



A recent soil health field day – the kiwifruit industry’s collaborative model may be accelerating the adoption of soil-health-focused practices



# ANSWERS UNDER FOOT

*For his Kellogg Rural Leadership Programme research project, Richard Pentreath explored why soil health may be horticulture’s most important sustainability measure. He outlines his findings for NZGrower & Orchardist.*

Richard Pentreath

**When discussions turn to sustainability in horticulture, the focus is often on water quality, greenhouse gas emissions, biodiversity or agrichemical use. Yet beneath every orchard and vegetable crop lies a resource that underpins them all – soil.**

Healthy soils are essential for productive, profitable and resilient growing systems. They regulate water, cycle nutrients, support biodiversity, store carbon and help crops withstand climatic extremes. Despite this, soil health rarely receives the same attention as other environmental indicators.

My recent Kellogg Rural Leadership Programme research project explored a simple but challenging question: Should soil health be our number one sustainability goal?



After reviewing international research and interviewing growers, researchers, industry leaders and policy experts, one conclusion became clear: While there is broad agreement that soil health matters, there is still significant work to do before it becomes a central measure of sustainability across New Zealand horticulture.

## **A growing global concern**

Globally, soil degradation is emerging as a major environmental challenge. The United Nations Food and Agriculture Organization estimates that up to 75 percent of the world’s soils are already degraded.

This matters because soil is much more than a growing medium. Healthy soil is a living ecosystem that supports plant growth, regulates water movement, stores carbon and sustains complex communities of microorganisms. When soil health declines, the effects ripple through entire communities.



## There is no soil health under concrete

In New Zealand, productive soils face a dual threat. Firstly, there is the ongoing degradation of soil through unsustainable management practices. Secondly, highly productive land is increasingly being lost to urban expansion.

As one interview participant noted, “There is no soil health under concrete.”

For the horticulture sector, where access to versatile, high-quality land is fundamental to future success, both threats deserve serious attention.

### Knowledge gaps remain

One of the strongest themes to emerge from the research was the existence of knowledge gaps.

Interestingly, these gaps are not limited to growers. Researchers, industry organisations and policymakers all acknowledged that soil health remains difficult to define, measure and communicate.

Unlike water quality, which can be assessed using relatively straightforward parameters, soil is incredibly complex. It consists of mineral particles, organic matter, water, air and a vast array of living organisms interacting in dynamic ways.

Many growers understand the importance of maintaining good soil structure and organic matter. However, uncertainty remains around questions such as:

- ❓ What does a healthy soil actually look like?
- ❓ Which measurements matter most?
- ❓ How much change is required before improvements become meaningful?
- ❓ How can improvements be linked to productivity and profitability?

Several participants felt that the sector already possesses sufficient knowledge to make meaningful progress. The challenge is not necessarily generating more research but ensuring existing knowledge reaches growers in a practical and accessible form.

The loss of publicly funded extension services during the 1990s was highlighted by several interviewees as a turning point. Many growers now receive advice primarily from commercial suppliers, while access to independent technical support is often limited.

The success of initiatives such as the A Lighter Touch programme demonstrates the value of well-designed extension programmes that connect research with practical on-farm application.

### The mindset challenge

While knowledge is important, many participants believed mindset may be an even greater barrier to change.

Several interviewees suggested that growers often perceive soil-health-focused practices as risky, particularly during periods of financial pressure. Established management systems provide predictability, while new approaches can create uncertainty.

This challenge is not unique to New Zealand. International research consistently shows that adoption of sustainable soil management practices is influenced by personal values, social networks, risk perception and identity, as much as by economics.

One grower interviewed during the project commented that he had effectively been applying regenerative principles for decades but had little interest in labelling himself a regenerative farmer. For him, the focus was simply on good management.



## ...soil health sits at the centre of many sustainability outcomes we already care about

This reflects an important point. Improving soil health does not necessarily require growers to adopt a specific farming philosophy. In many cases, meaningful improvements can be achieved through relatively simple changes such as:

- Reducing unnecessary soil disturbance
- Maintaining living roots in the soil for longer periods
- Increasing organic matter inputs
- Managing traffic to reduce compaction
- Using diverse cover crops
- Improving groundcover management.

Many of these actions carry relatively low business risk while delivering benefits to soil function over time.

### Profitability still drives decisions

For most growers, environmental outcomes must sit alongside commercial realities.

The research found that profitability, labour constraints, compliance requirements and market demands often take precedence over long-term soil considerations.

This does not mean growers do not care about soil health. Rather, they operate within systems that reward production and financial performance more directly than environmental stewardship.

Several participants noted that growers are currently paid for producing food, not for improving biodiversity, enhancing soil carbon or protecting ecosystem services.

This creates a disconnect between the benefits healthy soils provide to society and the incentives available to growers.

Interestingly, the research also highlighted examples where soil health and profitability aligned strongly. Well-managed soils were frequently associated with greater resilience, reduced input requirements and improved crop performance.

In other words, soil health should not be viewed as separate from business performance. In many cases, it is a key driver of long-term profitability.

## Leading the way?

The kiwifruit industry was referenced by some interviewees as a sector making positive progress.

Participants pointed to several factors contributing to this success:

- Strong industry collaboration.
- Grower engagement with markets.
- Investment in extension programmes.
- Recognition of the relationship between soil health and crop performance.

The sector's integrated structure can allow information to flow more effectively between researchers, industry bodies and growers. Several interviewees suggested this collaborative model has accelerated the adoption of soil-health-focused practices.

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**...soil health should not be viewed as separate from business performance**

That said, even within kiwifruit there were differing views about how well growers understand soil health. Some believed awareness was high, while others felt only a minority of growers actively managed soil health as a core business objective.

## Markets are likely to drive change

Perhaps the clearest finding from the research was that market signals are likely to influence grower behaviour more strongly than regulation.

Export markets are increasingly demanding evidence of environmental stewardship.

Sustainability credentials are becoming a prerequisite for market access rather than a point of differentiation.

As overseas customers seek assurance around climate impacts, biodiversity and resource management, soil health is likely to become a more visible part of sustainability reporting.

Several interviewees predicted that soil health scorecards could eventually become as commonplace as current environmental reporting requirements.

Rather than relying solely on regulation, industry-led initiatives and market incentives may prove more effective in encouraging widespread adoption of better soil management practices.

## Looking ahead

The question posed at the beginning of this project remains deliberately provocative: should soil health be our number one sustainability goal?

The answer may depend on perspective. However, what is increasingly clear is that soil health sits at the centre of many sustainability outcomes we already care about.

Healthy soils support food production, water quality, biodiversity, carbon storage and climate resilience. They are fundamental to both environmental and economic sustainability.

For New Zealand horticulture, the opportunity is significant. Compared with many countries, we still retain productive soils with relatively high organic carbon levels and strong biological potential.

Protecting those soils, improving their health and preventing further loss to urban development may prove to be some of the most important sustainability decisions we make.

After all, every outdoor crop we grow and most sustainability targets we pursue ultimately relate to what is happening beneath our feet. ●



*Redeveloped kiwifruit block with straw mulch and emerging cover crop*