

FDI Feature Interview

Stephen Frost - Stonemeal Farm

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Key Points

- Soils are a living entity and must be treated as such.
- The potential side effects on soil biology from fertiliser and chemicals have unintended outcomes. These must be considered when determining the type and rates of soil chemical inputs.
- Remineralisation, using natural rock ore minerals in conjunction with soluble mineral fertilisers, improves soil biological health and resilience, resulting in better stock productivity and health.
- There is no one-stop-shop that is able to provide all of the scientific information farmers require relating to soil chemistry, biology, geology and related disciplines.

Introduction

FDI recently interviewed Stephen Frost, a wool and prime lamb producer from Narrikup in the Great Southern region of Western Australia, about the biological approach his wife Kerry and he have taken to farming at Stonemeal Farm. The Frosts are of the opinion that knowing and understanding the importance of the living soils is key to sustainable agricultural production. They believe that engaging in conservation practices and increasing the biodiversity in a whole-of-farm management system improves productivity and results in more profitable farming.

Interview

FDI - What is your approach to farming and what do you believe farmers should do?

Stephen Frost – From a farming perspective our number one asset is the soil. On top of that, it's the living aspect of the soil that we must emphasise. We have previously been led to believe that soil is merely a medium in which to stand up a plant and, through science, we can supply all the nutrition we need, and we can deal with harmful pathogens (disease causing bacteria) and other things externally.

To me, the conventional approach doesn't treat the soil as a living entity, whereas on Stonemeal Farm, we view our soil as our number one asset and it's the living fraction of our soil that generates our farm income. Farmers have the benefit of free photosynthesis (the chemical reaction that takes place inside a plant, which produces food for the plant to survive) and fungi and bacteria in the soil. By looking after these aspects of soils, and treating them as our priority, we get the benefits of that production – that's what farming is about.

If we were to treat the soils only as a medium, then we must add everything needed to grow healthy plants - the nutrients, minerals and biology. Plants growing in healthy soil is the normal natural system; that means farming can be a lot more profitable because we are utilising and working with that natural system.



Figure 1: Farm Field Day at Stonemeal Farm. Source: Stephen Frost

For us, [remineralisation](#) has been an absolute key part of building and maintaining our healthy soil. If somebody was to ask what my main farm asset is, I would answer that it's not the equipment or the shearing sheds, it's the soil. So, my thinking is the soil is the number

one priority. I think our farm shows how we prioritise the soil above everything else, even though there is so much that we don't know, particularly in the biological aspects of the soil. While in an academic sense there is a fair bit known about soil chemistry because that's where farming is today, my belief is that the main function in soils is [biological activity](#).

I have said that soils are a living entity and must be treated as such. Even though this is quite complicated, in reality we are enhancing or supporting the natural system. Here, our farming principles are, given what we do and don't know, is that we try to enhance the activities of the natural systems that exist. When considering inputs to our soils such as fertilisers and ameliorants like lime and other chemicals, we try to determine what will be the net effect and what will be the potential adverse side effect on the living aspect of the soil? We make decisions based around those considerations. For instance, if we were going to use a pesticide, we will consider the known potential harmful effects to the soil biology like damage to the fungi or the soil bacteria, which is really important for that soil to function. Our philosophy is to try to do the least amount of damage in relation to soil inputs and to think about the principle that the soil is alive – this is the energy that drives our farm income.



Figure 2: Biodiversity is critical in whole-of-farm management. Source: Stephen Frost

FDI – Would you define what you meant by ‘the living function’. Is it purely the microbiology, or is it more than that?

Stephen Frost – Most definitely its plants. Here, we farm the [rhizosphere](#), meaning in living plants, the root system and its interaction with the minerals, soils fungi, the bacteria, the algae and other micro-organisms. It's also about insects in the soil; earthworms are the obvious living organism. I call earthworms the 'elephant in the room' because, they are very

visual. There is, however, a heck of a lot more organisms in the soils that you can't see. Unfortunately, people think that if you can't see them (microscopic organisms) then they aren't important or don't exist. But they do exist, and their function is a critical component of good soil health. The interaction between the rhizosphere, the plants, its roots, the microorganisms, the insects, earthworms and everything else is what we are farming. It is also what drives the efficient use of nutrients in farming production. At the end of the day that's the energy source, the powerhouse to grow good pasture and good crops that are resilient to disease and improve water utilisation. A really active rhizosphere with lots of different bacteria and lots of biodiversity denotes a complex system that, if you think about it and look after it, actually proliferates. We look at our soil inputs on the fact that the productivity will come if we support the living soil. So, in a way, we're farming the rhizosphere, and everything comes from that.



Figure 3: Vegetation health and density.
 Source: Stephen Frost

FDI – Regarding soil activity, what factors will lead to a decision to make that activity more effective? How does a farmer know what to do?

Stephen Frost – Firstly, farmers must recognise that the rhizosphere exists and that it is important. The natural systems have evolved over millions of years; they are massively successful, and you can see that in the natural vegetation anywhere in the world. The rhizosphere is a natural system that we must enhance and nurture by looking at our inputs

and trying to work out which of these produce a positive or negative effect. Farmers need advice on this and not just on chemistry; it might be about biology or some other factor. We have taken advice from geologists who understand rock genus, the mineral components and their values to the soil. To my way of thinking it's hard because there is no one who can integrate all those aspects. For instance, you can talk to a soil chemist about certain aspects and they will give you some information on soil chemistry, but they often won't relate that information to soil biology. Nor will the chemist give you the information necessary to understand and make decisions on the total mineral content and interaction in the soil.

On our farm, I tried to communicate with all those people, and others, to try to get a sense about the soils on the farm. To assist farmers, I believe that, though experts and scientists represent different disciplines, the best thing that could happen is that all the science areas of biology, chemistry, mineral, etc come together in mutual and open discussion. This would make a huge difference and I think would result in some good advice for farmers.

I personally believe there is a prejudice against farmers who are doing things differently and successfully, particularly when it does not fit with present scientific thinking. Practical application on-farm should have equal merit with academic science.

Secondly, we must avoid the tendency, in soil science, to narrow everything down to one very small item. Soil health is a lot more complex than that. For us the solution was quite simple. It was to recognise that the soil is alive and what we needed to treat or otherwise enhance soil health. For instance, as a sheep farmer, I have certain practices that result in good nutrition, good productivity and lambing percentages which underscore our success: in a way you need to apply that sort of thinking in respect to the soil. The soil is not a medium - it is a living entity and, if we can grow a crop thinking about plants and how they function, we need to apply that same thinking about the soil. As soon as you think that way, you are open to more questions and more enquiry in respect to soil health and productivity.

I believe present farming is very re-active continually responding to a problem which gives little space to look at preventative management.

FDI - Is there a single source of scientific information that farmers can approach to gain the knowledge they need about their property?

Stephen Frost – I'm unsure whether or not there is anybody who can but, in addition to the physical scientific aspects of soil health, there are associated constraints that need to be considered. Rainfall is one such consideration and there are others. Though there has been thinking about the key biological aspects of soil, the main focus is the chemical aspect and soil health is often narrowed down to a few components. For instance, right now in our district, the [measure of soil acidity, or pH](#), dominates thinking about soil health. It has been determined that pH is the key driver to productive soils, and this is resulting in farmers spending immense amounts of money to correct their soil pH; I think there have been hundreds of thousands of tonnes of [lime](#) applied to West Australian soils annually to correct pH levels. Certainly, this has been the case in my district alone.

The result of concentrating on just one thing, such as pH, as the sole driver of nutrition and soil health, I think, is the point where farmers start to run into trouble. Personally, I tend to move towards the biological information available to me more simply because I believe it is the main driver in productivity and has the ability to buffer and help manage other soil constraints. For instance, on our farm we have levels of pH that are very low, yet we have very high levels of production while maintaining a stable pH (our production is not further acidifying the soil).

We are successful on Stonemeal Farm, I believe, because we are not looking at individual issues regarding soils health; we are looking the wider 'drivers' (to soils health) and how they work in conjunction with each other.

About the Interviewee:

Stephen Frost first qualified as a Forester with the then WA Forest Department and worked extensively in the Great Southern Region of Western Australia.

In 1979, Stephen and his wife Kerry took up farming in Narrikup, approximately 35 kilometres north from Albany WA. Their farm enterprise consists of 100 per cent wool and prime lamb production.

Stephen has had a long and extensive involvement with land care both on a catchment and regional basis. His efforts and his knowledge about farming and sheep production in his area were acknowledged at the 2017 Western Australia Landcare Awards, with the award of an *Australian Excellence in Sustainable Farm Practices*.

Any opinions or views expressed in this paper are those of the individual interviewee, unless stated to be those of Future Directions International.