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ENVIRONMENT AND NATURAL RESOURCES COMMITTEE

Inquiry into impacts and trends in soil acidity

Horsham-2 September 2003

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Mr J. Young, Chief Executive, Wimmera Catchment Management Authority; and
Dr R. Armstrong, Senior Agronomist, Victorian Institute for Dryland Agriculture.

The CHAIR — John and Roger, we have been having a brief look at your presentation. I welcome you officially and certainly thank you for your time. We hope we will not take too much of it from you.

The evidence taken by the committee today is taken under the provisions of the Parliamentary Committees Act and is protected from judicial review. However, any comments made outside the precincts of this hearing are not protected by parliamentary privilege. All evidence is being recorded by Hansard, and next week you will receive in the post a draft version that you can correct.

I am not sure who is going to give the presentation, but perhaps you could go through the presentation and then take questions from the committee — would that be okay?

Mr YOUNG — Certainly. Both Roger and I will share the presentation. We would like give you an overview of the strategic context for the region as it relates to soil health and soil acidity in particular. I will give you an outline of what is presented in the recently completed regional catchment strategy. That is the draft, and you will note it is well thumbed so there has been a lot of work gone into that.

Roger will follow on with some technical and scientific detail of the problem across the Wimmera and its context for you, and then we can answer some questions according to what you wish.

If you do not mind I will stand up so I can work the machine behind us. As you are probably aware the 10 catchment management authorities statewide are reviewing and renewing their regional catchment strategies. We have just completed that and now are awaiting formal accreditation from the state and federal ministers of the document which we hope to get in the next few weeks.

To give you an insight, we have assembled the document or the strategy this time as an asset-based structure and have identified regionally nine major natural resource management asset bases, they being the wetlands and waterways in the Wimmera and Millicent Coast basins, the Terminal Lakes in the Wimmera system, agricultural land, ground water as a resource as distinct from ground water causing salinity problems, parks and reserves, state forests, remnant native vegetation, and cultural heritage.

Our interest in this soil acidity issue relates predominantly to agricultural land in this region, so in that particular chapter we recognise the four main issues that impact on agricultural land from a natural resource management perspective, they being soil health decline, soil erosion, pest animals and pest plants, and climate change.

One of the things the catchment strategy mentions about soil health decline which is particularly central to improving the health of soils in the Wimmera is the need to identify and prioritise those soil types and management systems which are affected by or contribute to the processes of salinity, salinisation, acidification and soil sodification and soil structure decline. They came out through the strategy process and certainly came from the former strategy as the major issues affecting soil health in the area.

We have not yet determined what those long-term resource condition targets are. We have negotiated, as have most of our colleagues statewide, to take that on board as an outcome to be determined in the next 12 months. Nevertheless, we have looked at some broad management action targets that we want to achieve in soil health and these relate particularly to improving those soil conditioning things.

We want to see a 5 per cent increase in the recommended land management techniques by 2007, which is the life of the operational phase of the regional catchment strategy. One of the measures we are using to identify those things — minimum soil tillage and stubble retention practices — is system of crop transect monitoring at various times through the year.

We are interested to see increased land-holder participation in extension activity such as Topcrop. We are interested to see the increased number of land-holders who have prepared and are operating under a whole-farm property plan, and we are interested to see the change in that by 2007. Currently about 20 per cent of the region's farmers have undertaken a whole-farm management plan or at least have done the training to do so, and that comes from a study we did last year utilising Allan Curtis from Charles Sturt University who undertook a study of understanding the social drivers of catchment management in the Wimmera. Out of 1000 surveys sent out we received 730 responses, which gave us a large database of information, and that information came from that current 20 per cent.

We intend to further survey land-holders at the end of 2007 to assess what changes in values and practices have been taken up so we can get the difference between the 2002 survey work and five years on, 2007.

The management plan then goes into some detail, high level though it may be, about some of those major actions that will be implemented to assist those processes. It is important, and it was recognised across the whole region, that we need to identify and prioritise the soil-type management systems on a 1:100 000 scale, which I mentioned earlier, which have been affected by those issues, particularly salinity, sodicity, acidity, soil biota and soil structure decline. We want to develop and communicate a land capability and suitability plan that matches land use and management practices to land class types and to do that at an appropriate scale in priority areas.

There is some real demand for that across the region, and particularly in the upper catchment of the Wimmera there is quite a deal of investment interest in changed land use, particularly into horticulture and principally into viticulture. There is some urgency about understanding the land capability and the land suitability to suit those particular investment purposes.

We are looking at investigating strategies to change cropping and pasture regimes to conservation farming practices or to adopt alternative land uses in areas affected by, or that affect areas of soil health decline. The strategies suggest promoting current recommended practice to address soil acidification, and Roger will outline some of those in his part of the presentation. We are keen to assess the impact on soil health of any large-scale changes that may occur in agricultural enterprise, whether it is from grazing to cropping, as there is currently in the south of the region with changes from grazing to cropping and particularly raised bed cropping, and, as I mentioned earlier, from grazing to viticulture in the Upper Wimmera.

One of the other actions was to conduct community education programs to increase land-holder knowledge and awareness of those land degradation issues and principally the tool for that one-on-one basis is the Topcrop extension program. Perhaps I will hand over to Roger to give you an overview of the extent and severity of the problem in the region and some of the related issues. Thank you.

Dr ARMSTRONG — I will start by addressing the question: how serious is the problem of soil acidity in the Wimmera?

Overheads shown.

Dr ARMSTRONG — This is a map showing soil pH in the region. This is the Wimmera region in terms of catchment area which puts it in a state context. John spoke about various land management uses in the Wimmera, so that has been divided up into land management units in terms of current use, geology and so forth. I will put it into context in terms of where we are. In terms of the Mallee itself and the current mapping of soil acidity, this is data collected by Doug Crawford from the State Chemical Laboratory in Werribee a couple of years ago. Effectively, most of the soils in the Wimmera have alkaline pHs. Small areas of acid soils are located predominantly in the southern Wimmera.

So you have the upper catchment area in the Great Western area, around Edenhope in the southern Wimmera and other areas. The acid soil in this area is a reflection of two things - the geology of the region itself, the catchment, and also as you move north and south of the Great Dividing Range there is a significant increase in rainfall. So this area on the map has probably about 375 millimetres annual rainfall. In the upper catchment area you are looking at about 700 millimetres rainfall here. In the space of a couple of hundred kilometres it is a very diverse catchment from that point of view. But in summary [inaudible] in the region. Again this is data from Doug Crawford's study soil pH management units, the majority are neutral alkaline. The only areas that are considered acid would be the northern foot slopes, the Grampians and the South West Wimmera Plains. Doug set a pH criteria of 5.5 in water as an indication of soil acidity.

I notice the terms of reference set out the question about costs of soil acidity in the Wimmera. I suppose my initial response to that is that there have not been many detailed studies looking at the extent and the actual agricultural implications of acidity in the Wimmera. However, you can break it up into a number of areas. There is the direct cost via lost agricultural productivity and the application costs of lime to ameliorate the symptoms, and there are the indirect costs. So from an environmental point of view, probably the major factor driving a lot of current environmental planning in the Wimmera is poor water use and salinity and its long-term management.

Acidity has an interactive effect on that water management. Generally, acidity is also seen as a cost in terms of social infrastructure, climate and so forth but that is not a big economic issue in the Wimmera just because the southern Wimmera basically has a low population.

In terms of solutions, the immediate response to any issue surrounding extensive agricultural production systems is basically you do nothing. So a lot of the soils in the southern Wimmera are naturally acid. The industries there are

very extensive — grazing and opportunity cropping. In terms of economics, the most rational decisions a lot of farmers and land-holders can make is to do nothing.

The general response of landholders in higher productivity, better economic situations is to apply lime, but then there are endless questions about how much lime you add. Most strategies for estimating lime application rates are basically if you calculate the rate of acidification, which is based on the loss of particularly cations out of the system and export of products, you can calculate approximately how much lime you need to be returned to the system to limit acidification. I suppose making a general comment, (that is not from knowledge in our catchment) but from workers who are directly involved around Wagga. Farmers generally tend to cut back on lime applications, so there is a gradual decline in pH but it is probably not an issue in terms of current soil pH levels in the Wimmera.

I suppose the best solution you are going to have in terms of managing any issue, particularly both soil and environmental, is the very strong movement towards reducing the leakiness of our current farming systems. Similar to salinity, a lot of big issues around acidity are because of an imbalance in the water system. We are losing water down to the ground water, causing recharge and rising ground water systems. It is the same for acidity. Most of the acidity in Australian farming systems is through nitrate leaching, be it from fertiliser application or leaking-based pastures. There is a need for current annual farming systems to retain the cation balance in the system. When you have an imbalance there, you get environmental degradation and for nitrate, it is acidity.

The other solution that is often put forward in terms of overcoming acidity is not so much a solution to the development of soil acidity itself, but a solution for landowners to cope with it is breeding various species for acid tolerance. However, there is a danger in that. There is a lot of work around suggesting that if you take very acid systems and start developing acid-tolerant plants, you are basically making the situation worse in the long term. So it has to be part of the overall management system.

The final thing I want to leave you with in terms of comment on the Wimmera is: will overcoming acidity solve the environmental problem? I have here a map of Victoria, again with the Wimmera region here. This map of Victoria shows various soil types listed in terms of actual sodicity. You may remember one of John's initial slides where sodicity was identified as a very significant issue in this area. What we find in the Wimmera is that soils in the southern Wimmera are acid but also naturally saline and also naturally sodic. So the issue for agricultural productivity is that agricultural production is often limited by its most limiting factor. So, for example, if it is acidity, if you overcome the acidity the next most limiting factor comes into play.

I would argue that for the Wimmera, particularly southern Wimmera, the biggest soil limitation is more sodicity, and the effect it has on waterlogging, et cetera, than acidity. You could probably argue that adding lime or increasing pH in the southern Wimmera will not have a big impact on agricultural productivity or overcome some of the negative environmental consequences of that acidity.

One of the issues likely to have a large future impact on acidity and land management, particularly in southern Wimmera, is the very strong movement away from low-productivity farming systems; so in the upper catchment areas such as the areas around Great Western that are currently mainly native, low-input pastures based on very sodic clay soils — very acid soils with inherently low productivity, low economic returns — a lot of viticulture is being developed and there has been a significant improvement in soil quality and land values from a land management point of view.

Similarly southern Wimmera is traditionally dominated by very low stock-based industry because of waterlogging. However, there has been quite a bit of interest, (because of the current terms of trade, of livestock industries versus cropping) in moving towards cropping in these areas, particularly developments that will be raised bed cropping systems. A conventional cropping system in the Wimmera, probably averages about 1 tonne a hectare of wheat compared to a raised-bed cropping system where you average about 3 or 4 tonnes per hectare.

There are a number of implications rising from this change in land use. One is when you go to mixed pasture cropping systems your rate of acidification will increase, so that is a bad thing. Conversely, by improving the overall productivity and economic returns of that land use you significantly increase the capability of land-holders to ameliorate the soil through adding lime, et cetera, so there is a better balance between inputs and environmental degradation in the system.

I conclude with the question: will intensification of agriculture in the southern Wimmera be the solution or contribute to the problem long term?

The CHAIR — Thanks very much, Roger. I welcome Hugh Delahunty, the local member, to our hearing today. Hugh was a member of this committee last time around. It is good to see him here.

Mr DRUM — John, you used a couple of terms that we are not familiar with. One was crop transect monitoring. Would you explain that one along with the extension activity such as Topcrop, just those two terms?

Mr YOUNG — Crop transect monitoring was instituted some years ago by one of the predecessors of the now Department of Primary Industries. It was instituted mainly to measure the change in land use relating to stubble retention — minimum tillage. It was done simply by designing a swathe through the landscape which officers would inspect on what might have been adjacent to a main road or might have been a flight path, and they would fly over that particular strip at a particular time or several times during the year to see the sort of land use — was it stubble retention, was it open fallow — and then repeat that annually to see what changes were occurring to make some judgment as to the level of uptake of those minimum tillage conservation practices. That is the concept of transect. It is virtually a mapped line that can be straight or not, but it is a standard route that is taken to measure something over time.

Topcrop is basically an extension. Roger might be more familiar with it but it is generally the extension undertaken by DPI officers working with a group of land-holders to look at various practices and using, as I understand it, peer group interaction to demonstrate to one another the positives and/or negatives of a particular land use.

Dr ARMSTRONG — Topcrop is based on modern extension theory. To change their practices land-holders or anyone for that matter will learn more by talking among themselves rather than going through the traditional approach, which was a classroom situation where a scientist or an extension officer would come along and lecture people on what to do and people would take away only about 5 per cent of the information; whereas if they go out and work as a group and look at the consequences of that management change, they take a lot more on board and there is a much greater probability of practice change.

Mr DRUM — Is there a formal structure associated with Topcrop?

Dr ARMSTRONG — Yes, it is one of the programs and extension components of the DPI; it is a part of the Catchment and Agricultural Services. A lot of money is spent on Topcrop groupings and a lot of groups are spread throughout the Wimmera and the state. There is a Topcrop group down in the southern Wimmera and Kalkee Plains, in north Kaniva and in Birchip.

Mr HILTON — I got the impression, John and Roger, that you do not really see soil acidity as a major issue in this area. Do you feel that will always be the case or is it just not a major issue now but could become one in the future?

Mr YOUNG — I think Roger put in context the extent of it in relation to the various soil types. It is currently not a major issue because it is not impacting to a great degree on particular land use, and most of the areas traditionally associated with acid soils in this region have related and still relate to grazing zones; so the economic imperative is not there to go about affecting the acidity. I think Roger made the point that there are other soil health issues that are probably more critical in the first instance, and soil sodicity is certainly one of those. That probably needs to be dealt with in a priority sense to soil acidity.

On the other hand there is potential for some land use change, particularly in the higher rainfall belt of the upper Wimmera which would see such things as viticulture moving into traditional grazing zones. That by itself will change the land use and will bring the management decisions to make that economic change to deal with acidity if it is required to do so. But at a regional scale and at the industry scales broadly it does not demonstrate the land soil health issue that perhaps sodicity does.

Mr HILTON — How aware do you believe farmers are in this area of soil acidity?

Mr YOUNG — I will get Roger to answer that.

Dr ARMSTRONG — In southern Wimmera the majority of farmers would do soil testing, but most of the pHs there are around about 5.5 in water, so they are aware. It is probably one of the contradictions in the Southern Wimmera that a lot of the soils are either acid in the surface soil and highly alkaline in the subsoil. That is quite different, for example, from north-east Victoria and Rutherglen where the soils are more acid throughout their profile. Similarly when you go down to areas such as Hamilton and the Western District they are much more acidic.

In answering your question whether the soils are acid, I would argue they are not seen as a big problem because the pH is not considered 'very acid'. In the context of a lot of soils — I suppose what I see as traditional acid soil areas are more in the north-east, in Rutherglen and Wagga — a lot of the soil pHs there are getting down to about the low 4s, where you start getting clay dissolving, but there are much more intensive farming systems there, so it is a big issue. Yes, the soils here are acid neutral; but as John said, in terms of the Wimmera context as opposed to the Western District and the north-east, soil acidity is not the big problem. The issue here is based around poor soil structures, sodicity and the potential development of salinity.

Mrs COOTE — John, you spoke before about the management action targets, and you spoke about the survey in 2002 and follow up in 2007. Will this information you are talking about be concentrated enough on the aspect of acidification of the soil or is it just a general survey; and in those five years is that going to be enough? What is the research plan for the future? Given that you have both referred to the changing agricultural products and farming practices, is that research in train?

Mr YOUNG — The approach will be that in five years time we will redo the survey that we did last year to try to pick up the adoption of changed management practices in this particular situation in respect of soil health. So we will be looking for changes to the adoption of best management practice, be it minimum tillage or be it stubble retention. We will be looking to see what land use changes might have occurred in terms of changing from one industry to another, be it cropping or grazing, be it grazing to viticulture and some of those changes.

As far as the regional catchment strategy is concerned, it will be looking at those high-level changes rather than the specifics of soil acidity, soil sodicity or for that matter salinity, which will probably be done at a lower level and at a detailed localised level within lower level action plans.

Mrs COOTE — So are you aware if they are doing proper research into this?

Mr YOUNG — Well, there is quite a deal of work that will be commissioned and is under way in terms of soil research. I mentioned the work being done on land capability and land suitability. In order to do that we need to understand the soil and soil types around the region. So there is some work that is being commissioned now to package that together, at a fairly broad scale admittedly — 1:100 000 — but once that whole jigsaw is coloured in, dare I say, we can then start to target those key areas to identify whether they are acid soils, or from our higher priority, maybe it is soil sodicity as the issue that we need to look at.

Mrs COOTE — Could you give me some idea of timeframe on this? Obviously this is not going to happen overnight, but the survey is five years. Is that going to be sufficient time to identify these changes?

Mr YOUNG — We suggest that possibly it is because there were quite recognisable changes in the uptake of minimum tillage practices going back the last 5 years and certainly the last 10 years, so some of that change is quite quantifiable. It is intended that we will be able to recognise significant growth in that change practice over the next five years; but it is based on the life of the regional catchment strategy, which is five years, so we will be required, dare I say, to be able to make some report on the adoption of those sorts of things or changes over that time.

Dr ARMSTRONG — If I can add something. There are probably two issues that we can draw out of that. One is that it is about priorities. There is not enough money to do everything. There are the catchment plans and a lot of people so there is wide-ranging opinion about what the issues are. So in terms of the north-east, and Glenelg Hopkins for example, acidity would be right up there near the top, but it is not a big issues in terms of the Wimmera as a whole. The other thing is that a lot of the work is funded through the Research and Development Corporations so — in fact the vast majority — so acidity was a big issue for the wool corporation and the wool industry but that money has dried up in terms of cropping.

The Wimmera itself is the grain basket of Victoria and most of the cropping at the present is confined to neutral or highly alkaline soils. So a lot of farmers in the Wimmera argue for more soil acidity and to reduce some of the high alkaline pHs, particularly in the southern Mallee. Yes, there are small amounts of government money, but if you look from an industry perspective, it is driven by administering needs and priorities.

Ms DUNCAN — Roger, are you doing any work, or is VIDA doing any work on soil acidity?

Dr ARMSTRONG — No, my area of research is in soil plan and interactions but is mainly around subsoil conditions. So, for example, we have a \$2 million product from GRDC looking at subsoil limitations, including the BCG cropping group. What we found when we started looking was that with a lot of the problems in

terms of agricultural productivity and subsequent environmental issues such as salinity is that everyone looks at the surface of the soil. The problems are in the subsoil and those issues we term subsoil limitations are mainly high boron, high sodicity and primary salinity. Primary salinity is natural salinity as opposed to secondary salinity such as you see in Western Australia in recharge irrigation areas. At present we have no work being undertaken in terms of acidity.

In terms of the Department of Primary Industries, there was some work done by Bill Slattery's group. I believe you would have seen Doug Crawford's report from the State Chemistry Laboratory. Again he did some work, but all that work was initiated in the early 1990s when there was more money around for those issues.

Ms DUNCAN — Where do you think the priorities should be for future funding research?

Dr ARMSTRONG — I think one of the issues is the poor physical structure of the soil, sodicity and its relationship to salinisation — those environmental issues.

Ms DUNCAN — And you say that from the perspective of the Wimmera or for Victoria as a whole?

Dr ARMSTRONG — I believe that it is the wrong approach to look at trying to treat the state as a whole. We have clay soils and cropping with 300 – 450 millimetres of rainfall. The priorities here are going to be different from say, Rutherglen, which has a 650 millimetres or 700 millimetres of rainfall, naturally acid soils and predominantly extensive livestock industries. If we start with a blanket approach to all issues, it is not going to work in the long term.

I suppose one thing we are increasingly seeing in terms of research is — and I congratulate you for looking at soil factors such as acidity — there is no magic fix. If you are thinking that you can overcome acidity as a single issue, our system is driven by a whole range of interactions and mixes, and we need a more focused systems approach to the issue. It goes back to the point I made earlier — crop growth and agricultural productivity is often limited by one factor, but then the next most limiting factor comes into play, and it is a case of tackling a number of the key priority issues simultaneously if you are going to make the best gains both environmentally and from an agricultural productivity point of view.

Mr YOUNG — That is why from a catchment management strategy context we have taken the view that soil health is the issue and arresting soil health decline means that we have to deal with the issues where they occur in situ around the region in the first instance. So it really is about managing all those elements and managing all those factors together, or priorities where they occur.

Mr SEITZ — John, you were saying earlier that it is about farmers talking about productivity and economics. When do they start realising that productivity is costing them money and that they need to do something about the soil? At what level or at what stage?

Mr YOUNG — That is a good point, but I think the primary drivers in terms of addressing those soil health factors in this region certainly are related to agricultural use. We do not see demonstrations of significant on-site impacts on the environment through the vegetation issues, nor for that matter are we seeing, other than secondary salinity issues pertaining to the environment off-site. So it is very much about managing the land for its productive values and ensuring that those productive outputs are sustainable.

So when we come back to what we have described in the strategy as soil health issues and practice, it is about getting best practice in terms of managing the soils for productivity in the sustainable context — of maintaining the soils, maintaining the productivity et cetera. All those things are hopefully dealt with together, even though the trigger point for the land-holder in determining whether he applies some investment through liming or through some other strategy to arrest acidity or some other aspect of soil health, is going to be driven by his ability in his economic environment and the marketplace to be able to recuperate that investment.

But the message we are trying to get out to the land-holders, predominantly through the concept of the Topcrop extension, is that you have to manage the soil for all those factors and for soil health generally rather than just soil economics.

Mr SEITZ — How do you do that? Do you do it through field days or seminars?

Mr YOUNG — Pretty much the concept of Topcrop extension, which is coordinated through the Department of Primary Industries here and the field officers in working with land-holders themselves. Roger mentioned a number of locations around the region where Topcrop groups work together to share their ideas and to

share their failures as much as their successes as well. They work with the support and assistance of one or two of the departmental officers to add to the information and to grow their abilities to improve their management and approach and to maintain best practice. So it is very much a group type activity, not unlike the Landcare group concept.

Mr SEITZ — You mentioned the word ‘leakiness’ before. Does that mean that if I am down the slope and the land-holder up the slope is not doing his job properly I will finish up with all his contaminants on my soil, especially the subsoil?

Mrs COOTE — There are not many slopes in the Wimmera.

Dr ARMSTRONG — I suppose you could look at a larger scale than that. If I were a South Australian I would argue that Victorians and New South Wales people are pretty big contaminators of their systems, so it depends on what context you put it in — whether you are talking about large catchment issues or smaller farm issues. A lot of major problems with soil salinity, for example — a classic example — is farm practices, so in terms of the Wimmera and the upper catchment we are not sure but we think that most of the salinity problems in the Wimmera originate from the upper catchment. Farmers there can be unaware that what they are doing is having a negative impact on what might be affecting not only their neighbours’ land but land 100 kilometres away. Acidity is different from that point of view because it is localised on farms, so you can manage acidity on a paddock-by-paddock basis. But again a lot of those processes are very slow, so it takes from 20 to 50 years to occur.

Going back to your earlier question about how people can manage those problems, you need to break that up into various stages. The first is: are there tools around so people can recognise that they have a problem, and that is not always obvious. With a lot of issues, particularly environmental issues, people do not recognise that there is a problem until it is glaringly obvious and it is probably too late to do something about it. The next critical stage is: once you identify there is a problem, can you do something about it? In the case of acidity we would argue that you do what the rest of the world does — just add lime, as simple as that. But the real crux for most Australian farming systems is what John hinted at: can farmers afford to do something about it?

Farmers are businessmen. No farmer wants to see his land or his neighbour’s land or his community’s lands deteriorate, but it is about price economics. That is why I raised the issue earlier that if you are in an extensive livestock system, say sheep grazing, in the last 10 years in particular there has not been a lot of economic opportunity to put a huge amount of money back in the form of lime. If you go to a more intense system such as viticulture, which is right at the opposite end, the value of land needed to set up a viticulture system is about \$30 000 a hectare. Lime is a piddling amount of money in terms of the overall context. If you have to spend \$500 a hectare for lime on your soil for viticulture it is not a big issue. If you are a sheep grazer in the southern Wimmera your land is probably not worth more than \$1000 a hectare, so it is a very complex interaction.

Ms LOVELL — I believe a cost-sharing arrangement for the management of soil health in the catchment has been proposed. Correct me if I am wrong, but I believe that land-holding is 60 per cent, agribusiness is 10 per cent, the state government is 20 per cent and the federal government is 10 per cent. Has the CMA estimated the total cost of managing soil health care?

Mr YOUNG — I cannot answer that, Wendy. I do not know that we have currently. We did attempt that in the first generation of the regional catchment management strategy in 1997, but I do not remember the numbers. I guess the annual expenditure on soil-related grants would be of the order of \$150 000 to \$200 000 this year, so it is not a lot; and the uptake is that trigger factor to the expenditure if you like. Most of the uptake of grants, what we call land protection incentive scheme grants, has in recent years related to issues of salinity on farms and treatments to arrest that either immediately locally or off site. I do not recall from memory in the last 12 months very many grants to land-holders in respect of addressing particular soil health issues directly. I cannot give you a figure on that.

Ms LOVELL — Do you know if all those identified parties have signed up to the plan?

Mr YOUNG — To the strategy?

Ms LOVELL — Yes, to the strategy.

Mr YOUNG — There is no normal signing for community people, but the engagement process certainly covered a very wide cross-section of stakeholders, and we did meet with all those. In particular the VFF, for

instance, was represented in each of the working groups that we ran throughout the development of the strategy process and offered comment on the draft strategy that went out last month. Not a great deal of comment was received in terms of those issues other than that. Because there was no comment we have assumed that that means no comment, no support.

A lot of the work that was done has come through from the soil health area through the Department of Primary Industries, as it is now called, the Topcrop groups and of course Landcare people, who are generally farmers first. I guess our sign-off process for the community is, firstly, the workshops we run, engaging representatives of their groups and individuals as they feel the need, and secondly, the public consultation process.

The CHAIR — You talked about some work that was done by Allan Curtis. Would we be able to have a copy of that report?

Mr YOUNG — I can make that available, yes.

The CHAIR — My other question is around perennial pastures. Encouragement of the use of those has been identified as a high priority. Can you go through why that has been a priority and what steps have happened in the last 12 months to get more perennial pastures sown?

Mr YOUNG — The approach to the use of perennial pastures in the Wimmera has been predominantly at recharge, reducing the recharge of water to the water table salinity. The areas where perennial pasture is encouraged are certainly targeted within those areas as mapped and are identified generally speaking in the upper catchment. Roger made reference to that earlier in that the genesis for salinity transport in this region at a regional scale comes from our those upper catchment recharge areas.

There have been salinity grants — that might be what you were referring to — for the establishment of perennial pastures in the upper catchments of the Wimmera and predominantly across the inland slopes of the Great Divide through central Victoria as well for quite some years and that continues. We are keen in this region to pursue the uptake of lucerne in that context because that services the best need of water use because of its deep-rooted nature.

But I believe there have been some technical difficulties, and Roger is probably better attuned to those than me, in terms of the ability to sustain this throughout some of the areas, so there are still some issues to be solved. But certainly that is a major promotion in terms of the use of lucerne and perennial pasture, and even more recently work being done by Southern Farming Systems looking at the expanded use of native pastures.

Dr ARMSTRONG — I suppose the issue of perennial pastures just goes back to the leakiness of the system. You had a very public example in Western Australia where much of the current vegetation there has greater potential for recharge, and it is the same for acidity. If you go to a cropping-fallow system where you have predominantly annual species and when you have that sort of mismatch between plant growth, which tends to be in spring, and water availability and mineralisation in terms of acidity which tends to be in winter, you have a mismatch between the system and that is when the system becomes leaky in terms of nitrate or water. So perennial systems tend to overcome it.

Just a note here; all perennial systems are not necessarily the same so I did some work in the Mallee, looking at the subsoil limitations. A lot of the perennials there, rather than being deep rooted mostly have root growth in the top soil because the subsoil is too hostile for root growth. So there is a note of caution there: do not treat all perennial systems the same. We suspect — we are not sure — that some of the problems we had with lucerne may be because it is not adapted to our subsoils here, so it is actually not deep rooted in this context, whereas a lot of native grasses and things like that appear to be okay.

Mr DRUM — This is the first time we have heard the term ‘sodification’ or soil sodicity. Can you just explain that one to us?

Dr ARMSTRONG — Soil sodicity is just a high amount of sodium in the soil within the exchange complex. Eighty-Five per cent of the soils in Victoria are classified as sodic just because of the geology. Areas like this have been under marine deposits several times over the millennium. We are effectively low rainfall, high clay so that sodium cannot be leached out of the soil. Sodium impacts on soil because it destroys the soil structure. What is a good example? Parts of southern Victoria have that, you know, really cracking, sticky, mucky clay?

Mr DRUM — Yes.

Dr ARMSTRONG — These are most likely to be sodic clay whereas the reverse is low salt. Cracking clays particularly are non-sodic at the surface; they have beautiful soil structures, water infiltrates readily and plants grow.

Mr DRUM — And you say that has been the no. 1 priority at the moment?

Mr YOUNG — Sodlicity has been.

Mr DRUM — And the approximate cost of lime in this region? As you say, we heard up in the north-east that it is expensive because of the cartage costs. In this region?

Dr ARMSTRONG — There is not much sold commercially around here. It would be much dearer than in the north-east because it has to come from across the border. As you say, the big cost of lime is the cartage cost. Lime itself is not inherently expensive.

Mr HILTON — You mentioned climate change as being one of the issues. Have you seen any evidence of that, and if you have, what are the implications for soil acidity?

Dr ARMSTRONG — I would argue that it is a dangerous approach to ask if we have actually seen climate change because every hot summer someone talks about climate change. I believe that undoubtedly the world has experienced climate change. You just have to look at the long-term records. The question, and where opinions differ scientifically, is in the rate of that change. I was talking to John about that before we came in here. The Australian Greenhouse Office predictions are talking about a 30 per cent decrease in rainfall in the next 50 years and a 2 degree or 3 degree increase in temperatures and therefore a concurrent increase in evaporation and implications. There is going to be less water around particularly when we need it, which is in winter in terms of crop growth and also run-off. I think the implications of that from my perspective are going to be a steady movement of more intense agriculture and cropping out of the northern areas of Victoria, from the Mallee towards the south.

There has been a huge expansion in terms of cropping in the southern Wimmera and the higher rainfall zones of Victoria in the last five years, which has corresponded to the drought. What we call dry seasons are getting more frequent and longer term; and when we talk about longer term, it is 20 or 30 years. But if you expect to see climate change tomorrow, you are probably going to be disappointed. I think a lot of thought is being given to how we can manage those changes. As I said, there will be a lot more cropping in the southern areas of the state, whereas traditionally cropping was confined to the northern areas.

Mrs COOTE — Given that you said you have the Topcrop program, and indeed you said that in soil health decline one of the actions was to promote, and then over the page on the next slide one of the things that you showed under solutions was to do nothing. How entrenched in the Wimmera is that do-nothing culture?

Dr ARMSTRONG — I suppose you have to put it in a different context. I am a Queenslander. I suppose what surprised me about the Wimmera was that it is a very conservative area. This is one of the more traditional cropping areas in Australia so there is a very strong capacity to respond to changes, including financial capacity — or there was prior to the drought — whereas in areas in the southern Wimmera, where education levels are probably not so high, farmers are interested in land but there are financial implications. If you were living off a wool cheque you would not have made a lot of money over the last 10 years so there is just not the financial capacity to respond to it. But I have not met too many farmers who, if they are given the knowledge and the financial opportunity, will not do something to directly improve their productivity.

Mrs COOTE — So given that large cropping area, say outside Rupanyup and Minyip, owned by the large corporations, are they more amenable to change and looking into adapting and taking on board your Topcrop and promotion programs?

Mr YOUNG — Perhaps I can comment that I think the drivers are there for them to do that. If they can see the benefit both financially and otherwise in adopting best management practice they will avidly accept that provided they are convinced that the practice is appropriate to proceed, whatever it is, to deal with soil acidity, soil sodicity or any of those soil health issues, and that applies across the board. I think some of the performances of the larger properties have demonstrated that that is very much the way to go in sustainability as well as economics.

Dr ARMSTRONG — It really gets down to economics. It is very easy for researchers who dream up good solutions but who do not have to fork out the money themselves to make those changes to criticise land-holders and say that they do not like those changes.

Mr YOUNG — A very good example of that momentum is the Birchip cropping group which is driven by farmers. The whole purpose of that group is to aspire to best management practice and change as required by economics, science or the environmental circumstance. The growth of the Birchip cropping group and the Southern Farming Systems demonstrates that.

Mrs COOTE — We are seeing the Southern Farming Group later in the week.

Dr ARMSTRONG — It is the key point for all farmers these days; it is not seen as a case of environmental benefits or productivity benefits. All our best management strategies are often based around simultaneous win-win situations, and that way you get adoptions in terms of financial gain and environmental outcome.

Ms DUNCAN — Again, this CMA strategy talks about finding alternatives to lime and gypsum for dealing with acidity. Is that also about economics, about finding a cheap alternative, or is there a problem with the continued application of lime?

Mr YOUNG — I am not sure if I understand where you are coming from. Certainly the economics of the application of lime are critical in terms of the industry, whether it is grazing or cropping. It determines whether you do it.

Ms DUNCAN — So the desire to find an alternative is not so much a reflection on lime but more about the economics?

Mr YOUNG — Yes, and perhaps in some of the lower productive areas, particularly on the slopes of the upper catchment, the change in land use from traditional grazing to horticulture, principally viticulture, is bringing about an alternative.

Mr SEITZ — Changing the direction, we talked about private land-holders and productivity and economics. If we do nothing and the acidity continues, is it likely to have an effect on our water streams and public lands?

Dr ARMSTRONG — In the Wimmera?

Mr SEITZ — On the environment, yes. I am talking about even in 60 years time.

Dr ARMSTRONG — It will affect all environmental issues, but in this case what we have to address first is salinity or acidity. To give a good example, a huge amount of work on acidity was funded in Wagga by the then Australian Wool Corporation in the late 1980s, early 1990s, but out of the blue came salinity. In terms of public infrastructure salinity is having a much more negative impact than acidity at present. But it is all those issues, yes.

The impact will vary from region to region. For example, the greatest impact of acidity will be in high rainfall areas where the soils are naturally more acid but also more poorly buffered from a pH point of view; but there will be other areas such as lower rainfall areas, more clay soils, where rates of acidification will be much lower and I suppose in terms of overall priorities it will not have a huge impact.

The CHAIR — Is soil testing something that farmers do routinely?

Dr ARMSTRONG — It varies. They are strongly encouraged to do it. The reasons it is not more widely undertaken are, firstly, probably because of costs; and secondly, say for something like phosphate testing, which is probably the second or most major nutrient fertiliser input there, the findings made from phosphorous testing of alkaline soil compared to those made from traditional soil are very inaccurate, so that has created a bit of cynicism. But I would say if you look at the long-term trend, without doubt there has been a steady, significant increase in the number of farmers undertaking soil testing and using that as part of their paddock and property management.

Mr DRUM — Roger, did you say that some of those tests have been inaccurate?

Dr ARMSTRONG — Yes.

Mr DRUM — Are they undertaken by farmers in conjunction with a commercial company?

Dr ARMSTRONG — Almost inevitably these days because of the integrated nature of farming the commercial companies will undertake it, and that commercial testing could be directly through the fertiliser companies, and they would obviously like to encourage soil testing because they will then give a recommendation to add more fertiliser; or increasingly farmers are looking for private guidance from independent people who only take soil tests for themselves and then give independent advice about the best strategy in terms of fertiliser use or soil renewal such as gypsum.

Mr DRUM — There is a significant cost factor there too, isn't there, between getting an independent agronomist to do it as opposed to getting a commercial fertiliser company to do it for you?

Dr ARMSTRONG — There is room for that. I do not know, but I suspect fertiliser companies would probably offer that sort of test at cost price or at a slightly reduced price if they were going to make up for it by increased fertiliser sale. But I do not know the facts. I am not privy to that.

The CHAIR — If I can go back to where I was with the soil testing: the farmer wants a soil test done, and it is like if I have a blood test done — it might tell me I have glandular fever but it will not tell me that I am pregnant, depending on what test is carried out. Are soil tests the same? Do you actually have to look for acid soil, or do you look for aluminium, or phosphate or something else? Does one test tell you everything there is to know or do you have to identify what you are looking for and they test for that?

Dr ARMSTRONG — Generally soil tests can be specific. Factors such as pH, or salinity or phosphate can be relatively simple. Part of the problem with costing is that you may take one soil sample but there is a whole range of different procedures for analysing that soil. Work is being undertaken, looking at extractants or methodologies where you can combine soil tests, for the same reasons they do it in medicine — because of potential cost savings. Unfortunately not as much money is spent on soil testing as on medicine so the advances are not so quick.

The CHAIR — So the tests that you were saying were inaccurate and unreliable were around the phosphate?

Dr ARMSTRONG — What we find is that some soil tests for phosphorous on alkaline soils are not very accurate. Most of the tests were developed for acid soils, so in terms of the context of this inquiry they are reasonably accurate, such as in Colac. We have found there was a natural tendency for people to assume they could take those tests and use them on different soil types, and they were not found to be very accurate.

The CHAIR — Thank you very much for your time.

Mrs COOTE — It was very interesting. Thank you.

Witnesses withdrew.

CORRECTED VERSION

ENVIRONMENT AND NATURAL RESOURCES COMMITTEE

Inquiry into impacts and trends in soil acidity

Horsham-2 September 2003

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Mr B. Ower, Victorian Farmers Federation.

The CHAIR — Welcome Bill. All evidence is taken under the provisions of the Parliamentary Committees Act and is protected from judicial review. However, any comments made outside the precincts of this hearing are not protected by parliamentary privilege. All evidence is being recorded by Hansard and next week you will receive a proof version of the transcript. As I explained to you before, perhaps you want to make some comments and then take questions.

Mr OWER — I was contacted last Friday by Mr Sid Cramer, who is the organiser for the VFF, asking me if I would have time to come and meet with you today in this forum. I was not briefed before on what the inquiry was about, but I have made a few inquiries since and to the best of my knowledge the occurrence of acid soils in the Horsham district or the Wimmera region — where you are as the present time — is not widespread. In fact, one of the few instances of a severe area of acid soils would be on the southern fringe of what we know as the Little Desert, which is to the north-west of here, or north-west of the township of Natimuk to the west of us. Apart from that I am not familiar with any other areas of any size where soil acidity is a problem.

The area to the south of the Little Desert tends to have lighter, sandy-type soils, which in themselves are rather difficult to treat because they can sometimes go hand in hand with a problem that we call non-wetting sand. There are a number of ways that farmers can treat non-wetting sand with a view to clay topping or spreading clay over the soil and then allowing the clay or the heavier loam soil to mix with the sand. It will therefore hold moisture and can be treated with things like clovers, which will reduce the acidity of the soil and build it back up to either a neutral or an alkaline state. Gypsum is sometimes used as well in soils that are not non-wetting to get a better penetration of water. But I would not regard soil acidity as a major factor in this particular area.

I do not know that I need to comment any more unless there are some specific questions.

The CHAIR — Okay, we will take some questions.

Mr HILTON — Bill, you say it is not a problem now, but do you see it being a problem in the future?

Mr OWER — I rather doubt that it is a major threat: I do not see it as a major threat at the present time. I heard the good doctor talking about soil testing, which is becoming a fairly common practice amongst farming people these days, and whereas in some instances they are not terribly accurate I think that farmers are getting a pretty good handle on what the soils are and the condition that the soils are in. Farmers have a lot of very good technical knowledge these days, not only from the departmental agronomists and people who are very skilled but most of our grain growers in private enterprise these days have an agronomist working from a commercial company who gives them very good advice. I would say that the condition of soils generally speaking tends to be improving in the area rather than depreciating.

Ms LOVELL — Bill, you said that the area around the Little Desert was the worst affected area around here. What types of agriculture is happening around that area?

Mr OWER — The southern edge of the Little Desert tends to be light, sandy loam-type country. It is being used for both cropping and grazing. I am not personally very familiar with the extremities of that acidity problem, but on the southern fringe of the Little Desert there is also some irrigation from underground water, with some irrigators growing things like potatoes — this is further west in the Minimay and Neuarpuir area towards the South Australian border, and back this way, where they perhaps grow some clover seeds and other crops. So it is a mixture of dryland and irrigated farming. It is a mixture of cropping and grazing, and that principally covers it.

Ms LOVELL — What measures are the farmers there taking to address the acidification?

Mr OWER — As I said, one of the biggest problems with acidic soils in that area is that they tend to be the sandy-type soils, and one of the problems you get with some sandy soils is a non-wetting fault. When I say non-wetting sand, it does not matter how much rain you get, the moisture tends to go through that sand and does not lodge there; it goes through to the heavier clay soils below. So if you are going to treat acidic soils with things like clover, which tend to build up the alkalinity, you need to treat those soils so that they will hold the moisture. They do that by clay topping or taking heavier soil from another part of the property and spreading it across the sandy soils. That costs at least \$100 per acre to do; it is a major expense. After that heavier soil has been mixed with the sandy soil, it will hold the moisture when it rains and you can then plant a crop or establish a pasture there and it will grow because the moisture has been retained around the roots of the plants. That way the acidic problem can be not eliminated but improved by building up the alkalinity.

Mr SEITZ — You seem to me to be a very experienced sort of person — —

Mr OWER — Don't let me fool you! You had a lot more experience here in the two previous gentleman than in myself. I am very much a lay person, as I said to your Chair.

Mr SEITZ — Well, that is what I coming to. You are from the university of hard knocks and the question I want to ask is: in the 1950s and the 1960s the then Premier, Mr Bolte, was handing over some of the Little Desert to be cleared and used for farming, so over the years the land has been used in different ways. Some of it has been used over the last 60, 80 or 100 years for the traditional European way of farming. Can you just elaborate on that even from your own knowledge? In this region how long has some of that land been farmed?

Mr OWER — What you are suggesting is that this goes back to the days — —

Mr SEITZ — Soldiers settlements and stuff like that. That was happening in the 1950s, right?

Mr OWER — It goes back to the days of Minister McDonald, who had a vision to open up a fair area of the Little Desert for farming purposes. In fact, some of it was done. A number of subdivisions of parts of that land were given up for settlement back in the 1950s and 1960s. It was stopped, however, because people could see it would lead to a degradation of the environment. Some of that country was probably best left as it is under natural bush than cleared for farming practices.

I guess that is part of the problem. Those lighter soils are very fragile and they tend not to be terribly productive. That has changed in the last 10 years in particular, when the use of underground water in west Wimmera in particular has been used to promote irrigation, both by the centre pivot irrigators and by other means. I do not think there can be any argument with the fact that that subdivision and opening up of land in the Little Desert went only so far. It probably if anything went a bit too far in my personal opinion before it was stopped. But the soil is fragile.

One of its biggest problems with that light sandy soil is that your level of inputs has to be kept up to a fairly high level to keep productivity because when it rains that light soil tends to leach most of the things that you add to the soil out of the soil. It washes out and washes through. With fertiliser you need to keep putting it on regularly because the rain tends to wash it through and dissipate, whereas the heavier soils like we have around here have the ability to hold that fertiliser for quite some time. That is the difference. I might not have answered your question for you.

Mr SEITZ — No, you have. If I can extend it a bit further, we had the settlers here and the squatters in this area around the region. How long had they been farming here in this traditional European way of farming before they changed to the modern machinery and the great broad acreage farming?

Mr OWER — The property where I live just out of town was taken up in 1845, so white man came here in the early 1840s, The township of Horsham was settled in the late 1840s and since then the area has been farmed. Of course in the early days it was '5 acres here and 10 acres there' type of thing, using a horse and later horse teams. I guess farming became mechanised very much from the 1930s on. The 1930s, 1940s and 1950s was the mechanisation era in farming with the introduction of tractors and bulk handling and that type of thing and farms moving to much greater acreages.

Years ago most of these areas here were surveyed into 320-acre properties or smaller, and they were regarded as being sufficient to be able to raise a family and probably employ another working man with a family. As time went by those farms became 640 acres, then 1000 acres and now 2000 acres and sometimes a farming family here would look at 3000 to 4000 acres as being a viable farming area for, say, a farmer and son. That is one of the tragedies, I suppose, for the country insofar as where an area of farming community might once have held 300 or 400 people, today it might hold 20 or 30.

Mr SEITZ — I will finish with my last point: does the introduction of that heavy machinery add to the degradation of the soil compared to the conventional or original farming methods?

Mr OWER — I would not have thought so; quite the contrary, especially in the last few years with the movement into very sophisticated farm machinery using things like satellite location devices which can tell farmers all sorts of things about the condition of their property and where their better yields are coming from. The advent of the spreading of gypsum on some of our soils has certainly improved the profile of our mixed and red soils and generally speaking the farms are not being worked anywhere near as much as they used to be. We have things like minimum tillage these days; chemical fallow rather than conventional fallow where the land is sprayed; the weed growth is killed to retain the moisture rather than having the weeds growing, taking the moisture out of the ground.

I think the farming methods today are much better for our soils than they were back in the days of slower, older, smaller machinery, or even back in the days of horse teams.

The CHAIR — Do you know the cost of lime locally?

Mr OWER — I do not, I am sorry. I know Kalari transport from Portland brings a lot of lime up to this area from Ballarat, the Western District area, but I do not know what the cost per tonne would be spread on the property.

The CHAIR — Do you know whether farmers have any problem in accessing the lime?

Mr OWER — I would not have thought so. Again I do not know of any reason why they should because lime is advertised as being readily available from the Western District around Ballarat and west of Ballarat, through that area there.

The CHAIR — What are your views on the Wimmera regional catchment strategy? It highlights the need to better match the land use with management practices and the underlying land class, like the soil type and the slope and the aspect, simply to better manage and better protect the soils of the Wimmera. Can you give me your views on that strategy?

Mr OWER — What you have just said is a very general, broad-brush type thing. I certainly would not argue with it. It does not matter how well something is managed, you can always improve on it, I believe. Specifically what are they talking about? Are they talking about the erosion problems of the upper Wimmera catchment area or are they talking about use of livestock on country which is probably prone to wind erosion and that type of thing?

The CHAIR — Yes, and I think moving from pasture to cropping and perennial grasses so that we are improving the productivity by changing the land use and improving the ability of the farmer to make a living by further intensifying the land use and management practice.

Mr OWER — There are certainly some soils that possibly need to be cultivated very little, and we are getting back to those lighter soils again which are very fragile. One of the things we introduced in this country years ago which does help that light sandy soil a great deal is a grass called veldt grass, which is a native from South Africa. It is a deep-rooted grass which farmers can establish in light soil, and the root system is so strong that it holds it and stops it from blowing and disappearing. I have seen some instances where country that has been well established with veldt grass has been cultivated and that veldt grass cover lost, and with the opening up of the soil it does lead to some wind erosion, certainly. But I do not think that is a practice which is widespread.

Most farmers these days are conscious of the fact that they must look after their soils because the soils look after them; and as I say, with the advice that they have these days both from the departmental point of view and a professional point of view with their own agronomists who are retained commercially I think that they come to a fairly good balance of what they can do with their various soil types, and they do not tend to abuse it.

Ms LOVELL — Bill, you mentioned about veldt grass and the deep rooting system on it. Has there been any other experimentation with other deep-rooted grasses like phalaris or something like that?

Mr OWER — Phalaris is certainly used in lighter soils as well. The veldt grass, I think, was favoured because it was much easier to establish than phalaris. Phalaris is not an easy grass to establish in some pasture situations, depending on climactic conditions, and again I think the veldt grass is a little easier to establish in those non-wetting sands where phalaris would be very difficult indeed; but once that clay was mixed with it phalaris would probably be a good alternative insomuch as it would perhaps be a bit more flexible in terms of its suitability to livestock. Livestock like veldt grass but they probably like phalaris even more in some circumstances.

The CHAIR — Thanks very much, Bill. Thanks for your time today.

Witness withdrew.