

Dr Ron Ehrlich: Hello, and welcome to Unstress, I'm Doctor Ron Ehrlich. I continue to be fascinated by this world we live in, and what holistic means. My guest today is Terry McCosker, and Terry is an internationally acclaimed teacher and has worked in research and property management. Now, that's agricultural properties, in both government and private sectors for over 45 years. Now, in his research era, Terry published over 40 papers, and made several world-first discoveries in the 1980s, in the fields of ruminant nutrition and fertility, as well as a deep understanding of pasture ecology. And he shares some pretty amazing facts with us today.

Terry's ideas took farming out of a war against nature, to an association with it. It's not just a lesson for farmers, it's a lesson for us all. He introduced Australian farmers to the concept of ecosystem health and developed methods of measuring it alongside financial health. Rather importantly, he introduced the concept of farm-family wellbeing and welcomed female partners, siblings and parents into courses about decision making. Again, it's probably lessons not just for those on the land, but for us all as well.

I hope you enjoy this conversation I had with Terry McCosker.

Welcome to the show, Terry.

Terry McCosker: Good, thank you. Good to be here.

Dr Ron Ehrlich: Thanks, Terry. Listen, Resource Consulting Services, RCS. How did you get started? Tell us a bit about it.

Terry McCosker: Well, I think it came about because I jumped the fence in my earlier career. I'd been with the Queensland Department of Private Industries for 11 years as a scientist and an advisor, and then I went on to a property to implement everything that I thought I knew. And within six months I realized that I actually knew nothing that worked and fitted into a system, and pretty soon after that, I decided that one day I would set up a private extension service, which operated differently to the public extension services. I had no idea how to do it, and I had no idea when I would do it, and it was probably ten years or more after that, that I started RCS, and then it took me another five years after that to work out how to put together and grow a private extension service that operated differently to the public extension services.

So that's a sort of a plotted history of how we got started.

Dr Ron Ehrlich: So you had spent a considerable number of years in Queensland Private Industry Department, advising farmers?

Terry McCosker: Yes, so the history goes back a fairway. I joined the Queensland Department of Primary Industries as a cadet in 1967. So, I've been operating professionally in agriculture now for a little over 50 years.

Dr Ron Ehrlich: God, Terry. Sobering, isn't it? Sobering.

Terry McCosker: Well, it is, yeah. And it that I've had all sorts of different experiences. So, in the government sector, on a property for seven years, trying to implement what I thought I knew, and figuring out that I didn't know enough to make it work. And that was a sobering experience. And then having a go at operating a consulting business for several years, and that wasn't successful, and then I stumbled on, in a way, holism, and I had learnt while I was on the station to... I've learnt a lot about systems thinking, and pulling things together, and pulling all sorts of threads together, and I was in a wonderful position there.

I was, as a young kid, only about 28, I was given this property, and all the resources I needed to solve all the problems in the beef industry in Northern Australia. And we went ahead and did that within the context of a cattle property, and I employed experts and consultants from all around the world. But what I learnt to do was take what was going to work, and put that into a system.

So, over time I developed some skills around being able to do that. But, I hadn't really come across the terminology of holism until really the late 1980s, and that sort of started me down a different journey then, from the early 1990s, where we started to then take RCS into an organization which operated holistically, and looked at how we could get farming families to operate holistically, as well. So that was really when I started to work out how to put together the private extension service that was going to work.

Dr Ron Ehrlich: And this word, holistic, you know I know what it conjures up in the medical world. I can only imagine what it would conjure up in the world of agriculture. How was the word holistic... I mean, this was in the 1980s. How is the word holism received in 2019?

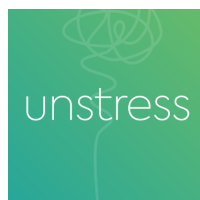
Terry McCosker: With incredible opposition.

Dr Ron Ehrlich: Bizarre, isn't it? It's quite bizarre, but anyway, go on.

Terry McCosker: It is bizarre, but I think when you come in with completely new concepts of running agriculture, for example, which is what it was; what that does is threaten everybody who's been doing it within the old paradigms, or the existing paradigms for their entire life. And it particularly threatens the careers of the scientists involved, and I had unbelievable opposition from my old organization, Queensland Department of Primary Industries, CSIRO, every department of primary agriculture in Australia had incredible opposition. And I was actually told in Queensland that they would put me out of business for such heresy, and they tried and very nearly succeeded.

But I overcame that by where I focused. And, so I had to work out firstly who was right and who was wrong. Were this incredible opposition, were they right? Or were the one person I was listening to, was he right? And so I was very fortunate to get a Churchill Fellowship, and I went around the world and I studied a process called cell grazing, which is based around holistic management. And I realized in that process that the one person I was listening to was right, and everybody else was stuck within an old paradigm.

Dr Ron Ehrlich: Do you want to put a name to that person?



Terry McCosker: Yeah, Doctor Stan Parsons.

Dr Ron Ehrlich: Stan Parsons, yes, I've heard that name before. Is he based in Australia? Was he-

Terry McCosker: No, he's a Zimbabwean. He was a partner of Allan Savory's for 13 years. And the world owes Parsons and Savory a debt of gratitude, because it was their combined intellects that put together the concept of holism in agriculture, and in fact, it was Stan who introduced Allan Savory to holism. And Stan had Jan Smuts's which was published I think in the 1930s, which was the first book on holism, and Stan had read that. And then he thought, well, we need to start taking up this type of philosophy in agriculture, and the combined intellects of Savory and Parsons was unbelievable. And neither of them produced as much on their own again after that, as they did when they were a combined force.

Dr Ron Ehrlich: It's interesting, Terry, to hear you say you embracing this concept of holism in the 1980s, because, in my practice in the City of Sydney, I embraced this concept of holistic dentistry, and received similar pushback. And I've heard you say that agriculture and medicine are very similar, in that their main focus is on treating symptoms, not causes. What are some examples of symptomatic issues agriculture faces?

Terry McCosker: I think the biggest one is weeds, for example, is a classic symptom treating exercise. And there's an old saying that says, "well [inaudible 00:09:01] you treat weeds, there'll be weeds for you to spray." And weeds, diseases in crops, and so on, are symptom treating. And what I teach people is the opposite, and that is focus on what you want, not on what you don't want, and if we keep focusing on weeds, we keep getting them, because we keep treating a symptom, and therefore the cause is never treated, and the symptom just keeps coming back. Now, whether it's a weed or whether it's a disease in plants and soils, et cetera, it's the same process. And by trying to [inaudible 00:09:38] plants with the chemicals that are available to us today, we're then doing further damage, which encourages other weeds and diseases.

So, when I'm working with people, I say, "look, focus on what you want, not on what you don't want." So, if you want grass there instead of weeds, then focus on managing grass. Focus on managing the soil, and the ecosystem, so that you get the outcome that you want, and eventually that plant which you're calling a weed, which is serving an ecological function. Mother nature has put it there for a very good reason. Let's go with that, and its journey will end sometime in the next one year, to two years, to three years, and you will end up with what you want if you focus on what you want.

And I suspect there's a, you know, fairly similar sort of thing goes on in medicine, in that-

Dr Ron Ehrlich: Absolutely.

Terry McCosker: You get hit with the antibiotic, for example, which then destroys your microbiome, which then, you know, causes a whole lot of other issues, so-

Dr Ron Ehrlich: No, I love that statement. I might print it up in my surgery. Focus on what you want, not what you don't want, because that is exactly what people do focus on. You know, you come in with inflammation, you get an anti-inflammatory. You come in with depression you get an anti-depressant, and so on, and I guess on the farm, you focus on the weed, and you'll get a pesticide or a herbicide, or a whatever-inside you're trying to kill.

Terry McCosker: Absolutely. And there's plenty of those available, and there's a lot of companies that are willing to supply you with as many of those as you're willing to buy.

Dr Ron Ehrlich: Yes, it's a great economic model, isn't it? Just not a very good health model, it's a common theme. Listen, another thing that I wanted to ask you about, because it's a message we increasingly hear about in news and media, about public health, climate change and the environment. And animal agriculture, you know, the use of animals, and the consumption of meat is often raised as a big part of this problem. How do you respond to that?

Terry McCosker: I think there are two sides to any coin, really, and the first one is that depends on what part of the livestock food chain you look at, is to whether it's a problem or a solution. Grazing ruminants are a solution to climate change, to human health, to a whole lot of things. Feed-lotted animals, and intensive animal management in housing, et cetera, is not good for the animal, and generally not good for the environment.

And Wendell Berry summed it up beautifully many years ago, when he talked about the feedlot industry, and he said, "we've taken an elegant solution, which is grazing animals on grass, and turned it into two separate problems, which is the issues that we get out of the feedlot," and there's actually more than two when you start adding them up.

So, grazing livestock was involved as recyclers, and a ruminant animal recycles about 85 per cent of what it eats. So all that plant material is cycled back onto the ground in dung and urine, which is then plant available. And urine from a ruminant is such a beautiful thing, that it contains plant growth hormones that stimulate the very grasses that the animal is then going to come back and eat.

Dr Ron Ehrlich: Wow.

Terry McCosker: And mother nature works in incredible ways. So those animals then that are eating grass, and free-range in a way, is they have the right balance of nutrients. So their Omega-3 to Omega-6 fatty acid ratio is more in balance with our traditional diet. When we start feeding grain to ruminants, which were never designed to eat grain, in fact, it makes the ruminant go acid, and well they can't eat it. You've got to transition them onto that, and then there's a whole lot of side effects. And making a ruminant eat grain is like making a human eat sugar. There's again a lot of parallels in the impact on animal health and human health.

But if we put those animals on what they were designed to eat, which is forage, then we end up with a tight Omega-3 Omega-6 ratio, and we end up with the good fatty acids, for example, from that animal. And, a lot of the data that's around on food quality from meat, is

actually from the US feedlot industry, but you get a different view of the quality of meat and its health benefits if you're looking at grass-fed meat, for example.

And I remember my daughter Stacy when she was studying to be a naturopath, she did an assignment once in the quality of beef, and she said, "Dad, beef is really bad for you." And I said to her, "I want you to go back and look at that literature that you've just reviewed, and I will bet you that every bit of it is based on feedlot animal. I'd like you to go and find grass-fed data and compare the two." And so she did, and she came back and said, "Dad, beef is better than fish, if it's grass-fed." And I think a lot of people don't understand that, but the beef that the majority of people are eating is in fact grain-fed, even if it's just for a short period.

Dr Ron Ehrlich: Yeah, I was at a conference recently, where a professor of nutrition got up and was talking about how bad red meat was, and my question to him was, was there a difference between grain-fed and grass-fed, and he had to admit there was! But, only on questioning, you know? He kind of made the statement that people were writing notes, you know, red meat bad, you know? Terrible? But asked the question, is there a difference, and he said, "ah, yeah, there is, I suppose there is." And I'm just loving that plant growth hormone in the urine. Wow, that I just didn't know. That makes the system even more beautiful than I thought it was.

Terry McCosker: Well, I'll give you another example of how beautiful it is. There are a bacteria that lives in the soil, and on a plant leaf, called *Streptococcus syringae*, and *Streptococcus syringae* is a bacteria that then floats off into the atmosphere, and it's got a particular structure that attracts water. And so, it goes up into the cloud, and it is what forms rain within clouds. And then those bacteria fall back to earth again, back onto the plants, go through a life cycle, then go back into the atmosphere. So, if we have bare ground, for example, we don't have those bacteria going up into the atmosphere, into the clouds, and forming raindrops. And they are far more powerful than the other elements that form raindrops.

Dr Ron Ehrlich: Fantastic. Well, this is holism, isn't it? I mean, it's fascinating, I mean, I love it. I love the fact that you just keep on learning. But I guess people's resistance to it is, we also love certainty, you know, and we love to know the answer, and a simple answer is one we move to much more readily. So that just adds so many components to it, and I'm sure there are many, many others, as well.

Terry McCosker: Yeah, I mean, that guy you were listening to was a scientist, but he has politicized his science. And I think that's a real danger that we're running into today. So, he's letting his paradigms about what should be right drive what he's telling people at out of the science. So, he's selecting what he wanted to tell people, and I think we see a lot of that in climate, as well as everywhere else.

Dr Ron Ehrlich: Yeah. Another interesting thing is that, you know, managing resources, and we've been focused on regenerative agriculture on this show on several of our episodes. It seems often to focus on how animals are managed, but I also heard you say; see I've been doing my homework, Terry. I also heard you not that long ago, that RCS, your

company, is now addressing some of the issues of cropping. What are the challenges of cropping from a regenerative perspective?

Terry McCosker: Yeah, if I can give you a little backstory to that. We'd been involved with holism in terms of grazing, and regenerative agriculture since the late 80s, in the grazing industry. And we did not go anywhere near cropping until very recently, because I did not have a set of principles that I believed were regenerative or sustainable into the long view. I take the view that we need to be able to do we're doing today in 5000 years time, and if we can't, then what we're doing is not sustainable, and a lot of what we do today isn't going to flat out last 50 years or 100 years, let alone 5000.

So, in the last few years, there's been some breakthroughs around biology and a whole range of things in our understanding of how soils operate. And when I did soil science close to 50 years ago, we learnt about chemistry and we learnt about physics, and even up until probably the last 5 years, and 10 years, I know people that are graduating that are still only learning about chemistry and physics.

But the third element of soil is biology, and what we know now is that biology controls chemistry and physics. So, as a human, if we think that we can get out there and manipulate our environment through chemistry and physics, we're sadly mistaken. Because what we're doing often in the process is destroying the biology, which was going to do the job for us.

And, so, over the time that I've been working with graziers, a lot of people think that they were graziers or livestock managers. Well, the time they do the first round with us, they realize that they're grass managers. But by the time they learn a little bit more about ecology and soils, et cetera, they realize that they're soil managers, and that management of that soil, that creates all the wealth, that happens from then on.

And in terms of cropping, what we've put together is a set of principles now where I think we can turn around the way cropping systems are done, and that doesn't matter whether we're talking wheat or sugar or horticulture. The same principles apply. You know, and the first of those is really about management, and one of the things that I've learnt now, being involved for a very long time, is that the outcomes that we get in our ecosystem, and in our systems, and our production systems, et cetera, are due to management.

The current drought is a classic example. A lot of what we're seeing and hearing in the media, et cetera, is man-made, and it's not... it's partly due to lack of rainfall. But we've degraded our soils to such an extent, that when we do get rain, it doesn't go in. So we've got a massive man-made issue now, to deal with. So, it comes down to management.

We've got to maximize photosynthesis because the soil principles are in fact about looking after biology, and the first principle is a little bit like the first principle of medicine. First, not harm, because so much of what we do in agriculture harms biology. So, we're looking at how we do no harm, and we understand that biology is the driver of the system, not an outcome or an incidental thing that just happens to be there. And if we focus on it, and we help it, then it will do unbelievable jobs for us.

We need biodiversity in our systems, and this is probably one of the biggest issues in cropping systems, where we, you know, wheat year on year on year, or wheat interspersed with barley, or oats, or something like that. But no real biodiversity into that plant and soil system is a real issue.

And, surprisingly, one of the key principles around soil health is livestock. Livestock must be involved, and there are several reasons. Again, one of those is the fact that they're a recycler, and the second is, they are biological taxis. So on their hooves, and their mouths, and so on, they're carrying around biology from one part of the paddock to another. If you think about a bacterium, for example, it can't get up and move. It has to have something that transports it, and livestock fulfill that function as well. So those are the sorts of things.

And, just to give you an example of doing no harm. One of the things that are commonly used in agriculture throughout the world, are salt-based phosphate fertilizers. So, mono-ammonium phosphate, di-ammonium phosphate, single superphosphates, et cetera. And we put those on, but they will kill between 30 and 70 percent of the mycorrhizal fungi, that was going to feed the plant phosphorous. And, you know, you can see how when we start treating symptoms, and we leave nature out of the equation, we have to do all the heavy lifting, because nature just pulls back and says, "well you think you're smart enough, away you go."

And, so it's very easy to select forms of phosphorous to use in agriculture that are not harmful to biology. So, that's the sort of thinking that we're bringing into the cropping space now.

Dr Ron Ehrlich: How does that translate to a wheat... say you were going up to consult say a wheat farmer, and you know, here is a year in year out alternating two crops, maybe, I guess. How do you go about changing that pattern, on a massive scale? Like, I had a patient in a few weeks ago who has 25000 acres up in Northern New South Wales, wheat farmer. And that would be quite a challenge, wouldn't it, to translate that into the big production?

Terry McCosker: It is, but what you've got to look at is a transition process, from industrial chemical-based agriculture into more of a biological-based agriculture. Now, what we do know is that biology is incredibly resilient, and we can bring it back very, very quickly if we just stop harming it.

So, there are probably three or four harmful things that we're doing. The first one is phosphorous, the second one is nitrogen, and using excessive amounts of nitrogen. We know, for example, that when you're putting on things like urea, there's only about 30 percent of it gets to the plant system. The rest of it either volatilizes to the atmosphere, or is lost through the soil profile.

And we can change that very, very quickly, by adding organic compounds in with urea and spraying it on in small quantities onto the leaf. So, the plant takes it in in a form where it can convert it into amino acids, because it's got the nitrogen and the carbon immediately there almost bound together, if you like, in the foliar application. So, there are simple things like that that we can do.

We just start doing those all together, so change the type of phosphorous, reduce the amount of nitrogen, start putting it on in a different way, start putting humic acids and formic acids into your system. If you must use weedicides, and most cropping systems still will have to use weedicides, but then mix those weedicides with formic acid, and reduce the amount of weedicide by 30 percent straight up, and make it, because you can make it more effective by mixing with a humic or a humic compound like that.

And, so we're doing less harm. Putting biology in when we plant a crop, for example, using compost extract. So, we're only using the equivalent of about two to three kilograms of compost per hectare, but we extract the biology from that, and so that's very very cheap. You could make your compost, put it out, and it's costing you cents per hectare to put on very broad spectrum biology in while you're planting the crop.

You know, so there's actually sudden things we can do to be transitioning, and then slowly, over a period of time, start withdrawing the harmful things, and what you find then is that, as a plant is fed properly by biology instead of us feeding it artificially or force-feeding it with fertilizers, the quality of that plant improves.

So, the Brix level, which is the measure of the complex sugars in the plant, rises. And once the Brix level gets above 14, plants are resistant to insects and diseases. So, very, very quickly, within one to two years, insecticides and fungicides go right out of the business. There's no need for them because the plants become self-protecting. In other words, they have their immune system, which they'll develop when we let biology do the job.

Dr Ron Ehrlich: I know he was talking about literally thousands of dollars worth of urea sprinkled on, you know, sprayed on the land every year to add to that nitrogen. So it's interesting, you just picked that, you know, mentioned that straight off. You know, the other... I was talking to, I had the pleasure of talking to Alan Savory last year, and he made the point that soil was the biggest export in the United States every year, you know. They lose so much soil that people are soil farmers, as you say, not just grass farmers, but actual soil farmers no matter what they do.

Terry McCosker: That's correct, and the reason that's happening, and I read I figure recently, I think it's something like they export something like 5 kilos of soil for every kilo of corn that they grow. Now, the reason that happens, is that the soil biology is being killed, and it's soil biology that holds the soil together. Now, when we take that out of the system, the soil then becomes very loose.

It can be picked up by wind, it can be picked up by rain, and it's very easy to demonstrate, just with a soil infiltration tester, an aggregation test, to show that a healthy soil that's got biology in it, you can put it in water, and the water below it stays perfectly clean. You can take soil out of a chemical-based system, and put it in water, and it just disintegrates, it just falls apart. And so, the difference is biology, and all we need to do is make sure that we maintain the biology in the system. Get it back into the system and get it doing its job, and all of that soil loss will stop.

Even recently, in the United States, there's been major highways closed because of wind erosion and dust going across roads where you can't see anything.

Dr Ron Ehrlich: And I think you mention the drought, a big component of the drought is man-made, because, you know, wind and rain. Just to let our listener know, if a healthy soil if it rains, a healthy soil, the water should penetrate quickly, and deeply? And that's a big difference between an unhealthy soil where it washes away. What's the difference? I mean, you know, in healthy soil, moisture should get in quite quickly, shouldn't it?

Terry McCosker: Well, I'll give you some numbers on that-

Dr Ron Ehrlich: Thank you, I was hoping you would.

Terry McCosker: In a healthy pasture, an inch of rain will disappear in ten seconds.

Dr Ron Ehrlich: Into the soil.

Terry McCosker: Into the soil in ten seconds. On an unhealthy pasture, let's say straight through the fence, but managed differently, in a pasture situation, that same inch of rain can take seven minutes to infiltrate.

Dr Ron Ehrlich: That's huge.

Terry McCosker: On a crop, and this data I'm quoting is from one crop where pasture had been sprayed out, and one crop had been grown. On the same soil type, it took 32 minutes for one inch of rain to go into that soil.

Dr Ron Ehrlich: Wow.

Terry McCosker: So, you know, ten seconds versus 32 minutes.

Dr Ron Ehrlich: And in the process losing a bit of soil as the water runs off.

Terry McCosker: Well that's correct. The moment that water starts to move, and you don't have the biology, you don't have the aggregation and the porosity in the soil. So, it's the biology that aggregates the soil into particles, and when you aggregate, you end up with a lot more air space, and a lot more space for water within the soil. As that biology disappears, the glue disappears out of the soil, and the soil then becomes compacted so that you have less air space and less space for water into the soil. Therefore, the water just gets up and goes and takes the soil with it.

Dr Ron Ehrlich: Yeah, look, I also, I've had the pleasure of talking with Charles Massy, who I'm sure you know, and he talked about five cycles, and I think I'm going to get these right. The solar cycle, which is your maximize photosynthesis. The water cycle, which is what we've just been talking about. The soil-mineral cycle, and diversity, which you've also spoken about. But he mentioned the fifth, and I think possibly the most challenging, and arguably the most important, is this human-social cycle. I hope I got those five cycles right.

What are some of the challenges when you're dealing with that human-social cycle? I mean, I think you mentioned resistance to change, but what are some of the other challenges in that human-social cycle?

Terry McCosker: It is the biggest challenge, and it comes down to our paradigms. It comes back to traditional approaches, so the tradition is essentially a paradigm, and I think what Charlie says is the human mind that oversees all of those other things, and it's the human, and therefore the management that humans apply to an ecosystem, that determines the health of the ecosystem.

And have been teaching this stuff now for 30 years, the thing that turns farmers on the most is a basic understanding of ecology, and the fact that they are managing an ecosystem, not managing livestock, for example, and not just growing crops. You know, they're not just in agriculture, they're managing an ecosystem. And they get turned on by that, they just love it, and as they get that understanding, their whole paradigm shifts in terms of how we go about managing it into the future.

And so, the way we operate in RCS is firstly we have a training event, which is aimed at shifting paradigms. Goes for seven days, it's very, very intensive, and we throw far more information at people than they could absorb. But it's not about what information they absorb, it's about busting open paradigms. It's about making people receptive to change, and so that's our beginning process.

From then on, you've got knowledge, for example, like you, as a dentist. You might have read some books, you might have seen people do it. But to be a good dentist, you have to have the skill to implement the theory and the knowledge that you have. And farming is no different.

We could teach people all sorts of different ways of doing things, but until those different ways of acting are put into practice, and become skills, the business itself, the farm itself, the soil, the ecosystem, et cetera, doesn't change. And one of the big mistakes I think that a lot of organizations have made, is run out there and do a one-day soil course, or a two day teaching about this, that and the other thing. Those exercises are about awareness, and that's very important, but in my experience, you don't bring about permanent change until you've shifted paradigms, and secondly, you've then developed new skills, which replace some old skills.

You know, if you ask your audience who wants change, and how are we managing climate change or whatever, everyone will put their hand up. But if you ask the question, who wants to change, you'll get a different number of hands up, and we're all the same, you know? We will all resist change, and we all want to... we're comfortable with our paradigms, and our brain. You know, when we're learning something new, it's a high energy activity for our brain. It doesn't like it, it would much prefer we go back into our old habits, where it can just churn stuff through without us having to think about it.

So, I see the real issue is firstly, how do we create paradigm shifts? Because that's effectively what we're wanting to do. We're wanting to bust up the tradition, bust up some of the traditional science if you like, which I think has led us down the garden path. And, then how

do we educate people, and then bring about the skills change that is required to make a difference on the ground. So, those are the key issues, I think.

Dr Ron Ehrlich: You know, it's interesting. I've been fascinated by change, you know, and managing change particularly when we're talking about health. People sometimes have to change, and what drives that. And a big part of it is whether you feel you have the locus of control, is one way of looking at it, and do you have any internal locus of control? Which means you've got some control over what's going on in your life, or do you have an external locus of control, meaning I'm a victim of fate, I'm a victim of the climate, I'm a victim of this, I'm a victim of that?

And, I guess one of the biggest challenges is to encourage people to realize that having control over what happens is a very empowering thing to do, and you mentioned management being a very big part of determining outcomes, the paradigm shift. It's so interesting to hear you talk about this managing an ecosystem, because I've often said if I had a choice of what I'd go back to study, I'd go back and study anatomy, physiology and biochemistry, and see it in the clinical setting of what I see every day in my practice. I'd study it with nutrition, and I'd study it with pain.

So going back to basics, and seeing how the world works in that ecosystem, must be a really important part of changing people in that paradigm.

Terry McCosker: I think it is, and just understanding that it's an ecosystem that we're working with, and the other thing, I take an Aboriginal view of the world, and that is that we don't own land. We're only custodians of it for a very short period of time, and as a custodian, I think our obligation is to leave it in better condition than we found it.

And, unfortunately, we have as a human race, we have developed this attitude that we're above ecosystems. We're above mother nature, that we can smash it into the shape that we want it into. But my experience is that mother nature has got more tricks and more stuff up her sleeve than we will ever understand, as humans. And I think that we have to be much more humble about our role in nature and that we have to understand that we're a part of it, and we are part of the ecosystems. We're a very powerful part, and that's the problem, but we are not above it, and that's a paradigm shift that we need to make.

And the other thing you mentioned there is management and control. My definition of management is controlling your destiny, and I think that we've got to, as individuals, we've all got to take more responsibility for our outcomes. And again, I think a great weakness in society today, is that this whole ethic of self-responsibility seems to have gone out the window, and everybody wants somebody else to be responsible for their outcomes, and while ever we go down that path, it's not going to have a happy ending.

Dr Ron Ehrlich: Now, this is probably a good opportunity to ask you, that if you had an opportunity to speak to people in the city, and get them involved in a positive way in this human-social cycle, this regenerative movement; giving all you know, and what you've done professionally for so many years, what would you say to those of us in the city? How can we in the city help this movement?

Terry McCosker: That's a good question and a very difficult one to answer. The first thing I would probably say is to look for regenerative food. Initially, all you could probably do is focus on organic food. But there's a difference between the quality of organic food and food that I would consider to be grown regeneratively, and that's that organics have moved away from its original focus, which was actually around soil health and organic carbon in soils. It's moved towards a lack of chemicals in the production of food. The problem with that is, there is no system, there is no way of you in the city identifying what was grown regeneratively, and what wasn't. So there's a major problem there.

The other thing that I would dearly love to do is change the message that goes to the city. Agriculture sends the wrong message continuously. The drought is a classic example, and I know people that the media has come along to their place to do an interview with them, and when they've found out that they're actually managing the drought reasonably well, they're comfortable with where they're at, they leave, and they go and find somebody that's got a poor bugger me story. The doom and gloom story, where my animals are dying, and I've run out of money, and all of that stuff. The media is sending the message that's coming from about five to ten percent of agriculture, and portraying that like everybody, and that's a major problem that we've got in agriculture, to communicate.

The message I would like to see, going to the city, is that we are managing an ecosystem. We are trying to do our best. There are a lot of people out there that are reversing damage that's been done to our ecosystem over the last 150 to 200 years, and people are working hard to do that. How could that be supported? How I would like to see that supported is through carbon credits, for example, carbon credits for soil carbon. And over the next four or five years, we're going to see those start to come onto the market.

If you're buying carbon credits or supporting somebody who is, then what you are doing is supporting regenerative agriculture. Because those are the people, people that can regenerate carbon in their soils, which is a win-win-win in every direction. So, it's a win for the environment, we're taking CO₂ out of the atmosphere. Probably, more importantly, we're taking water vapour out of the atmosphere, and storing it. The quality of food produced in a soil improves as the amount of carbon in the soil increases. We hold more water, so therefore farms are more resilient in terms of these climate changes and extremes that we're getting. Soils are warmer in winter and cooler in summer, when you've got lots of carbon in the system, and there's an income source there for farmers to encourage them to become regenerative.

So I think those one way, and one of the other things are just starting to be developed now, is biodiversity credits, as well. So, as farmers are increasing the biodiversity, the bird populations, the insect populations, the soil biology, the plant biodiversity on their properties, all that biodiversity, which they're doing out of their own pockets at the moment. There might be an opportunity down the track for people to support that sort of stuff as well.

Dr Ron Ehrlich: Fantastic. Now listen, we've covered some territory here, Terry, and I just wanted to finish off by asking you, if you were to take your step back as an educator and your work at RSC, and we're all on this health journey together through life. What do you

think the biggest challenge is for people on our health journey through life and our modern world?

Terry McCosker: Again, that's a brilliant question, Ron. It's something I've been reflecting on just recently because I'm in the process of writing up a little bit of stuff from my past. And, I grew up on a mixed farm in a situation where we'd milk the cows before we went to school in the morning, we'd work with the pigs, we'd work with the crops, and we had no water, and our entire family, which was seven of us, would bath in about two inches of water in the bottom of the bath once a week. And that was the most water we had. What I was reflecting on, is that as a result of that, I have an incredibly strong microbiome, and if I was to take your question now and answer it on the background of that, I would say the first thing is, we've got to change the disconnect from nature.

I've got a niece whose got a young child in Melbourne, and they live in a high-rise, and they work in a high-rise across the road, and he goes to daycare in the high-rise across the road. So, they'll go out of that high-rise, they'll cross the bitumen, they'll get into a lift and they'll go back up into another high-rise, without any connection whatsoever to nature, and the microbiomes that they could and should be picking up. And I shudder to think of the health issues that that child's going to have in another 20 or 30 years because it hasn't had the chance to build a healthy microbiome.

I'd like to see people getting dirty. I think there's too much emphasis on trying to keep things clean and on antiseptics and things like that in our life. That's got to be damaging our microbiome, and I think the next point is processed food. I saw a thing, I think it was on Facebook a week or so ago, and a scientist in the US had put up the ingredients of three things. Two of them were non-beef burgers, and one of them was dog food, and he asked people to pick which one was which, and when you looked at the ingredients, and there was a list of ten, 12 ingredients in each of those things, and it was impossible to pick which one was the dog food. And that says to me that the further we go down this processed food approach, away from eating fresh food, growing our fresh food, for example, the sicker we're going to get as a society.

And the final one I would say is that there are major problems in our food chains, and a lot of it's to do with being that processing. I think the dominance of the supermarkets determining what it is we're going to eat, is an issue, and the really big one is how, if I'm sitting in Sydney, or Melbourne, or Brisbane, or big towns, or cities anywhere. How do I source real food from real farmers, and I can get that connection? That's a real, a major issue, and there's no good supply chain set up to do that. I think there's a number of issues, and I could keep going on, but those are sort of the major ones that I see in relation to health and the sort of connection to agriculture.

Dr Ron Ehrlich: Terry, that's terrific, and thank you so much for joining us today. We're going to have links to your RSC site, and maybe we can see if we can get some things happening between what's happening out on the land and us in the city, and closer connections. Thank you so much for today.

Terry McCosker: Thank you, Ron. It's been a pleasure.

Dr Ron Ehrlich: It's so interesting to talk with Terry. We did an episode with the legendary Alan Savory last year. Go back and have a listen to it. But Terry did mention he was an influencer, and he's done that for many people globally. In that show, Alan said, "it's not the resources," and he was referring to say fossil fuels or animal agriculture that's the problem, "it's the way a resource is managed that counts." And he added, "to always be making decisions within a holistic context. How will what you do affect the long term health of the individual, and the planet." As we know, the two are interconnected.

I love Terry's line, "focus on what you want, not what you don't want." That's why focusing on your health is such a good plan. What about his point, and this blew me away, ruminants urine contains plant growth hormone? Amazing, I hadn't heard that before, and also, it promotes microbes in the soil, that float up into the air, and seed rain. Now just to clarify, because I was blown away by this, and I had to ask Terry to make sure that I'd got the organism here referred to correct, and he did mention streptococcus but, he corrected himself. It's a *Pseudomonas syringae*. Also absolutely amazing.

So, until next time, this is Doctor Ron Ehrlich. Be well!

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