COMMENTS ON THE PRODUCTIVITY COMMISSION DISCUSSION DRAFT ON RURAL WATER USE AND THE ENVIRONMENT

ENGINEERS AUSTRALIA

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INTRODUCTION

Engineers Australia is the peak body for engineering practitioners in Australia representing all disciplines and branches of engineering. Membership is now in excess of 80,000 Australia wide and *Engineers Australia* is the largest and most diverse engineering association in Australia. All *Engineers Australia* members are bound by a common commitment to promote engineering and to facilitate its practice for the common good. Engineers Australia is pleased to be able to respond to the Productivity Commission's discussion draft on Rural Water Use and the Environment.

The discussion draft is an important addition to the intellectual resources available to inform policy makers involved in water reform in Australia. Many of the Preliminary Findings set out in the draft report are supported by *Engineers Australia*. However, there are several areas in which the Commission's recommendations either do not go far enough or comprise incomplete analysis. In this Submission *Engineers Australia* briefly sets out its views on these matters.

INTEGRATED GROUND AND SURFACE WATER AND RETURN FLOWS

Section 2.3 of the discussion draft deals with the importance of integrating management of ground water and surface water and to improve efforts to understand return flows. This issue was included in the 1994 COAG water reform framework and it is a sad commentary on the progress of water reform in Australia that this issue continues to be discussed in similar terms in 2006. *Engineers Australia* strongly supports the Commission's Preliminary Findings 2.3 and 2.4. While *Engineers Australia* accepts that more research at water basin and ground water province level is essential, the character of ground water and surface water interconnectivity has been understood for many years. Equally well understood has been the relatively small proportion of mean annual precipitation (1%) which recharges groundwater resources compared to river runoff (11%)[1] and the limitations this places on ground water extraction.

The information provided by the draft report on the impact of groundwater extractions on surface water availability in the Murray-Darling Basin points to a serious erosion of the cap on surface water extraction. This information is corroborated by others such as Bryan and Marvanek.[2] The Murray-Darling Basin Commission is quite explicit in its views on what the cap means. "The cap is not an end in itself but rather a first step towards achieving the longer-term objective" of equitable, efficient and sustainable use of the Basin's resources[3]. The disturbing issue here is that the level of water extraction legitimised by the cap has not at any stage been accepted as sustainable. *Engineers Australia* believes that the Productivity Commission could do more to highlight this and to draw attention to the efforts to circumvent the cap using ground water extractions. Connectivity between ground and surface water in essence means that water is being drawn from a common source. Certainly water trading will help adjustment by irrigators, but unless water users appreciate that total extractions need to reduce over time, river degradation will continue, albeit more slowly to the extent that the cap influences the situation. The Commission cites the most recent assessment of risks[4] on p133 of the draft report. There is scope for integrating Preliminary Finding 6.4 with the discussion in this Section especially in terms of implementing a process reducing the Murray-Darling cap over time.

Engineers Australia believes that the Commission should reconsider Preliminary Finding 2.5. There is considerable support for water entitlements and water allocations to be specified in net rather than gross terms. Water suppliers appear to have sufficient knowledge to estimate the gross water release necessary to deliver net entitlements at the farm gate and are regularly displaying this understanding in their on-going operations. Responsibility for system losses, which essentially are the difference between gross and net allocations, is then shifted to water suppliers who are in a better position to do something about reducing these losses. Similarly, irrigators know where they stand in respect of water application efficiency. This position is much the same as adopted by Pratt Water in its study of the Murrumbidgee Catchment.[5]

PRICE RESPONSIVENESS OF IRRIGATORS

The focus of the draft report is on exploring the scope for market mechanisms in rural water reform. The principle expression of market mechanisms is price and so it is surprising to find that the draft report does not review the price responsiveness of irrigators in different circumstances and how this might effect the usefulness of market mechanisms. *Engineers Australia* acknowledges that this is an area of empirical economics fraught with difficulty, but without such an analysis the value of market mechanisms in different circumstances is difficult to evaluate. It is not enough to simply assert the efficiency of the market without assessing whether reliance on the market will result in sufficient change to make any difference.

INFRASTRUCTURE INVESTMENT AND WATER FOR THE ENVIRONMENT

The analysis used to derive Preliminary Finding 6.2 is incomplete. In essence the draft report compares the price of a permanent water entitlement per mega litre of water to the cost per mega litre of off-farm infrastructure designed to save water. The conclusion arrived at is that the economic opportunities for such investments are limited. This comparison is a superficial approach for several reasons:

- The comparison ignores the market value of system losses which are significant. At present, system losses are about 14% of gross water consumption in the MDB, or in the order of 1600GL which exceeds the South Australian share of the cap by a significant margin. The purchase of a water entitlement in the market by an environmental manager does lead to an increase in water available to the environment while reducing the quantity of water available for irrigation. However, the Pratt Water study demonstrates that win-win options are possible when water losses are correctly dealt with.
- The Pratt Water study also shows that the boundary for establishing economically viable infrastructure investments is about half the current price of a permanent water entitlement when the synergy between Basin wide investment options is taken into account.

- The comparison uses the current market price for a permanent water entitlement. However, current water entitlements prices do not reflect a sustainable level of water extractions, the risks to extractions associated with climate change, the growth in farm dams, afforestation, groundwater extraction and bushfires and externalities. For the comparison to be valid a price adjusted to accommodate these circumstances should be used. Marginal cost analysis requires enumeration of all costs.

- The capacity to manage available water is another unvalued element of the comparison. The best example of this is the value added achieved from irrigated farming in South Australia where, being downstream, water availability is a more acute problem and has resulted in wide spread use of piped solutions to improve irrigation efficiency.

A final point is the concern often expressed by conservation groups about alterations to stream flows, particularly seasonal alterations. While it may be argued that system transmission losses return via ground water drainage, the timing of this is dependent on when irrigation water is used and the time returns take to percolate back to the river. The Pratt Water study shows that the infrastructure investments needed to make optimal use of unaccounted water can be used to mimic natural flows, improving the environmental outcomes.

ECONOMIC EFFICIENCY AND SUSTAINABILITY

In the Introduction to the draft report, the Commission refers to the objective of the National Water Initiative which is to achieve "a nationally-compatible, market, regulatory and planning based system of managing surface and groundwater resources for rural and urban use that optimises economic, social and environmental outcomes."[6] This is a conventional statement of the objective of sustainable development.

There is a substantial economics literature on sustainable development which begins with the pioneering work of Dasgupta and Heal (1974), Solow (1974) and Stiglitz (1974)[7]. This work profoundly influenced the Brundtland Report of 1987 which is credited as the commencement of modern interest in sustainable development. In this literature economic efficiency is interpreted in the context of achieving inter-generational equity. In a context of a single generation, economic efficiency says little about sustainability.[8] While the broad methodology and principles of economics continue to apply, the rules of optimising behaviour contain modified messages. It is not necessarily the case that static, single generation economic efficiency serves as a satisfactory surrogate.

While it is reasonable to argue that the economics of sustainability is not yet as commonplace as static microeconomics, it is unreasonable to ignore a valuable resource which can shed light on how policy may proceed, especially when the objective of that policy is a straight-forward sustainable development problem. The issues that need to be canvassed go beyond accounting for externalities. While it is pleasing to see the considerable space the Draft Report devotes to externalities, moving towards sustainable development of water resources requires that the analytical framework embraces the main issue of sustainability which is inter-generational equity.

Static economics is able to internalise externalities, but "sustainability as inter-generational equity is potentially an additional constraint on the allocation of goods and services."[9] Optimising resource allocations over multiple generations will have additional price effects to ensure that utility is maintained over time. Thus, price effects come from two sources, one from the conventional operation of the price system in the context of the current generation, and a second set which derives from inter-generational considerations. While conventional economic efficiency is an essential argument to improve the current operational efficiency of water institutions, water trading is at least partially about adjustment to sustainable levels of water extraction, and by not taking into account both sets of price effects irrigators and the community at large are unlikely to achieve the full benefits of optimal adjustment.

A significant contribution to sustainable water reform would be an analysis of the implications of weak versus strong sustainability which is a threshold assumption in economic models of sustainable development. Under an assumption of weak sustainability, capital stocks additively comprise man made capital, human capital and natural capital. Economic models assume a high level of substitutability between these components to maintain the economy's overall capital stock. Models of this kind underpin the suggestion in the previous section concerning the substitution of enhanced infrastructure for natural capital (water). In particular, Hamilton[10] derived the so-called genuine savings rule in which genuine savings equate to investment less resource depletion and pollution. So long as genuine savings remain positive, that is, so long as investment exceeds the depreciation of natural and man made capital, development is sustainable. This rule and variations of it are common in writings on sustainable development.

Strong sustainability is based on a harsher interpretation of environmental assets. Models which assume strong sustainability put forward the view that man made capital and natural capital are separable and not substitutable. When natural capital is depleted the game is up. Models of this type have given rise to concerns about irreversibility from which the precautionary principle has developed. This principle says that if there are serious risks of irreversible damage, environmental protection should be pursued even in the absence of conclusive scientific information and/or conclusive economic benefit-cost analyses. Once the environmental asset is depleted human made capital cannot be used in its place.

There are critics of conventional economics who reject the relevance of economic models on the grounds that sustainability is a much broader subject than "chrematistics." These critics base their arguments on the evident limitations of short run static analysis in dealing with issues of sustainability. They advocate the need for a "new economics" built on entirely new axioms based on sustainability notions[11]. The rejection of economics out of hand is entirely unnecessary. However, it is equally unnecessary to persist with analytical techniques unsuited to the problem at hand.

The Productivity Commission would contribute substantially to water reform by undertaking an extension of its present research to include the economics of sustainable development. While water itself is renewable within the constraints of climate change, the environmental damage caused by unsustainable levels of water extraction and from both dry-land and irrigation induced salinity may lead to impacts which, if reversible, are costly and time consuming to overcome. Irrigation farming makes a substantial contribution to the Australian economy and as far as possible strong future contributions should be encouraged. AATSE and *Engineers Australia*[12] in 1999 published a report which showed that adaptive management of water resources could achieve this. The formulation at that time was not prescriptive but indicative of the mix of policies that could achieve positive outcomes. Using the economics of sustainable economics may lead to stabilising the composition of such policies. Asserting the merits of economic efficiency is insufficient.

ENDNOTES

[1] John Tisdell, John Ward and Tony Grudzinski, The Development of Water Reform in Australia, CRC for Catchment Hydrology, Technical Report 02/5, May 2002, p4
[2] Brett Bryan and Steve Marvanek, Quantifying and valuing Land Use Changes for Integrated Catchment Management Evaluation in the Murray-Darling Basin 1996-97 to 2000-01, CSIRO Land and Water Client Report, November 2004.
[3] Murray-Darling Basin Commission, Review of the Operation of the Cap, 2000
[4] Albert van Dijk, Ray Evans, Peter Hairsine, Shabaz Khan, Zahra Paydar, Neil Viney and Lu Zhang, Risks to the Shared Water Resources of the Murray-Darling Basin, MDBC Publication 22/06, February 2006
[5] Pratt Water, The Business of Saving Water, December 2004
[6] Intergovernmental Agreement on a National Water Initiative, COAG, June 2004, p3
[7] See for example John C V Pezzey and Michael A Tomans, The Economics of Sustainability: A Review of Journal Articles, Resources for the Future, Washington, Discussion Paper 02-03, January 2002 and by the same authors Sustainability and its Economic Interpretations, draft chapter in Ayres, Robert U, David Simpson and Michael A Tomans (editors) Scarcity and Growth in the New Millenium, 19 June 2006
[8] Pezzey and Tomans, 2006, p5
[9] Op cit, p8
[10] Kirk Hamilton, “Green Adjustment to GDP”, Resources Policy, 1994
[11] See for example John E Ikerd, Towards an Economics of Sustainability, University of Missouri, May 1997
[12] AATSE and Engineers Australia, Water and the Australian Economy, April 1999