

Australian Government

Productivity Commission  
Attn Ms Vicki Thompson

Submission to the inquiry on the draft report on;

## **Recovering Water in the Murray Darling Basin**

‘To review market based mechanisms for diversifying the Government’s approach to purchasing water for the environment in the Murray Darling Basin’.

By Walter Jehne  
Director  
Healthy Soils Australia

A not for profit national network committed to the Regeneration of our Landscape as a basis for securing and restoring our essential water, food and bio-systems health and service needs from our limited, degraded natural resources and increasing climatic, energy and social stress.

## Introduction

As pre-empted by over 150 years of on the ground observations and numerous reviews, Australia's Murray Darling Basin (MDB) is facing a severe, systemic water crisis as greatly reduced river inflows and reserves are used to meet its over-committed and growing demands.

While accentuated by the current 'drought' this crisis will not be solved when it next rains as it is contributed to by an interaction of serious policy failures including;

- the massive over-allocation and over-use of the Basin's water resources,
- the serious degradation of the Basins natural soils, landscape and thus hydrology,
- policies and practices that continue to accentuate this degradation, and now
- the consequences from the further aridification of the MDB due to climate changes.

At risk is over 40% of Australia's food and agricultural production, communities of over 2 million citizens, the environment of the Basin and the wellbeing of many additional communities and economies dependent on the Basin's water and food exports.

While the Australian Government has committed itself to spend some \$9 billion to buyback water and water entitlements and upgrade infrastructure to try to secure water to maintain some key environmental assets, there is much uncertainty if this can be effective or relevant to the key national strategic imperative to secure the sustained health and viability of the MDB. That uncertainty stems from the basis that the policies and actions are focused on 'an end of pipe' solution, from which at best only 12% of our rainfall flows out, not on the essential 'front of pipe' solution - primarily our soils - where 98% of our rain falls. Largely ignoring this fundamental principle has led to our current crisis and planned policies, such as the MDB Authority's proposed triage of many current water users in the MDB via mandated Statutory Diversion Limits (SDLs), are unlikely to be effective, as they continue to ignore the essential supply through a properly managed landscape.

## Purpose

This submission outlines practical and cost effective options by which Australia can secure its essential water needs and recover additional water within and for the MDB through practical actions to regenerate the natural hydrology and health of the MDB and its landscape.

These actions have the potential to benefit Australia significantly through addressing our:

- **Water needs**-by overcoming current and pending water shortages with climate change.
- **Environmental responsibilities**-by securing and restoring the sustained health of key environmental assets in the MDB and those underpinning our natural hydrology..
- **Economic objectives**-by avoiding the need to spend over \$9 billion in public funds on ineffective end of pipe water buyback and infrastructure as well as much of the \$1.4 billion/an in exceptional circumstances 'drought' relief funding.
- **Social responsibilities**-securing our food and fibre production in a sustainable fashion, through healthy soils and catchments. With healthier soils we can expect to sustainably produce healthier foods to meet an expanding population and also a healthier one.

## The Challenge

Australia and the MDB authorities and communities need to face the reality that unless they can recover more water from the existing , and predicted decreased rainfalls with climate

change there will not be enough water to meet their assumptions, model projections, expectations, entitlements, wants or even essential needs.

We must urgently recover more water ‘front of pipe’ from the 98% of our rain that falls on our soils but is now mostly lost via evaporation, due to our current land management practices. The situation will become acute as climate change and aridification intensify, and rainfalls in southern Australia and the MDB decrease by a projected further 30% and stream and dam inflows (which at best can only hold 2% of rainfalls) inflows decline even more.

To recover more of this reduced rainfall we have to understand what should happen to it when it hits the landscape, how ‘end of pipe’ outputs are effected by poor land management practices and hence what practical measures need to be taken to regenerate our landscape and natural hydrological processes.

It is essential that action be taken to restore the natural capacity of our soils and landscapes to infiltrate and retain rainfalls safely in our restored ‘in soil reservoirs’, rather than be lost via erosive surface flood flows (including urban run off), or evaporated from surface pools and soils. Once retained and protected in the ‘in soil reservoirs’ the water can be used efficiently over time to both sustain productive vegetation growth through efficient sub-soil irrigation, as well as to slowly recharge streams and dams to substantially increase their effective functions and capacities.

As in the former natural hydrology of the MDB, the increased interception, storage and protection of rain water in such ‘in soil reservoirs’ generally increases the quantity and quality of the water that slowly seeps into streams to recharge dams and ‘end of pipe’ water uses. Rather than reducing water yields, such slow subsoil recharge of streams and dams actually increases their effective capacity significantly above their presently limited 2% volumetric maximum.

However this strategy of optimizing the interception, retention and protection of rainfalls in ‘in soil reservoirs’ is diametrically contrary to current water policy and assumptions which seeks to minimize the ‘interception’ of water by the landscape as an assumed water loss.

Policy must change from focusing on maximizing water yields from the rivers and dams under the old ‘end of pipe’ control doctrine based on meeting urban obligations and the generation of commercial income, to one that optimizes the sustained recovery and security of water supply via the wise management of the total hydrological system, ‘front of pipe’. The legal provisions that effectively deem the ‘interception’ of water in and by the landscape as a loss to ‘end of pipe’ commercial interests need changing to recognize that such interception and the concept of in soil reservoirs is beneficial to the landscape including ‘end of pipe’ outputs and commercial viability.

### **Encouraging Change**

Notwithstanding climate stress, how best then to introduce policies that can help catalyse practical actions on the ground throughout the MDB and the Australian landscape to restore its resilience, bio-productivity and our water and food security?

We know that the Australian landscape evolved highly resilient and productive bio-systems that have survived extreme climate and water stresses. Hence in defining policies for recovering water for the MDB we need to better understand these processes, emulate them where possible, and then develop appropriate food policies and market mechanisms as a result.

If we are to respond effectively to these physical and policy realities and recover more water in the MDB to secure our essential water and productivity needs, science indicates that we must;

- Regenerate our landscape to better conserve and utilize the 98% of our rain that falls, on our soils and urban areas.
- Restore the natural highly effective ‘in soil reservoirs’ that characterized the landscape pre European agriculture with its extensive oxidation and erosion of soils.
- Repair the incision of our streams so that flood water can again spill over and recharge the floodplains and valley fills rather than be lost via eroding storm flushes.
- Restore the natural shelterwoods critical in reducing exposures, wind speed and the evaporation of rainfall as well as conserve and cycle more of the transpired water within the canopy by enhancing condensation levels.
- Rebuild the natural hydrostatic recharge of surface soils that enables vegetation to be sustained with up to 10 fold efficiencies and less loss relative to surface irrigation.

To help us implement such efficient, productive and resilient soil water plant systems we need to understand better the unique processes that evolved in and governed the natural hydrology of the Australian landscape; processes ensuring that almost 100% of rainfall was conserved and used efficiently despite our often highly weathered soils and extreme dry climate; and processes that enabled the buildup up of very high levels of organic matter (10-30%+) in our soils to considerable depth and underpinned their high soil fertility and resilience.

The processes that we have degraded substantially over the past 220 years through oxidative cultivation, fertilization, bio-cides and overgrazing has resulted in the degraded and compacted subsoils, with often less than 1% organic matter, that we farm today. This structural degradation of our soils has not only impaired their capacity to infiltrate, retain and supply water in their ‘in soil reservoirs’ but also the limited capacity of roots to proliferate in such soils to access water and sustain their natural productivity and resilience.

To regenerate these soils and their capacity to retain and recover water, we must restore their ‘in soil reservoir’ capacity by restoring their soil structure via increasing their organic matter levels. This can be done practically, effectively and even profitably, but only by supporting land managers in their adoption of new soil carbon farming practices and removing the impediments that limit this.

While still much less than in nature, science has confirmed that soil carbon farming can bio-sequester up to 20 tonnes of carbon per hectare per annum. Extended and integrated into wise land management over Australia’s 550 million Ha of farmed rangelands, could draw down substantial levels of carbon from the atmosphere to restore our critical in soil reservoirs. This could be stimulated greatly via the incentive of a nationally agreed commercial carbon price, adjusted perhaps on an annual basis.

A range of similar practical actions that bio-mimic and enable us to restore many of the natural processes can be used in regenerating our landscapes and their capacity to retain, recover and more effectively utilize our limited water resources. Once even partially regenerated, these landscapes may help increase the nucleation of rain from the humid air flows and hazes that have increased over the MDB, thereby increasing potential water recovery despite an aridifying climate.

While there is more to learn in restoring and managing such processes, innovative land managers throughout Australia have much of the understanding, skills and capacity to implement relevant and proven national and regional strategies to enhance the productivity and resilience of their agro-ecosystems, based on these natural ‘front of pipe’ hydrological processes.

Consideration needs to be given to open demonstrator site testing and monitoring of the effectiveness of these natural ‘front of pipe’ landscape regeneration approaches for the MDB and for the rest of the Australian landscape. Such approaches can also help offset climate impacts. To do this we need policies that help catalyse and extend, not impede, testing and potential widespread commercial adoption of such key hydrological processes.

Indeed close consideration needs to be given to the impact of a range of regulations and policy impediments that currently limit our capacity to achieve water security objectives, under business as usual policies and assumptions. Such impediments may arise from:

- mis-information on hydrological interceptions and the impacts from climate change.
- the incompatibility between water yields and management objectives.
- land management restrictions in the ownership and wise management of water flows.
- restrictions in the optimum management of vegetation to aid water outcomes.
- the legislative priority given to particular water uses in the MDB.
- distortions from public subsidies for ineffective ‘end of pipe’ approaches.
- the protection of business as usual via exceptional circumstances allocations.

Finally, further consideration may also need to be given to how market incentives could significantly aid the rollout and effectiveness of such landscape and hydrological regeneration actions. As increasing the organic matter content of our soils may be the single most effective action to recover more water via such ‘front of pipe’ action, particularly in a kick start sense, policies need to create incentives to farmers to bio-sequester carbon in soil sinks via an effective annually adjusted national carbon price which should also help to achieve much of our national strategic water objective.

## **Conclusion**

Clearly the MDB and Australia is facing an acute strategic challenge in how to secure and manage its future water resources and thus its sustainable food production needs. Policies based on a business as usual approach and on current assumptions, policies and large spending proposals are not the answer.

Instead we must be prepared to examine and pilot alternative approaches that proven science and practical experience indicates will provide us with far more reliable, natural, effective and economically responsible solutions to secure our essential water needs.

The science and proposals discussed for recovering water from and for use in the MDB through practical actions to conserve and more effectively use the 98% of our rainfall that is retained and/or lost from our soils ‘front of pipe’, needs to be further evaluated in this context. This includes the feasibility and benefits from regenerating our landscape so as to restore the natural ‘in soil reservoirs’, resilience and bio-productivity of our bio-systems on which our water, food and economic security will increasingly depend.

We need to recognize that whether we can secure our essential water needs, depends not only on rainfall and catchments, but how we manage the proven processes that make water available there from. Notwithstanding a seriously degraded landscape, it is still not too late to secure our future water needs, but only by regenerating our landscape and the hydrological processes that govern its water supply.

## **Further Information**

Further information on and substantiating the above proposal can be obtained by contacting the author of this submission Walter Jehne or at Healthy Soils Australia, a not for profit

network of scientific and community leaders focused on restoring the health and productivity of our soils and their capacity to meet our essential strategic needs.

Thank you for your consideration.