REPORT OF PROCEEDINGS BEFORE

STANDING COMMITTEE ON NATURAL RESOURCE MANAGEMENT

At Sydney on Wednesday, 3 September 2003

The Committee met at 10.00 a.m.

PRESENT

The Hon. Pam Allan (Chair)

The Hon. R. S. Amery
Mr G. Aplin
Mr A. M. McGrane
Mr G. F. Martin
Mr D. F. Page

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COLIN JOHN MUES, Research Development Manager, Natural Resources Economics, Australian Bureau of Agricultural and Resource Economics, GPO Box 1563, Canberra, sworn and examined:

Mr MARTIN: The normal procedure is you might like to do a preamble opening address and then we will proceed with questions from around the table. Are you happy with that? Are you happy for ABARE's written submission to form part of your sworn evidence?

Mr MUES: Yes, and I have formed another paper that can be taken as part of that submission.

I thought I would take the time to open with a couple of remarks that come to the heart of our submission and I think there are really three points. The first is that on the basis of our research it is clear that water trade does have the potential to alter in-stream salinity outcomes in the River Murray system. This is the result of collaborative work between the CSIRO (Commonwealth Scientific and Industrial Research Organisation), Land and Water Division and ABARE (Australian Bureau of Agricultural and Resource Economics). I will discuss a little bit more detail further on, but it is sufficiently substantial I think to take notice of.

The estimates that we are coming up with suggest that the impacts of the trade on people not involved in the trade, not the buyer and the seller directly, can constitute anywhere between 10 to 15 per cent of the value of some trades. It is not a minuscule proportion, but when we think about the nature of this problem, and I can explain it later if you like, we have to think about whether this is a problem that is solvable, and from our perspective the key thing here is transaction costs. Is the problem amenable to actually being instrumented and resolved through change in the institutional structure or change in policy in a way that is reasonably cost effective, that is, is the cure worse than the disease? That is the challenge we have got here.

When you think about the nature of the problem, the salinity problem in the southern Murray Darling basin is a problem, but it will not necessarily be a problem in other valleys. Where it is not a significant problem, all the time and effort to introduce institutional arrangements to take account of the salinity effects from trade will probably be more costly than the problem itself. That is the first point I would like to make. We have to be conscious of, firstly, judging how large the problem is and how effectively it can be addressed with the institutional change.

If we were to proceed, it comes to my second point, and that is that we then have a choice of a number of instruments, and in summary you can call them price based instruments or quantity based instruments and other things equal, if demand is relatively constant - that is the demand for irrigation and the associated salinity discharges from it - then price based instruments and quantity based instruments are relatively similar, they lead to generally the same outcome. When demand does change from season to season then a price based instrument starts to become favoured from an economic efficiency point of view. I can go into that in more detail if people want to address questions.

The third point is that of those choices, although they have different efficiency implications, they also have very different wealth implications that is for holders of the irrigation entitlements. The nature of the institutional change we use to address salinity in trade will affect the value of those assets. For the irrigators we have choices over the way we instrument this problem and our choices then will have a flow on effect, a consequence, for the wealth held by irrigators.

It is important to be conscious of those types of issues: Firstly, the nature of the problem, and I can talk about that in more detail; secondly, whether we can come up with a solution or a cure that is better than the disease; and, thirdly, we need to be fully aware of the consequences for the value of capital assets for the choice of institutional arrangements we make.

With those opening comments I might leave it to members of the

Committee to address questions to the verbal comments and the written submissions I supplied.

Mr PAGE: On the question of whether the cure is worse than the disease, because that is pretty fundamental to this Committee's deliberations if we are going to set in place a whole range of mechanisms to try and offset the negative impact of water trading on salinity levels, I think your submission suggests a regional focus. Have you identified those areas, the priority areas, where it might be worth the cost associated with trying to get solutions, from an institutional perspective versus other areas? Presumably the lower the level in the basin, the higher the priority, or is that not necessarily the case?

Mr MUES: I suppose there are two issues here. One is the biophysical characteristics of the regions involved and the hydrological conductivity, and hence the volume of trade that goes. I will start with saying that I think the extent to which we go between individuals or regions is really dictated to us by information, and here we rely on the scientific fraternity, who need to be able to tell us what is the impact of irrigation on a particular site with a particular irrigation practice.

At the moment there are so many factors that influence the salinity impact it is difficult and very costly. I am sure they could do it but we would be funding a fairly significant research effort. Our thinking is that from our modelling we have identified the general characteristics at the valley level. Our modelling looked at the major irrigation areas in each of the valleys of the Murray Darling Basin, and in the lower Murray part we separated into about 11 regions, from Boundary Bend down to Morgan in South Australia. We can have a look at those general characteristics of the regions and identify that, yes, there are probably some gains to be made from at least going to that regional level. The information seems to be there. We understand the general characteristics, average ground-water salinities being a key thing, average soil type is another, and ground-water response times being the third.

Mr PAGE: One of the concerns I have had in relation to water trading is that people who are in salt affected areas that have water licences will trade into non-salt affected areas because they can avoid the problems of salinity. It strikes me that if you just take a regional approach, say, by reasons you seem to be talking valleys, is it not possible under the arrangements that appear to be emerging under COAG (Council of Australian Governments) that people will be able to trade from one region to another, one valley to another, and transfer a salinity problem in one area to another. I raise that issue in the context of what you are talking about as being a regional based solution for areas of high priority. Presumably there will be inter-regional movements of water which will impact, or could impact, significantly on transferring salinity problems from further down the basin to further up the basin?

Mr MUES: I might just recap then in terms of the nature of the problem and the underpinning of our results because with that we will be able to have a better understanding of why trade like that is less likely to transfer the salinity problem.

The problem arises because when we irrigate we have a recharge fraction that goes beyond the root zone and into the ground-water system. The added pressure on a ground-water system then pushes a larger amount of ground-water back into the river system. That is the natural flow path for the ground-water. The impact of irrigation in any particular region depends crucially on two things. One is how large is the recharge fraction, so how much water goes into the ground-water system; secondly, what is the salinity of that ground-water.

In the paper I have tabled, our conference paper 2001.16, if you go to page 11, table one, here we actually list the characteristics of the critical regions, from our view, anyway, from these trading scenarios and included in there are the two key variables - the recharge fraction and the ground-water salinity. The ground-water salinity varies from, on average, 1,000 milligrams per litre in the Murrumbidgee system, which is relatively fresh, but when you get down into South Australia, between lock two and lock three, the ground-water down there is, I think, approaching half the salinity of sea water, 33,000 milligrams per litre. If we have the equivalent amount of recharge going into both of those areas we are pushing a whole lot more salt into the River Murray out of lock two and lock three than we would be in the Murrumbidgee. It is not so much moving a salinity problem, it is

actually when we change the location of irrigation, the irrigated activities have differential impacts on the Murray system.

The proposal then is to bring in institutional arrangements that provide incentives to irrigators making trade decisions to take those salinity impacts into account, which currently they are not. They trade on the basis of how much can I make from my water, how much can they make from their water, let us have a bilateral trade and the individuals are not held directly accountable for those. But if we do redress it with institutional change and policy change there will be market incentives for irrigated activity to move to those areas that are less damaging for the environment. I am talking about in-stream salinity; I am not talking about soil salinity on the irrigation farm itself, or high water tables underneath the farm itself; it is ground-water exports into the river; it is in-stream salinity.

Mr MCGRANE: On your case here from Goulburn to lock two and three, the climate changes, the soil changes dramatically from Goulburn to there. You grow crops down the bottom area that you cannot grow at Goulburn. That would have to be taken into account.

Mr MUES: Absolutely. The private benefits from trade there, and in some of our tables we do separate out what we call the net internal benefits, that is what is the gain for trade between the two individuals. That reflects the different climatic conditions and soil types and the fact that we can grow very good horticultural crops in the Sunraisier and Riverland districts and we can not do that as much in Goulburn or the Murray. They are the private incentives for trade that really we are trying to have arrangements that will make individuals make choices that will reflect also the salinity outcomes. They will be making that of their own free will in the market place. Water trade can still actually move and go to higher value activities. If we bring the arrangements in to deal with the salinity we get an overall better outcome. The irrigator, in making their own decisions, will also take water to those areas that have less impact on the river through trade.

CHAIR: You might have already addressed this, but given that nationally governments seem to be working towards the water trading model, what sort of response are you getting to your proposal? Are they addressing any of these issues?

Mr MUES: I believe it is on the agenda now, yes, as a result of this work., and ABARE has had a representative on the task force preparing background papers for the COAG meetings last week and we believe it is on the agenda. How well it is being received - definitely it is seen now as an issue that is probably worthy to be addressed and we now have to figure out what arrangements can provide a net improvement rather than complicating the system overly without necessarily getting a net benefit from change.

That is recognised at the Commonwealth. I am pleased to say that I have had the opportunity to present our submission to this committee. When I talk to the Murray Darling Basin Commission, I think they are now starting to appreciate the nature of the problem here, and the slow distillation of scientific work, but we have coupled it up with economic analysis, is starting to be better understood and people recognise it as a problem. I will pull short of saying that irrigators see this as something that has to happen. As I mentioned, options for institutional change have wealth effects. It will change the value of their capital asset. Obviously they are reticent to give it full endorsement because they are thinking: What are the consequences for my region and what are the consequences for my asset?

CHAIR: They will not want any constraints on their opportunities to trade if it is introduced, will they, or will they?

Mr MUES: What this will do, there will be winners and losers from this. If we chose to change the status quo to one that dealt with salinity, there will be winners and losers. The winners will be those irrigators who are irrigating in places that have potential low salinity impacts. The losers would be those who are already in areas with high impacts because suddenly they have to pay maybe a salinity levy or bear the brunt of an unfavourable exchange rate to trade into their region, so suddenly getting more water becomes more expensive for them. That is the whole objective of the change in institutional arrangements.

Certain irrigators in certain regions would be able to see - those in the Murrumbidgee, for example, being a net importer of salt into that valley, would

actually appreciate that this change would favour them. They would be one of the beneficiary groups. I think to broadly classify it, it would be the irrigators in the Riverland district of South Australia and the Sunraisier district of Victoria and the New South Wales mallee that would be disadvantaged. From the overall perspective we are better off. It is unfortunate that there are winners and losers within that irrigation stakeholder group.

Mr MCGRANE: Is it awfully hard to implement?

Mr MUES: Awfully hard to implement with consensus, yes. We have to be open about the wealth effects that are created by these types of changes.

Mr APLIN: Who would be the determinator then of that institutional arrangement? We are talking multi-State here, and you have done your research, is that going to be accepted by the irrigators as being the final decision? Is it going to be argued? Are there going to be States opposing each other in the determination of salinity levels?

Mr MUES: I must admit I am not an expert on consultative mechanisms and approaches.

Mr APLIN: It requires acceptance of this?

Mr MUES: It does. There are affected stakeholders out there, and much as we are going through the process of consultation for the living Murray, we would have to go through something similar. People are aware of the rationale for the change and what the objective is we are trying to reach. From my experience irrigators are quite aware of their responsibilities to irrigate within the limits of environmental responsibility, I suppose you would like to call it.

It is a cross jurisdictional issue in the lower Murray system. Other valleys may not have that. In the lower Murray system, definitely. I think it would require consistency between States to get the right outcome. Otherwise we are putting in partial solutions where we might expose ourselves to a perverse type of trades from one State that has addressed the problem to the State that has not addressed the problem, without being specific.

Mr MARTIN: Early on you spoke about one of the problems being that a lot of irrigators are unsure of the impact on them and they are obviously hesitant. Do you see a way through that? Is there a way of quantifying how everyone is going to be impacted up front, even if it is bad news?

Mr MUES: I think irrigators are becoming more aware, through the land and water management planning exercises, they are becoming much more aware of impact of irrigation on the river. There is a basis of understanding that is already there. Irrigation groups would be able to speak more directly to that than me.

In terms of the information and how well it would be accepted, it does need objective and independent assessment, by scientific experts in the first instance, to provide the background parameters that we have used in our modelling. We did our work in conjunction with the CSIRO Land and Water Division, through Glen Walker, and they were able to characterise our regions in a biophysical sense. I know that there is additional investment in scientific understanding about the character of these regions and how ground-water flows are interacting with the river, so that information base is slowly being enhanced. Is it enough to go out and convince all irrigators? I wouldn't be able to say.

Mr MARTIN: You mentioned the CSIRO and you had some interaction with them. The model that they have developed, is it similar to yours, or what are the significant differences there?

Mr MUES: Which model are you referring to?

Mr MARTIN: The Young and McColl.

Mr MUES: The Young and McColl model is more a framework for thinking, a model of institutional arrangements. Ours is an integrated economic and biophysical model. We are trying to represent economic behaviour, bolting it onto the ground-water relationships that Glen Walker and company have produced. It is

hydrogeological models of ground-water flows. We take the summary relationships and we link it up into a networked model that has an economic layer over the top. We are trying to represent the choices that individuals would make in terms of water trade or estimate the returns to water use.

CHAIR: We have some other questions. We will ask them quickly. Do you expect the number and volumes of trades in New South Wales to increase? Why?

Mr MUES: In the short term, I mean with the current season, I think the trade market will be fairly active, that will be the temporary market as they respond to drought and try and adjust their way through that. It will not be until the long term that we see a lot of permanent trading. We do not want to raise expectations if we expand the interstate water trade pilot to a larger area that we would suddenly see an acceleration of permanent trades. We just do not think that is right.

Our thinking is that there is a large amount of irrigation infrastructure that is out there in the regions and out there on the farms, and they invested in that anywhere between last year and many years ago. Most of it has some element of an economic life; it has not reached replacement point yet. When you think about the water market you think about a fellow that has an existing property with all the infrastructure already invested, and they are already in a region where they have the delivery infrastructure, and compare what they are able to pay or willing to pay in the market to a Greenfields development, who at the same time as they buy the water has to pay for the infrastructure on the farm; $20,000 a hectare I hear, for the pumping infrastructure from the river perhaps, or pay for an extension of the irrigation delivery infrastructure, and that is a huge capital cost to get a Greenfields development up.

The existing irrigator actually has an economic or market advantage of the Greenfields developer for the moment, because they have their capital in place. So in the water market they are able to bid more for water than the Greenfields. Until that advantage disappears we do not see that there will be a heck of a lot of permanent trade. What will happen is when the existing infrastructure reaches the end of its economic life and we face major replacement or refurbishment decisions, then the two groups will come onto an even cue and that is when we get competition in the market and see a little more permanent trade.

We have some research going on to quantify the disadvantage, how big that disadvantage is, and how its impact on the volume of trade would be. At this stage we have not got those final results but that is our thinking. So, trade will not really get up, permanent trade I am talking about here, will not dramatically increase volumes until the longer term, until the infrastructure assets reach the end of their economic life and we have to replace or refurbish.

Mr PAGE: What is your opinion on the concern people have about water barons being able to corner the market?

Mr MUES: I do not see there is much in it. I was talking to Golden Murray Water three weeks ago, and Murray Irrigation as well. Golden Murray Water have 10,000 customers and Murray Irrigation have 2,000 odd customers, 1,200 odd farms and 2,000 customers. That is a really large market and for someone to try and corner that market would be an extraordinary outcome. They are very large markets, a lot of participants, and if they are trying to highjack the market and take extraordinary rents out of the market there is all the other competition from the other water rights holders. I do not see there is a heck of a lot of chance of that emerging in practice.

Mr MCGRANE: The Macquarie Valley, at the end of the Macquarie Valley, has been developed in the last 15-20 years for cotton. Now, the small irrigators around Narromine, and the town of Narromine itself, have got a lot of horticulture and other things happening. They have sold on to the big cotton operators, and therefore irrigatable country right along near the Macquarie is not being irrigated now because there is no licence. We had an instance just last week, $1,100 was the price, and that was on a little place between Narromine and Dubbo. The big guys, I am not knocking them, but the cotton people are the big operators and they can afford to pay more to get this water. Now, that is draining the economy of places like Narromine. A lot of small operators did operate in other fields bar cotton. There is a shift of economic entity from Narromine to a big

cotton area.

Mr MUES: I agree.

Mr MCGRANE: That is happened and it is still going to happen, surely.

Mr MUES: Yes, it would. I do not want to seem heartless, but that is a good thing. What we are seeing is water going to the highest value use. There would be some regional or rural economies that win. If they are taking water down to the cotton area near Narromine, they win.

Mr MCGRANE: Narromine, Trangie, Warren and further down from Warren.

Mr MUES: That little rural economy starts to flourish because we have more irrigator activity. There is a negative effect where the water comes from. We cannot ignore that. If we get the market right, there will be net increase.

Mr MCGRANE: They have always forced the price up. As I said, over $1,100 last week in trade, which is a lot higher than $700 12 months ago.

Mr MUES: This does reflect people's willingness to pay the market.

Mr MCGRANE: They have big bucks, the big operators.

Mr MUES: Yes, but the business structure of the operation may well favour large irrigators. If the objective is to get the most out of our water resources that sit up in the storages that may be seen to be a good thing. We should not gloss over the fact that, I am afraid, some small communities and irrigator communities may have accelerated adjustment pressures as a result of the trades.

Mr PAGE: One of my concerns is that a big multinational corporation that is making its money out of some area entirely unrelated to agriculture or water might deem that it is strategically smart for them to diversify and water would be an attractive thing to be involved in on the basis that the price of water is likely to go up, continue to go up over the next 20-30 years. They might be happy to cross subsidise a water purchasing program with the existing cash flow, which is unrelated to agricultural, on the basis that they will actually gain significant access to water and in the process actually further accelerate what they are looking to see happen, which is the price of water going up, because they will be taking water out of the system even if they do not use it. The argument has always been: Why would they do that because they have to use it or lose it? I am not sure that is the case, depending on where the water market goes from here on in. Is there not an argument that could happen? Convince me it cannot happen.

Mr MUES: Well, if you go back to the economic literature, competition in markets tends to occur with a small number of participants. Six or seven I think is the lowest number I have seen where you get active competition. I am not saying that there will not be some small valleys or unregulated systems or we might get some of that. We might have such a small group of irrigators where it might not happen.

In the large areas where I have heard this comment made, in the Murray Irrigation Area and Golden Murray Area in Victoria, there are so many market participants I do not think they can horde a volume of water and extract a higher than fair price, because there are other people saying: He is getting a hundred dollars, I will not sell it for 50, I will throw in a bid for 70. It ratchets it down. It does not serve the corporate entity, the baron, to horde the water either because that is a capital asset that they have locked up their finances with and they are after a return on that, so they would be actively looking to sell it at the best price they can.

Non-agricultural holders might add some liquidity to the market, if anything, by being a constant source of surplus water that people, if they need, can turn to to buy. They will be buying from either that corporate entity or from other irrigators who might have surpluses in their district. It is a matter of the number of irrigators that are contemplating decisions to buy and sell, and that does not have to be terribly large. And in the large irrigation areas I do not see it is too much of a threat at all. I suppose there is always that element of suspicion; I can appreciate that. I think they are fairly large and when you think about the objective of the

individual holding that water entitlement, then provided our water market is right, we are dealing with salinity in the right way and that is free and open trade between regions, then there is probably little difference between a corporate entity holding it and an irrigator themselves. I do not know if it fully allays your fears.

Mr MARTIN: I guess what you are saying really is that if the market finds its own level, then there could be communities like Narromine along the way that are left there as some sort of structural adjustment that has been left to the Government of the day. That is one of the negative impacts.

Mr MUES: As we open up trade and we see water moving around from where it has historically been used to newer areas or different enterprise activities, then, yes, there will be, as there is adjustment in agricultural all the time. There could be accelerated adjustment in some regions, yes.

Mr PAGE: In your submission, you say that ideally water access rights would allow individual irrigators full access to the benefits of water use and hold them accountable for all the costs imposed on other users and the environment. Does this mean that irrigators are not currently getting the full benefits of trade? Could you explain that?

Mr MUES: I suppose you have to look at this from two perspectives. At the moment irrigators are not being held directly responsible or accountable for their effect on salinity discharges in the river system. If someone were to be involved in the trade from a low impact area into a high impact area, our modelling suggests that there will be a net increase in the salinity impacts, yet the people involved in the trade are not being held accountable, the buyer is not being held accountable for the increase in salinity that they are going to cause in the stem of the river.

Conversely, if you think about it the other way, what happens if a buyer in a low impact area sought water out of a high impact area? Their trade has led to an improvement in the salinity outcomes and yet they get no benefit, in any form, from causing that improvement. So when we say the benefits from trade typify the private exchange, obviously people are able to capture their private benefits. Being held accountable for the costs or for the benefits that might result from the trade, that is where the institutional arrangements to deal with salinity need to come into play.

Mr PAGE: At the moment the negative impact of trade is borne by the individual irrigator?

Mr MUES: The negative impact of the trade is being bought by water users more generally, not those directly involved in the trade. In the case we put in the paper here of trade from the upstream regions between lock two and lock three in South Australia, it is those water users below Morgan that bear the brunt, including Adelaide's urban users.

Conversely, if we trade that water out of that region back up to the Murrumbidgee, we would probably see an improvement in the salinity outcomes from the Murrumbidgee all the way downstream. All those irrigators and water users from the Murrumbidgee down would benefit from that water trade. What we are proposing is a change in institutional arrangements that reflect that benefit, or that cost, and people will adjust their willingness to pay in the market for water knowing that they have to bear the costs of the salinity outcomes.

That question logically leads to the next, which is about the institutional arrangements for dealing with salinity. I do not know each of these in detail but I can speak to them; within the southern Murray Darling basin we have the drainage strategy where we do have an arrangement for trades between States to account for the change in salinity impacts in the river. That is the States trying to manage the changed salt outcomes as a result of changing pattern of water use. It is not the individuals being held directly responsible.

I think Victoria have a system where large irrigation developments do have a fee to basically pay for the offset the State has to make, but I am not sure if that exists in other States, nor does it necessarily affect small trades that, when you think about an individual instance it is a minor effect, but the cumulative effect of many small trades does not get borne by the individuals in those trades. In South

Australia we have salinity prevention orders that people who purchase water are obligated to sign an obligation to offset the additional salinity impacts of their irrigation when it occurs. Unfortunately, ground-water systems take a little while to adjust, and if we take water into those regions it may be 20-30 years before we see salt exports start to rise.

Mr MARTIN: When you say "offset" you mean rehabilitate, do you?

Mr MUES: Either offset through some actions to reduce the impact or extract salt from some other source, I suppose. I am not sure of the exact phrasing of the prevention order.

If it is that far off, I wonder how accountable we can make the businesses that buy the water now for impacts in 20 years time, and how many businesses will be around in 20 years time. There is a question mark hanging over the enforceability of those arrangements. I have heard anecdotal evidence that people are structuring businesses to avoid the future enforcement of those prevention orders. None of the arrangements actually come and place the responsibility with the individuals involved in the trade. That is what our proposal is. The arrangements need to be changed so that people participate in the water market subject to their known responsibilities for dealing with salinity. That is not happening at the moment.

Mr PAGE: You started out by saying you wondered whether the costs of putting such a program in place would be greater than the cost of salinity itself. Have you done any work on those two levels of costs?

Mr MUES: No, we have not. We know what the potential gains may be in terms of quantifying the salinity trade and so forth. In terms of the administrative costs of putting in the system, administration, monitoring, enforcement, no, we have not delved into that. The State agencies or perhaps those managing the interstate water pilot may be better placed to give you a feel for that.

Mr PAGE: Would it not be the case that there would be some short-term institutional costs associated with establishing such a framework and some long term environmental benefits having established it and it would be a classic situation where after five or ten years you would be in front in a cost benefit analysis, one would presume?

Mr MUES: Yes. The operational costs, in terms of the monitoring, enforcement, managing of the register and things like that would not be tremendously excessive if it is done at the regional level. If everyone around this table has an individual salinity impact, or salinity rating, and then trade is done on the basis of the difference between the rating, you are levied, if you go from a low to high you are levied with an extra charge. That is pretty complex. Get down to individuals, and hence our suggestion that this may be more cost effective to do it at the regional level. Where there is really good information available - I know the Murray irrigation area is such a large area, where the information is available to break that up into four trading districts, we could go to a district level or a subdistrict level, but principally it will be constrained by the available information.

Mr MARTIN: You are talking about getting the statistics off people or technical information?

Mr MUES: Technical from the scientific field.

Mr MARTIN: Is that not one of the problems, that there are so many uncertainties at the moment, particularly in the trading area, no-one knows exactly how the market is going to end up. Like the adjustment between the Greenfields irrigator and the established one. If you have a number of examples like that through the market it could be some indeterminate time before it all settles down in terms of financial institutions having some confidence in the market for lending. Is that a real problem we are facing?

Mr MUES: My observation is that it is rather a tumultuous time in the irrigating sector.

CHAIR: Has ABARE got a preferred model of institutional arrangements or you have not?

Mr MUES: Because we have not got through the actual costing of the administrative arrangements we have not come up with the preferred model. What our work has been saying is we are trying to provide guidance to key decision makers to say: Here are the key issues you have to weigh up in terms of determining which instruments you use and which level you apply it at. In terms of instruments, our work suggests that a price based instrument is a bit more efficient than a quantity based instrument, given that demand varies from year to year and people's willingness or demand for discharge rights will vary from year to year. Price instruments tend to have a favour there.

When it comes down to the issue of cost effectiveness of the solution, it depends on which level you apply it at. Do we go at an individual level, so we have a site specific use right that we hinge these trading arrangements off, or do we define everybody's use within the district as being the same and then we hinge these arrangements off a regionally defined use? They are the key issues.

I think both the individual State agencies responsible for water, and in this case the Murray Darling Basin Commission, really need to work through the nuts and bolts of those solutions. At this stage I see that the COAG initiative does provide us an opportunity. We are going to go through a process where hopefully we get our market settings right, possibly including the treatment of salinity, but at the same time we will be trying to provide more security to irrigators for their entitlements and they will hopefully have more security to get over that change that is constantly affecting the sector.

I think what lies ahead with this COAG agreement, this may well be a very timely time to do it, because we can do a couple of things, we can say, well, I know you are going to be disadvantaged with this, but in return this is a positive change for you and it might change the level of acceptance for the changes.

CHAIR: What about the similarities and differences between your models and those of Young and McColl, do you agree with them in terms of freezing any expansion of permanent trading at the moment?

Mr MUES: In terms of similarities of the model, we have both identified that these functional use rights would be the basis for managing externalities, be they defined at the farm level or regional levels. Use rights separate from water entitlements is a common feature of the two models. The Young and McColl model proposed to date really fails to ignore the transaction costs involved in separating each and every attribute of the access right. That is where our research has been going, trying to understand, if we are to do this, is it so complex that, like I said earlier, the cure is worse than the disease.

It is all about what level do we put in these arrangements, at the individual or regional level. I think the Young and McColl model is prescriptive, I think they were leaning towards pollution permits, whereas we are leaning more towards the price instruments. I think the underpinnings are similar; it is the thought process through to the practical solution that is slightly different.

When it comes to the agreement on the freeze in trade, out of the questions provided to me by the Committee ahead of time this is the one that gave me the most grief. I certainly share their shortcomings about the nature of the problem. We unearthed the problem, we thought through it and it is there, and I think a better water market will have externalities accounted for where they are sufficiently large to cause a problem.

A freeze on the expansion of the pilot trade scheme - that is a little bit more difficult for me because I think, on the one hand, surely there will be opportunities for trade that will lead to benefits to the individuals that will be in excess of the salinity negative that we create. On the other hand, I am thinking an efficient market should takes these things into account. I think it is a matter of weighing up the risks. I certainly share their concerns about the goal of having an efficient market that directly addresses these things.

How that is done in practice and whether it involves a freeze, I went through it and I had three options, one of which is a freeze. We can proceed with the pilot in the belief that the existing State regulations for how individuals that have accountability for salinity will be effective, although I have already said that I

am hesitant to conclude that absolutely. We can proceed with the trade and acknowledge - in the Young and McColl paper terminology they say that some of the capitalisation, some of the flaws in the market will be capitalised into asset values. Well, if we allow high value trades to go ahead, even with the salinity impacts, that might be a good thing for society overall, but some of the individuals who trade will be buying an asset that, when the institutional change is made to address it, will be devalued. That is very sensitive. I am not going to judge on that. That is a sensitive issue when we affect the capital value of individuals assets. Or we address the problem, and I am probably thinking the addressing the problem, the timing is probably right, we are going through the process. So whether it is a freeze in terms of the expansion of trading until we get that done, providing we can do that quickly as part of the COAG process, it would certainly be a good thing to think about.

CHAIR: Who has more influence, you or them?

Mr MUES: Best to ask the people we are trying to influence. Mike and I, and Jim McColl and the people at ABARE share a common goal: we are trying to debate and understand the nature of the water market and the changes necessary to reform it. It is logical to expect that we will not necessarily come to the same conclusion all the time. We will have different perspectives. That is not necessarily to say that one is more relevant than the other. We need constructive debate with an objectivity both of an awareness of the economic efficiency characteristics, the social implications, which have come up this morning, and that is largely related to the equity issues of the wealth effects that some of these instruments might create.

CHAIR: Will there be uniformity across the States or across the nation on models? Is there compulsion from the Commonwealth for a model that is a national model? Some of the States have been kicking around various models, so what is the likelihood of similarity between models, or are we going to have a lot of dissimilar audit training models?

Mr MUES: To go back to my earlier comments, in some regions salinity will be a sufficiently large problem, salinity as a result of water trade, to justify addressing it directly in the institutional arrangements for trade. However, that will not be necessarily the case everywhere. I do not think we will end up with the same model. There may be the same principles sitting in behind thinking about the final model we end up choosing, and those principles will be common largely across the country, but it will not imply that we would have to have the same trading model.

Obviously where we have inter-jurisdictional issues consistency is a desirable thing, border rivers in Queensland and the southern Murray basin being the two obvious examples. Through our work we are trying to make people aware of the underlying principles and then make them aware of the issues they will have to weigh up in terms of choosing the final model.

Mr MARTIN: How confident are you of the economics that you have based your model on?

Mr MUES: Reasonably confident. The project I mentioned earlier that built our model was a partnership project with the Murray Darling Basin Commission. As a condition of going into that project we said we really need the best scientific advice we have got because we are a bunch of economists and we are not good on those science things. The Commission organised a collaborative arrangement with CSIRO Land and Water. The hydrogeologists in that group, are possibly the best in the country. Knowing that we have got that scientific underpinning, yes, I am pretty confident of it. In terms of the way that the science or the reality of the real world is reflected in that model, and in terms of the economic relationships, we are fairly confident of those.

Mr PAGE: Just a general question about managing salinity in-stream which is where your focus has been. You talked today about how to do that in the context of water trading, and on a regional basis preferably. How do you see that, whatever institutional arrangement we come to, tying in with the broader issue of salinity management a lá increased environmental flows, for example, which is what the South Australians want? They want to see more water down the river to flush the system out. You have the salinity management at the macro level and

salinity management at the regional level. Do you see an ability to manage the macro situation through water management plans, for example, in New South Wales by the environmental flow policy option, and can that be complementary to what you are talking about, or are they two separate areas?

Mr MUES: Separate but related. If I could choose to take that option, related because really if we are trying to manage the salinity level in the river for the downstream users, the volume of environmental flows that go down the system will act as a major source of dilution flows, no question of that. I will say separate because really what we are looking for is, notwithstanding the environmental flows on the one hand, we are trying to set up the incentive structure and let the market operate so we get the most out of our water resource. For that to happen, because we know water trade has an impact on the salinity aspects, I think it does need to be directly addressed within the system. Certainly the macro awareness of the issue is that, yes, environmental flows will be relevant to it. In terms of this aspect of salinity management, I think that can be dealt with separately.

Mr APLIN: In relation to the accountability aspect that was raised earlier, particularly you talked about irrigators. I think we could broaden that. The obvious outcome will be that people will be held accountable for the amount of salinity being returned to the water. That will impact on the valuation of land for whatever use; we have talked about irrigators primarily. What resistance have you encountered in that area, because it will have a direct impact for all operators, not only agricultural pursuits, but industrial areas?

Mr MUES: For industrial areas, I suppose it comes down to this notion of can we cost effectively introduce administrative arrangements to hold everybody accountable for their salinity exports? Point sources from urban centres and industrial outputs, yes, definitely, usually amenable to direct measurement and monitoring and enforcement. When we go outside into dryland agricultural, we are in the realm of where the cure is probably worse than the disease. It would be so extremely complicated to do a property assessment for each and every property. That will provide your base, but of course you adjust that as they change their tillage techniques and pasture composition and put in trees over there. The costs of administering such a system and holding dryland agricultural accountable for their individual contributions is not feasible. It is a nice example I suppose to illustrate that transaction costs problem. Where a market based instrument is not suited, then we have to obviously look for other types of measures, whether it be research and development into new agricultural activities or information and awareness raising education. There are different ways to approach the problem rather than directly through a market.

CHAIR: Do you get out on the ground much? Do you escape from your computer and get out there?

Mr MUES: I do occasionally, probably not as much as I would like.

CHAIR: Tell us where in New South Wales are they doing it right, or elsewhere, that is a good example of an approach. We have been to a number areas over the years. Is there something we do not know about that we should be looking at?

Mr MUES: For salinity management more broadly?

CHAIR: And linking it to the moves to deal with the issue as well.

Mr MUES: Whenever I do go out and consider what is happening on the ground - and my parents had a property in the southern Riverena, in the Murray irrigation area, I have that background as well - I keep coming back to the nature of the problem: we can not expect individuals who manage properties to do things in the public good that really are quite expensive to undertake. What I think is that you do see some activities in their own interest - that is to be expected, every one is motivated by self interest - and to a degree they are doing some altruistic activities as well. To that extent, the Landcare model and the information extension and the awareness raising has been very effective at making people aware and probably getting as much out of the altruistic approach of volunteerism as we can. That has been quite effective. When it comes to the large changes in land use patterns that the CSIRO is talking about, that John Williams always talks about, we have to fundamentally redesign our agricultural. The incentives are not there for the

individuals involved. That is the nature of our problem.

With salinity and water trade, we have an opportunity to influence the way we set up a market and rectify it through that mechanism. In the dryland sector I have not uncovered a market option. Similarly, land care and all those kind of volunteerism approaches and altruistic approaches will only go so far. It is the one unanswered question for me. I have not struck upon a model or choice that would say that will fill the last piece of the puzzle.

You see it reflected in the different parts of Australia. In Western Australia, what I hear is that farmers are actively involved in tree planting because they are looking to address the salinity problems that are not only causal on their property but also felt on their property. So the ground-water systems are smaller. If the soils are sandier, the ground-water systems respond quicker, so they can see the benefit of their actions much quicker, and they receive the benefits from it. The pattern of behaviour we see in Western Australia contrasts dramatically with what we see on the slopes of New South Wales, for example, where the soil types are heavier, so we will take longer to see the benefits. The ground-water systems are larger so generally when you do something on your property the benefits are felt off your property and you can not have co-operative action between neighbours because the ground-water systems extend so far.

CHAIR: That will make it interesting when they get regional power.

Mr MUES: They will be looking at different instruments. They will not be trying to create a market where landholders are held accountable. The one model that probably does appeal to me would be the direct investment model, the targeted public investment model. We know within the catchment there are a couple of hot spots - let's use the regional funding and go in there and buy out land and put it under vegetation or put in trees and get into joint ventures with landholders to revegetate or purchase conservation covenants. It is targeted and intrusive investment of public money.

CHAIR: That is going to be challenging because we are going down the role of devolving power into these regions. It is going to be harder, in my opinion, for regions to be making the decisions about targeting areas as opposed to a more centralised authority.

Mr MUES: It is the information base that supports those regional groups. Some regions have a good understanding of their regions and where the hot spots are because it has been the focus of research activities in the past and other regions are flying by the seat of their pants.

Mr PAGE: What is your opinion of a salinity credit market? Have you seen anything overseas that would give us any hope in that regard?

Mr MUES: In terms of a salinity credit market, in our paper we talk about salinity mitigation credits. If you do it at a regional level you are able to measure what you think is the salinity exports from every farm within that region on average. That is amenable to it. It is such a diffuse problem in the dryland areas, it will defy market instrument.

Mr MCGRANE: The salinity problem in my dryland is caused by land practices in Gerard's electorate, 120 kilometres apart.

Mr MUES: Part of our portfolio actions will be living with salinity, because we took 150 years to cause this problem and in reality it will probably take 150 years to fix it.

CHAIR: Any further questions before we depart the scene?

Mr MUES: If any other questions do arise I will be happy to respond in writing. I hope it has helped your deliberations.

(The Committee adjourned at 11.15 a.m.)