



CSIRO Submission 10/400

Inquiry into the management of the Murray-Darling Basin

Senate Standing Committee on Rural Affairs and Transport

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Introduction

The Murray-Darling Basin Authority (MDBA) released the overview to the draft Basin Plan on 8 October 2010. A final Plan, due by July 2011, will make recommendations to set limits on the quantities of surface water and groundwater that can be taken from the Basin water resources, and will be used as a basis for Parliamentary decisions to define legally enforceable water limits. The Plan will provide for the integrated and sustainable management of water resources in the Murray-Darling Basin (MDB) and will provide a transformational basis for managing water in the MDB.

CSIRO and other research groups provided underlying research, models and data to enable the development of the Basin Plan. CSIRO undertook work to provide methods, systems and some input data, such as climate scaling factors and groundwater assessments, to the MDBA for the development of sustainable diversion limits (SDLs) for the Plan.

How, and if, this information was used by the MDBA was at the discretion of the Authority.

CSIRO has been working in the MDB for over a decade. A major research project was the MDB Sustainable Yields Project, which in 2008 provided a rigorous assessment of the potential impacts of development and climate change on surface water and groundwater availability across the Basin. CSIRO's report 'Water Availability in the Murray-Darling Basin' outlines the assessments for 18 regions that comprise the Basin that were undertaken as part of the Sustainable Yields Project. The report is available at <http://www.csiro.au/resources/WaterAvailabilityInMurray-DarlingBasinMDBSY.html>

Further information on CSIRO's current research in the MDB is available at <http://www.csiro.au/science/MDBscience.html>

It is CSIRO's view that the future management of the MDB requires careful consideration of the complex range of social and economic values associated with water, the environment and agriculture. Comprehensive assessments of potential reform options are needed to fully identify and understand the likely impacts of different future scenarios for the Basin.

Our submission is based on a combination of our past and current research in the MDB as well as our knowledge of scientific literature and other research being conducted in this domain. We address the terms of reference for which CSIRO has relevant research expertise and results to provide input, and in doing so, we suggest ways to consider the complex questions posed by the terms of reference. We

emphasise opportunities to assess the net benefits that the Basin Plan could be expected to deliver for Australia if it is implemented optimally.

(a) the implications for agriculture and food production and the environment; and (b) the social and economic impacts of changes proposed in the Basin;

The future management of the MDB needs to be guided by a comprehensive assessment of the total net benefits to Australia of proposed reform options. This should be compared to a comprehensive assessment of the expected outcomes of not proceeding with reforms – that is, the “do nothing” scenario.

These assessments could be in economic terms but should consider that some of the benefits from improved environmental condition are unlikely to fully accrue for decades – that is, the issue of inter-generational equity that is paramount in achieving environmental sustainable resource use. These assessments need to recognise that some of the benefits – existence values, biodiversity and cultural values – are challenging to consider in an economic framework but feasible.

The full range of social and economic values associated with water are yet to be identified. While these start with the benefits flowing from agricultural and industrial uses of water, they extend to a wider set of social benefits. Social surveys, using well-tested socio-psychological methods, can elicit information on social values that can help guide policy, reduce zones of conflict and identify how social loss can be mitigated and/or compensated.

Any meaningful assessment has to begin with clear recognition of the costs of not implementing the Plan. This involves assessing the medium and longer-term consequences of no reform, which should consider the issue of changing values through time and the issues associated with choice of discount rate in aggregate cost-benefit analyses. Important outcomes to consider include:

- Environmental outcomes and associated economic costs
 - Costs of water quality degradation;
 - Costs involved with loss of ecosystem goods/services/values such as safe drinking water, tourism and recreational opportunities;
 - Costs associated with restoration/remediation activities like pipelines, treatment plants and alternative water supplies.
- Agricultural outcomes and their dependence on Basin environmental health
 - Can production be sustained or would it fall in some instances due to factors like increasing salinity or less reliable irrigation allocations?
 - What investments would be required to sustain irrigation production?

- Socio-economic impacts for regional communities
 - These will vary in time and space and from sector to sector geographically within the Basin. This complexity needs to be understood to assist policy setting and decision-making.

Other external drivers that determine baseline trends in the “do nothing” scenario include:

- Climate change scenarios;
- Economic trajectory of agricultural and other sectors;
- Social trajectory at local and regional scales (using accepted metrics of social change: employment, income, demography, identity etc.);
- Continuing regional economy diversification;
- Opportunity cost of no reform at regional and local scales;
- International commodity prices and global food demand;
- National food demand; and
- Australia’s contribution to the global food system.

(c) the impact on sustainable productivity and on the viability of the Basin;

In considering the impacts on productivity and viability of the Basin it is important to take a whole of system approach. As a starting point, it is important to identify to whom do the benefits of reform accrue, and how do these relate to ‘the national interest’ as required of Basin Plan reforms. Homogenised views of aggregate benefit will not assist policy making and structural adjustment. The full range of values associated with water across society need to be considered to give policy-relevant assessments. Assessment of the benefits of implementing the alternative scenarios in the proposed Basin Plan should include:

- Social survey to elicit information on social values;
- Determining willingness to pay for environmental quality in the MDB through Choice Modelling. This could be innovatively extended to ‘willingness to accept compensation’ for loss of environmental benefit using the same methods;
- Valuation of environmental benefits/outcomes;
- Considering how to best structure management of environmental water holdings to realise greatest benefit and how the operation of the environmental water holder impacts other parties.

For specific MDB regional socio-economic consequences it is important to ensure considerations are not just assessing vulnerability, but assessing how successful adjustment can be facilitated, including the consideration of:

- Opportunities to reduce flow-on economic effects, especially to employment, in agricultural services sector and regional economies that are highly dependent on irrigation;
- Opportunities to capitalise on changing demographics in MDB such as emerging industries, or migration;
- Empowering local communities, including indigenous communities through stewardship, skills development, and regional planning support.

(d) the opportunities for a national reconfiguration of rural and regional Australia and its agricultural resources against the background of the Basin Plan and the science of the future;

Social and economic costs and benefits will vary in space and time and across different sectors of the Basin and beyond, and this complexity needs to be revealed. Socio-economic assessment of the consequences for regions and communities beyond the Basin should consider:

- Economic trajectory of agricultural and other sectors nationally;
- Economic trajectories of communities and regions nationally;
- Any consequences that flow beyond Australian shores into the wider global food system.

(e) the extent to which options for more efficient water use can be found and the implications of more efficient water use, mining and gas extraction on the aquifer and its contribution to run off and water flow;

Refer to information regarding efficient water use in agriculture at Term of Reference (f). CSIRO has not yet conducted research regarding implications for mining and gas extraction relevant to this term of reference.

(f) the opportunities for producing more food by using less water with smarter farming and plant technology;

Improving agricultural outcomes in a water constrained context is not a simple assessment of the impacts of reduced water use, but rather how to maximise economic outcomes from reduced water availability, through consideration of:

- Improved water use efficiency of crops, pastures and trees (better varieties, better technologies and better practices at the field scale) expressed in terms of harvested product per megalitres of irrigation used;
- Improved water use efficiency at the farm scale through dynamic changes in the activity mix (crop/pasture choice, water application choices) and strategic changes in the irrigation farm business structure (expressed in dollars per megalitres at the whole farm enterprise scale);
- Opportunities to dynamically link on-farm irrigation strategies with environmental water use strategies and make use of seasonal variability for win-win outcomes;
- Improved delivery efficiency of water through on- and off-farm infrastructure, by considering what investments by government and irrigators make economic sense;
- Opportunities and costs associated with transforming the irrigation sector to a different suite of agricultural activities (including markets, infrastructure) and a different geographic footprint of these activities;
- Spatial optimisation of land use for environmental, production and carbon sequestration benefits: basin scale and regional scale (expressed in dollar per megalitres or employment per megalitres or some other socio-economic measure at region or basin scale).

(g) the national implications of foreign ownership, including:

- (i) corporate and sovereign takeover of agriculture land and water, and**
- (ii) water speculators;**

CSIRO has not conducted relevant research to address this term of reference.

(h) means to achieve sustainable diversion limits in a way that recognises production efficiency;

Currently the knowledge base on which government, industry and community progresses the structural adjustment regarding SDLs is inadequate. Much more targeted investigations are needed to ensure the maximum environmental benefits are achieved from reductions in water diversions whilst at the same time the economic and social impacts on irrigation industries and communities are kept to the minimum possible.

A comprehensive assessment of the total net benefits of proposed SDLs requires consideration of the optimal level and nature of government investment in both recovering water for the environment and broader structural adjustment investments for affected regional communities. Well thought out investment and instruments can

maximise the economic returns from consumptive use of reduced volumes of water and maximise environmental outcomes from environment water; key opportunities to realise these outcomes need to be comprehensively identified and evaluated.

(i) options for all water savings including use of alternative basins;

While inter-basin transfers and major new MDB storages are a consideration, careful evaluation of cost-effectiveness (given current value of irrigated production and likely inflows) is essential.

One potential compensation for less water for irrigation in the MDB is irrigation development elsewhere (e.g. Northern Australia and Tasmania). The economic and environmental viability of these opportunities should be carefully considered.