g. that an allocated area should rather be turned into a nature reserve or recreational area, and fundamentally pursue preventative soil protection (N. Steinbacher, personal communication, January 22, 2024).

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## POLICIES

The proposed EU-SML proposes land take and soil sealing and their effects on soil derived ecosystem services to be monitored and suggests laying down principles to mitigate the impacts of land take as part of sustainable soil management (European Commission, 2023d). While these suggestions do not hamper with the project's goals directly, they fail to deliver a mechanism for preventative action against land take. However, BUND Rhineland-Palatinate identifies that the fate of soil degradation, soil erosion and fertile soils is, to a large degree, in the sphere of responsibility of the smallest political level, i.e. the municipality (Schneckenburger et al., 2021). Given that targets of the regional government to reduce new soil sealing to less than 1 ha/day were not met but reached 4.3 ha/day in 2021 (MKUEM Rheinland-Pfalz, n.d.) the BUND Rhineland-Palatinate demands a state soil protection concept of the state's government (BUND Rheinland-Pfalz, n.d.). But despite its commitment to support and fund measures that reduce land take, the state government of Rhineland-Palatinate wants to avoid top-down regulation and endorses the approach of clarification, awareness building, consultation, and support for municipalities' decision makers (MKUEM Rheinland-Pfalz, n.d.).

However, in 2017 the Federal Building Code, i.e. a national law that defines the most important instruments for urban planning (Vereinfachtes Verfahren, 2017) was amended to include art. 13B. The paragraph impacted the Boden schätze(n) project's aims significantly, as it enabled accelerated building permit procedures and allows for municipalities to assign areas on the outskirts of townships to be recognised as building land without requiring prior environmental impact assessments and compensation for interventions (BUND Baden-Württemberg, n.d.). Consequently, many detached houses were built on natural areas in rural municipalities, which led to the destruction of ecologically valuable habitat and the additional sealing of soils. However, in 2023, in a Germany-wide precedence ruling of the Federal Administrative Court, a new development area, planned under art. 13B, in Baden-Württemberg, was found to violate EU laws (BUND Baden-Württemberg, n.d.). Thus, development plans issued under art. 13B are now missing an applicable legal basis. As a result, the BUND project aims to provide information and tools for citizens to find and report such "illegal" municipal development plans, that on may bring about legal action to contest soil harming developments from being implemented (N. Steinbacher, personal communication, January 22, 2024).

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## (FUTURE) CHALLENGES

The remaining challenges of the project include recruiting enough volunteers to get active in approaching municipalities. Also, due to limited labour force within the project, the planned brochure is still not in written form yet. An additional bottleneck is the difficulty to convince municipalities to address their needs for development and economic expansion in a land take and soil sealing-neutral fashion. According to N. Steinbacher (personal communication, January 22, 2024) tight budgets of many municipalities solidify this circumstance. Furthermore, while the state government aims to reduce land take, the current legal situation represents another challenge for the project, as it does not provide any legally binding mechanism to reduce land take and soil degradation.

## BACKGROUND

The DaLeA Project is a research-focused EIP-Agri (now part of the EU CAP network) project on a trial farm in Rhineland-Palatinate that has tested the effect of a permanent living mulch layer consisting of clover on different crop rotations in their no-till cultivation system (DaLeA, n.d.).

The aim is to further develop and scientifically test a cultivation system that is in line with the goals of the EU Green Deal of decreased use of pesticides, fertilizers and minimized nutrient losses (DaLeA, n.d.). More directly, the project is a response to the effect of longer drought periods on the farm site (C. Mittermeier, personal communication, January 19, 2024). They primarily investigated the influence of the living mulch (*Trifolium repens*) on the soil water balance, possible reductions of crop protection agents and fertilizers, and nitrogen fixation (Figure 3) (DaLeA, n.d.).



Figure 3 3 Left: clover in barley, including a monitoring setup. Right: *in situ* measurements (DaLeA, n.d.)

The project consists of an interdisciplinary team of practitioners, agricultural associations, and scientists, including university students. The project is funded by the EU Fund for Rural Development and the Agricultural Ministry of Rhineland-Palatinate (DaLeA, n.d.).

## POLICIES

Allner (crop scientist) and Mittermeier (farmer), both representing DaLeA (personal communication, January 19, 2024), suppose the project is positively impacted by a number (inter-)national policies, including foremost the CAP, as these are in line with DaLeA's objectives. While the project coordinators were aware of the existence of the proposed EU-SML, they lacked detailed knowledge about the content of the potential law. According to Mittermeier, the innovative DaLeA project is not threatened by the EU-SML, and additional monitoring might yield further insights. They suppose that soil monitoring could be of use for those farmers who do not regularly sample soils and could potentially assist them in improving their soils.

However, they fear that, yet another law imposed on farmers adds even more regulations and bureaucracy to the already strongly regulated sector. They perceive a bottleneck in the definitions of e.g. 'sustainable practices' and 'healthy soil' and stress that they must be clear, individualised for each soil type and consider context like weather to assign useful soil health indicators. Furthermore, they

mention the name 'Soil Monitoring Law' ('Bodenüberwachungsgesetz') to bear a negative connotation of increased government surveillance, whereas the former name 'Soil Health Law' comes across as more desirable to a farmer.

Concerning policies in general, the team has most issues with the lack of freedom in activities and the rigidity in implementation. According to DaLeA practitioners, legislation may state the goal and set targets, but should not dictate the practice to get there. In this context, regulations, particularly on the use of plant protection products, i.e. the Plant Protection Application Ordinance (Bundesministerium der Justiz, 1992) were perceived as a hurdle for the project. For instance, certain PPPs permitted for monoculture cannot be legally used in mixed cultivation, despite their potential benefits in regulating weeds and decreasing competition of the living mulch with the main crop (C. Mittermeier, personal communication, January 19, 2024).

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### (FUTURE) CHALLENGES

As DaLeA is in line with the Green Deal and may help combatting the problem of land degradation, upscaling would be desirable. To make the adoption of living mulch systems attractive and feasible for farmers, profitability of the system must be a given. This is only achievable when specialised technology is accessible. Few farmers own these advanced machines so far and the machinery is not yet widespread enough to be used in machinery sharing rings (Mittermeier, personal communication, January 19, 2024).

Additionally, a complete rethinking of cultivation systems would be needed. Particularly the current generation of farm managers, who are facing various challenges and uncertainties, rarely have the capacities to deal with additional requirements that go beyond their understanding of farming operations. Furthermore, the idea and visual image of permanent living mulch differs from their idea of what a field should look like.

Lastly, due to the increased complexity of mixed cultivation systems, farmers often do not have the oversight of how DaLeA may benefit soil fertility and climate resilience in the long term and may lack the specialised plant cultivation knowledge necessary. This knowledge gap needs to be addressed by professionally educating interested farmers about the interactions between main and catch crops, impacts on weeds, nutrients, and water management. There are no advisory services yet to close this gap between legislation and practice.



## INSIGHTS AND RECOMMENDATIONS

### INSIGHTS

Our research has shown that the perspectives on what a healthy soil comprises vary depending on how stakeholders relate to soil. The points of views of stakeholders on soil and land policies reflects this. While environmental NGOs are concerned about the lack of legally binding mechanisms to reduce land take and ensure improvements of the status of soils, land managers prioritised aspects soil resilience against extreme weather events and (tools for) sustainable land management practices (e.g. technology). A general point of agreement, however, is that knowledge provisioning is important on both the rural (e.g. educating land managers) and urban side (e.g. informing citizens and municipalities). Also, there are financial and technological gaps for land managers to implement sustainable land management practices which need to be overcome.

Remarkably, both publicly available statements and personal communications indicated that German farmers experience a huge lack of faith in governance bodies and processes, and do not feel heard and trusted by governing bodies. On the one hand, farmers point out that despite being experienced practitioners, they feel heavily regulated regarding practices they are allowed to employ. On the other hands, they feel little inclusion in the legislative process itself. This lack of inclusion is clearly reflected in the current tensions in the agricultural sector and protests in Germany and across the EU in general. Even though the EU does proper attempts to facilitate participation (e.g. by organizing dialogues (European Commission, 2024) or by farmers' representation in Brussels), the farmers included in this report do not *feel* this inclusion and transparency. For example, none of the farmers that we spoke to have more knowledge of the EU-SML than that it exists. They experience an enormous gap between the policy formation and the actual implementation, feeling like policies are imposed on them from above, suffocating their entrepreneurial freedom and authority, adding on bureaucracy, administrative and financial burdens.

During personal communication, it became clear that it is not only farmers who are not up to date on legislation, but also stakeholders on forestry management and municipality level were not aware of the contents of the EU-SML beyond hearing of its existence. This shows a distinct lack of information.

### RECOMMENDATIONS

#### GENERAL RECOMMENDATIONS

- Facilitating participation and inclusion
  - a. As part of the legislative process, input from actors on a local level (land managers, civil society, industry, governance) needs to be facilitated. Commissions, such as the “Zukunftskommission Landwirtschaft” or the Borchert Commission have experienced broad acceptance and enabled participation of a broad spectrum of stakeholders (P. Henning, personal communication, January 25, 2024). When bringing varying visions of different stakeholders together at local levels, and reporting outcomes to decision makers (i.e. the state level), participation is made more accessible, concrete, and suiting actors' social environment. The Government needs to show willingness to consider and implement the resultant recommendations.
  - b. On the EU level, transparency and information access must be provided during all stages of the legislative process. Government agencies, research institutes and the media may play a



vital role in translating available information (e.g. the first proposal of a new law like the EU-SML, summaries of meetings on developments of a policy etc.) into a clear, relatable language that is comprehensible for practitioners who are affected by certain measures. This could take the form of e.g. articles in agricultural magazines, videos, and informal dialogue events. Information provisioning should not be limited to farmers, but include advisory services and agri-business, since all those actors are so dependent on each other and interlinked in the value chain. The EU should make funds available for this.

- Legally binding targets of soil parameters should be set for specific soil types, morphological contexts, and climate conditions. However, it is crucial that legislation leaves room for flexible practices that safeguard an appropriate level of entrepreneurial freedom and autonomy of farmers if targets are met. While sustainable practices for specific contexts can be outlined at state level, they should not be binding.
- Knowledge transfer from agricultural researchers to farmers and forest managers and cooperations between researchers and practitioners should be promoted on a large scale. Training facilities, on-the-job trainings and practitioner networks with low-threshold access should be set up and financially supported to enable farmers to learn about, advance their skillset and exchange experiences on sustainable practices that fit their needs. In addition to the living labs of the EU Horizon project, the establishment of regional model farms that offer workshops and guided tours for practitioners and consultants should be funded.
- Financial rewards for adopting soil health improving practices need to be large enough to make the shift in practices and additional expenses for practitioners worthwhile. Financial incentives must be linked to effective and scientifically sound soil conserving practices and should enable farmers to invest in necessary technical equipment. Furthermore, agricultural funding schemes should involve as least bureaucratic expenditures for farmers as possible. Such funding schemes should move away from the scattergun approach of hectare-based payments to results-based direct payment programs that are linked to specific soil health indicators e.g. soil biodiversity, humus content and soil organic carbon, need to be promoted. They should be similar in design to the well-received “Species Promotion Programme” (Landwirtschaftskammer Nordrhein-Westfalen, 2023).

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#### RECOMMENDATIONS SPECIFIC FOR THE EU-SML

- Soil monitoring should be implemented in line and complementary with already existing monitoring systems in MS (e.g. BDF in Germany).
- Soil and human health threatening substances like PFAs should be included next to contamination with heavy metals.
- The benefits of soil monitoring should be made noticeably clear to all those involved, with special attention to land managers. Farmers and foresters whose soils are classified as unhealthy as a result of governmental soil monitoring should not be sanctioned, but emphasis should be on incentivising and supporting land managers to work towards a healthier soil.
- Indicators on soil health and sustainable soil practices should be defined and standardised depending on the local context. Particularly, the development of more inclusive indicators on soil biodiversity, including abundance, diversity, and respiration of soil life should be considered. The ecosystem services and soil functions of a specific area should be included in designing indicators. Reliable and smart measuring devices should be provided to give practitioners and

consultants direct real-time access to data and more autonomy to make use of measuring results.

- Regarding land take, the proposal should oblige MS to define a legally binding target on land take reduction. MS or state governments should develop science-based concepts that contain evaluations and a quantification of measures for space-saving building, illustrations of the further necessary political and legislative steps, and highlight the need to direct remaining building activities according to a complete soil evaluation map to ensure sparing of valuable soils.

## REFERENCES

- Agroportal. (2023, July 25). *New pillar of the farming Green Deal, the EU soil monitoring law is considered as acceptable by Copa and Cogeca*. Agroportal. <https://www.agroportal.pt/new-pillar-of-the-farming-green-deal-the-eu-soil-monitoring-law-is-considered-as-acceptable-by-copa-and-cogeca/>
- Barth, N., Borho, W., Cordsen, E., Heller, C., Höper, H., Ludwig, B., Marx, M., Meesenburg, H., Spörlein, P., & Weller, M. (2022). *Einrichtung, Betrieb und Auswertung von Boden-Dauerbeobachtungsflächen*. LABO.
- BMEL. (2023, October 25). *Tagung des Rates (Landwirtschaft und Fischerei) am 18. September 2023 in Brüssel*. BMEL. <https://www.bmel.de/DE/themen/landwirtschaft/eu-agrarpolitik-und-foerderung/gap/agrarrat-09-2023.html>
- Botticini, F., Auzins, A., Lacoere, P., Lewis, O., & Tiboni, M. (2022). Land Take and Value Capture: Towards More Efficient Land Use. *Sustainability*, 14(2), Article 2. <https://doi.org/10.3390/su14020778>
- BUND. (n.d.). *Projekt—„Boden schätze(n) – Flächen schützen“*. BUND - BUND Für Naturschutz Und Umwelt in Deutschland. Retrieved 19 January 2024, from <https://www.bund-rlp.de/themen/mensch-natur/boden/boden-projekt/>
- BUND Baden-Württemberg. (n.d.). *FAQ zum Paragraf 13b und den Konsequenzen des Grundsatzurteils*. Naturschutz-Erfolg: Klage gegen Flächenfraß – was folgt? FAQ zum Paragraf 13b und den Konsequenzen des Grundsatzurteils. Retrieved 24 January 2024, from <https://www.bund-bawue.de/mensch-umwelt/flaechenschutz/faq-zum-paragraf-13b-und-den-konsequenzen-des-grundsatzurteils/>
- BUND Rheinland-Pfalz. (n.d.). *Landesbodenschutzkonzept*. BUND - BUND für Naturschutz und Umwelt in Deutschland. Retrieved 23 January 2024, from <https://www.bund-rlp.de/themen/mensch-natur/boden/landesbodenschutzkonzept/>
- Vereinfachtes Verfahren, § 13 Baugesetzbuch § 1. Kapitel - Allgemeines Städtebaurecht (§§ 1 - 135c), 1. Teil - Bauleitplanung (§§ 1 - 13a) , 4. Abschnitt - Zusammenarbeit mit Privaten; vereinfachtes Verfahren (§§ 11 - 13b) (2017).
- Bundesministerium der Justiz. (1992). *PflSchAnwV 1992—Verordnung über Anwendungsverbote für Pflanzenschutzmittel*. Verordnung Über Anwendungsverbote Für Pflanzenschutzmittel (Pflanzenschutz-Anwendungsverordnung). [https://www.gesetze-im-internet.de/pflschanwv\\_1992/BJNR118870992.html](https://www.gesetze-im-internet.de/pflschanwv_1992/BJNR118870992.html)
- CEJA. (2023, June 14). *CEJA launches #LandStories campaign for land preservation in the EU*. CEJA. <https://ceja.eu>
- Chen, Y. (2019). Withdrawal of European Soil Framework Directive: Reasons and Recommendations. *Journal of Sustainable Development*, 13, 1. <https://doi.org/10.5539/jsd.v13n1p1>

- Dahm, J. (2023a, July 5). *Commission tables first EU soil law, slammed for 'lacking ambition'*. Www.Euractiv.Com. <https://www.euractiv.com/section/agriculture-food/news/commission-tables-first-eu-soil-law-slammed-for-lacking-ambition/>
- Dahm, J. (2023b, July 5). *Commission tables first EU soil law, slammed for 'lacking ambition'*. Www.Euractiv.Com. <https://www.euractiv.com/section/agriculture-food/news/commission-tables-first-eu-soil-law-slammed-for-lacking-ambition/>
- DaLeA. (n.d.). *Dauerhafter Lebendmulch im Ackerbau*. Dalea. Retrieved 19 January 2024, from <https://www.dalea.blog>
- Deutscher Bauernverband. (2023). *Europawahl 2024*. <https://www.bauernverband.de/dbv-positionen/positionen-beschluesse/position/europawahl-2024>
- Deutscher Naturschutzring. (2023, July 7). *Überwachen statt schützen: Bodengesetz enttäuscht*. Überwachen statt schützen: Bodengesetz enttäuscht. <https://www.dnr.de/aktuelles-terme/aktuelles/ueberwachen-statt-schuetzen-bodengesetz-enttaeuscht>
- European Commission. (2021). *COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS EU Soil Strategy for 2030 Reaping the benefits of healthy soils for people, food, nature and climate* (COM(2021) 699 final). <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0699>
- European Commission. (2023a). *Impact assessment report—Accompanying the proposal for a Directive of the European Parliament and of the Council on Soil Monitoring and Resilience*. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=SWD:2023:417:FIN>
- European Commission. (2023b). *Meeting of the Civil Dialog Group Environment & Climate Change* (AGRI Dir B/VM/(2023)7943590).
- European Commission. (2023c). *Proposal for a Directive of the European Parliament and of the Council on Soil Monitoring and Resilience (Soil Monitoring Law)* (COM(2023) 416 fina). <https://data.europa.eu/doi/10.2777/821504>
- European Commission. (2023d). *Proposal for a Directive of the European Parliament and of the Council on Soil Monitoring and Resilience (Soil Monitoring Law)* (COM(2023) 416 final). <https://data.europa.eu/doi/10.2777/821504>
- European Commission. (2023e, July 5). *Questions and Answers on a Directive on Soil Monitoring and Resilience* [Text]. European Commission. [https://ec.europa.eu/commission/presscorner/detail/en/qanda\\_23\\_3637](https://ec.europa.eu/commission/presscorner/detail/en/qanda_23_3637)
- European Commission. (2023f, December 20). *Soil health*. [https://environment.ec.europa.eu/topics/soil-and-land/soil-health\\_en](https://environment.ec.europa.eu/topics/soil-and-land/soil-health_en)

- European Commission. (2024, January 25). *President von der Leyen launches Strategic Dialogue on the Future of EU Agriculture* [Text]. European Commission. [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_24\\_417](https://ec.europa.eu/commission/presscorner/detail/en/ip_24_417)
- European Environmental Bureau. (2023a). *Position Paper: EEB position paper on the Soil Health Law*. European Environmental Bureau. <https://eeb.org/wp-content/uploads/2023/05/EEB-Soil-Health-Law-Position-Paper.pdf>
- European Environmental Bureau. (2023b). *Soil Monitoring Law assessment*. European Environmental Bureau. [https://eeb.org/wp-content/uploads/2023/09/EEB-assessment-of-the-European-Commissions-proposal-for-a-Soil-Monitoring-Law\\_27.09.23.pdf](https://eeb.org/wp-content/uploads/2023/09/EEB-assessment-of-the-European-Commissions-proposal-for-a-Soil-Monitoring-Law_27.09.23.pdf)
- Federal Ministry of Food and Agriculture. (2019). *2035 Arable Farming Strategy*.
- Follmann, J. (n.d.). *Flächenverbrauch bekämpfen: Keine neuen Versiegelungen zulassen - BUND RLP*. BUND - BUND für Naturschutz und Umwelt in Deutschland. Retrieved 24 January 2024, from <https://www.bund-rlp.de/themen/mensch-natur/naturschutz/zukunftsfaehige-flaechennutzung-und-flaechenverbrauch/>
- FoodDrinkEurope. (2023, May 7). *Strong incentives needed to protect and restore EU soils*. FoodDrinkEurope. <https://www.fooddrinkeurope.eu/resource/strong-incentives-needed-to-protect-and-restore-eu-soils/>
- Frelih-Larsen, A., Bowyer, C., Albrecht, S., Keenleyside, C., Kemper, M., Nanni, S., Naumann, S., Mottershead, R., Langrebe, R., Andersen, E., Banfi, P., Bell, S., Brémere, I., Cools, J., Iles, A., Kampa, E., Kettunen, M., Lukacova, Z., & Vidaurre, R. (2017). *Updated Inventory and Assessment of Soil Protection Policy Instruments in EU Member States*.
- German Environment Agency. (2023, November). *European Commission—Have your say* [Text]. European Commission - Have your say. [https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13350-Sante-des-sols-proteger-gerer-et-restaurer-durablement-les-sols-de-lUE/F3442249\\_fr](https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13350-Sante-des-sols-proteger-gerer-et-restaurer-durablement-les-sols-de-lUE/F3442249_fr)
- Ginzky, H. (2023). Harald Ginzky A new soil protection legislation for Germany – challenges, conceptual approaches and next steps. *Soil Security*, 100123. <https://doi.org/10.1016/j.soisec.2023.100123>
- Glæsner, N., Helming, K., & De Vries, W. (2014). Do Current European Policies Prevent Soil Threats and Support Soil Functions? *Sustainability*, 6(12), Article 12. <https://doi.org/10.3390/su6129538>
- Hellfeld, M. von. (2021, December 13). *German federalism: How does it work?* DW.Com. <https://www.dw.com/en/german-federalism-covid-challenges-the-system/a-57042552>
- IFOAM. (2023, July 12). *From a Soil Health law to a Soil Monitoring Directive*. IFOAM Organics Europe. <https://www.organicseurope.bio/news/from-a-soil-health-law-to-a-soil-monitoring-directive/>
- Kaufmann-Boll, C., Kern, M., Kastler, M., Niederschmidt, S., Kappler, W., Müller, F., Oellers, J., Toschki, A., Steffens, M., Wiesmeier, M., & Mathews, J. (2022). *Abschlussbericht Konzeption und*

- Umsetzung eines Klima-folgen-Bodenmonitoring-Verbunds für Bodenbiologie und organische Bodensubstanz* (p. 254). Umweltbundesamt.  
[https://www.umweltbundesamt.de/sites/default/files/medien/479/publikationen/texte\\_67-2022\\_konzeption\\_und\\_umsetzung\\_eines\\_klimafolgen-bodenmonitoring-verbunds\\_fuer\\_bodenbiologie\\_und\\_organische\\_bodensubstanz.pdf](https://www.umweltbundesamt.de/sites/default/files/medien/479/publikationen/texte_67-2022_konzeption_und_umsetzung_eines_klimafolgen-bodenmonitoring-verbunds_fuer_bodenbiologie_und_organische_bodensubstanz.pdf)
- Kotschik, P., Princz, J., Silva, C. de L. e, Renaud, M., Marti-Roura, M., Brooks, B., Pieper, S., Rijk, I., Simini, M., Andres, S., Scholz-Starke, B., & Grenni, P. (n.d.). The upcoming European Soil Monitoring Law: An effective instrument for the protection of terrestrial ecosystems? *Integrated Environmental Assessment and Management*, n/a(n/a).  
<https://doi.org/10.1002/ieam.4834>
- Kurth, T., & Subei, B. (2023). *The Case for Regenerative Agriculture in Germany and Beyond*.
- Landwirtschaftskammer Nordrhein-Westfalen. (2023). *Öko-Regelungen*.  
<https://www.landwirtschaftskammer.de/foerderung/direktzahlungen/oekoregelungen.htm#or5>
- Lehmpful, K. (2014, July 17). *Soil protection law* [Text]. Umweltbundesamt; Umweltbundesamt.  
<https://www.umweltbundesamt.de/en/topics/soil-land/soil-protection/soil-protection-law>
- Marahrens, Stephan; Schmidt, Simone; Frauenstein, Jörg; Mathews, Jeannette; Bussian, Bernd-Michael; Penn-Bressel, Gertrude; Utermann, Jens; Glante, Frank. (2015). *Bodenzustand in Deutschland*.
- Maurin, J. (2023, June 29). Pestizidverbote und mehr Artenvielfalt: Bauern gegen EU-Naturschutzpläne. *Die Tageszeitung: taz*. <https://taz.de/!5932864/>
- Milicevic, V. (2023). *L'Union européenne et les forêts*.
- Ministerie van Landbouw, N. en V. (2023, November 21). *Germany is promoting peatland restoration as part of national climate strategy—Nieuwsbericht—Agroberichten Buitenland* [Nieuwsbericht]. Ministerie van Landbouw, Natuur en Voedselkwaliteit.  
<https://www.agroberichtenbuitenland.nl/actueel/nieuws/2023/11/21/germany-is-promoting-peatland-restoration-as-part-of-national-climate-strategy>
- Ministry for Climate Protection, Environment, Energy and Mobility of the State of Rhineland-Palatinate. (n.d.). *Soil protection law and responsibilities*. Retrieved 18 January 2024, from <https://mkuem.rlp.de/themen/kreislaufwirtschaft-und-bodenschutz/bodenschutz-und-altlasten/bodenschutzrecht-und-zustaendigkeiten>
- MKUEM Rheinland-Pfalz. (n.d.). *Flächenverbrauch; Ministerium für Klimaschutz, Umwelt, Energie und Mobilität des Landes Rheinland-Pfalz*. Retrieved 24 January 2024, from <https://mkuem.rlp.de/themen/kreislaufwirtschaft-und-bodenschutz/bodenschutz-und-altlasten/flaechenverbrauch>



- Montanarella, L., & Panagos, P. (2021). The relevance of sustainable soil management within the European Green Deal. *Land Use Policy*, *100*, 104950. <https://doi.org/10.1016/j.landusepol.2020.104950>
- Paleari, S. (2017). Is the European Union protecting soil? A critical analysis of Community environmental policy and law. *Land Use Policy*, *64*, 163–173. <https://doi.org/10.1016/j.landusepol.2017.02.007>
- Panagos, P., Imeson, A., Meusburger, K., Borrelli, P., Poesen, J., & Alewell, C. (2016). Soil Conservation in Europe: Wish or Reality? *Land Degradation & Development*, *27*(6), 1547–1551. <https://doi.org/10.1002/ldr.2538>
- Panagos, P., Standardi, G., Borrelli, P., Lugato, E., Montanarella, L., & Bosello, F. (2018). Cost of agricultural productivity loss due to soil erosion in the European Union: From direct cost evaluation approaches to the use of macroeconomic models. *Land Degradation & Development*, *29*(3), 471–484. <https://doi.org/10.1002/ldr.2879>
- Ronchi, S., Salata, S., Arcidiacono, A., Piroli, E., & Montanarella, L. (2019a). Policy instruments for soil protection among the EU member states: A comparative analysis. *Land Use Policy*, *82*, 763–780. <https://doi.org/10.1016/j.landusepol.2019.01.017>
- Ronchi, S., Salata, S., Arcidiacono, A., Piroli, E., & Montanarella, L. (2019b). Policy instruments for soil protection among the EU member states: A comparative analysis. *Land Use Policy*, *82*, 763–780. <https://doi.org/10.1016/j.landusepol.2019.01.017>
- Routschek, A., Schmidt, J., & Kreienkamp, F. (2014). Impact of climate change on soil erosion—A high-resolution projection on catchment scale until 2100 in Saxony/Germany. *CATENA*, *121*, 99–109. <https://doi.org/10.1016/j.catena.2014.04.019>
- Scheid, A., & Ittner, S. (2022). *Assessment of the German CAP Strategic Plan: Environmental and climate contributions* [Policy report]. Institute for European Environmental Policy and Ecologic Institute.
- Schneckenburger, T., Albrecht, M., Halmburger, M., Stockmann, M., Follmann, J., & Ningelgen, K.-W. (2021). *Eine gute Bodenpolitik ist möglich—Hintergrund- und Positionspapier des BUND Rheinland-Pfalz*. BUND - BUND für Naturschutz und Umwelt in Deutschland. <https://www.bund-rlp.de/service/publikationen/detail/publication/eine-gute-bodenpolitik-ist-moeglich-hintergrund-und-positionspapier-des-bund-rheinland-pfalz/>
- Schulz, F. (2019, November 27). *40,000 farmers on tractors block Berlin in protest at new agricultural policy*. Wwww.Euractiv.Com. <https://www.euractiv.com/section/agriculture-food/news/40-000-farmers-on-tractors-block-berlin-in-protest-at-new-agricultural-policy/>
- Seitz, D., Fischer, L. M., Dechow, R., Wiesmeier, M., & Don, A. (2023). The potential of cover crops to increase soil organic carbon storage in German croplands. *Plant and Soil*, *488*(1–2), 157–173. <https://doi.org/10.1007/s11104-022-05438-w>

- Statistisches Bundesamt. (n.d.). *Siedlungs- und Verkehrsfläche wächst jeden Tag um 55 Hektar*. Pressemitteilung: Siedlungs- und Verkehrsfläche wächst jeden Tag um 55 Hektar. Retrieved 26 January 2024, from [https://www.destatis.de/DE/Presse/Pressemitteilungen/Zahl-der-Woche/2023/PD23\\_09\\_p002.html](https://www.destatis.de/DE/Presse/Pressemitteilungen/Zahl-der-Woche/2023/PD23_09_p002.html)
- Umweltbundesamt. (2013, August 2). *Boden beobachten und bewerten* [Text]. Umweltbundesamt; Umweltbundesamt. <https://www.umweltbundesamt.de/themen/boden-flaeche/boden-schuetzen/boden-beobachten-bewerten>
- Umweltbundesamt. (2014, July 17). *Soil protection law* [Text]. Umweltbundesamt; Umweltbundesamt. <https://www.umweltbundesamt.de/en/topics/soil-land/soil-protection/soil-protection-law>
- UNEP Law and Environment Assistance Platform. (n.d.). *Federal Soil Protection Act*. Retrieved 16 January 2024, from <https://leap.unep.org/en/countries/de/national-legislation/federal-soil-protection-act-0>
- van der Putten, W. H., Bardgett, R. D., Farfan, M., Montanarella, L., Six, J., & Wall, D. H. (2023). Soil biodiversity needs policy without borders. *Science*, *379*(6627), 32–34. <https://doi.org/10.1126/science.abn7248>
- Wageningen Environmental Research. (2023, October 23). *Petition calls for the proposed EU Soil Health Law to be supported, but also tightened*. WUR. <https://www.wur.nl/en/research-results/research-institutes/environmental-research/show-wenr/petition-calls-for-the-proposed-eu-soil-health-law-to-be-supported-but-also-tightened.htm>
- YARA. (2021). *Our position on Soil Health*.
- Zikeli, S., & Gruber, S. (2017). Reduced Tillage and No-Till in Organic Farming Systems, Germany—Status Quo, Potentials and Challenges. *Agriculture*, *7*(4), Article 4. <https://doi.org/10.3390/agriculture7040035>