TRIPLE BOTTOM LINE GUIDELINES FOR SUSTAINABLE WATER RESOURCE DEVELOPMENT, GOVERNANCE AND MANAGEMENT

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Summary

Growing pressure on scarce water resources presents a daunting challenge to the world in the 21st century. More specifically, the challenge is how to manage consumptive and non-consumptive water uses and interests harmoniously to satisfy the dual imperatives of food security and protection of environmental and social values. The intense debate generated by the report of the World Commission on Dams (2000) is a reflection of the concerns raised when proposals are put forward for storage construction and extensions to infrastructure to gain greater control over water resources for productive use, and which may be seen to be at the expense of environmental quality. These concerns emphasise the need for a credible set of guidelines and processes through which to underpin the design, assessment, governance and management of water development projects, taking full account of environmental, social, economic, financial and technical criteria. This is of particular relevance to international funding bodies charged with the task of ensuring that the limited assistance available is put to best use in achieving technical priorities consistent with environmental prerogatives and human wellbeing.

This paper summarises a six year journey undertaken by the author and his group to consider, in the first instance, the common elements from the international rhetoric on priorities for resource management in general, and water resources in particular and then, in the second instance, how that rhetoric might be applied in practice. Putting it another way, the central concern is to work out the details of how the new and emerging perspective of ecological economics might be practically applied to the 'coal face' of integrated water resources policy development, water resources management and water resources governance. Late last century, the CEEWPR developed a set of guidelines for the assessment of large water resource development projects that embed many of these concerns (Gill, 2001). By a combination of stealth and explicit intent, the guidelines attempted to articulate how water project managers and policy professionals could actually ***do*** integrated water resource development planning and assessment in keeping with the latest rhetoric on 'sustainable development', 'triple bottom line' development and 'integrated water resources management' (as only three different versions of essentially the same rhetorical core). While I will provide some more specific details about these guidelines in the next section of this paper, my main concern is to present a much more fundamental set of ideas that I believe are of greater general relevance to this World Water Congress audience.

Succinctly, my main argument is along the following lines:

- we, the citizens of this planet, cannot continue along present lines for much longer in the water resources management area;

[1] The author would like to thank his colleagues at the CEEWPR for input on this paper specifically and for their collaborative insight provided over many years of working through the issues that the paper addresses. Specific thanks are given to John Pigram, Jeannet van der Lee, John Wolfenden and Michael O'Loughlin. This has been a truly great team to work with.

- grappling with the rhetoric of 'triple bottom line sustainability' and its like from a conventional 'command and control' perspective is probably the most dangerous thing any water policy professional can do;
- there is nothing more damaging to the cause of integrated water resources management than the hegemony of a water policy bureaucracy that self-assesses its own relevance and progress; and
- the design, management and assessment of water resource developments should be a 'transdisciplinary, shared learning process'. This implies a willingness to recognise the reality of prevailing mental models and to embrace the evolution of those mental models towards constructs that are in practical empathy with integrated economic, environmental and community progress.

The Minefield of the Sustainability Rhetoric

Sustainability related concerns and issues are assuming an increasingly prominent place in policy discussions throughout the world. Government, industry and community groups use the term with ever accelerating vigour. The vision statements of corporate and public sector organisations continue to espouse sustainability related objectives. The broad set of concerns embodied within the sustainability debate have entered the culture of contemporary thinking. As with most cultural developments, one's interpretation of the merits or otherwise of individual attempts to address sustainability depends on the subjectivist priorities of the interpreter (Meppem and Gill, 1998). In broad disciplinary terms, ecologists, economists, industrial leaders and environmental activists are all likely to diverge in their interpretation of and recommendations to address specific sustainability issues. The meaning of sustainability is emphatically conditioned by cultural setting (values, attitudes and beliefs).

Institutional economists have devoted considerable attention to the importance of underlying value structures as explanators of observed nationally specific governance arrangements (eg. Hayden, 1982 and Gill, 1993). It is unfortunate that this particularly rich perspective is so infrequently visited by those engineering and neo-classical economist disciplinarians who have been so historically influential in the design of water resource governance and project implementations.

Ecological economists claim to represent a 'transdisciplinary' perspective on the sustainability agenda. This implies room for pluralism in disciplinary perspective. Most practitioners attempt to maintain an openness or responsiveness to ideas that may come from outside their own field. Our own Centre for Ecological Economics and Water Policy Research, for example, boasts a team with disciplinary roots as diverse as geography, engineering, economics, ecosystem management and psychology. We even have literary theorists on our team! My own 'take' on ecological economics is one that is fundamentally informed by institutional economics. This background leads to the explicit recognition a couple of inescapable truths:

- all environmental systems are 'complex';
- the behaviour of all environmental systems is driven by feedback relationships (negative and positive feedback);
- some of the detail that matters to the explanation of any system's behaviour is likely to remain beneath the resolution of any analyst's modelling efforts;
- real world complex systems are fundamentally unpredictable (for the reasons outlined above); and
- our prospects for developing improved understandings of real world complexity are always improved through well-facilitated, learning-orientated dialogue.

The challenge to this kind of open-mindedness comes from those devoted disciplinarians who fear some kind of syncretic adulterations to their own cherished and usually highly self-referentially managed intellectual camps. Elaborate barricades are erected to perpetuate cherished disciplinary hegemony in areas such as the formal design and assessment of large water resource developments. Or in ranking the merits of different development project funding applications.

In their paper on Sustainability as a Learning Construct, Meppem and Gill (1998) outlined the merits of a transdisciplinary perspective to facilitate the reconciliation of currently divergent opinion and policy

processes that constitute the contemporary sustainability debate. Their main conclusion was that much can be gained through developing a 'learning environment' context for the debate. Participants are facilitated away from the need to defend individual perspectives and view-points towards a more healthy willingness to listen to and participate in the evolution of more generally shared insights. Before a claim of helpless idealism is attributed to this goal, lessons from systems thinking, learning organisation management and the science of complexity, are suggestive of some potential in this regard. The task is to extract those critical success factors underlying the achievements of learning organisation approaches to the consideration of issues in the corporate world, and apply them to the wider context of the 'environmental debate'. The result would be an accelerated rate of progress within this most important policy agenda.

Following their review of the extensive literature on 'sustainability', and based on what they interpreted to be core insights from a number of different perspectives on the subject, Meppem and Gill (1998) proposed a reworking of the sustainability concept that is perhaps more relevant to contemporary resource management and policy issues than has been the case in the past. The elements of their reworked definition noted that:

1. sustainability describes a state that is in transition continually;
2. the objective of sustainability is not to win or lose and the intention is not to arrive at a particular point;
3. planning for sustainability requires explicit accounting of perspective (worldview or, mindset) and must be involving of broadly representative stakeholder participation (through dialogue);
4. success is determined retrospectively, so the emphasis in planning should be on process and collectively considered, context-related progress rather than on achieving remote targets. A key measure of progress is the maintenance of a creative learning framework for planning;
5. institutional arrangements should be free to evolve in line with community learning; and
6. the new role for policy makers is to facilitate learning and seek leverage points with which to direct progress towards integrated economic, ecological and sociocultural approaches for all human activity.

This reworked sustainability 'manifesto' describes a move away from a culturally inappropriate, exclusive epistemology of positive and normative definitions to a process that facilitates reflective insight and the genuine sharing of ideas.

It is at this point that I would now return to the key theme of this paper. What can be done to systematically and genuinely address progress against sustainability objectives that mean different things to different people and that will always be expressed through real world systems that are invariably messier than can be represented in any disciplinarian's model? Or, more specifically, how can we progress the implementation of the reworked notion of sustainability as proposed above in specific relation to the design, assessment and governance of large water resource developments? This was the challenge my group accepted in our development of a detailed set of guidelines for the assessment of large water resource developments. In theory, this kind of exercise is a prime ambition for a contemporary ecological economist. In practice, I think this work has appealed to a diversity of interests greater in scope than would be contemplated by even the most eclectic of transdisciplinarians. The journey taken to put our guidelines together, and our observations in relation to how they have been received is just as interesting as the guidelines themselves. I believe that the insights derived through all this are very significant indeed to the ambition of progressing so-called triple bottom line outcomes for water resource developments anywhere in the world. Before sharing these insights, however, I will briefly turn to the actual content of our Guidelines.

Summary of a Set of Guidelines for the Assessment of Large Water Resource Developments

The original brief for these Guidelines was developed by the Australian Government. The articulated need was for a methodology that could be applied to support the consistent attention of prospective water resource development proponents to, in effect, the likely impacts of their proposals on the

economy, environment and community. The guidelines were also intended to support decision makers in their consideration of those proposals in a manner that is both transparent and consistent across different government jurisdictions. Facilitating attention to the economic, demographic and bio-regional scope of proposals was also important. Whereas water resource development can have substantial benefits for regions, there can be disadvantages in terms of environmental degradation, water quality problems and conflict between communities over how water should be valued, used and shared that extend beyond a specific project locality. These considerations are important to any government agency which is entrusted with the disbursement of public moneys in accord with (some concept) of the regional or national interest.

The assessment process developed by The Centre for Water Policy Research (now The Centre for Ecological Economics and Water Policy Research) and The Australian Centre for Tropical Freshwater Research is capable of being applied to proposals for large water resource developments and related infrastructure in countries and regions of the developed and developing world.

Preliminary Rapid Screening

The process provides for two levels of assessment - first, a rapid screening phase to allow preliminary assessment of proposals. This is followed by a more detailed and rigorous integrated assessment procedure which collectively addresses the possible implications of a proposal, with reference to a comprehensive set of technical and non-technical criteria. The rapid screening phase involves a proponent specifying his or her thoughts via a template proposal form. This very simple first step attempts to facilitate the proponent's thinking in integrated or holistic terms from the outset. The proponent is asked to specify, in effect, what he or she thinks might be the likely (qualitatively described) triple bottom line impacts of their proposal. This very short proposal statement is then sent to a government agency with appropriate jurisdiction (given that both permission and, usually, government funding will be needed for nearly all large water resource developments). The outcome is advice on how or if the proposal should be subjected to a considerably more intensive assessment along the lines outlined below. Given that large water resource developments are also likely to involve jurisdictions that cross central/federal and state/regional (or, indeed, international) boundaries, the other main outcome from the preliminary screening stage is the possible initialisation of a network of cooperating agency interests which will subsequently be engaged through the second detailed proposal assessment phase.

Detailed Proposal Assessment

The detailed assessment phase starts with a systematically organised stakeholder identification process and works through to a highly participatively-organised qualitative and quantitative impact assessment that is systematically holistic in scope. A range of factors are drawn out to specify benefits and costs at the construction and operational stages, capital costs, environmental sustainability, economic viability, and community service obligations. The procedure requires the services of appropriately accredited consultants to manage both the consultative and analytical components of any proposal assessment.

Qualitative Strategic Environmental Assessment

A critically important first step in any detailed assessment is the undertaking of a precisely defined Strategic Environmental Assessment (SEA). This is both to provide 'stakeholders' with the assurance of objective, third party facilitation of issues and to maximise the prospects for the identification of as comprehensive a set of project impacts or implications as possible. As articulated in our guidelines, this particular version of SEA is, in effect, an open-invitation project information sharing workshop (or series of workshops) where the perceptions and views of all active participants are noted via an emphatically inclusive, non-technical graphical mapping process that we call 'mudmapping'.

This particular approach to the facilitation of community-engaged workshopping has been applied in a great variety of projects by CEEWPR staff over the past five years. The elements of the technique have been templated as best practice for applications as diverse as regional development planning and for the review of organisational governance arrangements. It was purposefully designed as a mechanism through which to facilitate dialogue-based learning across participants with significantly different views, perspectives and technical backgrounds. The actual graphical mapping process used is a form of cognitive mapping that, in effect, imposes a single non-technical language as the medium through which

all related discussions take place. Through this approach, the views of participants are revealed as transparently as possible. Propositions are systematically unpacked, complex viewpoints are rendered more transparently than would ordinarily be achieved through recourse to disciplinary jargon and, most important of all, the views of all participants are given space and noted in equal currency. We have noted that this particular facilitation process engenders a strong degree of ownership and empathy with participants. As facilitators, we do not 'translate' concepts proposed from the floor in a way that is outside the comfort zone of those advocating them.

Methodologically, this all-important development proposal workshopping process works to promulgate a shared process of systems thinking. Given that all water resource developments involve a complex interaction of environmental, community and economic factors, we seek, through this process, to unravel the underlying cause and effect relationships as articulated by a diverse interest array of 'informed system observers'. Naturally, much attention needs to be given to setting up meetings of this kind. We propose a preparatory, iterative, one-on-one consultative process aimed at the identification of stakeholders and stakeholder interest groups that must be represented in the ensuing participative workshops. We always attempt to ensure that our SEA workshops are attended by specialists and non-specialists and our mapping process facilitates 'learningful' engagement between those representatives. It will be noted that this particular component of the overall assessment process is in direct accord with items 3) and 4) from the revised concept of sustainability presented in the previous section.

The importance of the potential achievements to be realised through this opening workshopping stage cannot be underestimated. They include:

- a concentrated overview of the holistic dimensions of a proposal;
- the assertion of an holistic perspective through which to describe and evaluate a water resource development proposal
- a definitive statement of the likely stakeholder positions in relation to the perceived merits or otherwise of the proposal;
- a rich integrated picture of the proposal's likely impacts;
- the initialisation of an engaged stakeholder network that is now more informed than is ever likely to be achieved through alternative, generally more divisively-managed 'public enquiry' processes;
- provision for a greater degree of community empathy with (or at least understanding of) a proposal than is likely through more divisively-managed enquiry/assessment processes; and
- a rich qualitative data set that can be directly applied to subsequent quantitative analysis.

Formal Quantitative Assessment

It is at this point that our Guidelines become particularly challenging to those disciplinary economists who have traditionally managed the assessment of water resource development projects (and of their associated funding arrangements). Whereas the more conservative economist may be inclined to go along with the SEA process, (largely because 'participative, community-involved engagement' is a central component of the political rhetoric in most countries) what we now propose represents a methodological challenge. Our formal quantitative assessment stage was informed through the holistic perspective of ecological economics. It is thus predicated on a number of mental models or world views that are less commonly in evidence within disciplinary economist circles. Most notably, we have attempted to define a quantitative assessment framework that is genuinely holistic in scope. We recognise the need for and role of the traditional benefit cost analytical toolbox, but we provide a radically different context within which such assessments should take place. I at least do not apologise for challenging the establishment in this way! The continued prevalence of unresolved water sharing conflicts, environmental problems and the plain fact that the world is increasingly 'short of water' should recommend a mature analyst's preparedness for new ideas.

Our detailed assessment process works through system dynamics modelling. While I do not have the space here to outline the specifics of this analytical framework, I would guarantee that its heritage in the area of environmental management and policy decision making is long and illustrious. A good starting point for the interested is Ford (1999). I also recommend consideration of papers by van den Bergh (1995) and more recently by Radzicki (2003) who shows, in a compellingly assessable way, (through

the device of a mudmap!) where system dynamics fits within the wonderfully convoluted domain of economics.

For current purposes, it is sufficient to simply say that the fundamentals of the mudmaps developed through the opening qualitative assessment phase can be inputted, largely without distortion, into a formal quantitative model and then applied to the measurement of prospective project impacts in a way that is meaningful to the greatest possible diversity of interested parties. While I would not claim that this kind of quantitative analysis is equally accessible to all stakeholders, I would claim that it is an assessment procedure that is more transparent to a larger array of interested parties than the more arcane offerings of conventional economists. Most observers (in my experience) have little trouble relating with how their input provided through our qualitative mudmapping phase has been rendered through its transition to the computer. They still, generally, empathise with the assessment routine given that they can usually see that their own particular concerns are still visibly represented. We call this phase of the assessment process 'transparent box modelling' to emphasise its distinctiveness from the usually rather non-transparent (or 'black box') workings of either economists or hydrologists.

Given that the kind of system dynamics modelling that we recommend involves the development of a graphical interface with very strong visual links to the preparatory mudmaps with which our stakeholders have been involved, it is generally a straight forward task to 'take back' a system dynamics model to a stakeholder reference group (importantly, constituted through self-selection rather than direction) and then test its validity in accordance with that group's own perceptions, intuition and specialised system understandings. If this assessment process is managed well, the reference group will certainly include agency/government specialists who can consider the integrity with which their own concerns, needs and expertise have been incorporated. Our framework is certainly capable of generating calculations for the usual indicators of economic efficiency that are generally required for assessments of this kind. The big difference, though, is that it is also equally amenable to the generation of creditable evaluation in relation to those environmental and community indicators that are or should be of equal importance to any genuine integrated assessment process.

Progressing Integrated Water Resources Management

As indicated at the outset of this paper, the Assessment Guidelines for Large Water Resource Developments were conceived and developed as one particular attempt through which to promulgate a necessary shift in the 'culture' that underpins contemporary water resources planning and policy towards a closer fit with both the rhetoric of Integrated Water Resources Management and with the revised concept of sustainability presented above.

A Brief Diversion on Value Structures

It is a generally accepted human reality that the hardest thing of all to shift are those basic values that inform how we each perceive the world. The behaviour of individuals and institutions is correlated with value structures (Gill 1983). Institutional economists like, for example, Bush (1983), have long noted that values are either ceremonially-warranted or instrumentally warranted. Ceremonial values are derived from custom, social mores and other components of belief structures. Such values support habitual modes of thought and behaviour embedded in traditional practices. Instrumental values emerge from the process of inquiry into causal relationships; they are inherent in the processes of scientific inquiry and technological innovation. The main observation to follow from this, for current purposes, is that these very fundamental behavioural drivers tend to inform our attitudes and beliefs that soon become manifest in the debate that seems to underpin big issues like water reform. Our choice of professional paradigm is certainly not unrelated to these things. It is then a short step towards making the argument that the tools or approaches we use to assist with the resolution of such issues are, indeed, informed by our values, attitudes and beliefs. Our chosen toolboxes, following this argument, are significantly culturally determined. It is possible to reach this same conclusion via a number of different schools of thought. Advocates of Organisational Learning, (eg. Senge 1982) would propose that our mental models or world views drive our behaviour and certainly may get in the way of our capacity to think laterally and holistically. Partial/reductionist thinkers tend to use partial/reductionist tools to underpin their professional activity.

The Real Needs for Integrated Water Resources Management

Few could argue that conventional tools or methods like benefit cost analysis for economists and hydrological modelling for environmental engineers are anything other than partial in terms of factors explicitly considered. While peer acclaimed facility with tools of this kind rightly assert an individual's professional standing and intellect, the problem that should concern us here is that the sensible limits to the application of these tools are often ignored. Disciplinarily-devised tools are pushed outside their competence zones very frequently in the water management planning domain. Our value structures tend to at least numb our sensibilities in relation to the dangers. These dangers become particularly acute when our own professional perspective and approach is fed by and feeds into a larger organisational culture. The result is a self-reinforcing loop through which to explain away the obvious deficiencies of accepted professional practice and allow us to remain guilt free when we really know, deep down, that we are only paying lip service to the rhetoric of the sustainability debate.

I am, of course, advocating the need for a culture shift, a change of mental model, through which to underpin real progress in resolving the outstanding big water resource management issues. My brief diversion on values highlights that this is much easier said than done. Reading more deeply into the reworked definition of sustainability presented previously, it should be incontestable that progress can only proceed with the evolution of mental models, at least within water governance circles, away from those that support partial/reductionist thinking towards new improved versions that are in strategic alignment with the principles that underpin our revised sustainability definition. It is not, for example, OK to agree with the proposition that inclusive diverse interest stakeholder participation and engagement in water resources management planning is a good thing if what we actually do, professionally, is antagonistic to that cause (by, for example, persisting regardless with exclusive, jargon drenched assessment methodologies). One of the most fundamental needs to support real progress against our own or any other similarly holistic sustainability concept is for us to realise that no single human or no single discipline has all that it takes to resolve the inestimable depths of real world environmental-economic complexity. The full detail that combines to explain the observed behaviour of any environmental-economic system will always remain outside or beneath the resolution of any model we may conceive to support our decision making. Knowing this, we must then progress towards the self recognition that the best prospects for sensible progress lie in transdisciplinary cooperation and learning. Especially the latter. Our genuine engagement with this notion, in turn, must imply that we are no longer prepared to value disciplinary expert knowledge above all else. We develop humility in our facility for omniscience. We recognise that a seemingly humble farmer, villager, or a local shop keeper may have some insights to add to our rich picture building that may well be significant to our resolution of issues.

With all this in mind, we crafted our guidelines as a framework within which to facilitate the greatest possible prospect for genuinely evolutionary learning as the key asset to underpin water resources planning. Our process maximises the prospect for shared learning via facilitated dialogue. Our mudmapping language, and its subsequent iteration into the still graphical system dynamics format, is all designed to maximise the learning possibilities available through well facilitated communication. It fundamentally asserts the need to embrace rich complexity rather than assume it away. It also offers tremendous capacity for quantitative assessment, but of a kind that requires and inspires a preparedness for lateral thinking.

Learning from Experience

At this point I would like to reflect on how our guidelines have been received, because there are some very telling insights of value to the theme of this paper.

Much to our surprise (given the acknowledged mind set challenges that they represent), our Guidelines were adopted as Federal (Australian) Government policy by the Deputy Prime Minister in early 2000 (Gill, 2001). Apparently, the rhetoric and ambitions that we have attempted to address is highly acceptable at the political level. Certainly, the brief we responded to was framed in terms of prevailing government rhetoric and our responses seemed credible from that perspective.

However, it was not long before the full implications of what we had proposed began to be noticed by our government agency colleagues. Thus began a process of review or arbitrage to move the Guidelines

closer to prevailing procedures and protocols. Some definite improvements were made to couch the Guidelines within the framework of the still evolving water reform process under way in Australia. Our main concern was to keep the fundamentals sufficiently intact to preclude the production of yet another rhetorical statement with sufficient built-in ambiguity to enable business as usual. While I think we have succeeded in keeping the integrity of our Guidelines intact, one should never underestimate the challenges to such a process from the culture of instrumental rationalism that seems to characterise the inner sanctum of the water reform process at least in Australia. There is manifold confusion in that camp over how to proceed with anything other than their instrumentally-warranted reductionist tool boxes. Despite its foundation on some absurd propositions in relation to human behaviour (eg, universal homogeneity of preferences, linearity and aversion to the very concept of feedback), benefit cost analysis remains as a flawed but logical construct for dealing with some components of the issues that need to be resolved in water resource project assessments. It is not, however, a self-contained framework. Our Guidelines provide a vastly improved context for such evaluations. Some analysts will, however, interpret our efforts as an assault on their own professional integrity. It pays, in these circumstances, never to underestimate the elaborate barricades that have been constructed around the fortress of economic rationalism.

I do, however, think there is considerable hope. Our Guidelines are an attempt to inculcate the necessary cultural preconditioning required to seriously engage with ever more pressing and seemingly unresolvable water management issues (as a subset of the wider environmental policy and management domain). I am pleased to observe that this strategy demonstrably works.

In the past three years, we have applied the elements of our 'integrated mudmapping-based strategic environmental assessment, system-dynamics-modelling-as-a-learning-construct' methodology to a diversity of water and related environmental management planning issues. This has included an integrated catchment management application, another for the consideration of how best to manage environmental water in a regulated river system and a series of applications for triple bottom line regional planning. This same perspective is now being applied to a highly collaborative Australian water visioning process. Elements of our process have now been templated as best practice in regional planning (Planning NSW, 2001).

Ordinarily, we do not find it necessary or actually advisable to indicate that our real aim is to inculcate a shift in underlying culture or mental models. This aspect of our work is important to us in an academic sense. Our focus at the applied level is merely to offer an integrated planning and assessment process that addresses all the key needs of our clientele and which is in complete accord with progressing the main themes of most people's perceptions of integrated sustainability. At the end of the day, our main aim is to facilitate improved understanding in relation to how complex environmental-economic systems work and where problems come from, and then support the application of those improved understandings to their resolution. If you understand a system better, you can manage it better. It really is as simple as that. Our engagement with a culture shift of the kind necessary to address our reworked sustainability concept does not necessarily imply a threat to the disciplines that intersect around water resources issues. Nor does it imply the need for scrapping old organisational structures or governance arrangements. Our agenda is the facilitation of constructive evolution.

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