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AGRICULTURE & INNOVATION

Protecting agricultural soils from contamination

How to prevent agricultural soil contamination and how to address the problem of contaminated soils?

Soil contamination is a part of land degradation that is caused by the presence of harmful substances in the soil. These contaminants may originate from different sources, which can be natural or human-induced. The 20 experts of the Focus Group dealing with this question identified the most important contaminants of agricultural soils as follows:

- ▶ pesticides and mineral fertilisers when used in excess
- ▶ heavy metals
- ▶ sewage sludge
- ▶ industrial and urban waste
- ▶ low quality irrigation water
- ▶ plastic pollution

To produce healthy food the first prerequisite is healthy soil as many contaminants may be taken up from the soil by crops. However, over 137,000 km² or 6.24% of all agricultural soils in Europe would need remediation activities. Quick, pragmatic and affordable solutions are needed to prevent soils from being contaminated in the first place, and to remediate and mitigate contamination of soils that have been affected. Regardless of the contamination source farmers and land-owners need the help of other stakeholders to restore soil health.

Where soil is contaminated due to poor management practices or other reasons, correct remediation techniques need to be applied to clean the soil and restore its functions as far as possible. There is no “one size fits all” so treatments should be chosen depending on the exact source of the contamination, type of pollutant, its quantity in the soil and target threshold.

Remediation processes are time and resource intensive and often not fully effective. Therefore, the most efficient solution in farming is to prevent soil contamination by adopting well-known techniques such as growing cover crops, crop rotations, diversification of land use and efficient irrigation systems. Precision agriculture also offers different solutions such as helping to reduce the input of herbicides or improving fertiliser and irrigation use efficiency. To encourage wider use of these practices farmer-to-farmer learning and informing advisers on the many benefits of these practices is important.

“Look after your soil and prevent contamination.”

- Pilar Bernal (Spain), expert from the EIP-AGRI Focus Group on protecting agricultural soils from contamination -

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Ideas for Operational Groups

- ▶ Develop methods for farmers to easily measure emerging contaminants (pharmaceuticals, veterinary products and personal care products (PCPs)) in agricultural soils.
- ▶ Establish common soil sampling procedures to evaluate and monitor soil quality based on the farmer's needs.
- ▶ Test alternative crops for low quality agricultural or marginal land: advantages, disadvantages, and benefits for farmers and for the environment.
- ▶ Develop a decision support system for farmers to choose the most appropriate precision agriculture methods for their farm based on standardised and validated methods (see research need below).
- ▶ Find new ways to support farmers to identify the right amounts of fertilisers to apply based on plant eco-physiological needs thus making their farming systems more sustainable.

Research needs and actions

- ▶ Establish and set up a soil quality monitoring protocol to enable farmers to assess the status of their farm soils.
- ▶ Identify alternative crops to be cultivated in contaminated soils (e.g. energy crops, fibre, biomass, etc.) considering plant behaviour and the uptake of contaminants.
- ▶ Establish long-term experimental sites to deliver scientific criteria for the long-term efficacy of soil remediation. This would help to assess cost-effectiveness of different remediation methods.
- ▶ Establish the fate of emerging contaminants such as pharmaceuticals, veterinary and PCPs and define threshold values.
- ▶ Standardise/validate different precision agriculture methods that would help to make precision agriculture approaches usable and affordable for small-scale farmers.

More ideas for Operational Groups and research needs available in the Focus Group report

More information on the EIP-AGRI website



Focus Group webpage	EIP-AGRI workshop: Shaping the EU mission 'Caring for soil is caring for life'	EIP-AGRI video: AGRI challenge: Protecting soils from contamination
Focus Group report	EIP-AGRI seminar: Healthy soils for Europe: sustainable management through knowledge and practice	Press article: Italian table grape farmers cooperate to improve soil quality
EIP-AGRI Focus Group Industrial crops		EIP-AGRI Brochure: Soil organic matter matters

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