Manaaki Whenua
Landcare Research

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Short webinars for environmental policy-makers and practitioners

Safeguarding the life-supporting capacity of soils

The following questions were asked during our live webinar with Jo Cavanagh but due to time restrictions, we were unable to answer these in the session.

Did you receive a good outcome of engagement with Te Ao Māori groups as sequentially it happened relatively late and did not allow for an inclusive approach prior to starting research?

Yes, as we were able to build on initial engagement that occurred through the MWLR MBIE Endeavor programme on Soil Health and through this work focus on contaminant aspects, which is a key area of interest for Māori. The connections developed through the initial Eco-SGV programme are being built on in a current Envirolink project. We note that the greatest challenge lies with the number of Māori, including those with sufficient technical background, who are available to engage with this work i.e. capacity is severely constrained with many demands on specific individuals time.

Please can we have a second episode to finish this?!? Awesome presentation so far!

Thanks! We are looking to hold a part 2, with a focus on the surplus soils in the not too distant future.

Is some information about soil resilience recovery after contaminant application and which types of soils recover faster or have more resilience?

Great question. This is the type of work I had proposed in a previous MBIE Endeavor proposal, which unfortunately was not successful in receiving funding. This remains a knowledge gap.

Can you say more about the sensitive, typical and tolerant soils for Cu and Zn and you hinted at better mitigations than removal for Cu and Zn too which is of interest.

The difference in soil types is based on soil properties - pH, clay, organic content and CEC, the specific values for each soil type are provided in various reports - available on the Envirolink website - here is a link to the most recent report - https://www.envirolink.govt.nz/assets/2214-MLDC162-Exploring-the-implementation-of-ecological-soil-guideline-values-for-soil-contaminants.pdf.
My reference to Cu and Zn and better mitigations were primarily in contrast to 'dig and dump' approaches to remediation and also specifically NOT using the Eco-SGVs as remediation end-points but rather facilitating active management - in particular for plant growth - of soils that have concentrations that exceed the Eco-SGVs (provided there are no off-site risks e.g. to aquatic ecosystems posed by concentrations) - and contrasting the relative benefits of this approach with 'dig and dump'. Of course stricter approaches should be used to prevent concentrations reaching these levels to start with.

There is a trend to push for human waste to be discharged to land rather than to water. Obviously there is a requirement for it to be treated first but is technology sufficient currently to prevent contamination? Also, wondering if composting of waste is still going to produce contamination?

Yes, composting of waste (organic resources) can still have contaminants associated with it - the quality of the product also depends on the source of material - there are some draft guidelines for the beneficial use of organic waste in productive land produced by Water New Zealand that cover off on some of this information, particularly for municipal waste water treatment.

In future if we can develop agricultural practices "toolbox" to mitigate contaminant concentration. An interesting case study in New Caledonia with over concentration of Nickel increase with composting practice.

That would be a great approach - a key thing in the first instance is increasing awareness of the use of different trace elements by farmers and an understanding of the consequence of accumulation over time. I would be interested to know more about the New Caledonian example.

Out of interest you mentioned bioavailability of the different contaminants was considered - was this derived for different ecological receptors (e.g., birds vs microbes?)? Is there any work looking at potential co-benefits for adhering to eco-SGV's, e.g., sustainable food systems, productivity and perhaps even SOC?

The difference in bioavailability is based on soil properties - pH, clay, organic content and CEC, and was factored in, where possible (i.e. when sufficient data was available) for microbes, plants and invertebrates. Great suggestion for evaluating co-benefits of adhering to Eco-SGVs, and a great way to raise awareness of the value for managing trace element inputs. To date there is no explicit work being undertaken - this will vary for different contaminants e.g. for cadmium, compliance with food standards (for some food crops) will be a greater driver than productivity/other benefits, but for copper and zinc in particular balancing input for pest/disease control whilst remaining within an 'optimal soil concentration range' would be valuable.

Biochar as a remediation tool: NZ research showing success with sheep dips but a lot of international data on other benefits such as Cad. Benefits also clear for nutrient management. Any plans to expand LcR into investigation on biochar?

Thank for the comment. We are hoping to finalise a report on some biochar studies shortly.