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Allocation and Coordination of Water Resources.

Towards a National Water Policy Framework: Vision to Implementation

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PROF YOUNG:

I want to move on to talk particularly about allocation issues and get down into some of the very difficult, nitty, hard detail and talk about allocation issues. Some of you will have read the COAG communiqué that was issued on 29 August 2003. COAG - The Council of Australian Government - the prime minister, state premiers and the head of local government – have announced a National Water Initiative that “Will implement a robust framework for water access entitlements”.

They have said that this will happen while ensuring there is sufficient water available to maintain healthy rivers and aquifers. Under the National Water Initiative jurisdictions have committed to establishing “*a robust, transparent regulatory water accounting framework that protects the integrity of entitlements*”. I stress ‘protects the integrity of entitlements’. These are very, very brave words. I want to spend this talk exploring the detail associated with this commitment or, at least, what I think these leaders of Australia have committed themselves and this Nation to.

Robustness

The vision I have, and this is my vision, is that Australia has to identify a robust set of institutional arrangements that enable the efficient and equitable allocation and management of water resources and it’s more than just efficiency, it’s also about equity. In particular, there are some very important process and procedural issues that have been largely ignored and, or at least, have not well handled. I hope we can put in place a set of institutional arrangements that will go on delivering efficient and equitable outcomes forever. In fact, I think we should behave as if we are starting a design competition, a search for excellence, for elegance and simplicity in the way water is allocated and managed. The search for solutions that will last for centuries. We should be searching for solutions that make water resource management boring, absolutely boring. One of those things that just happens because we know how to do it.

Robustness is a word that COAG has picked up and stresses. Robust systems are systems that function well, they remain efficient in an economic sense through time, they are dynamically efficient, they just keep on changing and adjusting painlessly to new circumstances and conditions. The outcomes they produce remain equitable. Robust frameworks are self repairing. Once implemented, Parliament can leave them alone, there is little need to amend legislation. And they maintain environmental health.

Robust systems cope with biophysical, technological and social conditions as they change. As they change dynamically. Let me give you a couple of examples of some really robust systems around the world. If you cast the net and really hunt around for systems that are rock solid, you can find them. Typically, they are so boring that nobody ever argues about them. The first one I would like to draw your attention to was invented in 1862 in England. In 1892 England set up a Company's Act that worked. In fact, it was so successful that it was soon adopted around the world. Today, virtually every nation in the world has a companies act. Companies have proven to be robust institutions. Today we all understand how companies operate, how they share out risk liability, set up boards, have annual board meetings, pay dividends and so forth. The system designed by three men in 1862 was so robust that the world still uses it 150 years later.

Similarly, the Torren's Title System which was first used to is now used to define who owns an area of land. The innovation that Sir Robert Torrens and Ulrich Hubbe put forward was the proposition that ownership should be defined in a government controlled register rather than on contracts that are passed from one person to the next. The system is now used everywhere. Nobody bothers to change it. It is robust.

Another example of the robustness is the banking system. If you look at the banking system, and in particular the way we define dollars and cents. The system is robust. The fundamental principles of banking are understood around the world and are rock solid. We play around at the edges a bit and argue over exchange rates and interest rates etc but we don't go back and say we're going to scrap money and have some other new system of exchange. It's robust, it works and it's boring.

In 1952 - the year I was born in, the Nobel Prize committee sat down to discuss whether or not they could award a Noble Prize in economics as well as in science. After a lot of thought, the first Nobel Prize in Economics was awarded to Jan Tinbergen for saying something that is incredibly important. Tinbergen had shown and had argued that if you want to manage things in a way that remains robust through time, you must use a separate instrument for every objective you want to achieve. Today, this principle is referred to as the Tinbergen Principle

Our water systems typically have one licence, one plan to manage everything. They violate this fundamental, Nobel Prize winning principle.

The National Water Initiative suggests that Australia should correct its ways. It promises a nationally compatible system of entitlements, it promises robustly defined entitlements and it promises fully functioning markets. Learning from the Company's Act it promises perpetual shares that fully assign risk. It promises to make it quite clear which risks are assigned to water users and which are assigned to government. It promises to reveal who's going to bear the pain and who is going to gain from each change. Robust water accounting to protect the integrity of entitlements, full cost pricing and best practice in resource management is promised. Going further, the Initiative promises to return of over-allocated systems to health by making \$500 million of funding available to start the process of restoring health to the River Murray. The words 'new funding' are placed before the \$500 million. It means, as I understand it, all previous promises to spend money on enhancing environmental flows aren't part of this new \$500 million.

When COAG met nearly 10 years ago, it came up with a vision to separate land and water titles and to set up tradable rights and to price water use at the full cost of supply. I think this decision was both a very naïve recommendation and also a very exciting step forward while trading has created increased wealth for many, it has also created a lot of environmental and social problems. In many areas, we have traded into trouble rather than trading out of trouble. Markets, and I'm an economist, are brilliant servants but if you get the specification wrong and pay insufficient attention to the detail, markets will gloriously trade you into trouble and further into trouble. And while you argue over whether or not the market is not working properly, they keep on trading you further and further into trouble until you either switch them off or fix them.

Robust separation

If you put together a robust system, the mechanisms used to manage equity would be separated from those used to manage seasonal allocations and control use. New South Wales has partially done this but not totally, the Victorian green paper is thinking about doing this. Other states are saying, "Well, we don't really need to do it because our system is pretty robust". Markets also need to be developed for channels capacity. Irrigators need water at specific points in time so in a robust world you would set up separate markets in shares (entitlements) and allocations and also in channel capacity, so that people who must have their water in February, can buy entitlements that guarantee they can have priority access to water in February.

You would also realise that if you trade, you need to manage the salinity impacts of changes in land use, so you would set up salinity shares and salinity allocations and so forth. I could go on but it's a long way from where we are today. Essentially, Australia needs to decide if we talking about setting up a robust solution for this century and the century that comes after, or just one that will work for a while?

Risk specification

Robust risk specification, how might you specify risk in a robust manner? COAG has proposed that if there's a climate change or a natural fluctuation of any sort, the impacts of any necessary reduction will be born by those who hold water entitlements. Similarly, COAG has proposed that any change in expected future allocations as a result of new scientific information should be at the risk of entitlement holders. They can choose to insure for it, or manage for it. It's their risk. If however, administrators make an administrative error, for example, put the wrong name on an entitlement, entitlement holders can expect to be compensated, compensated fully.

If a government over-allocates the system – as we've done in a large number of systems – then any due diligence assessment of a government administrative decision would say that it should never be allowed to over allocate a resource. Over allocation is incompetence. Due diligence would require that that any change as a result of over allocation should be compensated. Similarly, there is a case for compensating people for rapid and unexpected changes in policy.

Robust accounting

Consideration also has to be given to the impacts of allowing land use change in a way that reduces another irrigator's entitlement. For a robust outcome, it is essential to specify water entitlements in a way that is consistent with hydrological realities. Ground, surface and overland flow systems are connected. Some of our entitlement and allocation systems define allocations in terms of entitlements to pump water without any consideration of how much water returns to river and groundwater systems after it has need applied to land. A few account for returns via surface drainage systems but none of the surface allocation systems that I can find anywhere in Australia account for that which returns to the river systems via ground water flow, none at all. This is pretty serious and I will show you why if you look at what happens in the river Murray system. As indicated in table one, in about 20 years' time by allowing irrigators to reduce return flows, develop groundwater etc and allowing others to expand the area of land under forest production, we should expect to lose a little bit over 1,600 gigalitres of water from the River Murray system. I might be out by 20 or 30 per cent but I don't think I'm out by 100 per cent and every one of these estimates is very conservative. I wouldn't be at all surprised if the numbers were more like 2,000 to 2,500GL.

This is worrying. The largest volume of water under consideration for return to the river is 1,500 GL back and account has also to be given to the fact that some regions the sum of expected allocations is greater than the regional cap. In South Australia, for example, it has just been decided to reduce water use by 20 per cent because of the drought. To do this it is necessary to reduce entitlements by 35 per cent because a considerable volume of water is neither used nor sold. It's very difficult to communicate to people why you've got to take 35 per cent away to get 20 per cent down.

These sorts of flaws and omissions are all in many of our entitlement systems. Add all that up and we could go through a process that's being talked about at the moment and end up having thought we were putting water back in the river, only to discover that there is less, not more water in the river even though we've put water back. The challenge that COAG has given Australia is a very courageous one, but a very exciting one.

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Table 1 Estimated reduction in mean annual flow and available seasonal allocations of design omissions in the entitlement systems used to allocate water in the River Murray Basin (baseline 1993/94)

Design Omission	Net effect
<i>Reduced drainage and groundwater returns to the River resulting from water use efficiency savings^{a)}</i>	- 723 GL
<i>Reduction in water yield from catchment land-use changes like increased forestry and farm dam development^{b)}</i>	- 600 GL
<i>Reduced groundwater flow to the River as a result of increased installation and operation of Salinity Interception Schemes^{c)}</i>	-20 GL
<i>Reduced groundwater flow to the River from increased groundwater use^{d)}</i>	-349 GL
Estimated net reduction in mean river flow and allocations to irrigators	-1,692 GL

- a) This assumes that a mean of 8,734 GL is used for consumptive purposes in the River Murray System. Since 1993/4 there has been considerable investment that has sought to increase water-use efficiency. If 1,500 GL is withdrawn from irrigation, it can be expected that irrigators will respond by increasing water-use efficiency further. It is assumed that the collective long run effect of reduced groundwater return, reduced surface water return in those systems where licences are defined in gross not net terms and increased investment in the capture and use of run-off will be around 10% of the remaining water.
- b) It has been estimated that from 2002, increased plantation forestry stimulated by financial incentives will reduce recharge across the entire Murray Darling Basin by 1,300GL (Hairsine, pers. com.; Vertessy *et al.*, 2003). Assume that this reduces mean flow into the River Murray System by 600GL. The estimate is intentionally conservative. More accurately, an estimate of the impact from 1993/94 to 2002 could also be included. In our original text we did not include an estimate for farm dam development. More recent advice to us suggests this impact could be as big as that caused by forestry development in high rainfall areas.
- c) At present, pumping of saline water and its subsequent evaporation as part of a salinity interception scheme is not defined as an extractive use which needs to be managed under the cap. This estimate of 20 GL is also conservative. The MDBC has since advised that 40 GL is a more appropriate estimate of the impact of existing and planned schemes (Close, pers. com.).
- d) Results from MDBC studies (currently embargoed) are understood to have estimated that increasing groundwater development will erode the Cap by somewhere between 4 and 7%.


Trading seasonal allocations

If you set up an allocation trading system that is transparent and rigorous, everybody would have access to a register that looks like a bank account with columns that show debits, credits and the balance at any point in time and you could look these accounts over the internet. Just as many people regularly access their bank accounts over the internet. Figure One provides a mock-up of such an account. The volume allocated in any season is defined by reference to the number of shares held. If you bought some water, it would be recorded straight away in your bank account and so on. This is not rocket science. You would be able to write water cheques. Instead of accessing “Bpay” to transfer money to other people, you would have access to a “Wpay” system that you would use to transfer water to another water user. This is old technology, why don't we use it for water?

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Figure 1 Hypothetical Water Account

Account Name: Aussie Irrigation Statement No: 24				
Date		Debit	Credit	Balance
1/7/01	Balance bought forward			400
1/9/01	Periodic allocation 1000 shares translates to 2000 ML of water that may be consumed		2000	2400
12/10/01	Transfer from XYZ Pty Ltd Cheque No. 1234 5678		500	2900
3/11/01	Use from 1/9/01 to 1/11/01 (Pumped 1000 ML and deemed to have used 50%)	500		2400
3/11/01	Transfer from AB&CD Smith Electronic RN 9876543		300	2700
30/4/02	Use from 2/11/01 to 30/4/02 (Pumped 1320 ML and deemed to have used 50%)	660		2040
30/5/02	Unused water not available for carry forward to 2002/03 season	420		1620



Date _____

Pay _____ _____ ML

The sum of _____ ML of 2002/03 Water

Water Trading Australia

Signature _____

807512 085 249:0223 7851

Robust management of the impacts of use

Just as there is a need for separate instruments to control entitlements and seasonal allocations, so there is a need for a separate instrument to enable management of the impacts of water use on other irrigators and the environment.

That is, there is a need for those who wish to irrigate to hold a separate use licences that gives people permission to use water. It would set out irrigation conditions in terms of maximum volume and allowed practice. The licence may place an upper limit on the total volume of water that may be applied to an area but the licensee would still have to buy the water or source the water from somewhere else. The licence may only allow certain types of irrigation practice and it would state obligations to third parties. It would state all obligations clearly and, as we do with land titles, it would reserve pollution rights to the Crown rather than giving irrigators pollution rights, which is what a lot of the current systems do.

System complexity

It is also necessary to decide how many types of entitlement are necessary in a robust world. In the past, there have been many estimates of the number of types of licence in the Murray System. Some people say that there are 14 types of licences, others say that there are 24 types of licences. The largest number I've seen for New South Wales is 89 types of licences. Clearly, we have too many licences. Do we have a Victorian system with high security entitlements plus sales water? Do we have a New South Wales system with high and low reliability entitlements? Do we allow banking of allocations as some states do in some systems but not other systems? Can unused water be carried forward from year to year or should any water that is left at the end of a season be lost. Use it or lose it is an option but so is inter-seasonal banking.

Scale of management

We have to think very carefully about the area within which risk is pooled. Do we allocate entitlements by dam system, by sub-basin, or by local area. How do we pool risk? If you put it all entitlements across the entire connected Murray System into one share system, then climate risk is shared and there are no opportunities for speculation about system change. If you put lots of systems in place, there's tremendous arbitrage opportunity to move water ahead of all the reforms and make a killing. In the past, restrictions on trade have been used to prevent such things happening. As trading rules are relaxed, one needs to decide what role spatial speculators are to have in the market. Systems can be designed to make use of them or, alternatively, to ensure that they are kept out of the system.

In practice, a lot of the regulations and restrictions on both temporary and permanent markets are there for good reasons. In the past, they have stopped the system from trading into trouble. We need to unpack the system with great care and careful attention to the reasons why restrictions were put in place.

Registering entitlements

We also need to think carefully about the security of entitlement registers. Are we going to guarantee them as we do for land titles or are we only going to half guarantee them? As water entitlements are now more valuable than the land to which water is applied, I think that there is a very strong case for guaranteeing registers, licensing brokers and setting up formal settlement procedures.

Robust governance

A question that needs much more research is the question of how best to govern water use and river management. If land use is managed separately from river flow, that is, if you have a river manager and a catchment manager, the two may rarely need to talk.

In short, what's the best level for governments to assign responsibility and accountability to? Can we learn from the Europeans and set up subsidiary structures that give real accountability to catchment managers by empowering them to do all that central governments can do and making them total responsible? So, for example, if a catchment board wants to increase a levy and then increase it again and increase it again, does it have to get permission from higher government body to do so. Do we go beyond the partnership rhetoric and let communities govern on their own or do we have to have give state governments a veto power which often becomes an excuse for producing more and more plans rather than real on ground action? There's been talk about restoring health to over-allocated rivers by setting up a water bank or trust and I've been one of the advocates for that. When one sets up a Trust, responsibility and accountability for an outcome is assigned.

I can see a strong case for appointing three to five trustees to run an environmental Water Trust, putting the entire \$500 million of new funding for the restoration of health to the River Murray System into this structure. The role of central government would be to set up the Trust's terms of reference and to tell them to get on with the job of sourcing more water. Once they have the water the trustees could engage in countercyclic trading, selling some of the water in times when it's very valuable to irrigators and of less value to the environment and then buying it back in wetter times when the price per megalitre is likely to be much less.

The Trust would probably operate as a sourcing and holding bank and not get involved in the day to day management of the River. Instead, it would negotiating releases to river managers in large strategic lumps. It would be focussed on outcomes.

When it comes to sourcing water, the best approach that I am aware of is the compulsory offer approach. This approach is used in the United States to deepen the market for air pollution permits. Every person, every entitlement holder is required to offer to sell a proportion of their entitlement – that is they are required to offer to sell some of their water – but they get to choose the reserve price. Essentially, everybody in the community is required to answer the question, “How much would you be prepared to sell us some water for?” Everybody is free to set a reserve price as high as or as low as they like. It is their choice. Once all offers are in, the Trustees then inspect all the offers and choose the price they will pay. All those whose reserve price was set at a level less than the price chosen are then paid this price. Those whose offer price was higher than this level get to keep their entitlement. Compulsory offer schemes are incredibly cheap to run and are very effective.

If you run a compulsory offer scheme, those whose offers are accepted receive a payment that can then be invested in the community. This can be used to improve water use efficiency. To provide real improvements in water use efficiency in a “net” sense that does not take water from other irrigators.

With the right incentives, we don’t need to have governments designing and signing off on all of the water use efficiency proposals that are put in place. Local communities with the money in their hand can decide rationally whether or not they make sense.

Policy makers also need to pay attention to implementation sequences. I’ve suggested already that if money for restoring flows is placed into a trust and then used to implement a compulsory offer scheme the result can be cost-effective. If a group of irrigators want to shut a whole supply system down, an extra payment could be offered to reflect that value of the resultant system wide savings.

If you allow the trust to trade counter-sequentially then you could decrease the cost of reform quite dramatically. Conversely, if you do not put a really robust entitlement system in place, you could end up having to pay a lot more money. So sequencing is a very big issue. There is quite a strong argument, at least, in the short term, to restricting trading largely to temporary trading of net allocations, are not allowing people to worsen environmental problems.

Removal of all barriers to trades is wiser only after changes have been made to account for the effects of forestry, salinity interception schemes and all the other processes that act to reduce flows. Roll out a robust entitlement system with two types of entitlement is possible – High security shares and general security shares.

As far as we can assess, there is no need for more than two types of entitlement. With all the entitlements grounded built around the hydrological realities of the water cycle, use of this water can be managed by an independent use licences. These use licences can be managed and maintained by catchment boards. Centralised government agencies need not get involved.

So what guidance can we give to those responsible for the National Water while it is still in its early stages?

To me the answers lie more with separation than with integrated natural resource management. Integrated natural resource management paradigms enable people to fudge the solutions – to not address the hard realities. If you separate the issues, you are forced to think with clarity and face up to the horrible system challenges that are in there and get them right. You must have clear specification of entitlements and unambiguous specification of allocations and specification of obligations that are consistent with the realities of the water cycle and the ways that water flows through our systems.

I think sequencing is a very big issue that needs a lot of careful thought. Rolling out reforms in the wrong order can significantly increase the cost of reform and foreclose opportunities.

Australia now has a mandate to roll out a flawless, state of the art system, but are we willing to do it? Australia desperately needs an entitlement design competition where we search for excellence. We as a nation have a chance to get water allocation and management right forever. In my judgement, water is too crucial to the future of this country to spend the next century arguing over it in water reform process after water reform process.

COAG has given us the chance to get water reform right, I hope we are brave enough to focus on design and to choose the most elegant, the best system that Australia can roll out rather than one which looks as if bandaids have been placed on band aids. The alternative is a robust framework produced through a process where everybody gets together and gives this country a water based future that is robust and solid.

Thank you.