



NBSOIL

Nature-Based Solutions
for Soil Management

Roadmap for effective upskilling of soil health advisory services - identifying existing resources

Deliverable D3.2

08.11.2024



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This work has received funding from UK Research and Innovation (UKRI) under the UK government's Horizon Europe funding guarantee grant number 10061997.

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Deliverable D3.2	Roadmap for effective upskilling of soil health advisory services - identifying existing resources	
Related Work Package	WP3 – Prototyping the Soil Academy	
Deliverable lead	Soil Association	
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Reviewer	Karin Pepers (AERES)	Grzegorz Siebielec (IUNG-PIB)
Grant Agreement Number	101091246	
Instrument	Horizon Europe Framework Programme HORIZON-MISS-2021-SOIL-02	
Start date	01 December 2022	
Duration	48. months	
Type of Delivery (R, DEM, DEC, Other)¹	R	
Dissemination Level (PU, CO, CI)²	PU	
Date last update	08.11.2024	
Website	nbsoil.eu	

Revision no.	Date	Description	Author(s)
0.1	20.11.2023	First version	Karen Fisher (SA) Katy Jo Stanton (SA) Ana Allamand (SA) Carlo Schiano (SA)
0.2	29.11.2023	Version 2	Carolyn Coxe (SA) Katy Jo Stanton (SA) Ana Allamand (SA)
0.3	08.11.2024	Version to address M18 review comments	Carolyn Coxe (SA) Carlo Schiano (SA)

¹ R=Document, report; DEM=Demonstrator, pilot, prototype; DEC=website, patent filings, videos, etc.; OTHER=other

² PU=Public, CO=Confidential, only for members of the consortium (including the Commission Services), CI=Classified



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Please cite this deliverable as:

Fisher K et Al., D3.2 - Roadmap for effective upskilling of soil health advisory services. NBSOIL project funded under grant agreement n. 101091246 of the European's Union Horizon Europe programme. November 2024. Document available at: nbsoil.eu

List of acronyms

D – Deliverable

EU – European Union

T – Task

WP – Work Package

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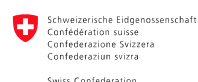
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1. Summary

The NBSOIL project aims to train and upskill soil advisors to promote sustainable land management through holistic Nature-Based Solutions and advanced soil health practices.

This review of available soil-related learning programs highlights a variety of academic, professional certification, and Continued Professional Development (CPD) courses. While universities across Europe and the UK offer degree programs in environmental science, agriculture, and physical geography that include soil science, specialised undergraduate soil degrees are rare. Professional certification options, though limited, provide more practical, hands-on learning, while CPD programs offer a wide range of accessible, often free, courses for soil advisors. However, specialised soil courses tend to be more expensive and less widely available, particularly for in-person learning.

Stakeholder workshops and interviews reveal the need for diverse and practical training programs to enhance soil health advisory services across Europe. Participants emphasised region-specific training, hands-on experience, and peer learning to bridge the gap between scientific knowledge and practical skills. Soft skills, such as communication and trust-building with farmers, were deemed crucial, and a lack of standardisation and certification was identified as a barrier to consistent advisory quality. Recommendations included hybrid learning models, certification frameworks, local expert engagement, and promoting peer learning. Barriers like fragmentation of training, technological limitations, financial constraints, and resistance to change also need to be addressed for successful upskilling efforts.

The report lays the foundation for the NBSOIL Academy through the ‘*Soil Health: Upskilling Advisory Services Roadmap*’, a strategy to enhance the skills of soil advisors across Europe through collaboration among agricultural organisations, educational institutions, and government agencies. This effort focuses on reducing fragmentation and fostering a multidisciplinary approach that includes soil science and social sciences. Key initiatives include specialised training programs, workshops on emerging technologies, continuous education, and creating networking platforms for knowledge sharing.



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2. Introduction

The overall objectives of the NBSOIL project are to collate and complement resources with the aim of designing a blended learning programme consisting of scientific based soil information, tools focusing on advice for advisors, and developing business models that enable advisors to support all scales and sectors of land management to improve soil health practices through implementation of holistic Nature Based Solutions (NBS).

This roadmap review is part of the outputs from NBSOIL work package three (WP3) ‘Prototyping the NBSOIL Academy’, focussing on developing a comprehensive training programme for next generation soil advisors and advisory services. The NBSOIL project is engaging with advisory service providers, academic institutions and soil related regulatory bodies across the EU and associated countries, to strengthen the knowledge and skills base available, to provide impartial advice on soils and sustainable soil management.

Curriculum co-design will form the foundation of the training resources developed for the NBSOIL Academy, through collaboration and demonstration site testing, trials, and validation. NBSOIL is incorporating into this process, evidence, and insights from project work packages two and four respectively, that focus on Soil and Nature Based Solutions (NBS), including soil health indexes, NBS demonstration sites and soil sensing and mapping, including exploring the use of unmanned aerial vehicles (UAV) and geographic information system mapping (GIS) in the context of soil management and nature-based solutions.

The aim is to empower 300 participants to complete the training programme and create a network of next generation soil advisors.

In this report, existing learning programmes and resources for soil knowledge are collated and reviewed using a multi-actor approach. This approach utilised surveys, interviews, online workshops and in-person workshops, to engage soil advisors, land managers, providers of soil courses and internal and external project stakeholders; namely those from universities, research institutions and independent soil advisory services. The knowledge gained from these activities has been collated using live documents/online products such as Mentimeter, Google Docs and Jamboard. The review process and stakeholder engagement has also considered the evaluation of new forms of advisory services that could make more effective use of digitisation and new models for advisor-farmer-data interactions. The primary focus of this review has been on agricultural land management, as this sector



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dominates the soil advisory focus as it represents the predominant land use in the majority of EU and associated.

2.1 The growing demand for soil advisors

The growing demand for soil advisors is influenced by various factors related to broader agricultural and environmental trends. Over the past decade, there has been a growing global interest towards sustainable agriculture, with increased awareness of the pivotal role of soil health in environmental resilience and food securities. This emphasis has created a potential rise in the demand for soil advisors capable of guiding farmers and landowners in adopting sustainable soil management practices. Growing public awareness of environmental issues, including soil health, and increased funding initiatives for sustainable agriculture may have also led to a greater demand for advisors who can assist in implementing best practices for soil health and management.

The integration of precision agriculture technologies has become more widespread, and advisors proficient in utilising these technologies for optimised soil management and in conjunction with economic stability or recovery through reduced inputs, have experienced an increased demand for their services. Additionally, the introduction of new environmental regulations and policies, both at national and international levels such as the EU's Common Agricultural Policy (CAP) or the UK's Sustainable Farming Incentives (SFI), could contribute to an increased demand for soil advisors. Regulations addressing soil health, soil contamination, carbon sequestration, and sustainable land management may drive the need for further advisory services.

Advances in soil science research and the development of new technologies for soil analysis and monitoring, particularly in-situ monitoring and predictive analysis using satellite data and mapping (see AI4SoilHealth project) have heightened the demand for advisors with up-to-date technical knowledge and skills. It's important to note that the demand for soil advisors can vary regionally based on local agricultural practices, government initiatives, and environmental conditions and what is in demand in one region, may not be the same in another. It is this range of differing factors that contribute to the growing demand for soil advisors.



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2.2 Why do we need to upskill the next generation of soil advisors?

Upskilled soil advisors can enhance agricultural productivity by implementing precision farming, customising soil management plans, and promoting sustainable practices. Their expertise can extend to optimising fertilisation strategies, managing diseases and pests, and integrating innovative technologies for real-time monitoring. Through continuous adaptation and comprehensive strategies, upskilled advisors can play a vital role in protecting and improving soil health, whilst ensuring resilient economics into agricultural systems. Importantly, upskilled soil advisors can integrate nature-based solutions into their professional practice, recognising the value of harnessing natural processes for soil health and overall ecosystem balance and demonstrating this in practice.

Upskilled advisors can play a pivotal role in implementing and promoting sustainable farming practices, crucial for ensuring long-term environmental health and resilience. These individuals can be equipped to adapt to changing conditions, addressing challenges such as climate changes and extreme weather patterns. They will be able to design and implement strategies to mitigate the impact on various aspects of management practices, including soil quality, crop yields, tree health, and overall water and air quality protections and improvements.

Efficient resource management is a hallmark of skilled advisors who optimise resource use, minimising waste and reducing environmental impact. Improved soil management practices contribute to economic stability by enhancing crop yields, reducing input costs, and promoting overall agricultural sustainability.

In the context of meeting global food demand, upskilled soil advisors become instrumental. They can play a vital role in ensuring food security by maximising the productivity of existing agricultural land, addressing the challenges posed by a growing global population.

Furthermore, these advisors will actively contribute to agricultural innovation and research, fostering a culture of continuous improvement within the industry. Upskilling initiatives facilitate the smooth transfer of knowledge from experienced advisors to the next generation, supporting effective succession planning in the agricultural sector and related industries.

Environmental stewardship will be a key focus for upskilled advisors, as they are more likely to adopt and promote practices that protect natural resources, biodiversity, and overall ecosystem health. In summary, upskilled soil advisors contribute comprehensively to



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sustainable agriculture, economic stability, and environmental well-being through their strategic, innovative, and environmentally conscious practices.

By investing in the upskilling of the next generation of soil advisors, we address current agricultural challenges and prepare for the future, where sustainable and efficient soil management will be increasingly critical to food production, water, and air quality, and increasing environmental and human resilience to climate change.



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3. Review of available learning programmes

A review of available learning soil related programmes has created an example list of degree based, certification and continued professional development (CPD) courses (see appendix 1). This review was not exhaustive as the goal for the report is not to provide a complete list of all soils related programmes, yet to understand the types of courses on offer (i.e. specialised or broad), their approach (i.e. geographical location and teaching style) and the accessibility (i.e. financial and virtual or in person). This review lays a foundation of current learning programmes on offer for the informed development of the NBSOIL academy roadmap.

3.1 Academic based studies

Universities across Europe and the UK offer several academic courses in environmental science, agriculture, and physical geography, which will involve some level of soil science teaching. From diploma, foundation, BSc, MSc, MRes, PhD and DAgr, there is a range of undergraduate and postgraduate taught and research-based options available. In the UK alone, 121 universities offer 640 related undergraduate courses, with 102 universities offering 489 postgraduate courses (see Appendix 1) with most, if not all of these teaching an element of soil and soil interactions as a key part of the wider environmental science learning. There is a similar picture across Europe with universities, colleges and agricultural teaching institutions providing a range of environmental and agricultural courses, such as the Sustainable Agriculture BSc at the University of Ghent, Agricultural Sciences BSc and MSc courses at ETH Zurich, and a range of Agricultural Sciences degrees at Boku University (see Appendix 1).

This huge offer of environment, agriculture and physical geography courses will lay a good knowledge foundation for future soil advisors and practitioners yet will likely not provide a detailed higher level of knowledge required to begin or further develop a career as a soil's advisor, unless study is continued into post-graduate level through flexible modules such as research dissertations supervised by a knowledgeable soil scientist. The challenge for advisors, farmers and other professionals wanting to improve their knowledge base is that these courses tend to come as a package of the whole 1-to-4-year study and so many of



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the soils focussed modules are integrated into the wider study and so are not accessible as stand-alone targeted learning.

There are a small number of undergraduate soil specific degrees, with postgraduate academic study providing a greater opportunity for specialisation in soils learning. Exceptions being where the environment and geography departments host a leading soil scientist, such as Aberdeen University, Edinburgh University and Wageningen University who each teach an undergraduate soil focussed degree.

By very nature most of these academic courses will be largely classroom based and will not teach practical applied soil advice or soils advisor approaches. Of course some will contain a field-based element for learning, yet this learning will likely be broad, with soil analysis and understanding largely remaining an academic focus. Postgraduate research is more likely to contain more hands-on experience of soil analysis.

Agricultural Universities and technical colleges are more likely to provide these more hands-on courses linked to classroom-based learning. The courses focus on agriculture and agronomy that will include soils analysis and health, particularly those involving crop production (and increasingly those focussed on livestock production as the grass management and soils relationship is better recognised).

However, within these institutions there will be quite a difference in the depth and quality of the teaching with regards to Nature Based solutions to sustainable soil management and health, as some courses may take a more conventional approach to soil management (i.e. how to test for input calculations and crop maximisation). Of course, these skills can still be very useful for a future career in nature-based soils advice and analysis, yet much of the application and approach to management will likely need further learning.

All the degree-based studies mentioned here are widely available as in person, hybrid, and online access courses, yet will all be paid for courses and usually demand a larger time investment making it a significant limiting factor for many, especially those current advisors, farmers and other professionals looking for more readily available learning approaches and continued professional development.

An example of the academic based courses available is in Table 1, with the full list compiled for this review available in Appendix 1.



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Table 1. An example of the academic based courses available, with the full list compiled for this review available in Appendix 1.

Title	Institution	Country	Type	Access	Finance	Description
Soils & Global Change (IMSOGLO)	Various	Belgium	MSc	In person	Paid	Aims to train future soil scientists with the expertise to characterise soils, understand their evolution within ecosystems under global change, and develop strategies for climate-smart soil management policies.
		Austria				
		Germany				
		Denmark				
Soil, Water & Environment	Swedish University of Agricultural Sciences	Sweden	MSc	In person	Paid	Gives students expertise on the sustainable use of land and water resources and how they are linked, including modules on soil biology, biogeochemical cycles, and soil management.
Soil, Water & Atmosphere	Wageningen University	The Netherlands	BSc	In person	Paid	The bachelor's degree provides students with the basic skills and knowledge to address environmental issues from a natural science perspective.
Soil Scientist Apprenticeship	Cranfield University	UK	MSc	Hybrid	Paid	The Soil Scientist Apprenticeship meets the requirements of the Level 7 Soil Scientist Apprenticeship Standard, enabling graduates to perform effectively as professional soil scientists in a competitive and fast changing environment.
Agriculture	Harper Adams University	UK	BSc FdSc	In person	Paid	Agriculture degree with modules on soil and crop management



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General courses in Environment & Physical Geography	Various universities & colleges	UK & Europe wide	BSc MSc PhD	Hybrid	Paid
EUR-Organic: European Master in Organic Agriculture & Food Systems	Various	Various	MSc	In person	Paid

There are several environmental science and physical geography courses across UK and European institutions. Each will have an element of teaching about soil and interactions with the wider environment. Institutions with a soil scientist presence will often provide the opportunity for a student to study soil science further, especially through research dissertation work.

In the UK alone 121 universities offer 640 undergraduate courses, and 102 universities offer 489 postgraduate courses (Complete University Guide).

A comprehensive and integrative education in all areas of organic farming, as well as the processing and commercialization of organic food is offered by five leading European universities.



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3.2 Professionally Accredited and Certified Courses

Although undergraduate and postgraduate courses are open to everyone, they do tend to be more attractive for younger people, with those looking to re-train, specialise (likely after a degree) or to further their experience being the more likely to look to professional certification options.

In review of professional certification options for soil advice, there appears to be a limited offer, with a smaller number of in person or online courses available across Europe, where the content culminates in an assessment for an independently certified pass from the supplier.

Online certification courses market themselves as flexible learning spaces where you can learn at your own pace, often involving multimedia to show practical implementation of soil analysis. The remote approach means people can gain access from anywhere, creating literally a world of options, for example European soil advisors can become accredited by an American college, university, or independent provider, as easily as they could in their own country.

There are challenges with online only learning when it comes to soil analysis as the physical action of sampling, looking and even smelling the soil can be key tools in the advisor's toolbox that cannot easily be transferred as repeatable knowledge remotely.

It is notable that the in-person courses (or hybrid with an in-person element) often market this importance of in-field hands-on training. The obvious challenge for people engaging with these courses is the accessibility, time, and financial commitment, especially if there is no course held within their region.

Another challenge for someone looking for certification learning approaches is knowing where to look and which certification to trust as the courses are self-certified by the institution, therefore it is difficult to know the quality of the teaching and content until the course has begun, all of which require payment to access (although some online courses do offer a trial period or modules). This issue is amplified if you are new to the industry as knowledge of reputable providers will not be known, thus making the decision of what course is best and how the learning environment will support development (i.e. in-person or online) challenges. This will limit new entrant confidence and access to train to become a soil advisor. During this research this challenge became increasingly evident, for example, the assessment was carried out by an English-speaking researcher from the UK, and it proved difficult to find details of certification courses in Europe. This possibly is a function of a language barrier or maybe a search engine optimization issue (as it may only return UK related results, or those in English), but also the issue was not knowing where to look for reputable



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providers of training and certification in partner European countries, highlighting the barriers new entrants might face.

Having said this, in the UK those learners seeking opportunities will quickly find two prominent courses for soil advice certification provided by Basis and Cranfield University respectively. These are both well-known as reputable providers of training and accreditation, giving kudos to the holder of one of these accreditations within the wider industry.

The comprehensive training through BASIS-accredited programs includes courses such as Sustainable Land Management, Soil and Water Management (with an agricultural focus). BASIS, as the accrediting body, delineates the syllabus, and training providers meticulously craft course materials to ensure comprehensive coverage integral to their professional development. For example, the content of the BASIS Soil and Water Management Course offered in the UK, includes:

- Soil protection and soil health
- Prevention of water and wind erosion.
- Mechanics, economics, and environmental aspects of cultivation.
- Soil physical properties – texture and structure.
- Soil organic matter.
- Soil water properties.
- Drainage and irrigation.
- Plant macro/micronutrients and fertiliser planning.
- Manures and soil organic inputs to enhance crop growth and their effects on diffuse pollution.

The external examination and moderation process imposed by BASIS mandates that training providers adhere to the entirety of the syllabus, eliminating biases in content delivery, thus ensuring it keeps its reputable status.

Conversely, industry-recognised certification schemes are potentially absent in Poland, Austria, Italy, and Spain, although this may be a function of the challenges finding courses as a UK based English speaker as mentioned above.

In Switzerland, the Bodenpraktiker holds wide recognition within the agricultural sector, although its verification and certification status are not necessarily recognised outside of Switzerland and is a potential example of fragmentation across borders that could be refined in future and as part of an upskilling approach within the EU and associated countries such as Switzerland and the UK.

There are a growing number of courses targeted at those wishing to specialise as soil experts for specific soil advisory services. For example, the Soil Food Web, Integrity soils and BCA Biological Crop Advisors courses (see Appendix 1) all offer self-



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accredited outcomes, where participants can enroll in an online registry of these specialised advisors designed to promote the service to potential clients.

The financial commitment associated with these specialist courses is often substantial, and admission is variable and not necessarily contingent on prior industry experience, meaning the courses are not yet recognised within a wider industry context, particularly outside of small-scale horticulture and land management (e.g., large scale agriculture, construction, and planning).

This emergent course trend reflects a growing interest in soil health dynamics and its pivotal role amidst the contemporary climate change crisis, thereby fostering a paradigm shift towards agroecological systems in food production. Of significance is the observation that participants typically on these types of courses often deviate from conventional agricultural backgrounds or trajectories, contributing to a diversified demographic engaged in these educational endeavours.

3.3 Continued Professional Development (CPD)

In contrast to the small number of often expensive certified courses, the availability of Continued Professional Development (CPD) options is broad and deep, with the sector experiencing significant growth in educational initiatives for soil advisors, agricultural advisors, farmers, and horticultural growers.

For the learner, CPD options have a wide range of paid and free courses (or free with limited access). There are in person, hybrid, and online options across Europe (and globally when online options are considered). These CPD courses will deal with soils, water, agriculture, data, and many other topics that provide learning opportunities for foundational novice level introductions, through to specific advanced advisor and practitioner development.

Of note is the increasing accessibility of online courses, fuelled by a heightened emphasis on soil health and the understanding of its pivotal role in building resilience to climate change and extreme weather events. The often-free online interest courses focus on basic introductions to soils and soil health, such as the *'Soil, a burst of life: the hidden world beneath our feet'* by the European Commission, or sometimes have a more specific focus, such as the *'Soil related greenhouse gas emissions'* online course by the FAO for the United Nations. These types of courses are typically not accredited, however a good introduction to soil related subjects, often with free access to experts in the field, peers, and peer to peer learning, as well as industry specific courses that focus on specialist subjects.

Within agriculture sectors (i.e. farmers, horticultural growers, agricultural advisors), there is also a discernible increase in the availability of in-field, soil-specific short



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courses, and events, ranging from a single day to several months in duration. These in person or hybrid taught courses and events range from farm walks and learning networks, to more structured learning methods, such as the Basis ‘*Foundation in Soils*’ and ‘*Advanced quality of soils courses*’, that can be taken as standalone modules or form part of a broader modular credit award for a diploma in Agronomy. The courses cater to diverse sectors, including specialised areas such as sustainable / organic / regenerative agriculture, horticulture, and urban farming. Notably, these courses are characterised by practical in-field delivery methods, enabling participants to engage in hands-on learning experiences.

A distinctive advantage intrinsic to these practical infield courses (Table 2) lies in the dual facilitation of knowledge and skill transfer. Beyond the unidirectional transfer from trainers to participants, a noteworthy dimension is the facilitation of peer-to-peer knowledge exchange among participants. This collaborative learning dynamic contributes significantly to the overall efficacy of these educational endeavours.

Table 2. Examples of Continued Professional Development (CPD) programmes available. The full list compiled for this report review is available in appendix 1.

Title	Institution	Country	Access	Finance	Description
Foundation in soils	BASIS	UK	In person	Paid	Module for farmers, growers and advisors in soils
An Introduction to Soil Classification	British society of soil science	of UK	Hybrid	Paid	For land managers, researchers or consultants working with soils in the field, wishing to make the best use of currently available soil information.
Living Soil Academy	Living Soil	Belgium	In person	Free	The Living Soil Academy offers courses to professional farmers who have a large farm (>20ha) who wish to transition to agroecology



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<u>Continuous trainings in organic & agroecological productions</u>	Sociedad Española de Agricultura Ecológica	Spain	In person	Free with additional features	Training in organic and agroecological production at all levels, seeking to achieve a multiplier effect (training of trainers) based on the exchange of experiences.
<u>Sustainable Agricultural Land Management</u>	University of Florida	USA	Online	Free with additional features	Focus on agricultural and urban water quality and impact on soil.

Additional to Continued Professional Development is engagement in lifelong learning. Lifelong learning is the continuous, self-driven pursuit of knowledge at any career stage that helps to keep individuals curious, adaptable, and engaged with developments across a broader industry and topic areas than maybe they are used to. Embracing lifelong learning means people will seek diverse sources, stay updated, and choose topics that fuel their interests, making learning an ongoing journey that will benefit them personally and professionally. Specific lifelong courses are available, for example the 10-week online Living Soil course hosted by Aberystwyth University that is a basic introduction to garden soil health (Appendix 1). However, lifelong learning is as much an approach to broadening horizons and pursuing wider learning opportunities, than attending courses that would be considered more under the Continued Professional Development route to training and development.

3.4 Summary

There is a myriad of options available for soil learning programmes with more accessible, free, or more loosely connected environmental based programmes having a large range of options. As the training becomes more specialised the current options available often become less available and more expensive, although they can still have a variety of different time requirements (i.e. short-course, part-time or full-time) and locations (i.e. remote or in person).



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4. Stakeholder workshops & interviews

The stakeholder workshops and interviews conducted by the NBSOIL WP3 team reveal several key insights into upskilling soil health advisory services across Europe. Feedback was obtained through two online workshops in May 2023 and a series of interviews conducted with soil advisors across multiple European countries. The findings point to a need for diverse, practical, and locally relevant training programs that can address the challenges associated with soil management.

During the workshops, participants from diverse backgrounds, such as educational institutions, organisations, and businesses, engaged in discussions about upskilling in soil health. The workshops aimed to present NBSOIL's objectives and explore the current landscape of soil health education, from university programs to informal courses, online modules, and workshops. Participants engaged in collaborative exercises to map out available learning opportunities and discuss challenges, solutions, and gaps in soil health training.

The reflections below offer an analysis of the feedback received, emphasising areas for improvement and potential strategies for advancing soil health education.

4.1. Embracing Diversity in Soil Health Training

The feedback highlights the complexity and regional diversity of soil management across Europe. There is a clear need for training programs that can accommodate a variety of approaches tailored to different soil types, climatic conditions, and agricultural practices. This diversity suggests that a one-size-fits-all approach is insufficient, and curricula should be designed to include multiple methods and perspectives to reflect the range of conditions faced by soil advisors and farmers.

Training programs can be enhanced by incorporating region-specific modules that focus on local challenges, soil types, and best practices. This approach can improve the applicability of training and ensure that advisors are better prepared to offer relevant advice in different contexts. Developing partnerships with local organisations and agricultural institutions could also facilitate the integration of location-specific knowledge into training modules.

4.2. Bridging the Gap Between Theory and Practice

A significant challenge identified in the workshops and interviews is translating scientific knowledge into practical skills. While there is a wealth of scientific research available, turning this information into actionable practices for soil health remains a critical need. Training programs should focus on providing clear, step-by-step



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guidance for implementing soil health practices and include case studies that illustrate the practical application of research findings.

Moreover, hands-on training should be prioritised to allow advisors to experience soil properties firsthand and understand the impact of different management practices in real-world settings. This experiential learning can help bridge the gap between theoretical knowledge and practical skills, enhancing the overall effectiveness of soil health advisory services.

4.3. The Role of First-Hand Experience and Peer Learning

The value of first-hand experience in learning soil management practices was strongly emphasised. Practical, field-based training can enable soil advisors to gain insights that are not easily conveyed through theoretical instruction. Peer learning opportunities, such as on-farm demonstrations and workshops, can complement formal training by allowing participants to share experiences and discuss what has worked or failed in similar contexts. This approach can foster a collaborative learning environment and encourage the exchange of practical knowledge.

To address the challenge of accessibility, demonstration sites could be strategically established in different regions, offering training sessions that cater to local needs. Such initiatives could be supported by digital tools, such as virtual farm tours or video case studies, to widen access to practical learning experiences.

4.4. Importance of Soft Skills and Building Trust

The feedback consistently highlighted the need for soil advisors to develop soft skills, such as communication and relationship-building. Establishing trust with farmers is essential for effective advisory services, as it can facilitate the adoption of recommended practices. Training programs should incorporate modules on communication strategies, active listening, and conflict resolution to equip advisors with the skills needed to engage effectively with farmers.

By integrating soft skills training into soil health education, advisors can become more adept at understanding farmers' perspectives, addressing their concerns, and fostering a collaborative approach to soil management.

4.5. Navigating the Challenges of Certification and Regulation

The lack of standardised certification for soil advisors across Europe presents a challenge for ensuring the quality and consistency of advisory services. The feedback indicated that while there are good-quality training programs available, awareness and



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accessibility can be limited, and the absence of a formal accreditation framework may lead to inconsistencies in the advice provided.

Establishing a certification system for soil advisors could address these issues by setting minimum standards for qualifications and continuing professional development. Drawing inspiration from countries like the USA and Australia, where certification programs exist for soil scientists, the NBSOIL project could advocate for the development of a similar framework in Europe. This would not only enhance the credibility of soil advisors but also encourage ongoing learning and adherence to best practices.

4.6. Balancing Science with Practical Application

The findings suggest a need to strike a balance between scientific rigour and practical relevance in training programs. While scientific foundations are crucial, training content should also focus on practical know-how and real-world applications. Ensuring that training is user-focused and considers the perspectives of farmers and end-users can help align the content with practical needs.

Developing modules that integrate scientific knowledge with practical case studies, field exercises, and peer-to-peer learning can help create a more holistic training approach. This approach can enable advisors to effectively bridge the gap between theory and practice, equipping them with both the knowledge and skills needed to support farmers in implementing soil health practices.

4.7. Recommendations for Future Directions

The insights from the workshops and interviews provide valuable guidance for shaping the NBSOIL Academy's training modules. The following strategies are recommended:

Develop Hybrid Learning Models: Combine online learning with practical, field-based exercises to offer flexible training that caters to different learning preferences and regional needs.

Engage Local Experts and Institutions: Partner with local agricultural organisations, universities, and soil science societies to incorporate region-specific content and provide access to demonstration sites.

Establish a Certification Framework: Advocate for the development of a standardised certification system for soil advisors to ensure quality and consistency in advisory services across Europe.



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Integrate Soft Skills Training: Include modules on communication and relationship-building to help advisors engage effectively with farmers and foster trust.

Promote Peer Learning and Knowledge Exchange: Facilitate opportunities for advisors to share experiences and learn from each other through workshops, on-farm demonstrations, and digital platforms.

Enhance Awareness and Accessibility: Improve signposting to existing training resources and ensure that programs are accessible to a wider audience, including those in underserved regions.

By addressing these areas, the NBSOIL Academy can contribute to a more robust and comprehensive framework for soil health advisory services across Europe, supporting the upskilling of advisors and promoting sustainable soil management practices.



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5. Effective use of digitization with farmer data interactions

‘Farmer data interactions’ refers to the various ways in which farmers and landowners can engage with and utilise data in the context of agricultural and land management practices. It involves the collection, analysis, and application of data to make informed decisions on the farm, estate, or land in question, including the management systems adopted both historically and/or in the future.

The increased data driven farming system provides an excellent opportunity for soil advisors to utilise digital tools and technologies to enhance training, coordination, and engagement with their clients across Europe.

This interaction with farm data can take several forms:

Data collection: Farmers gather data from various sources, including in-situ sensors, machinery, weather stations, and historical records. This data may include information on soil health, weather conditions, crop growth, and even emissions.

Data analysis: Farmers analyse the collected data to derive insights into the performance of their crops, the condition of the soil, and the overall efficiency of their farming practices. This analysis often involves the use of technology and data analytics tools.

Decision-making: Based on the insights gained from data analysis, farmers make decisions to optimise their farming operations. This could include adjusting irrigation schedules, choosing specific crops or crop rotations, implementing precision agriculture techniques, or addressing pest and disease management and even where to apply nature-based solutions.

Precision farming: Farmer data interactions play a crucial role in precision farming, where technology is used to tailor farming practices to specific conditions within a field. This can lead to more efficient resource use, improved yields, and reduced environmental impacts.

Monitoring and adaptation: Farmers continuously monitor their operations through ongoing data interactions. If unexpected challenges arise, for example, extreme weather events such as flooding or drought, they can adapt their strategies in real-time to mitigate risks and optimise outcomes.

Technology integration: The use of technology, such as farm management software, mobile and/or in-situ monitoring devices, and satellite and mapping imagery, can



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facilitate farmer data interactions. These tools provide valuable information to farmers for better decision-making.

It is becoming increasingly important for soil advisors to have the skills and knowledge to support farmers and landowners in the collection, analysis, and interpretation of their data for management practice adjustments and future system designs and planning.

Therefore, future learning and development of soil advisor knowledge and continued professional development must include elements of supporting the collection, assessment and outcome application of this farm data, creating new models of advisor-farmer-data interactions for soil health. This will likely include the development and use of technology platforms, data-sharing protocols and collaborative initiatives to improve soil health management based on accurate and timely data. Platforms to enable this are currently in development such as the UKs Soil Association Exchange (<https://www.soilassociationexchange.com/>).



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6. Barriers to implementation

Several barriers could hinder the implementation of upskilling soil health advisory services in Europe. These barriers fall under several categories:

6.1. Lack of Standardisation and Certification

There is currently no unified framework or certification system for soil advisors across the EU. This absence of regulation complicates the recognition of qualifications, the quality of training, and professional standards, leading to inconsistent advice and practices. Without standardised requirements, some advisors may lack the necessary expertise, while those with sufficient skills may not be formally recognized. Additionally, there is currently a shortage of properly qualified trainers capable of delivering courses that effectively bridge scientific knowledge with practical infield applications.

Identifying existing soil health experts across the EU and associated countries that can be part of the upskilling roadmap activities and training the trainers, is recommended and could be a primary step for NBSOIL Academy co-creation.

6.2. Lack of Clear Pathway to Become Soil Advisors

The absence of a shared pathway to become a soil advisor across EU member states and associated countries contributes to the upskilling challenge ahead.

While some areas offer potential models, such as incorporating soil training into roles related to crop protection and nutrient management, there is a lack of standardised training for soil health advice. Crop protection advice and nutrient management advice training in several of the member states involves accredited training and CPD regulations, due to the sales of plant protection products and fertiliser. A similar model could be implemented for soil health advice and education.

With access to soil health information and courses growing, alongside growing interest and awareness of its key importance, there is an opportunity to consolidate information and educational resources and address fragmentation, creating a clear pathway from early career stages throughout a soil advisor's professional life, as new knowledge becomes available. The EU Soil Monitoring Law represents a potential opportunity for member states to explore possibilities at a local scale through their CAP planning,



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policy direction and at frameworks level, for a unified approach to soil education and soil advisory services.

6.3. Need for Hybrid Training Models

This review has emphasised the necessity of developing models that combine online and classroom training with infield experiences. Soil health understanding often requires sensory tests that cannot be learned in an online or classroom environment. Blended learning approaches, addressing different learning styles, can contribute to better-quality advisors. Recognising diverse learning preferences, a blended approach can facilitate mutual learning among future or current advisors. A hands-on learning approach thus is considered vitally important when upskilling soil advisors, as better understanding soils and their health often requires sensory tests: touch and smell the soil, standing in a soil pit to see the profile in person, observe the biology, and understand different cultivations and field drainage designs. These skills are not always achievable or learnable in an online environment, or even a classroom. This does not mean leaving soil research aside, yet these courses should reflect the growing science around soil health and provide the tools to implement it in a practice-oriented way.

Additionally, it is important to understand that different people learn differently, and an appropriate blend of learning strategies can also secure better-quality advisors. Following the Honey and Mumford (1992) model, for example, we can better understand different styles and imagine blended courses that address these: some learn best by doing, others by understanding the theory behind actions, others by seeing how they can apply their learning to the real world and others through observation and reflecting on results. A blended approach can help address this variety of styles and help future or current soil advisors to learn from each other.

6.4. Fragmentation of Training Offers

The increasing availability of soil health courses, both in-person and online, poses a challenge as well as an opportunity, due to the lack of qualifications/accreditation frameworks and the diverse conditions impacting soil health. Addressing this fragmentation and aligning courses with appropriate qualifications and accreditation, could enhance the number of qualified soil advisors, trust in services and an increased capacity.



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6.5. Additional barriers

For the effective upskilling of soil advisors' future considerations must also include:

Language variations, funding, and technology access: Challenges include variations in the languages that some specific courses are delivered in, where courses are physically available, accessible funding mechanisms for training, and the accessibility of suitable technology. These factors further contribute to the complexity of upskilling initiatives and require careful consideration in planning and implementing effective training programs.

Limited number of qualified trainers: The shortage of qualified trainers for soil advisors, contributes to the limited access to tailored training programs. Identifying existing soil health experts across the EU and associated countries is crucial for knowledge transfer and a commitment to continuous training of the trainers is recommended.

Financial constraints: The lack of a clear pathway and regulatory specifications for becoming a soil advisor, coupled with financial constraints, hinders advisors from participating in training programs. Aligning upskilling efforts with broader agricultural policies and initiatives and funding opportunities for professional development, could begin to address these challenges.

Technological infrastructure: Inadequate access to modern technologies and a lack of infrastructure, can hinder the adoption of advanced soil management tools. Initiatives promoting specialised training programs and technology training, could mitigate this barrier.

Resistance to change: Overcoming resistance to change, especially among experienced advisors, is crucial and an important aspect of maintaining relevance and keeping up to date with technological advances in a rapidly changing sector. A blended learning approach, incorporating online, classroom, and infield training, caters to diverse learning styles, fostering openness to innovation and new practices and could work towards mitigation of this barrier.

Time constraints: Acknowledging the time constraints faced by soil advisors, particularly those learning on the job or outside of specific academic learning routes and accommodating in continuous professional development (CPD) programs, can



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This work has received funding from UK Research and Innovation (UKRI) under the UK government's Horizon Europe funding guarantee grant number 10061997.

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provide a framework for ongoing learning, allowing advisors to balance work commitments with educational pursuits.

Limited collaboration and networking: The need for establishing platforms for knowledge sharing, directly addresses the challenge of limited collaboration and networking. Networking events, conferences, and webinars create forums for advisors to exchange experiences and best practices.

Policy and regulatory challenges: The lack of supportive policies or regulatory frameworks is an overarching challenge. Collaboration with government agencies and policymakers is essential for aligning upskilling efforts with regulatory framework and funding opportunities.

Inadequate recognition of the profession: Recognising the profession of soil advisory services, is crucial for incentivising advisors to invest in continuous upskilling. Collaboration with agricultural organisations and educational institutions and applying a regulatory framework, can contribute to fostering recognition.

Language and Cultural Barriers: Addressing the diversity in languages and cultural contexts across Europe requires consolidating information and creating a clear pathway to it. This would contribute to overcoming language and cultural barriers and promoting standardised training programs.

Limited Research Integration: Integrating the latest research findings into practical training programs is essential. Collaborative research projects and initiatives can bridge the gap between academic knowledge and infield practice.

In summary, a collaborative cross-disciplinary effort involving policymakers, educational institutions, agricultural organisations, and advisors is necessary to create an environment conducive to continuous upskilling in soil advisory services, addressing the multifaceted barriers identified.



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7. Soil Health: Upskilling Advisory Services Roadmap Overview

Upskilling soil advisors in Europe and associated countries will involve collaboration between agricultural and land management organisations, educational institutions, government agencies and policy makers. This cross organisational collaboration is vital to reduce fragmentation and ensure a cohesive learning pathway for soil advisors. It will also entail cross disciplinary collaboration between different facets of soil science expertise and application, and other related disciplines such as the social sciences, to ensure effective soil advisory education for the future.

A comprehensive approach is needed to ensure a holistic and ongoing strategy for upskilling soil advisors, covering collaboration, targeted initiatives, community building, and continuous improvement through assessment and feedback.

Initiatives will include specialised training programs, workshops on emerging technologies in soil management, and promoting continuous education for soil advisors to stay updated on the latest research, technologies, and practices. Additionally, fostering networking opportunities and knowledge-sharing platforms could enhance collaboration within the soil advisory community. Regular assessments and feedback loops will ensure the effectiveness of upskilling efforts.

Four themes have emerged through the process of this review that inform the roadmap pathway needed to upskill soil advisors.

Table 3. Upskilling Advisory Services Roadmap

Collaboration	Targeted initiatives	Networking and knowledge share	Assessment
Partnerships	Workshops on emerging technologies and technology training	Establishing platforms for knowledge sharing	Applied cohesion in assessment criteria
Educational institutions	Continuous education promotion	Facilitating collaboration within the soil advisory community	Regular evaluations of upskilling programs



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Government agencies and policy makers	Online and in-person short courses and certifications	Networking events	Feedback loops for improvement
Collaborative research projects	Field workshops and demonstrations	Mentorship programs	CPD programs

7.1. Collaboration

Partnerships: Agricultural colleges, courses and organisations partnering with industry bodies, cooperatives, and relevant local, national, or international soil associations to pool resources and expertise. Identifying shared direction/initiatives and creating specialist working groups for specific soil related themes/challenges.

Educational institutions: Collaborating with universities and research institutions to design and deliver relevant soil advisory programs with strong scientific foundations covering all aspects of soil science and emerging technologies.

Government agencies and policy makers: Working with governmental bodies to align upskilling efforts with broader agricultural policies and initiatives and creating collaborative approaches for soil advisors to feed into policy recommendations for future resilience and management practices that support nature-based solutions.

EU Soil Monitoring Law: Provides a potential opportunity for member states to reduce fragmentation in soil courses, agree levels of accreditation across member states that can dovetail with other international frameworks, and provide cohesive country specific learning pathways.



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Collaborative research projects: Facilitate partnerships between soil advisors and universities or research institutions, especially those that can facilitate cross disciplinary research, encouraging engagement in joint research initiatives to contribute to the latest findings in soil science and nature-based solutions.

Networking events: Arrange regular conferences, seminars, or webinars that bring together soil advisors, researchers, and industry experts, fostering collaboration and the exchange of knowledge and insights, specifically for the current and future needs of soil advisors.

Mentorship programs: Create opportunities for experienced soil advisors to mentor and share expertise with new and early-career professionals, promoting collaboration and knowledge transfer within the community and consistency of applied learning.

7.2. Targeted initiatives

Workshops on emerging soil technologies: Conducting hands-on and online workshops to introduce advisors to the latest tools, sensors, and technologies in soil analysis and management, creating opportunities for knowledge sharing and blended learning approaches.

Continuous Professional Development: Encouraging soil advisors to pursue ongoing education and continuing professional development (CPD) through webinars, online and in-person specialist courses, and attendance at conferences, to stay updated on evolving practices.

Lifelong learning: Promotion of the continuous, self-driven pursuit of knowledge at any career stage. Lifelong learning helps to keep individuals curious, adaptable, and engaged with developments in soils approaches and understanding, allowing them to grow professionally. Lifelong learners embrace diverse sources, stay updated, and choose topics that fuel their interests, making learning an ongoing journey.

Online and in-person short courses and certifications: Develop specialised online and in-person courses covering specific specialised topics such as soil health, nutrient management, nature-based solutions for soil management and agroecological practices. Include themes emerging in the scientific or technical fields of soil advisory services, such as microbiology, fungi, bacteria, and macrofauna, soil restoration and soil amendments, soil protection and conservation practices, and nature friendly precision agriculture techniques. Additionally, how to interpret soil health analysis and



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wider ecological knowledge, into practical in field advice. Provide certifications upon course completion to validate acquired skills at specific points in time.

Field workshops and demonstrations: Create opportunities for applied learning, by conducting hands-on workshops in the field to showcase the implementation of modern soil testing techniques, precision agriculture tools, and specific conservation practices that maintain and improve soil health.

Technology training: Research and address the potential emerging digital skills divide through further discussion on potential internet connectivity issues creating barriers to access online training and networks, especially in rural areas. Research and address any skills gaps for technology; what they are and where they are found. Organise training sessions on the use of advanced technologies like soil sensors, GIS mapping, and data analytics for improved soil management decisions.

7.3 Networking and knowledge share

Establishing platforms for knowledge sharing: Creating forums, online communities, or conferences where soil advisors can exchange experiences, best practices, and the latest research findings in multiple local languages.

Facilitating collaboration within the soil advisory community: Encouraging partnerships and joint projects among advisors, to foster a collaborative and supportive professional environment.

Networking events: Arrange conferences, seminars, or webinars that bring together soil advisors, researchers, and industry experts to share knowledge, experiences, and insights.

Mentorship programs: Create mentorship opportunities where experienced soil advisors guide and share their expertise with newer professionals, fostering networking and community building within the field.

7.4 Assessment

Applied cohesion in assessment criteria: Explore application of similarly relevant frameworks e.g., crop protection, nutrient management to soil advisory education programmes. Opportunity to apply common levels of education to soil advisory



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education and services i.e., introduction, intermediate & advanced levels, or similar chartered status such as those seen in other sectors e.g., engineering, ecology.

Regular evaluations of upskilling programs: Implementing periodic assessments to measure the effectiveness of training initiatives and identify areas for improvement and areas that require updating due to emerging technologies and practices.

Feedback loops for improvement: Gathering feedback from soil advisors on the relevance and impact of upskilling efforts and using this input to refine and enhance future programs.

Continuous professional development (CPD) programs: Implement assessment mechanisms within the framework for ongoing learning to measure the effectiveness of the programs and identify areas for improvement. Establish a framework for ongoing learning, encouraging soil advisors to attend relevant conferences, read scientific literature, and participate in webinars to stay abreast of industry developments.

This four-step thematic approach aims to ensure a holistic and ongoing strategy for upskilling soil advisors in Europe, covering collaboration, targeted initiatives, community building, and continuous improvement through assessment and feedback.

The effectiveness of these initiatives will depend on customisation to the specific needs of soil advisors and the agricultural or environmental context of the local region and the specific demographics of the soil advisors within those regions, but we trust that this roadmap will serve as an effective starting point for the co-design and creation of the NBSOIL Academy, to upskill the next generation of soil advisors throughout 2023 – 2025.



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1 Appendix 1: List of Learning opportunities available

Title	Institution	Country	Location	Type	Access	Finance	Description	Language	Link
Soil, Water & Atmosphere	Wageningen University	Netherlands	Wageningen	BSc	In person	Paid	The bachelor degree provides students with the basic skills and knowledge to address environmental issues from a natural science perspective.	English	https://www.wur.nl/en/education-programmes/bachelor/bsc-programmes/bsc-soil-water-and-atmosphere.htm
Agriculture	Hartpury University	UK	Gloucestershire	BSc	In person	Paid	A course in agriculture that includes modules like: Soil and Grassland Management.	English	https://www.hartpury.ac.uk/university/courses/bsc-hons-agriculture-with-foundation-year/?gad_source=1&qclid=Cj0KCQjwyL24BhCtARIsALo0fSB5y3vMSsaf-Skvq2kBgBWCd7lfwzey21JP_Yb7nm1cggQGB4CpwXYaAtVBEALw_wcB&selectedTab=tab-eb095274ef7545cebae351c16ce446e5
Plant and Soil Science	University of Aberdeen	UK	Aberdeen	BSc	In person	Paid	Plant and soil science undergraduate degree	English	https://www.abdn.ac.uk/study/undergraduate/degree-programmes/828/CD27/planet-and-soil-science/



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Agriculture	Harper Adams University	UK	Shropshire	BSc FdSc	In person	Paid	Agriculture degree with modules on soil and crop management	English	https://www.harper-adams.ac.uk/courses/undergraduate/201021/2025/agriculture/#contacts
Sustainable agriculture	University Kassel	Germany	Kassel	BSc MSc	In person	Paid	Offers several study programs that focus on organic and sustainable agriculture.	German	https://www.uni-goettingen.de/en/96913.html
Regenerative food, farming & enterprise	Schumacher College	UK	Devon	BSc MSc	In person	Paid	Develops knowledge of resilient human-scale food systems and teaches the skills needed to design, influence or develop resilient, productive food-based networks and businesses, with an ecological and systemic approach.	English	https://campus.dartington.org/regenerative-food-farming-and-enterprise/
Soils and Sustainability	University of Edinburgh	UK	Edinburgh	BSc MSc PhD	In person	Paid	Various programmes covering topics such as soil formation, functions and ecosystem services, the role of soils in mitigating climate change, soil health as well as management strategies to promote and conserve soil health and sustainable soil systems.	English	https://www.ed.ac.uk/studying/postgraduate/degrees/index.php?r=site/view&edition=2024&id=781



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General courses in Environment & Physical Geography	Various universities & colleges	UK & Europe wide	Various	BSc MSc PhD	Hybrid	Paid	There are a number of environmental science and physical geography courses across UK and European institutions. Each will have an element of teaching about soil and interactions with the wider environment. Institutions with a soil scientist presence will often provide the opportunity for a student to study soil science further, especially through research dissertation work. In the UK alone 121 universities offer 640 undergraduate courses and 102 universities offer 489 postgraduate courses (Complete University Guide).	Various	https://www.thecompleteuniversityguide.co.uk/courses/search/postgraduate/all?keyword=environment&qualification=postgraduate#0
Sustainable Agriculture	University of Ghent	Belgium	Ghent	BSc	In Person	Paid	Sustainable agriculture degree	English	https://www.ugent.be/bw/plants-and-crops/en
Agricultural Sciences	ETH Zurich	Switzerland	Zurich	BSc MSc	In Person	Paid	Degree programmes looking at agriculture and food production.	English	https://usys.ethz.ch/en/studies/agricultural-sciences.html
Agricultural Sciences	Boku University	Austria	Vienna	BSc MSc PhD	In Person	Paid	A range of life science and agricultural degree programmes on offer.	English German	https://boku.ac.at/en/studies
Soil Science	University of Warsaw	Poland	Warsaw	BSc	In Person	Paid	Module as part of the applied geology study programme.	Polish	https://informatorects.uw.edu.pl/en/courses/view?prz_kod=1300-OGR2CW



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Agriculture	University of Agriculture in Krakow	Poland	Krakow	BSc MSc	In Person	Paid	Programmes in agriculture and economics	Polish	https://urk.edu.pl/en/study
Soil Management (agriculture)	ACS Distance Education	UK	Online	Certification	Online	Paid	Distance learning in soils management for agriculture	English	https://www.acsedu.co.uk/courses/agriculture/soil-management-agriculture-baq103-236.aspx
Soil & water management	BASIS	UK	Ashbourne	Certification	In person	Paid	Certificate for farm advisors in soil and water	English	https://basis-reg.co.uk/education/area/environmental-courses/soil-and-water-management-certificate
Bodenpraktiker	Bioland	Germany	Frankfurt	Certification	In person	Paid	Bioland is an association of over 9000 organic farms, as well as organic food processors and retailers. It offers the Bodenpraktiker course, a certified professional training aimed at farmers who want to improve soil fertility. The course is offered several times a year in different regions across Germany.	German	https://www.bioland.de/bodenpraktiker
BeCrop Advisors™	Biome Makers	USA	Online	Certification	Online	Free	BeCrop Advisors is an internally certified course to train advisors to use Be Crop technology to analyse soil biology and provide advice on soil health	English Spanish	https://biomemakers.com/becrop-advisors



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Agricultural Land Classification	British Society of Soil Science	UK	Cranfield	Certification	In person	Paid	Agricultural Land Classification Course has a formal role in the planning system in England and Wales and is designed to prevent the loss of our best and most versatile land in line with the principles of sustainable development.	English	https://soils.org.uk/education/soil-training/#britain
The CECRA Training Program: Empowering European Advisors in Rural Areas	CECRA	Germany	Landshut	Certification	In person	Paid	Certificate for European Consultants in Rural Areas, offers a comprehensive training program of the 20 learning modules, which cover structuring advisory settings for various scenarios. The training caters for all experience levels, with an emphasis on farm analysis, goal formulation, and collaborative problem-solving.	English German	https://soilxchange.eu/project-news/the-cecra-training-program-empowering-european-advisors-in-rural-areas
Advanced Soil Health International Certificate	Cornell University	USA	Online	Certification	Online	Paid	The Advanced Soil Health International Certificate Training Course is a certified online training for those who wish to deepen their expertise in soil health. Participants will learn the principles and processes that drive soil health, understand how to measure and interpret soil health metrics, and delve into the most effective management practices.	English	https://blogs.cornell.edu/soil-health-training/
Dr. Elaine's Soil Food Web School	Dr. Elaine Ingham	USA	Online	Certification	Online	Paid	Dr. Elaine's Soil Food Web School offers internally certified courses on techniques for assessing soil health and other practices that help restore and maintain the natural balance of the soil ecosystem.	English	https://www.soilfoodweb.com/



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CREATE Coaching	Integrity Soils	USA	Montana	Certification	Hybrid	Paid	CREATE coaching is an internally certified course designed to train and empower advisors for agroecological systems. The training covers different aspects such as microbiology, soil science, agronomy, plant physiology, management, mindset and behaviour change.	English	https://integritysoils.com/pages/create-coaching-yellowstone
Bodem Breed Academie	Bodembeheer Nederland SIKB KOBO-HO	Netherlands	Online	CPD	Online	Free	A digital platform focused on providing training and knowledge dissemination related to soil management and environmental issues. It offers courses, workshops, and seminars aimed at professionals working in fields such as soil science, environmental consultancy, and land management.	Dutch	https://www.bodembeedacademie.nl/
Earthworm identification	British Earthworm Society	UK	Various	CPD	In person	Paid	Learn how to identify earthworms with courses for Beginners, Intermediate and Advanced.	English	https://www.earthwormsoc.org.uk/training
An Introduction to Soil Classification	British society of soil science	UK	Cranfield	CPD	Hybrid	Paid	For land managers, researchers or consultants working with soils in the field, wishing to make the best use of currently available soil information.	English	https://soils.org.uk/education/soil-training/#britain
A Practical Introduction to Soils in Great Britain	British Society of Soil Science	UK	Cranfield	CPD	In person	Paid	A Practical Introduction to Soils in Great Britain. This course covers two days and includes a number of presentations, a practical session on soil description and then field visits to demonstrate a range of soils.	English	https://soils.org.uk/education/soil-training/#britain



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Population, food & soil	Dartmouth College	USA	Online	CPD	Online	Free with paid additional features	This course explores the population-environment relationship. In this course, you will learn about the human population and the ways in which changes in the population affect the environment. Agriculture, soils, and the environmental implications of eating meat, vegetables, local, organic, sustainable, industrial, and other types of food are discussed too.	English	https://www.coursera.org/learn/population-food-and-soil
Global Soil moisture dataset	Earth H2O observe	Austria	Online	CPD	Online	Free	Learn how to analyse global soil moisture datasets	English	http://www.earth2observe.eu/?sfwd-courses=long-term-hydrological-monitoring-with-active-and-passive-microwave-missions
Sustainable Soil Management: Soil for life	EDX	Netherlands	Online	CPD	Online	Free with paid additional features	Learn about sustainable soils management	English	https://www.edx.org/learn/soil/wageningen-university-research-sustainable-soil-management-soil-for-life
Soil, a burst of life: the hidden world beneath our feet	European Commission	Europe	Online	CPD	Online	Free	This course aims at raising awareness and increasing knowledge of the secret life beneath our feet, taking the public on a fascinating journey of discovery. It also allows you to familiarise with European Union initiatives for soil (biodiversity) protection.	Various	https://academy.europa.eu/courses/soil-a-burst-of-life-the-hidden-world-beneath-our-feet



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Climate smart soil & land management	FAO of the United Nations	Italy	Online	CPD	Online	Free	Learn about sustainable soils and land management	English Arabic Spanish French	https://elearning.fao.org/course/view.php?id=435
Soil related greenhouse gas emissions	FAO of the United Nations	Italy	Online	CPD	Online	Free	Learn about soil related greenhouse gas emissions	English Spanish	https://elearning.fao.org/course/view.php?id=639
FarmEd	FarmED	UK	Shipton under Wychwood	CPD	In person	Paid	FarmED is a not-for-profit organisation providing learning spaces and events to build sustainable farming and food systems. It addresses a wide audience ranging from farmers, advisors, or policy-makers to local communities, students and foodies.	English	https://www.farm-ed.co.uk/
Bodenpraktiker	FiBL	Switzerland	Frick	CPD	In person	Paid	Training for soil practitioners who wish to improve soil fertility in order to make farming sustainable. It is open to organic as well as conventional farmers.	German	https://www.fibl.org/de/themen/projekt Datenbank/projekt/tem/project/2566
Spatenprobe BodenDok	HAFL Agridea FiBL Agroscope	Switzerland	Online	CPD	Online	Free	Spatenprobe BodenDok offers user-friendly instructions and an application to perform spade tests in Swiss agriculture.	German French Italian	https://spatenprobe.ch/
Soil Management & Cultivations	Harper Adams University	UK	Shropshire	CPD	In person	Paid	This course will be applicable particularly to the potato sector and professionals in crop science e.g. senior agronomists.	English	https://www.harper-adams.ac.uk/courses/short-course/201056/soil-



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									management-and-cultivations
House of Agroecology	House of Agroecology	Belgium	Brussels	CPD	Hybrid	Free with paid additional features	The House of Agroecology is an organisation that offers information and training to different categories of actors who are engaged in farming and food system transformation.	French Dutch	https://houseofagroecology.org/
Soil Science: Exploring the World Beneath our Feet	Lancaster University	UK	Online	CPD	Online	Paid	On this four-week course, you'll learn from groundbreaking research taking place at Lancaster University to understand the basics of soil science. You'll also have the opportunity to get your hands dirty with practical experience in assessing soil properties and conditions.	English	https://www.futurelearn.com/courses/soils?utm_source=google&utm_medium=ppc&utm_campaign=fl_PMax_Google_EN_UK&source=Google&medium=ppc&campaign=fl_PMax_Google_EN_UK&gad_source=1&qclid=Cj0KCQjwyL24BhCtARIsALo0fSACURGlEcwyGOTjyIK4egt7pcggzI6qSlcVwXjEXI4f9nCUPid--F8aAl8JEALw_wcB
Living Soil Academy	Living Soil	Belgium	Flanders	CPD	In person	Free	The Living Soil Academy offers courses to professional farmers who have a large farm (>20ha) who wish to transition to agroecology	Dutch	https://livingsoilacademy.com/



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Triple Performance	Neayi	France	Online	CPD	Online	Free	Triple Performance is a platform compiling a wide range of resources on agroecological practices. It collects and links to resources from training and research centres but also offers original material as well as a forum enabling farmers, advisors and other actors of the farm and food system to share their knowledge and experiences. The platform also offers a search tool for soil related courses.	French	https://wiki.tripleperformanc e.fr/wiki/Triple_Performance
National Organic Training Skillnet (NOTS)	NOTS	Ireland	Co. Leitrim	CPD	Hybrid	Paid	NOTS is a not-for-profit network that provides a wide range of courses to support and expand the organic sector in Ireland. NOTS also facilitates producer networks. Its courses target farming and food professionals.	English	https://nots.ie/
Regeneration Academy	Regeneration Academy	Spain	Murcia	CPD	In person	Paid	We give young entrepreneurs and students the tools to become innovators in the fields of regenerative agriculture and ecosystem restoration	English Spanish	https://www.regeneration-academy.org/home-en
Inspection of consignments of soil, building materials and granular waste materials (AP04)	SIKB	Netherlands	Online	CPD	Online	Free	SIKB is a network where the public and private sectors collaborate to continually improve soil management standards in the Netherlands. The SIKB website offers resources such as factsheets in Dutch and English regarding requirements for soil protection and soil testing and analyses in the Netherlands	Dutch English	https://www.sikb.nl/



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Continuous trainings in organic & agroecological productions	Sociedad Española de Agricultura Ecológica	Spain	Various	CPD	In person	Free with paid additional features	Training in organic and agroecological production at all levels, seeking to achieve a multiplier effect (training of trainers) based on the exchange of experiences.	Spanish	https://agroecologia.net/formacion-agroecoinnova-pam-murcia-agroecologia-seae/
Sorting out soils	The Open Science Laboratory	UK	Online	CPD	Online	Free	A virtual field trip to the River Teign	English	https://learn5.open.ac.uk/course/format/sciencelab/section.php?name=soils
Discover Best Practice Farming for a Sustainable 2050	The University of Western Australia	Australia	Online	CPD	Online	Free with paid additional features	The Discover Best Practice Farming for a Sustainable 2050 Course is based on a clear vision: imagine best practice farming for 2050, start to implement these strategies now, all the while making sure it will still be profitable.	English	https://www.coursera.org/learn/best-practice-farming-sustainable-2050
Sustainable Agricultural Land Management	University of Florida	USA	Online	CPD	Online	Free with paid additional features	Focus on agricultural and urban water quality and impact on soil.	English	https://www.coursera.org/learn/sustainable-agriculture
The Valdibella Practical School of Agroecology	Valdibella	Italy	Valdibella	CPD	In person	Paid	Practical lessons on farm for agroecology	Italian	https://valdibella.com/nasce-la-scuola-pratica-di-agroecologia-valdibella/



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Ver de Terre production	Ver de Terre production	France	Online	CPD	Online	Free with paid additional features	Ver de Terre Production is a training and research and development organisation that disseminates knowledge on agroecology for living soils. It offers a video streaming channel with over 1000 free videos on soil health as well as a number of online, hybrid, and in presence courses aimed at farmers	French	https://www.verdeterreprod.fr/
Advanced quality of soils	BASIS	UK	Ashbourne	CPD, with module towards Diploma	In person	Paid	Module for farmers, growers and advisors in soil ecosystems	English	https://basis-reg.co.uk/news/article/advanced-quality-of-soils
Foundation in soils	BASIS	UK	Ashbourne	CPD, with module towards Diploma	In person	Paid	Module for farmers, growers and advisors in soils	English	https://basis-reg.co.uk/education/area/foundation-awards-courses/basis-foundation-award-soils
Agriculture	Aberystwyth University	UK	Aberystwyth	FdSc BSc MSc Mres Mphil PhD DAG	In person	Paid	A range of courses in agriculture that includes modules involving sustainability, the environment and soil.	English Welsh	https://www.aber.ac.uk/en/study-with-us/subjects/agriculture/?gclid=Cj0KCQjwYlL24BhCtARIsALo0fSAIYNMqEruYqzR6dfeZCpuL0UV-bntuv9-V8OoLy-qd4-v6nllmAApPXEARw_wcB



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Soil Science	Cornwall College	UK	Cornwall	Foundation degree	In person	Paid	A programme designed to train a new wave of soil practitioners and researchers focused on the ability for soil function and health to bring environmental, social and economic benefits	English	https://www.cornwall.ac.uk/news/uks-only-soil-science-degree-coming-to-eden-project-learning/
Living Soil	Aberystwyth University	UK	Aberystwyth	Lifelong learning	Online	Paid	An introductory but wide-ranging introduction to understanding and investigating common garden soil types and applying the principles of sustainable soil management.	English	https://www.aber.ac.uk/en/lifelong-learning/ecology/ecologycourses/living-soil-xs13505/
Soil & Environmental Sciences	Bangor University	UK	Bangor	MA PhD	In person	Paid	Offering MA and PHD courses and degrees that includes among other soil related topics: soil classification, soil biology, soil hydrology and physics.	English	https://www.bangor.ac.uk/courses/postgraduate-research/soil-and-environmental-science-phd
Agroecology	Interuniversitaire en Agroécologie – Belgium & France	Belgium	Brussels	MSc	In person	Paid	This master's degree trains actors capable of supporting the agroecological transition of food production systems in a European and tropical context.	French	https://www.gembloux.ulieg.ac.be/cms/c_4277423/fr/gembloux-agroecologie
Soils & Global Change (IMSOGLO)	Various	Belgium Austria Germany Denmark	Ghent Vienna Göttingen Aarhus	MSc	In person	Paid	Aims to train future soil scientists with the expertise to characterise soils, understand their evolution within ecosystems under global change, and develop strategies for climate-smart soil management policies.	English	https://imsoglo.eu/



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Programme in Agroecology	Isara	France	Lyon	MSc	In person	Paid	A two-year programme, professionally oriented, to study interactions among agricultural, food and environmental sciences in a socially oriented and action driven perspective.	French English	https://www.agroecos.fr/
Agroecology: Organic Agriculture	Isara	France The Netherlands	Lyon, Wageningen	MSc	In person	Paid	Students get the opportunity to understand the structure and function of complex agroecosystems. They will learn to apply systems approaches in studying, designing and evaluating (agricultural) systems and food production chains, and to develop creative solutions for sustainable farming and marketing of organic or other quality products.	French English	https://www.agroecology.fr/
Environmental science with specialisations in soil, water & biodiversity	University of Hohenheim	Germany	Stuttgart	MSc	In person	Paid	Masters in Environmental science with specialisations in soil, water and biodiversity	English	https://www.uni-hohenheim.de/en/environmental-science-soil-water-and-biodiversity-masters
Pedology & Soil Management	University of Bologna	Italy	Bologna	MSc	In person	Paid	A course on Pedology and Soil Management, covering soil classification, surveying, quality assessment, and laws concerning soil conservation. The program is part of the Environmental Assessment and Management Master's track and provides students with the knowledge to assess soil health in various land use scenarios	Italian	https://www.unibo.it/en/study/phd-professional-schools-and-other-programmes/course-unit-catalogue/course-unit/2022/478884
Agroecology & Food Sovereignty	University of Gastronomic	Italy	Pollenzo	MSc	In person	Paid	A Food studies program for the next generation of food activists	Italian English	https://www.unisg.it/en/programs-admissions/master-



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	Sciences of Pollenzo								agroecology-food-sovereignty/
Agroecology	Norwegian University of Life Sciences	Norway	Oslo	MSc	In person	Paid	The program prepares students for a wide range of positions concerning conventional and organic agriculture and food systems, such as in advisory services and extension, development projects, management of agricultural and natural resources, environmental protection, and further education and research.	English	https://www.nmbu.no/en/studies/master-2-year/agroecology
Local Agroecological dynamisation	Autonomous University of Barcelona	Spain	Barcelona	MSc	In person	Paid	Postgraduate Course in Agroecological Local Dynamism which has been designed for professionals, activists and students interested in training to promote the Agroecological Transition in our territories.	Spanish	https://dlae.cat/
Organic Agriculture	University of Barcelona	Spain	Barcelona	MSc	In person	Paid	Aimed at engineers, graduates and professionals interested in up-to-date, high-quality training in organic farming.	Spanish	https://www.ub.edu/mastera/e/
Soil & Water Management	Various	Spain	Lleida	MSc	In person	Paid	The course gives students multidisciplinary training in earth sciences, focusing on hydrology and soil science for the sustainable use and conservation of water and soil resources in agricultural and forest environments.	Spanish	https://www.magsa.udl.cat/es/index.html
Agroecology: An Approach to	Various	Spain	Various	MSc	In person	Paid	One year master course taught in Spanish.	Spanish	https://www.upo.es/master/Master-Oficial-Agroecologia-



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Rural Sustainability									Un-Enfoque-para-la-Sustentabilidad-Rural/
Organic Agriculture & Livestock Farming	Various	Spain	Sevilla	MSc	In person	Paid	Deals with productive activities, at different scales and interactions, bringing in knowledge from Agronomy and Natural Sciences, to Humanities and Social & Legal Sciences, providing a multidisciplinary approach that allows each of these fields of knowledge to be covered.	Spanish	https://www.unia.es/estudios-y-acceso/oferta-academica/masteres-oficiales/master-oficial-en-agricultura-y-ganaderia-ecologicas
Agroecology	Swedish University of Agricultural Sciences	Sweden	Alnarp, Uppsala and Umeå	MSc	In person	Paid	Using case studies and field experience, the Master’s Programme in Agroecology guides students through a learning process on agriculture as an open system, dependent on its global and regional surroundings, as well as people and local resources. The programme offers a head start for students who seek to work with development or research for agriculture.	English	https://student.slu.se/en/studies/courses-and-programmes/masters-programmes/agroecology/
Agroecology & food systems	ZHAW	Switzerland	Zurich	MSc	In person	Paid	Learn different approaches to sustainable food production and nutrition, with a focus on approaches from agroecology, regional value chains and fair-trade relationships.	English	https://www.zhaw.ch/en/lsfm/studies/master/environment-and-natural-resources/agroecology/
Agroecology, Water & Food Sovereignty	Coventry University	UK	Coventry	MSc	In person	Paid	A new MSc in Agroecology, Water and Food Sovereignty.	English	https://www.coventry.ac.uk/course-structure/pg/eec/agroecolog



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									y-water-and-food-sovereignty-msc/
Soil Science	Cranfield University	UK	Cranfield	MSc	Hybrid	Paid	This part-time course is primarily delivered online, with students coming together twice annually for week-long residential at Cranfield.	English	https://www.cranfield.ac.uk/courses/taught/soil-science
Soil Scientist Apprenticeship	Cranfield University	UK	Cranfield	MSc	Hybrid	Paid	The Soil Scientist Apprenticeship meets the requirements of the Level 7 Soil Scientist Apprenticeship Standard, enabling graduates to perform effectively as professional soil scientists in a competitive and fast changing environment.	English	https://www.cranfield.ac.uk/courses/taught/soil-scientist-apprenticeship
Geotechnical & Geoenvironmental engineering (including Soils mechanics)	Imperial College London	UK	London	MSc	In person	Paid	Post graduate degree in soils, in relation to civil engineering	English	https://www.imperial.ac.uk/study/courses/postgraduate-taught/geotechnical-geoenvironmental-engineering/
Sustainable Agriculture & Food Security	Newcastle University	UK	Newcastle	MSc	In person	Paid	Newcastle has a soils research group that leads a sustainable agriculture and agricultural and environmental science MSc programmes.	English	https://www.ncl.ac.uk/postgraduate/degrees/5237f/
Agriculture	University of Copenhagen	Denmark	Copenhagen	MSc	In person	Paid	The MSc in Agriculture is a broad programme targeted at students who are interested in the potentials of plants for the benefit of humans and in agriculture as a human activity.	English	https://www.ku.dk/studies/masters/agriculture



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Plant Sciences	University of Paris-Saclay	France	Paris	MSc	In person	Paid	Plant focussed research masters.	French	https://www.universite-paris-saclay.fr/en/
Biology Agrosiences	University of Bordeaux	France	Bordeaux	MSc	In person	Paid	A strong research-based training for rapid professional development in plant sciences.	French	https://www.master-bio-Sagro-bordeaux.com/
Agronomy	Poznań University of Life Sciences	Poland	Poznan	MSc	In person	Paid	Programme in agronomy, including soil biology and chemistry.	Polish	https://msc-bsc.puls.edu.pl/#1520503927378-85d897b9-3d7f
EUR-Organic: European Master in Organic Agriculture & Food Systems	Various	Various	Various	MSc	In person	Paid	A comprehensive and integrative education in all areas of organic farming, as well as the processing and commercialization of organic food is offered by five leading European universities.	English	http://www.eur-organic.eu/
Soil Science	University of Aberdeen	UK	Aberdeen	MSc Mres	In person	Paid	Soil science masters	English	https://www.abdn.ac.uk/sbs/postgraduate/masters-degrees.php
Soil, Water & Crop Science	University of Lincoln	UK	Lincoln	MSc PhD	In person	Paid	Soil and water sciences at Lincoln Institute for Agri-Food Technology focus around the study of agricultural field drainage, and soil management.	English	https://www.lincoln.ac.uk/liat/research/soilwaterandcrops/cience/



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Soil, Water & Environment	Swedish University of Agricultural Sciences	Sweden	Uppsala	MSc	In person	Paid	Gives students expertise on the the sustainable use of land and water resources and how they are linked, including modules on soil biology, biogeochemical cycles and soil management.	English	https://www.slu.se/en/education/programmes-courses/masters-programmes/soil-water-and-environment/
Soil Science	University of Reading	UK	Reading	PhD	In person	Paid	Research In Environmental sciences areas	English	https://www.reading.ac.uk/ges/phd
EJP Soils courses	EJP Soil	Europe	Various	PhD MSc	In person	Paid	A joint approach to supporting soil science across europe, promoting PhD and MSc with affiliated partners	Various	https://ejpsoil.eu/knowledge-sharing-platform/ejp-soil-phd-school-courses
Sustainable Soil Management Research	Aeres University of Applied Sciences	Netherlands	Aeres	Research	In person	Paid	Research hub at a university of applied sciences	English	https://www.aeresuas.com/research/professorships/sustainable-soil-management
Agroecology	Aarhus University	Denmark	Aarhus	Various	In person	Paid	A range of agroecology research, including soil fertility and soil physics and hydroponology.	English Dutch	https://agro.au.dk/en/research/research-sections



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Soil Specialisation programme	Institut Agro Montpellier	France	Montpellier	Various	In person	Paid	Aims to train high-level experts in soil science, covering topics like soil conservation, pedology, geochemistry, and agroecology. The curriculum consists of practical work, case studies, and a six-month internship, focusing on both Mediterranean and tropical regions.	French English	https://en.institut-agro-montpellier.fr/
Curso Online en Agricultura Eco AGAU0108	Escuelas de Agricultura, Ganadería y Medio Ambiente	Spain	Various	Various	Online; in person events are also organised	Paid	You will work on content such as soil management, cultivation and harvesting operations in organic farms, mechanization and agricultural facilities, prevention or management of the health of the agroecosystem. We also give you the possibility of carrying out teaching practices that will allow you to enter the labor market. Complete the Organic Agriculture course with our exclusive job board for our students.	Spanish	Cursos Especialista en Agricultura Ecológica MasterD
Fundamentos de la salud de suelos Soil Health Foundations	Organic Farming Research Foundation	United States	Various		Online	Free	The Organic Farming Research Foundation (OFRF) is pleased to announce a new asynchronous online course covering the importance of soil health for agricultural production. In this course we will enter the world of soil and explain how you can promote soil health as part of a healthy ecosystem. Healthy soils allow you to increase production with lower costs, and make your agricultural business more economically productive, while promoting the health of the environment, animals, and humans. We will discuss practices such as cover cropping, amendment application, tillage and crop rotation, and provide tools to help you decide which management practices are best suited.	English Spanish	https://ofrf.org/online-courses/los-fundamentos-de-la-salud-del-suelo/



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Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.



**UK Research
and Innovation**

This work has received funding from UK Research and Innovation (UKRI) under the UK government's Horizon Europe funding guarantee grant number 10061997.

Project funded by



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs
Education and Research EAER
State Secretariat for Education,
Research and Innovation SERI

This work has received funding from the Swiss State Secretariat for Education, Research and Innovation (SERI).