

## **Multi-Objective Analysis and the Murray-Darling Basin Plan: Case Study: Ecologically Sustainable Development (“ESD”) ~ A Cornerstone for Conflict Management & Resolution**

**Dr Ted Christie, 11 April 2019**



### **Disclosure Statement**

*Ted Christie does not work for, consult to, own shares in or receive funding from any company or organisation that would benefit from this article, and has no relevant affiliations*

*Developing the Basin Plan is a classic sustainable development issue. The conflict that exists between competing land use interests is a feature of public interest environmental conflicts!*

*The key to manage and resolve this information conflict relates to the appropriateness of the methodology used to achieve ESD outcomes in developing the Basin Plan?*

*The methodology would have to be one that is generally accepted as a reliable body of knowledge for environmental management and planning i.e. by being consistent with the standards and criteria of science; and to be an effective decision-making aid to resolve environmental conflict?*

*An alternative methodology to the “MDB Authority model” that could be used – “Multi-Objective Analysis” – is outlined as the cornerstone for conflict management and resolution/.*

The *Federal Water Act 2007* [at ss. 21(4)(a)] imposes a legal obligation for achieving sustainable long-term solutions in the Murray-Darling Basin Plan: -

*In developing the Basin Plan,*

*the MDB Authority must take into account*

*the **principles of ecologically sustainable development (“ESD”)**.*

The following statement by **Nick James**, the *Chair of the newly-formed Northern Victoria Irrigation Communities*, gives insight into community Basin Plan **concerns** and the **need** for Basin Plan outcomes to provides solutions for community seeks to manage and **resolve** the **conflict**: -

*"We're not looking for a short-term fix. We're not looking for a good rain or some environmental water to come on the market. That's just a band aid to fix cancer.*

*We're looking for long-term solutions to make it sustainable for the next generations."*

## The Federal Water Act 2007 and ESD

There are **five principles for ESD<sup>1</sup>** specified in the Water Act. All five principles are relevant considerations that must be assessed in order for the Basin Plan to achieve sustainable long-term solutions.

The most widely recognized is the first ESD principle prescribed in the Water Act. It is composed of three elements representing the multiple and competing objectives of ESD – *environmental, economic and social (including cultural)*: -

- **“Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations”**: Subsection 4(2)(a).

The framework to avoid potential future conflicts over Basin Plan’s ESD outcomes prepared under the Water Act is crucial: -

- **All multiple and competing objectives of ecologically sustainable development – environmental, economic, social (including cultural) - must be assessed and balanced, equitably.**
- **Decision-making processes should effectively integrate both long-term and short-term considerations.**
- **A sustainable solution is not weighted in favour of only one of the multiple and competing objectives of ESD.**

*Basin Plan outcomes for achieving ESD  
should minimise the extent  
to which environmental costs and benefits  
are shared disproportionately between  
MDB communities (both local and Indigenous),  
irrigators (both upstream and downstream),  
environmentalists, recreation users  
and Government.*

### **Methodology for Achieving ESD: The *Case for Multi-Objective Analysis***

Multi-objective methodology is a well-accepted procedure that has long been used as a decision-making aid for public-sector environmental and planning issues.

*Its application has evolved over time  
from conflicts involving a single land use  
such as a dam project –  
to more complex conflicts,  
such as multiple and competing uses of natural resources,  
where the evaluation of sustainable development was in issue.*

Established concepts and principles from conflict resolution and environmental management and protection are the foundation for the methodology. Two key elements of “**Principled Negotiation**” are the cornerstones for the use of multi-objective analysis as an environmental decision-making aid for finding sustainable solutions: -

- (i) Constructing options (“creative scenarios”) for mutual gain; and*
- (ii) Reliance on the use of the same objective criteria to evaluate all scenarios.*

### **An Outline of Multi-Objective Analysis Methodology**

- A scenario is a hypothetical construction of the conflict *e.g. developing SDLs as part of the Basin Plan*. The methodology requires several **scenarios** along a “continuum of sustainability” by varying the weight and mix given to the environmental, economic and social (including cultural) objectives.
- All scenarios must comply with the *environmentally sustainable limits* set under the Water Act for the amount of water that can be taken from the Basin’s water resources. Scenarios requiring an ESD solution under the MDB Plan, could then be constructed based on the [Commonwealth water reform investments](#) for the Murray– Darling Basin.

*The Commonwealth water reform funding provides a package for 37 State-run supply and constraint measures, to select from, to enable the construction of relevant scenarios. These measures aim to secure a long-term sustainable future for irrigated agriculture and communities through more efficient use of the Basin’s water resources.*

- An innumerable number of scenarios could be constructed. But a finite number of scenarios is required - with one proviso: All feasible supply and constraint measures are to be included in at least one scenario.

- Where scientific uncertainty exists in the application of a supply and constraint measure it would only be included in a scenario when the uncertainty/environmental risk for the application had been resolved.
- Framing **multiple objectives for sustainable development** provides the cornerstones for evaluating each scenario for its compatibility with sustainable development. This step is crucial if the methodology is to be an effective decision-making aid.

*As an example, **Environmental Objectives** could be framed based on appropriate legal obligations prescribed by the Water Act:*

- (i) **Ensuring that key environmental assets and ecosystem functions are not endangered or exposed to unacceptable risk;***
- (ii) **Managing the Basin's natural resources to embrace sustainable use, preservation, restoration and enhancement.***

- To remove any subjectivity in the evaluation of scenarios, the multiple objectives for sustainable development must be able to be measured
- Selection of the **criteria to evaluate each objective** is also a key to success. All criteria have equal weight in the evaluation process. The same criteria are used to evaluate all scenarios. The criteria need to be selected should be based on standards such as: scientific merit or equity; and to be legitimate and practical standards.
- The continuum of scenarios is not fixed - but may change after evaluation commences.
- The **preferred scenario** is one that most effectively balances the multiple and conflicting objectives for sustainability; and which secures as much available value as possible. It may be one of the original scenarios evaluated.
- In the situation that no single scenario is clearly superior, a new scenario could be constructed based on the best features of one, or more, or all the scenarios evaluated to become the preferred scenario. It must then be evaluated for its compatibility with sustainable development.

#### **Comment**

- (i) **One view of the multi-objective analysis methodology is that because most public-sector problems involve multiple conflicting objectives —***

*whether in environmental policy, water resources, energy or public health — the opportunity for the methodology is unlimited.*

- (ii) *Problems that must be avoided are using unnecessarily complex objective criteria; or objectives that cannot be measured or quantified; and, of overriding importance, criteria that cannot be evaluated because of the absence of a suitable scientific data or information base.*

A model template, developed by the author, for resolving conflict over co-existence between competing land use interests can be downloaded on the following [LINK](#).

*NOTE: The multiple objectives for sustainable development, and the objective criteria used to evaluate each objective that were framed, can be modified to apply, as appropriate, to the specific environmental conflict.*

## **End Note**

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<sup>1</sup> The *Federal Water Act 2007*, Subsection 21(2):

The following principles are [principles of ecologically sustainable development](#) :

- (a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;
- (b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation [*the 'Precautionary Principle'*];
- (c) the principle of inter-generational equity--that the present generation should ensure that the health, biodiversity and productivity of the environment is maintained or enhanced for the benefit of future generations;
- (d) the conservation of biodiversity and ecological integrity should be a fundamental consideration in decision-making;
- (e) improved valuation, pricing and incentive mechanisms should be promoted.