

THE FUTURE DIRECTION

Talking Water is about looking forward. Our common water future belongs to us, and collectively we must make decisions on where to go next. They are not easy decisions - change never is. However it is clear that a 'business as usual' approach will see us in more trouble as each year passes.

Talking Water has gathered the latest information, the facts about the water situation in Australia, and made them accessible for all.

Some of the home truths about our water situation are:

- Australia is the driest inhabited continent. Though we have about 5% of the world's land area, we only have about 1% of the world river flow.
- We store more water per head of population than any country in the world.
- Across our country, only about 12% of rainfall becomes river flow. This, however, varies enormously from almost 25% in the tropical north and 11% on the coastal side of the Great Divide to just over 6% in most of the Murray-Darling Basin and less than 2% in Perth.

- Just over 70% of extracted water in Australia is used in agriculture, 14% in other industries, 8% in households and 8% in supplying the water.
- Australia is one of the world's largest net exporters of water. Each year, we export products that have consumed about 7.5 million ML of water and import just over 3.5 million ML of water tied up in goods.
- In many areas, such as the Murray-Darling Basin, governments have over-allocated the water in our rivers. They have promised water that doesn't exist!
- In the Great Artesian Basin, bores have been allowed to run free for years, reducing the water level in the basin, affecting other water users and drying up natural springs. Governments have only recently started to fix the problem.
- Many farmers are not waiting for government direction; they are getting on with the job of improved land and water management.

From all regions of the country, Farmhand received ideas, opinions, visionary plans and passionate pleas about our water future. It is clearly a subject that is important to all Australians.





The book presents the best available facts about the large visionary schemes:

- A pipeline from the Ord River to Perth would pump 300 billion litres of water over 1800 kilometres to Perth and cost about \$10 billion to build and \$100 million annually to operate.
- The world's largest water transport project in Libya has pipes over four metres in diameter and when complete will cost over US\$20 billion and pump 6.5 billion litres of water over 1200 kilometres to major cities including Tripoli and Benghazi.

Remarkably, the single most common suggestion was that we should all learn to live in harmony with our dry continent and put our 'trust in God'. What does this mean? Do nothing and wait for rain.

The wide and varied range of ideas and schemes have been broadly assessed on the grounds of the cost of the option, the environmental and social issues, how much water would be created or saved, and where or when it might be applicable.

The assessment of options shows that no one solution can greatly increase the supply of water at reasonable cost.

For Australia to improve the way we use water, we need to move forward on a number of fronts. The Farmhand 5-Point Plan outlines the strategies and water schemes that are priorities for making this happen.

If the Farmhand 5-Point Plan is adopted and there are good water agencies to manage infrastructure, then the plan will see us looking forward to a sustainable water future, able to ride the bumps of our variable climate and meet the needs of urban and rural water users alike.

The Grand Water Scheme 5-Point Plan

For Australia, the Grand Water Scheme consists of moving forward on a number of fronts. The Farmhand 5-point plan specifies the way to get there.

It outlines the strategies and water schemes that are needed to build the new infrastructure, redevelop the old systems and create a world-class irrigation industry. It recognises the inevitability of future droughts and gives specific examples where we can get both immediate and long-term gains.

It will take the enthusiasm and cooperation of both Federal and State governments, Councils, water authorities, farmers, communities and individuals to make the Grand Water Scheme a reality.



1. Undertaking a National Water Audit

At the outset we urge the Federal and State governments to undertake a National Water Audit of water and infrastructure - where it is, where it is needed and the feasibility of matching the two.

The audit must be objective and independent. It must not just be an inventory of what is but rather a forward-looking statement highlighting and answering the needs of this continent for the next century.

2. Fixing and rebuilding our rural water infrastructure

A nationwide campaign to rebuild some of our water infrastructure in rural areas is one of the best ways we can save large amounts of water.

The problem with much of our rural water infrastructure is that billions of litres of water are lost

or unaccounted for every year. A water delivery system is only as efficient as the accuracy of its measurement system and only as economic as its source and transport systems. Measurement practices are very poor in many spots. Water sources like uncapped bores and transport systems like open earthen channels are constantly losing water through evaporation and leakage. This not only wastes water but causes waterlogging and salinity on farms. Capping bores and fixing some of the worst of our open channels will save vast amounts of water, in a short period of time.

Improving basic water measurement

The basic means of managing and sharing water relies on a set of water accounts that balance what comes in with what goes out. Many water users in Australia do not have a measurement device or meter for their water. This is a basic tool for good water management.

State governments should ensure that water meters exist and that a good set of water accounts are put together annually.

Fast-track the capping of bores in the Great Artesian Basin

Our largest water source is leaking 200 billion litres every year by uncontrolled bores. The Great Artesian Basin is an invaluable source of water in an otherwise mostly dry inland. While it may look like a never-ending supply, this is 'dinosaur' water, developed over millions of years, and not quickly recreated. Science shows that we are taking more than is sustainable - in other words, we are on a one-way track to running the basin dry.

Currently, 892 bores are running 24 hours a day, mostly in NSW and Queensland. The Great Artesian Basin Sustainability Initiative, jointly funded by the Federal and State governments, was formed in 1999 to accelerate the pace of turning off the taps and piping the open drains that come from these bores to reduce seepage and evaporation losses. However, our governments only committed, in funding, some of what was needed. It is not happening quickly enough. An investment of about \$250million is needed now.

The Federal and responsible State governments should fast-track capping of the remaining uncontrolled bores as a matter of urgency.

Moreover, we need to go one step further. We need to look at ways to start replenishing the water in the basin, to make sure that we will be able to use this resource for generations to come.



Pipe open channels for high-valued water use

Australia's vast system of open and unlined channels providing water for stock and domestic use in rural areas, loses between 30% and 50% of its water through evaporation and seepage. Recently, there have been proposals to replace these open channels with pipes, eliminating water loss.

The world's largest open channel system, the Wimmera Mallee Stock and Domestic Supply System in Victoria, has begun to be converted to pipes. It is estimated to cost \$300 million and save over 93,000 megalitres of water per year.

This system will not only provide more reliable and better quality water to the farms and towns, but also will restore the Wimmera and Glenelg rivers and increase flows to the region's nationally significant terminal lakes system, including Lake Hindmarsh and Lake Albacutya.

The open channels are a network like roads, with major highways, minor roads, and individual drive-ways.

Ultimately, parts of other open channel systems should be piped and pressurised where they are used for high-valued uses such as stock and domestic purposes and intensive irrigation.

Commonwealth and State governments should financially back and provide incentive funding to the piping of open channels where this is economically justified.

3. Developing the world's best irrigation industry

Australia must embark on a nationwide project to become the best irrigators in the world. Some of our irrigators are already there.

Giving farmers the right incentives to invest in water efficient irrigation systems is the key to the future of irrigated agriculture. We need to develop sustainable farming systems, and to specialise and diversify into a range of farm produce.

Provide incentives for adopting better irrigation techniques on farms

Agriculture uses 70% of Australia's fresh water. In many ways, the irrigation systems that are frequently used, such as flood or furrow, are a blank cheque for using water - that is people use it until it runs out. In Australia there are more than 70,000km of open water conduits, including 12,000km of stock and domestic supply systems.

Many farmers have adopted new ways to irrigate which are more efficient, such as spray or drip irrigation, and opportunities for the expansion of these technologies are huge. For example, while half of the fruit and vegetable farmers now use the highly specific drip irrigation method, a large proportion still flood irrigate their orchards, especially in regions of Victoria. Changing to more efficient irrigation methods could save around 50% of the water used on farms, and if done properly can help to halt the rise of salinity in our land.





An irrigation system is only as efficient as its measurement system. Technology which measures the soil moisture is fundamental to scheduling when and how much to irrigate. It has been shown that using soil moisture testers can reduce the amount of water used in irrigation by 70%, as well as improving the lifestyle of farmers. Soil moisture technology ranges from simple and cheap to complex and expensive. As yet, its adoption has been sporadic.

Financial backing and support is required by governments if a quantum leap towards world class irrigation practices is to be made.

Improve water security and develop water efficient agriculture

Some crops in Australia use more water than others. Developing new markets for a wide variety of native and non-native products which are water efficient, would help to ensure the best use of our water. Australia is also well placed to develop a number of 'out of season' crops for the northern hemisphere, as well as take advantage of value-adding opportunities for existing produce.

These on-farm ideas added together could be some of the biggest water saving schemes Australia can embrace, potentially reducing water use and creating greater agricultural wealth at the same time.

The speed hump slowing down the expansion of emerging new markets is the cost of establishing them. Significant levels of funding are needed to continue the research and development effort identifying which new crops will be viable in which regions and assisting to set up new domestic and export markets.

There is little purpose in growing produce if it cannot be sold. Equally, there is little purpose in trying to grow produce if water availability is not secure. Improving water security and the development of national and international markets for produce that is higher valued and water efficient have to go hand in hand.

Governments must improve the security of water and assist irrigation industries develop new markets for irrigated produce that provides a higher return on water used.

Subsidise research and development of farm management systems which look after our land and water

Salinity threatens to render much of our farming land barren if we continue to conduct 'business as usual'. Salinity is typically a result of our traditional annual crops replacing deep-rooted natives, or waterlogging due to irrigation raising the watertable, bringing salts to the surface.

To combat the spread of salt, farming systems, especially in salt prone areas, are in need of a facelift. Farm planning, which will identify salt prone areas and land capability, is becoming a vital tool in developing tailor-made farming systems that work with the land, instead of homogenous paddocks.

Incorporating trees into the farm for both commercial farm forestry and salinity control, is being adopted by many farmers in the form of windbreaks, alley planting, agroforestry and plantations. Further research is needed to determine which trees will be commercially viable in which rainfall regions.

Other farm management systems to reduce risks of salinity and erosion are currently being adopted and researched such as phase farming, companion planting, perennial cropping, farm diversification, replanting our riverbanks, native agricultural industries and organic farming.

The planting of saltbush should also be promoted as it not only provides fodder on salty land but helps draw fresh and brackish water from the watertable underneath. It can be used with alley and rotational

farming to revegetate land and restore soil carbon while allowing other crops to be sown and harvested. Saltbush is good for Kyoto, as well as farming.

If we revegetate our saline land successfully then it should lead to substantial carbon credits. Under the Kyoto protocol, carbon credits can be sold to heavy industries to offset their carbon emissions. The income from these credits could be used to help fund revegetation and other environmentally sound projects.

The move from single crop farms to a mosaic of land uses is a necessary one if we are to witness widespread sustainable farming.

'Grassroots' programs like Landcare, which empower farmers to put into place the practical experience of their neighbours, are ideal.

While government incentives exist in most states to assist a move into water efficient irrigation, these need to be given a new priority in light of the potential huge water savings. Governments need to increase funding for research and development into new farming systems, and for incentives to farmers who incorporate these changes.

4. Recycling and reuse for towns and cities

In many parts of the world, water is used more than once. Building infrastructure that enables Australian towns and cities to recycle wastewater and stormwater makes sense and will bring us in line with world's best practice in urban areas.

We should start where it is easiest and makes the most economic sense: in the large cities, the new suburban developments, the redevelopment of large urban sites and industrial areas.

Greater recycling of wastewater

Far from being 'waste', treated effluent water is estimated to be around 99% pure water and can be used for a range of purposes if it is properly treated.

Forward thinking local water authorities in rural areas of Australia such as Dubbo, Narrabri and East Gippsland, have already seen the logic in reusing wastewater, and are achieving up to 100% recycling rates. Overseas, many dry countries have long been reusing wastewater effluent.





Effluent can be used in many applications such as irrigation of parks and gardens, agriculture, tree plantations, aquaculture and industrial uses. Where appropriate, wastewater can be accessed directly from the sewers to save pumping costs. National guidelines are in place to ensure safe use.

In our dry country, it is imperative that we make the most of what water we have. It is unnecessary to be using freshwater drawn from catchments when treated effluent is available.

Councils and local water authorities should be required to optimise the potential for wastewater recycling by researching and implementing the best possible solutions for their local area.

More stormwater recycling

An estimated 5 billion litres per year of stormwater is piped out of our towns and cities. While some of this is needed for downstream ecosystems, there are many opportunities available to capture and reuse more of this water.

Stormwater should be captured as closely as possible to where it is to be used. In appropriate locations, this water can be stored in underground aquifers and drawn on for later use, as is already happening in some Australian towns.

Stormwater can be used to irrigate parks and gardens, sports fields, golf courses and industrial uses. Local government already insist on putting in detention

basins for floodwaters not to conserve water but to control its flow into the stormwater system. We need to look to more recycling of this water.

Inside the home, 55% of our household water use is on toilet flushing or on the garden. Storage of stormwater in rainwater tanks can be used to cover some of these needs.

Some Councils have already adopted recycling stormwater as part of a 'water sensitive urban design'. The Sydney Olympics reused their stormwater (and effluent) to save water. There are considerable cost savings to be gained in new urban development areas if stormwater is integrated into the natural landscape and used locally.

Rainwater tanks are a means of capturing storm water. There are currently rebates in place in some states for rainwater tanks and these provide added incentive for adopting them.

Local Councils should include stormwater recycling as part of their planning for new developments and promote more stormwater recycling.

Investigate household and community greywater reuse

All the water we use and 'throw away' inside the home, apart from the toilet, needs little treatment before being reused. We have the opportunity to almost halve our household water usage by using 'greywater' to water our gardens and flush our toilets.

It is ludicrous that we rely solely on our drinking water to flush our toilets.

Greywater systems can be on an individual basis, or as part of a large development. They already exist in recycling systems ranging from a block of 70 residential units in the ACT to an individual terrace house in Sydney.

Scientists at CSIRO have determined that it would be cost effective for up to 12,000 houses to be connected to the one greywater system. Greywater systems can be incorporated into new housing developments at reasonable cost.

Water authorities and Councils should investigate and implement more greywater reuse at a local level, especially for new urban developments.

5. Planning and funding the future water grid

Over the next 100 years, a water grid will emerge to service most of the growing population centres in Australia. The investment in the tens of thousands of kilometres of pipes, pumps, treatment plants and harvesting capacities will be massive compared to the great water schemes of the past such as the Snowy Mountains Hydro-electric Scheme. The grid will need to harvest more water where it falls and have the flexibility to move it around to where it is needed. This is our exciting challenge.

The grid will comprise many separate water networks that will compete for water and be linked in many ways. They will compete for the rain in clouds overhead and possibly for the icebergs from Antarctica. They will compete in catchments for the sources of available water and have interlinked pipe networks that make them more robust to handle drought periods. They will incorporate the better features of many of the water schemes covered in this book from reuse and recycling to gaining additional water from dams and aquifers.

Governments have important roles to play in making this happen. They need to ensure that their water agencies don't put up barriers to the inter-connection of pipe networks and that plans are in place for greater urban development. Moreover, they need to ensure that funds are readily available to build the new infrastructure and refurbish the old.

The private sector has a role to play but will only participate if the return on funds is attractive enough to claim private sector capital. This will be a massive funding exercise and our growing superannuation base is one possible source of extra funds that could

be well matched to financing future urban water infrastructure. The issue of infrastructure bonds is another option. Tragically, too often in this country, government regulators turn away potential sources of finance for infrastructure investment by the imposition of unworkable regulatory practices.

Governments need to adequately plan for population growth and the links needed to create the emerging water grid and examine new and innovative ways to fund national water infrastructure.

