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Short webinars for environmental policy-makers and practitioners

Taking a Well-Being Approach to Soil Health

The following questions were asked during our live webinar with Bryan Stevenson and Dean Stronge, but due to time restrictions, we were unable to answer these in the session.

Are you looking into natural ways to improve soil such as biochar that can have many benefits such as carbon locking, improve water holding and nutrient holding capacity?

We are not looking at specific amendments such as biochar, but there is a reasonable amount of research on biochar available (though not specific to NZ).

Hi, in the framework, why is biodiversity relegated to a human value rather than an intrinsic value?

Wellbeing takes a human-centric approach to policy - however this does not preclude wellbeing from being 'other regarding' - i.e., that it considers the wellbeing of non-human others - in this case recognising that biodiversity has intrinsic value.

In the field of contaminated land, we consider that there are very large areas of agricultural contaminated land. Have you consulted Maori re their views on contamination management?

Maori views on contaminated land are very generally considered in the book "Te Mahi Oneone Hua Parakore"

What indicators do you suggest around soil contamination?

There is some work around worm response to various contaminants, but the easiest and most straight forward approach is generally testing for trace elements and organic contaminants.

'Removing' trace elements is impossible on the necessary scale...

Yes, very scale dependent. For smaller areas, soil is generally removed, but not practical for larger areas. There has been some work on using plants to take up some of the contaminants (and then the plants are removed), but again not sure these are practical on a large scale.

Are there any next steps in identifying those cultural and social soil health indicators? Really interesting work thanks.

Work on developing those (or at least framing how cultural and social indicators might be developed) is currently underway in the latter part of the project.

What policy adjustments would have the most meaningful impact on wellbeing and soil health?

That will depend on what value you are trying to protect/promote. Therefore, it is critical to first understand what values are important. The values drive the intervention logic and dictate what should be addressed and how that should be measured.

Maybe we have currently have no 'good' bioindicators for soil health because none of them are improved by our modern land management practices, we do not like the answers...

There are several methods and measures used in research (particularly in ecological research), but most of these can be highly variable and difficult to interpret for soil health. How to score biological indicators (put limits on what is acceptable and not acceptable) in a healthy vs unhealthy soil can be difficult.

Will there be a single place that pulls together all the singular research pieces done as part of the project? are the individual publications freely available somewhere?

We have accumulated much of what has been done in the project within our webpage (<https://www.landcareresearch.co.nz/discover-our-research/land/soil-and-ecosystem-health/soil-health-and-resilience/>), along with a number of helpful links and reference material.

From a perspective of well-being, is the living biology of the soil of core importance? If so, how is this demonstrated beyond bacteria? What is the awareness from a wellbeing perspective of fungi as decomposers, mycorrhizal associates of most plants (native and crops), and as potential pathogens?

Yes, the biology of the soil is a core (but not the only) facet of soil health. There has admittedly been more work on bacteria (and some macro/meso-fauna such as worms and nematodes), but agree there needs to be more work on the fungal component.

Are you looking at soil drainage practices when evaluating microbial attenuation of nutrients and pathogens?

We did have a field study planned on the effects of drainage on soil properties, but unfortunately that had to be scrapped due to the COVID-19 lockdowns. There is some other work being done on long-term changes in soil wetness affect soil properties that we can reference if that work is completed by the time, we wrap up this project.

How do you see the values foundation informing identification and development of health indicators and science to deliver on them?

The values inform the identification and development of indicators through the 4-step intervention sequence outlined in the framework. Essentially this sequence consists of 4 questions that need to be considered in turn before moving on to the next one. These are:

1. What benefit are you trying to protect/promote.
2. What is the threat(s) to that value/benefit.
3. What tools are available to manage the threat.
4. What monitoring (or indicators) will be put in place to show that the tools are managing the threat and achieving or enhancing the core values/benefits.

It is the values that drive the process - the indicators just tell you how well you are achieving the benefit you are trying to protect/promote - they follow rather than drive the process.

Can there be some metrics that change promptly rather than on decadal cycles so farmers/growers can recognise changes and adapt on a quicker timeframe

Most soil health indicators are considered "dynamic" soil properties, but they can still respond at different rates. Total carbon is probably the indicator that takes the most time to respond. Labile (or "active") measures of C such as hot-water extractable C are likely to respond more quickly, but we also need to make sure those measurements also link to changes in soil function. Also, some biological indicators can change too rapidly (on the order of hours) so change that quickly isn't desirable as well.

Are there any developments to include soil health into integrated farm plans?

While there is some work on farm-scale soil health indicators, not aware of specific plans for inclusion into farm plans. There are likely to be individual sector encouragement such as the recent move by Merino NZ/Ice Breaker/Allbirds for more regenerative and sustainable practices.

Have you identified the key indicators for soil health in NZ or this is not the objective of this programme?

We plan to review the existing indicators used by regional councils and comment where there are gaps and what types of indicators may fill those gaps.