

## Catch it if you can

Published in The Australian April 29, 2005A long dry has sent water authorities back to the drawing board, but the figures they're using to estimate future dam levels may be flawed.

Dams are either half empty or half full, new dams are not the answer, water restrictions are going to get worse and Australia needs better water storage and recycling facilities, or the big dry is going to become the big thirst.

These are the issues facing Australia's water authorities as they plan for the future.

In the past month the West Australian government announced it had contracted Multiplex Degremont Joint Venture to build the biggest desalination plant in the southern hemisphere. Queensland's government has flagged a \$149 million new dam, Wyaralong Dam, in the hinterland behind the rapidly growing Gold Coast, and the NSW government announced a desalination plant was a viable option.

Meanwhile, Adelaide, the city that leads the national stakes in water recycling is investigating storing stormwater in underground aquifers for later re-use, and Melbourne is working on the Werribee Recycled Water Scheme.

Ross Young is the CEO of Water Services Australia, the association for water services providers. He says that, because Australia's rainfall is so variable, it can no longer rely on dams. "You can build another dam, but if it is not going to rain you are not going to get any water in it. So the approach has been to undertake a rapid program of diversifying the sources of water to minimise the risk."

He says cities are looking at using groundwater, recycling water for non-potable purposes, using groundwater, trading and desalination. "The options and the approaches will vary from city to city depending on soil type, climate population growth, the natural features of the city. There is no panacea here."

When drought gripped Canberra while Paul Perkins was CEO of ACTEW, Canberra's water and other utilities supplier, he looked to how others were managing. He was deeply struck by Perth's circumstances.

"The evidence of Perth is enough by itself for us to be very concerned about the capacity of our storage, as opposed to how often we get water to fill them," he says.

Between 1911 and 1974, Perth's dams received an average of 338 GL a year. Between 1975 and 2001 it halved, to 167 GL. Inflows have since fallen further, to around 120GL, nearly one third the earlier levels.

Perth launched a major program of dam building, water saving, accessing groundwater and recycling. "They doubled capacity in ten years, and now they are building desalination as well," Perkins says.

His own researches convinced him that Australia, quite apart from climate change,

experiences long dry cycles.

His conclusion is that using simple averages to forecast rainfall or inflows to dams is "not very useful in the middle of a multi decade dry". And Perkins believes south east Australia, and the Perth region have been in such a dry since the late 1970s.

"It means your yield (inflow into dams) is going to be anywhere between 15 and 40 per cent less than your long term average, which is dramatic," he says.

Carol Howe, from the CSIRO, estimates that even if cities cut per capita water use by seven per cent, and one quarter of new suburbs use recycled water for outdoor uses and toilet flushing, Australia will face a shortfall in supply of 800 GL by 2030. That shortfall is well in excess of the current working figure for Sydney's usage of 600 GL.

Sydney lags behind the other capital cities in building on-ground works to recycle or store more water. Some water experts argue Sydney water authorities are also failing to appreciate the scale of the shortfall facing the city.

Senior climatologist at National Climate Centre, Blair Trewin, says there is a marked decline in Sydney's rainfall over the past five years. Comparing the five years 2000 to 2004, with the 1961 to 1990 average, Trewin says the rainfall in Sydney itself is 20 per cent lower, while the catchment towns of Lithgow and Moss Vale are 23 and 32 per cent lower respectively.

Hydrologist Francis Chiew, an associate professor in the Department of Civil and Environmental Engineering at Melbourne University says the rule of thumb is that the reduction in run off into streams and dams is twice the reduction in rainfall. "So, for about 10 per cent reduction in rainfall, you would expect maybe a 20 per cent reduction in run-off."

Trewin says "the real story has been the virtually complete disappearance of the extremely wet periods." He points out

there has only been one month with 200mm plus rainfall since 1992: August 1998 the last time Warragamba dam filled.

Trewin says the Sydney weather, though dry, does fit into long term patterns, with a similar dry period earlier last century.

It is Melbourne's dry that is without precedent. "Melbourne has had eight successive years of below average rainfall, 1997 to 2004 some of them just below, some of them a long way below," Trewin say. "That is territory Melbourne hasn't been in before."

But Melbourne got rain late last year, and again in February that pulled it out of water restrictions. Sydney is still waiting.

John Marsden, from the Melbourne-based economic and financial consultants, Marsden Jacob Associates, is concerned the Sydney Catchment Authority is not taking into account the long dry, and is dramatically overestimating future yields.

He points out Sydney's long term average inflow into the Hawkesbury-Nepean, one of the catchments Sydney relies on for its water, is 1,442 GL a year, more than twice the inflow in the period 1991- 2002, of 697 GL.

He draws parallels with the West Australian situation.

"If you look at the WA data you can see you will get a different story if you use the 30 years data, from '75 onwards, compared to the other," Marsden explains.

He says WA's Water Corporation has done a lot of work on climate change, and now works on an eight year mean. "There has been no debate in the Sydney situation."

Marsden fears the Sydney Catchment Authority is not taking account of the big shift in rainfall, in estimating the safe yield of the Sydney system at about 600GL a year.

"You ought to be using the last 30 years or the last eight years, which is what the West Australians are doing. Then the safe yield for the Sydney system is likely to be dramatically lower. There is a real problem."

According to the Sydney Catchment Authority, the average monthly inflow between 1990 and 1996 was 71,635 megalitres (million litres). Between 1997 and 2003 the monthly inflows fell to 39,881 ML, or 55 per cent the figure for the six years earlier.

The inflow for 2004 was the second lowest on record, just 372.6 GL. Only 1940 was lower.

But "Securing Sydney's Water Future" a plan put out last year by the NSW government to address Sydney's water needs over the next 25 years, works on the assumption Sydney's major dam yield will be 600 GL a year. The Sydney Catchment Authority says it has yet to factor in climate change, and is currently working on a decrease of 10GL per decade.

With the average inflows for the three years 2002/03/04 just 627.5 GL, and Sydney's water needs just one of a number of users, it is clear Sydney, like Perth, faces a challenging water future.

Perkins laments the fact that the impact of the long dry is not under public discussion. He says people should be very concerned "about the capacity of our storage as opposed to how often we get water to fill them".

And he says the situation is going to get worse: in addition to population growth and climate change, there are now environmental flow requirements, which have come in since the dams were built. "We can't keep the dams as full as we used to, we have to let more out for environmental flows"

Australia has 500 large dams in Australia with a capacity of 84,793GL. Australia, due to its highly variable climate, stores over 4 million litres per head, more than any other country. But Perkins, in the light of the on-going dry, says "there is a serious question as to whether or not we have enough storage capacity all over Australia."

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