

Building more dams is no way to prevent flood catastrophe

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Residents in flood-prone areas must be better prepared, or shifted.

NOW is not the time to panic as we scramble to find ways to help the people affected by the floods. Calling for the building of new dams is, however, not a satisfactory response to a very wet La Nina year. Rather, Australia must look at more innovative ways to adapt to the naturally occurring floods and future increasing climatic variability.

The current deluge has highlighted the risk of flooding in many parts of Australia. Risk is the combination of occurrence (how often something occurs) and damage (how bad it is). The traditional focus in flood management has been to minimise the occurrence by building dams and river control structures.

But there are three main reasons why new dams are not an easy solution to manage future flooding in Australia.

First, the worst floods are the largest floods - to reduce the occurrence of large floods we would have to overdesign our dams. This would result in low efficiency and high costs as the dams would be mostly empty, as in the past 10 years of drought. And we can't accurately estimate the largest possible flood, particularly with predictions of increasing extreme events due to climate change. A dam can never provide full flood protection.

Second, because of the inefficiency of having dams solely for flood prevention, most dams have multiple purposes, such as for power generation or water storage - and these counteract the effective flood-prevention role.

A water manager focusing on flood prevention would want a dam to be as empty as possible to store the maximum flood, while one focusing on irrigation, water storage or power generation would like the dam to be as full as possible. As a result, the risk of early spilling is increased, resulting in floods downstream. Many of the major dams are currently full and spilling. Water storage in dams is also inefficient due to high evaporation losses, particularly in areas such as central Queensland.

Third, a large body of international research highlights the detrimental effects of dams on the environment, and this is one of the key drivers for the proposed Murray-Darling Basin plan.

Dams reduce flows and smooth out flow variations. In Australia - the land of droughts and flooding rains - the climate is highly variable, and this creates its natural beauty and diversity.

Floods are a key element of this environment. Dams cause variations in water quality and temperature that are different from the natural environment and disrupt downstream flora and fauna.

Finally, some interesting socio-economic research. Dams tend to give a false sense of security to people living below dams and on flood plains; they believe they are 100 per cent safe, which is never the case. And there is the fact that increasing water supply (through building additional water storages) always leads to increased water use and water demand.

Traditional catchment management has concentrated on preventing floods by focusing on land management, increasing infiltration and slowing down the water before it reaches the stream. Many countries, such as the US and in Europe, are looking at alternatives by focusing on the second part of the risk equation, reducing damage rather than occurrence.

The widespread flooding of the Mississippi in 1993 and in Europe in the Rhine and Elbe have further forced some of this rethinking. A key element of this type of management involves limiting development on flood plains to allow the river to run freely.

Spreading out the floods lowers the peak and thus limits the damage. For Australia, this involves identifying different ways of living and working in flood-prone areas, while still protecting high-value assets.

Reassessing development regulations and possibly moving homes or businesses might be part of the solution.

People living in flood-prone areas can be compensated or helped to be "flood ready", similar to people living in bushfire-risk areas. Re-routing floodwaters to certain areas of the flood plain could be another option.

Australian agriculture also requires flexible and responsive cropping systems that take full advantage of the wet years and make do in the very dry years. For this to be effective, flood risk forecasting, particularly at the long range, needs more focus.

There is significant forecasting at the short range, but full interpretation of long-range climate patterns, their influence on Australia and their possible changes due to climate change still needs more work. While we are able to predict the La Nina pattern, we are not yet able to accurately predict the impact or risk of such a pattern for different areas. Careful assessments of the floods now affecting Queensland will assist with this for the future.

Learning to live with floods rather than preparing to fight floods will lead to a more resilient and prosperous future and allow us to take full advantage of our variable climate.

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