

SOIL AND LAND CONSERVATION AMENDMENT BILL 2021

Second Reading

Resumed from 24 March.

HON COLIN de GRUSSA (Agricultural — Deputy Leader of the Opposition) [3.28 pm]: I rise to make some remarks on the Soil and Land Conservation Amendment Bill 2021, and I indicate from the outset that I am the lead speaker for the opposition on this bill. This is a relatively small bill, but it seeks to make some quite significant changes to aspects of the Soil and Land Conservation Act 1945. Nevertheless, we do not intend to take too long in debating this bill.

I want to take this opportunity to talk about one of the most interesting aspects of my farming career, and that was the management of the soils that we farmed. I am sure that many other farmers have the same experience. Soils are the lifeblood of our farms. The management of those soils is something that evolves all the time, and it certainly did over the time that we were farming. In fact, the minister did say in her second reading speech that there is not only a growing understanding of the need to prevent or reduce land degradation, but also a strong desire to address issues relating to soil health more broadly. Ever since I began farming—certainly, when my father was farming, that was always the case—we have always been looking to try to find ways to better manage the soil in which we grew our pastures and crops, because that was the lifeblood of our business, and it also meant the business would be sustainable into the future. I remember back in the 1970s—I was only a little tacker then—the south coast region of Western Australia, in particular that Esperance region, had very fragile, light sandy soils. I would get up on those cold mornings when the fronts would come through, usually at the end of autumn or early June. It would still be a bit dry at that time of year. Back then everything was ploughed and ripped up. I would get up and I could not see; it was like a fog, but it was sand. All the wonderful topsoil that we were trying to grow our crops and pastures in was drifting away and ending up over the neighbour's fence. In fact, I remember seeing fences with the posts sticking a couple inches out of a pile of sand about a metre or so high. That was just the way it was back then, but obviously people saw that and made the decision that they wanted to do something to try to manage the loss of soil on their farms.

I think it was about the end of the 70s when my dad, in particular, and neighbours of ours also looked at this issue. They made the decision that they were not going to follow the traditional method of cultivation that had always been done, regardless of where people farmed. They moved to a direct drill, as it was called then, eventually becoming no till later on, towards the end of the 80s and early 90s. I think that kind of transition was hard because nobody had really done it before. It meant changing practices—buying a boom sprayer for a start, which was not something that everybody had back then—and learning how to handle herbicides and other chemicals. It was all quite different, but the change was stark in terms of the management of the soil. At that time there was a big push to look at how we protect soils from wind as well. There were a lot of concepts such as alleyway planting of trees and all sorts of different methods for managing that aspect of wind and water erosion to try to better manage the soils on all those farms in that area and in other areas, too. I am speaking from my experience on the south coast.

The other thing I give credit to my dad for was that he certainly saw the value of native bush on the farm and he spent a considerable amount of time fencing off a lot of it to protect it from livestock. It was never grazed or cropped or anything like that as long as we were on that farm. There was a magnificent piece of bushland through the middle of the farm where Bandy Creek runs through on the way down to the Ramsar Convention on Wetlands of International Importance—listed wetlands in Esperance. They were great places to visit and have a look at the native wildflowers that went mad through that area.

Hon Alannah MacTiernan: How wide was your corridor?

Hon COLIN de GRUSSA: It varied from probably a minimum of at least 200 metres, probably wider. The creek itself would have been at best two or three metres wide at the widest areas. It was a very wide corridor and was probably at least five kilometres long on our property; my uncle's farm was next door and he had the same thing.

Hon Alannah MacTiernan: And you saw co-benefits from that planting?

Hon COLIN de GRUSSA: We did not actually plant it; we just did not clear it.

Hon Alannah MacTiernan: No, but from that corridor?

Hon COLIN de GRUSSA: Absolutely; no doubt. The obvious benefit was that by having that native vegetation there obviously we got the wildlife and the birds, which we saw a benefit from in terms of insects and other potential problems. The other thing we saw was the benefit of preventing erosion. With those creek lines, if we got a heavy rain and the headwaters all come in through that narrow creek line and there was no vegetation around those areas, they just become a disaster area of eroded sand, salt and soil, and does damage that is almost irreparable. That was a really good plan back in the 70s. It was not really thought of as anything particularly special then. It was just something that dad did because he thought it was a good idea.

As we moved on towards the 1980s, or the end of the 80s in particular, there was a seminal event in our little area, in Neridup. We had a very wet end of 1989, a heck of a lot of rain fell and did a heck of a lot of damage, eroding a lot of soil. Even though all these things had been put in place—tree covers and so on—there was a real problem managing the surface water at that point. Out of that, a little group down there was formed called the Neridup Soil Conservation Group, which is still going today. That group was, I believe, one of if not the first landcare group in WA. It was a very early one anyway. My dad was involved with that, as were many of our neighbours. One of the things that came out of that was a lot of research into how, as a catchment, people can work together to manage the issues with surface water and other things across the whole catchment, rather than just doing it as an individual. Through the 1990s there was a great movement of landcare, with the Natural Heritage Trust funding doing a lot of work in that area. That group did a lot of planning and a lot of work to manage the catchment-wide drainage to ensure that we did what we could to protect our soils from erosion and other things.

At the same time, there was a great shift through the late 80s and 90s in Western Australian agriculture—across the world too—into no till as it was called, or zero till, or minimum tillage, depending where the farm was. There were a lot of different names essentially meaning a similar thing, which is minimal disturbance of the soil in the planting of a crop. A lot of that research was done in the United States and Canada. They were very big on it over there. I remember dad got involved with one of the people in Canada when he was chair of the Western Australian No-Tillage Farmers Association, and he made a couple of trips over there. It was a lady named Jill Clapperton. I am not sure whether other members have heard of Dr Jill Clapperton. When we look at our soil, we have the physical and chemical aspects of soil. Dr Jill Clapperton was very interested in the biological aspects of the soil. Of course, the word “biological” conjures up all sorts of images in people’s minds. Immediately, some people would automatically turn to thinking about organic farming, but that is not what it is about. The soil is a biological system and Dr Jill Clapperton was one of the pioneers globally in looking at that biological system. Her particular field of interest was something that I know the minister is also interested in—that is, *vesicular arbuscular mycorrhizal* fungi. She had a lot to do with talking to a no-till group here at the time, WANTFA, about that, and the group went over to where she was based in Lethbridge, Alberta to talk to her about those sorts of aspects and what minimum tillage did for those aspects of the soil.

Hon Alannah MacTiernan: What institution?

Hon COLIN de GRUSSA: She was in Lethbridge, at the university there. She is not anymore. She is now in Montana and runs her own consultancy. I think it is jillclapperton.com or jillclapperton.org; I cannot remember the website address. Dr Clapperton visited Western Australia a number of times. She was instrumental in getting our heads around thinking about all the different mechanisms that make our soils work to produce an optimum crop or pasture, or whatever it is you are trying to do with it. I think that is one of the aspects, when you look at soil it has so many different components. There are, obviously, the physical components, the chemical components and then there are the biological components. Getting them to work in harmony is one of the real challenges.

A lot of research has been done by the department. It has been going on forever and a day because I remember a lot of trials on our farm back in the 1990s. I have spent a lot of time in the past couple of months scanning a lot of my dad’s old slides. He loved to take photos on 35 mm slides, so I have thousands of those to go through. There are heaps of photos of trials and all sorts of things. It is very interesting to look back through the 90s and see all the different methods of seeding with no till, and the different soils through the research of people such as David Hall, Jeremy Lemon and Rob Sudmeyer, who conducted a lot of different trials on our farm. I do not know about Jeremy, but most of those guys are still involved in the area. Those sorts of trials were always happening on the farm and I guess that is what piqued our interest in managing the soil on our land to make sure we produced the best possible crop we could, and also look after the soil. The important thing about this legislation is soil conservation. That means a lot of things to a lot of people, but essentially it means looking after the asset in every possible way to make sure we can produce a quality product, and continue to produce that quality product into the future and that the nutritive value of the soil is not lost through the effects of erosion or wind, and so on.

It was through the 1990s and 2000s that a lot of that work was happening. With the Western Australian No-Tillage Farmers Association we talked to no-till organisations in other countries to trial things such as summer cropping and different types of crops that had not been done before, such as cover cropping, to try to improve the organic matter in the soil. From the 1970s right through to the time we stopped farming we tested the soils every year. It was an annual event. We would go out and do the soil tests and see what had occurred, what had improved and how we could manage that. The aspect of managing that very important asset, the soil, was instilled in me as a young bloke by my dad who was always interested in the technical aspects of what he did as a farmer, and he really liked to ensure that we did everything we could to preserve that soil. That is one of the main things that drove him so passionately into the no-till movement. We are certainly growing our understanding of what constitutes healthy soil, and that is changing. Through those early years, first it was more about the physical aspects. Obviously we were using fertilisers, so there was some management of the chemical aspects, but it was really the physical aspects that were the biggest issues early on in the 1970s and 1980s when we saw erosion occurring. We gradually got on top of that and moved to looking at more of the chemical aspects of soils and managing the nutrient levels. We

then looked at the organic and biological aspects of the soil, yet they are probably the oldest parts of the soil and are very important. We know that biological activity can have a tremendous impact on the growth of crops.

I do want to talk about the bill. I guess I should not talk forever about soils, although I could. As I said at the outset, I really enjoy learning about what makes the crops and pastures grow and how we can do that better, and whether that is by trying things that are looked at as unusual or different, or perhaps even frowned upon, there always needs to be people who try something different to find out what works.

The bill deals primarily with amending the Soil and Land Conservation Act 1945 to encompass the addition of a new make-up of the council. That is probably the biggest change in the bill and the one that, for some, is a little controversial. The bill will change the make-up of the council from essentially mandated representatives of producer groups and so on to being appointments by the minister, albeit with expertise in certain areas, which we will come to discuss during Committee of the Whole. No doubt the minister was as surprised as I was to read that the committee had not been formed between 2003 and 2019. That is a long time, over many governments, and a real failure on the part of those previous governments not to keep that committee formed. We know that the issues the committee deals with are important to the future of agriculture in this state. However, we are here to debate the bill before us, which proposes changes to the make-up of the council. In particular, the minister will have the ability to appoint up to nine members who between them will have expertise and experience in agricultural production, environmental conservation, land management, local government and planning, the management of pastoral land, soil conservation and soil science. On the face of it, that does not sound too bad, although it is not necessarily mandated that any one of those will come from the producer groups that used to be on there. The opposition will ask some questions about that in the committee stage.

Another aspect of the bill is the repeal of the Landcare Trust, which was wound up in 2002. That makes sense. It is not a significant change. It surprises me to this day that even though legislation has been through this place relatively recently, how often it contains ancient terminology that does not reflect a contemporary society. It is good to see those sorts of proposed amendments. While we have the bill before us we may as well make it better in every aspect that we can and make the changes needed to improve it.

The Western Australian soil health strategy was launched at the end of last year. This bill ties in nicely with that. The Soil and Land Conservation Council will oversee the Western Australian soil health strategy. It will be interesting to see how that is delivered and what it means for the health of soil, as well as agriculture, in the state and how we can all work together to make sure we get the best out of our soils and ensure that they are sustained for future generations.

I have a couple of questions that I will ask during the committee stage. I note my colleague the Leader of the Opposition wanted to make some remarks, but I will continue while he is not here.

Essentially, some of the aspects of this legislation are around the appointment of the members to the committee, which we will come to in the committee stage of the bill. I do not envisage that will take long.

The opposition does not oppose this bill. We have some concerns, which I will come to during committee, around the appointment of some of the members of the committee. We think that the management of our soils, which I have been talking about for some time, is incredibly important and is something we all need to take a keen interest in because it is the very future of our agriculture industry. Indeed, any industry that produces food needs a medium in which to do it, and that is generally soil. It is a very big challenge to understand the complexities of soil science and the various things that can be done to improve soils. One of the concerns I have heard from industry is that, within the soil strategy and in the management of some of those aspects of our soils, we do not see options taken off the table. We have done a lot of different things to try to ameliorate problems with our soils, such as clay spreading for fixing non-wetting. On the face of it, it looks like a very pretty destructive and violent thing to do but the result is vastly improved soils, which then can continue to improve. We have also done things like turning back to the very old way of mouldboard ploughing on a strategic basis in order to make sure that, similarly, it fixes a bit of non-wetting but also loosens up the soil and continues to improve the production of that soil. We saw dramatic improvements in production by the strategic use of mouldboard ploughing. Notwithstanding that, it does cause significant issues if you do not get it right. We do not want to see these sorts of strategies that are used to manage the physical aspects of soil potentially become more difficult. We would not want to see those sorts of options taken off the table because there is a whole variety of different things we can do to improve soils that need to remain on the table. I talked about clay spreading and mouldboard ploughing, which has been used in a number of different areas, and there is deep-ripping and lime spreading—all those sorts of different things we use to continually improve our soil and make sure that we keep it sustainable in the future.

Hon Alannah MacTiernan: Surely you agree that some things should be off the table, like DDT, for example?

Hon COLIN de GRUSSA: I am more talking about the physical things that we can do. In terms of chemicals, DDT is off the table.

Hon Alannah MacTiernan: Yes, but your proposition was that nothing should be taken off the table. I agree that —

Hon COLIN de GRUSSA: I mean nothing that is not off the table.

Hon Dr Steve Thomas: We are not suggesting Agent Orange!

Hon COLIN de GRUSSA: No. Well, we do use one component of that. What I am really talking about is that the option farmers are using now often get tried and trialled before they are necessarily refined. When we did the mouldboard ploughing trial on the farm, I could have done a hectare but we chose to do 60 hectares and it was the paddock right next to the house. I spent about two months living in town because I could not stand getting up in the morning and seeing that cloud of dust I remembered from the 1970s blowing over the house. It was because we did not get the timing right, but we learnt from that and did not do it again. That is the key. On the face of it, one might look at that situation and say it is destructive and we should not be doing it to our soil, but the end result was vastly improved production and soil quality.

Hon Alannah MacTiernan: What was the technique used?

Hon COLIN de GRUSSA: It was mouldboard ploughing, a very old-fashioned technique but it can do a lot in some situations. It is not something we could use everywhere.

Hon Alannah MacTiernan: I suppose one of the challenges is to calculate whether it gives you a short-term gain or it is effectively an exercise in mining. What was it doing to your natural capital? How sustainable is that technique?

Hon COLIN de GRUSSA: It had a long-term benefit for our natural capital in all the trials we did. It was one of those one-off things that we did very significantly, but it did a number of things all in one operation: fixing non-wetting, fixing compaction and varying weed seeds. All those different things got dealt with in one operation. The production off that particular area, the crop yield, that very year was monumentally bigger than we had had forever and it continued to be that way.

There is always going to be experimentation in agriculture. That is the nature of the beast. With farming, we are always trying new things and trying to learn different ways of doing things. There probably are better ways to do things. I just want to be clear that those sorts of options should be able to be done. I am not necessarily thinking that it is the intent of the Soil and Land Conservation Council to prohibit these sorts of things, but it is worth making sure that these practices are not outlawed simply because of what may appear to be quite damaging in the short term. Clay spreading is similar in many respects. A big pit is dug and clay is spread across a paddock at 7 500, 200 or 400 tonnes per hectare, which is a tremendous amount of material. On the face of it, it can look quite destructive but the net result is a much longer term benefit and it does not have to be done again. Sure, there are other ways to do things. Farmers are always looking to innovate and we are always looking to improve the management of our soils so that we can continue to produce food and fibre for our state, our nation and globally and that we can do that in an efficient and sustainable way. We are always looking to innovate and always looking to try different things. I look forward to getting into the Committee of the Whole stage of this bill. I do not imagine we will take a particularly long time. As I said at the outset, the opposition is not opposing this bill. I will leave my comments there for the Leader of the Opposition.

HON DR STEVE THOMAS (South West — Leader of the Opposition) [3.56 pm]: As a fully paid-up member of the soil science fan club, I take great joy in being able to address the bill before the house today, the Soil and Land Conservation Amendment Bill. The bill itself is not one of great technical detail or soil science but I want to talk about some of the joys of things it might look at because I think it is particularly important. The Minister for Agriculture and Food and I agree that soils and soil science are critical parts of not just our understanding of nature as it exists at the moment and not just in relation to its underpinning of agricultural production, but also its potential underpinning of the future of not just Australia, but probably the planet.

One of the things that we have to address is the extraordinary lack of knowledge of what happens in our soils that we have as a group, as a species almost, as a world. The level of knowledge we have about the interactions in our soils is rudimentary at best. We understand a small amount about some of the bacteria, fungi and other protozoa and microorganisms that exist in the soil. We understand even less about the ultimate interactions of many of the nutrients. We kind of understand, to some degree, that when we put on so much nitrogen, it roughly relates to so much growth of pasture and it roughly relates to so much growth of stock, for example. Using the example of soil to pasture to animal to protein to humans, in fact we probably know the most about how much growth in humans it represents at the end of that because that is where the most research occurs—right at that far end of the digestive chain. That is the bit we know about. We overeat and we know how much weight we are going to put on and we have that pretty well measured. We have very little understanding of the steps that go along the process. Anything that the government and the minister can do to increase that knowledge is worthy of support. I think that is critically important. I suspect over the next 100 or 200 years, we will start to understand a lot more about how soil operates, how it is supported and its structures so we can improve soils over time. Some of it seems quite simple but the interactions are quite complex.

I give members this example, because the explanatory memorandum mentions climate change as it relates to soil science, which I think is remarkably interesting. Western Australia in particular has very low levels of organic carbon in most of its soils. There are huge swathes of soils in Western Australia where the organic carbon level is one to two per cent. There is a lot of desert out there that does not have much organic carbon in it. It is the organic carbon that provides the basis for life. It also generates the retention of water. When we look at rich, loamy type soils with eight, nine or 10 per cent organic carbon sitting in there, it is a rich environment in which to operate. For many years, we probably have not understood even that well enough to be replenishing some of it. Some of those richer soils have rich loam to a great depth—for example, the Darling Downs in Queensland potentially has 25 to 30 metres of topsoil. Some places have probably never been fertilised, because the amount of nutrient that sits in those soils allows the land to be harvested and stripped for a very long time. When we compare that with areas that have one to two per cent of organic soil carbon, we realise we are stripping out the nutrients. It is not just organic carbon; I am using that as the starting point. There is so much more we do not know about how it operates with soil. We have an opportunity to boost soil. For example, we can boost soil carbon. The explanatory memorandum refers to climate change. We have the capacity to put millions of tonnes of carbon back into the soil. That has a biosequestration component. As we biosequester, we also increase the soil fertility, but not if there are other restricting nutrients. We really have to understand that stuff. There are not many soils where the restriction is limited to one part. Organic carbon is only one part of this. In the climate change debate, people have often made the statement that climate change does not matter because trees will grow more rapidly to absorb all the carbon. It is a statement I have to deal with quite often. The proponents of that have never understood that carbon, and organic carbon in particular, is one limiting factor in a plethora of limiting factors in the soil. The statement is right if the soil is so rich that there are no other limiting factors, so there will be additional growth because additional carbon has been added. That has been proven absolutely to be the case in greenhouse experiments around the world, but only if there are no other limiting factors as a component. For most soils, and even for most environments, the atmosphere is the source of carbon. That is the case for most trees. I will not draw out the whole photosynthesis equation that we should have all learnt in primary school or early high school. Carbon in itself is not the general limiting factor; there are a plethora of limiting factors. That is why knowledge of all the components of soil, or as much as we can learn about them, including bacterial interactions, the arthropods, the insects and everything else that plays a role in the health of soil, is critically important to Western Australia's agricultural and natural future.

The government has great potential to get more active in the soil science debate about the gradual stripping of nutrients out of the soil. Members will know that I spent many years as a vet and I am still a registered vet. Milk fever in cattle is a disease of low calcium. Calcium is a highly underrated nutrient. People do not realise how much calcium we strip from the soil in primary production. I will give members some rough figures. I will use cattle as an example, because I know the numbers off the top of my head better than I do the numbers for sheep. If someone is producing and selling a 400-kilogram calf every year off their property and that calf contains 20 kilos of calcium as a minimum, and some will contain 40 kilos of calcium, they are taking five to 10 kilos of calcium off every acre of their property. After 50 years, a lot of calcium has been stripped out of the soil and unless they are putting that back, they will start to see the impacts of that. From my perspective, I have seen milk fever in a Hereford cow on a hill, and that animal had no right to be exhibiting that disease, but it was an old farm and calcium had not been put back onto that hill. That is just one example of the limitations we have because we do not understand this nutrient interaction in soils anywhere near enough, but we keep trying. Some of our research is good, but it has yet to be scientifically evaluated.

There are a couple of good movements around that are working on this. Members might be aware of the slow water movement that started in the eastern states and has some value—it slows water movement across a property. Rather than have water run through the property quickly so it can be accumulated, the fact that it slows down hopefully increases moisture in the soil, allowing particularly microbial growth to start. Microbial growth is carbon-fixing. This will allow soil to become more valuable and more fertile. That system is out there at the moment. I do not know that it is adequately studied or quantified, but all across Australia, including Western Australia, I know of farmers in particular but wider landowners engaged in some pretty interesting experiments about how they can improve the quality of their soil. The hard bit will be to quantify it, and even coordinating these studies is a fairly difficult prospect. The fact that we will have a reinvigorated and revamped group of people driving that on behalf of the state of Western Australia surely has to be a relatively good thing. Hopefully, a re-enthused council will start to look at these sorts of key issues.

The explanatory memorandum states —

The Soil and Land Conservation Act ... is the principal legislation ... relating to the conservation of soil and land resources and to the mitigation of the effects of erosion, salinity and flooding.

I could happily spend a long time talking about soil conservation and soil quality, but I have probably made my point that we simply do not know enough about it and the more we do, the better the outcomes will be.

I will comment on a few other things, such as erosion, particularly around flooding. I know that Carnarvon and a few other places have had some interesting issues with this, and it is an issue across the board. I have been on farms

where the flooding and erosion mitigation process is 80 or 90 years old. It was done by the early settlers with shovels and picks. I have been in manmade gullies that were taller than me—I know that is not setting a hugely high bar!—that were dug by hand for kilometres to control water. Again, that is not new. The issue is the scale at which we try to do these things. Certainly, in terms of flood management, flooding around the Busselton and Capes region has been an issue for a long time and there are flood mitigation processes and structures in place—retaining walls and dams that are supposed to slow the flow of water through that area, so that too much water does not come in in one hit. But there is much more to do on that.

A critical issue that we do not talk a lot about today, but which we certainly talked a lot about 15 or 20 years ago, is salinity, particularly dryland salinity where rising watertables bring salt up to the surface, which has a major impact on land. It is not just groundwater that is causing this. Those members who have been around for a time will be aware of the Wellington Dam debate and that 15 years ago we were concerned when the salinity level there reached 1 000 parts per million, mostly out of the East Collie River. I understand that the current measure is now over 1 300 parts per million, so salinity continues to creep up. It is probably coming from underground sources, but there is a flow point through to the Wellington Dam, to the point that a farmer who purchases water out of the Wellington system has to calculate how many tonnes of salt per hectare of year they are putting on their property when they use water from the Wellington Dam. It remains an issue. It is interesting that the government's softwood plantation process is looking to replace the blue gum plantation process in areas east of Collie, particularly in the West Arthur, Williams and Boyup Brook shires. There are going to be a lot of pine trees out there. The theory is that it will drive down the watertable, which may well be true. That will be a useful outcome or dual purpose. There are concerns around the whole process, but if used carefully to drive down watertables, a good synergistic effect is capable of being achieved as part of that process.

I spent some time in my early years as a member of Parliament looking at deep drainage and channelling processes around salinity. There will always be issues if saline water is drained and there is no place to put it. That is always the issue. The early drains were largely experimental. If people shifted the saline water from their property to the next property, they would make an enemy. Even putting it into salt lakes and reserves changed their ecosystems. That is not to say that there is not still a place for some deep drainage, carefully used, to control saline water movement, because I think there is. The ag department used to do a lot of work on this; I think it does much less now. There is a place for it, but how it is managed is obviously a critical issue. We need to make sure that the impact is not simply to transfer a high saltwater body from one area to another and cause the second area to suffer as a result. It is hard to find a spot.

It would be easy if we talked about desalinating some of the salty water bodies to get a synergistic dual effect. We looked at that many years ago with Wellington Dam. Desalination experiments have occurred at Wellington Dam. I can remember debate around whether Wellington Dam could be desalinated, because it is not all that salty—it has one-fiftieth the salt of seawater, for example. There were debates about whether the drop from the Wellington Dam wall could be used as an adequate force to desalinate the water in its own right, so that it would be a power-neutral process. None of the proper engineering works that I have ever seen came close to doing that. The problem, of course, is that, ideally, a drop of a couple of hundred metres is needed, but by the time that has occurred, it is so far down the river that it has lost a great part of the power of the hydrology that would in theory drive the process, because it is trying to drive an osmotic process at that point. There has not been an option to do that under those circumstances. There are probably not great options for using hydrology to generate energy with sufficient efficiency to be able to desalinate the water. The government is looking at hydro storage for energy; it will be interesting to see how the engineering figures look and how that will add up, because I suspect the new energy policy announced by the government yesterday will not be quite as easy as it thinks. Let us see where that lands.

I have seen some very good projects involving the desalination of highly salty groundwater based on using solar panels. I have to say that some of that is very good. Some of those projects are in wheatbelt areas not too far out of the Perth metropolitan region, with individual businesses able to provide enough water for a nursery or a business based on solar panels desalinating water that might be 15 000 parts per million total dissolved solids. That is a great use of a salty resource. The more of that that we can do, the better the outcomes will probably be. I would love this group to look at the combination of salinity and solar energy rather than to focus on being able to use a hydrological drop to power that process. Perhaps one of the secrets of doing that might be one of the secrets of renewable energy as well. This is one area on which I probably disagree with the current energy minister—that is, I would like to see a much more distributed model rather than a centralised model. The minister and I have a lot of things in common in terms of power generation, but I think he wants centralised solar farms and wind farms and those sorts of things while I want to see a much more distributed model where those things are distributed throughout the community as much as possible.

I think the same capacity should probably exist for the desalination of water to improve water capacity. I think a distributed model would be far more efficient, if for no other reason than a lot of businesses would be able to invest in it themselves. Obviously, there would have to be the groundwater component—they would have to be sitting

over a fairly saline aquifer with plenty of volume—but that is generally not that hard to find. There are saline aquifers throughout Western Australia. To be honest, we need only look at the northern Yarragadee; we do not have to go that far. The joy of the southern Yarragadee is that it is a very low salt environment. The northern Yarragadee is much saltier. That is a big resource in itself, but there are plenty of other resources all the way out to the Officer Basin—I say that as I wave grandly to the east—which is a fair way out. The reality is that all these assets have the capacity to make a contribution. Again, they would have to be very carefully managed.

The biggest issue we have is a lack of knowledge about how all this goes together and the interactions within it. These are the sorts of things that I think the group the minister will put together should be engaged in and hopefully have some fun with. There is an opportunity to do this much better. Again, the proof will be in the pudding as to the operations of the council. To some extent, that will depend upon the people appointed by the minister and, obviously, the direction of the minister and the government. I am confident that this minister will look at some things that I strongly agree with, such as the need for research into what soil actually is and how it contributes. We may have some differences around salinity, but I suspect that if we looked at a distributed model, we might find that we had a closer policy position than might first appear.

In terms of the capacity to store carbon as part of soil science, I think that is a major opportunity for the state of Western Australia. I will happily run the risk of raising the ire of a couple of lobby groups when I say that my view is that we should never restrict a landowner's capacity to invest in and make use of the storage of carbon as a marketable part of their operations. From my perspective, if that is the only part of their operations, good luck to them! I actually believe in the free market. If someone can run a pastoral station purely on the capacity to store carbon, all the more power to them and good luck to them; I hope they pay their taxes. I reiterate that that is an opportunity for all of Western Australia, not just the agricultural or south west regions. The issue with the south west is that a lot of areas are already highly forested and might be more limited in what they can store, but pastoral regions in particular have a massive capacity for storage in both soil and plant carbon. Some encouragement of that would ultimately be a good thing.

We have had this debate in the house before. The tough part is the measurement of how long carbon is stored—that is, whether it is permanent storage or temporary storage of carbon. I note that in the south west, a few places are claiming massive carbon storage results by simply not mowing and removing the chaff from around their trees or their vines, for example. The question is always about how permanent that is in relation to the storage of carbon. These rules have to be worked out over time. I am confident that one day they will. The world has changed dramatically in the last 10 years, and it will change dramatically again. The question in my mind is purely about the time frame. We will eventually get to the stage where that will occur, but I think there might be a bit more involved than simply mowing the grass and leaving it to sit on top of the soil. That obviously does ultimately have some carbon emissions benefits, but measuring the permanency of it will not be easy. The opportunities for better knowledge about soil science in this state are absolutely fantastic. The opportunity to do this better should be grabbed with both hands. I am a long-term fan of more knowledge in soil science and getting more active in the area. The bill before the house does not guarantee that any of that will happen. All of that comes with the council and the work that it does, and where the government invests its money. I see no reason to oppose the bill before the house, which is simply the administrative component. We want to see the measure of results at the end of this process.

The joy of soils, as with most landscape issues, is not measured over months, days or weeks; it is generally measured in years, and preferably decades, and occasionally centuries—in which case we will all be pretty old members of Parliament by the time we see the results of what might be done in the short term. But it is good to make a start and to have a debate in which we acknowledge the importance of the issue, and it is good to see where we can get to on a target. Again, the minister and I may well have different targets that we think should be the focus, but that is part of a healthy debate. I look forward to ongoing debates in this area, when we can debate those differing targets, accepting that the platform we have at the start is probably what we all agree upon. As I do with the Minister for Energy, I say let us debate the differences, because that is the fun part that probably delivers best in terms of political debate in Western Australia.

I have no problem with this bill. I simply look forward to the debate, and monitoring the minister on what might be delivered in soil science in the future. There is a great opportunity to be grabbed, as long as it is done in the right way. Heaven knows, we might actually move heaven and earth to deliver some good outcomes here.

HON DARREN WEST (Agricultural — Parliamentary Secretary) [4.23 pm]: I support this wonderful Soil and Land Conservation Amendment Bill 2021. I thank the minister for putting our industry back into the forefront of government. That has been a refreshing change since the minister took on that role. Nothing is more important than soil. The soil is what sustains us all. For too long we have not treated our soils with the respect and care we might have, and it is time to change that. It has been refreshing for me to see priority put on agriculture and the soil. This bill will also, as has been pointed out, modernise the Soil and Land Conservation Council, and that can only be a good thing. We need progressive people on the council who want to look into the twenty-first and twenty-second centuries, and not back the other way. I thank the minister on behalf of the agricultural sector. I know she has her

detractors—do not listen to them. Some media outlets, even the ABC, will sling off and have a crack at any opportunity they get over trivial issues, but this is at the core of agriculture. The general farming community is in total agreement with what the minister is trying to do. It is trying to diversify and change farming systems, and generally appreciates the efforts the minister has been putting in. I thank the minister for bringing this bill on. It will be supported, though there may be debate about some of its points. This is good for agriculture, and that is great.

HON ALANNAH MacTIERNAN (South West — Minister for Agriculture and Food) [4.25 pm] — in reply: I thank members who have, or have had, firsthand experience in agriculture to bring to this debate on the Soil and Land Conservation Amendment Bill 2021. I appreciate their broad-ranging comments that really enforced the need for us to see soil and land conservation at the very heart of agriculture. When I took charge of this portfolio, we had a fairly depleted resource to begin with. I was looking at the Commissioner of Soil and Land Conservation and the Soil and Land Conservation Council, and I was stunned to find that the council had not convened. There had been a plan going right back to 2003 to abolish the council. There was a view that there are now landcare groups and we did not need the council. We also found that the Commissioner of Soil and Land Conservation had been reduced to quite a junior level within the department, whereas it should be a fairly senior role. It is one of the few positions within the public sector that reports not only to the director general, but also directly to the minister. That is a really important distinction, because it highlights the fact that the Commissioner of Soil and Land Conservation has a very distinct stewardship role, which is not necessarily defined by practice in the department.

All members have spoken on the importance of soil to agriculture, and I appreciated the stories and the references. I had not heard of Dr Jill Clapperton, as mentioned by Hon Colin De Grussa, but I will certainly follow that up. In return, I highly recommend one book, John Kempf's *Quality Agriculture*. It is a series of interviews, and it is an excellent book in its practice and science across the whole field of soil biology and the interlinking of water retention in soil. I highly recommend that very readable book to anyone who really wants to understand. As Hon Dr Steve Thomas said, we are really just scraping the surface of understanding the biological systems at play in the soil, and the biological systems more generally that are on display, and we need to properly understand and harness them if we are to have sustainable agriculture to meet the targets that most of the enlightened people in the farming community—with a few exceptions—understand. Our markets demand of us that agriculture meets net zero emissions, and to do that we need to harness in a much more profound way the understanding of the biological systems at play.

The PRESIDENT: You have one more minute, minister.

Hon ALANNAH MacTIERNAN: All right. In that regard, I note Hon Dr Steve Thomas's reference to what he calls the slow water movement—I think that may be how I have heard natural sequence farming described—its absolute importance and the ability it has to change our landscapes and the ability of the soil to regenerate with minimum effort. I recommend that members look at the property of Rod O'Bree at Yanget, some 50 kilometres out of Geraldton, and the work that he has done in introducing those principles and the regeneration that has occurred across his creek lands on his landscape without planting a single thing.

Debate interrupted, pursuant to standing orders.

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