



Australian Government



Inspector-
General of
Water
Compliance

WATER'S EDGE: TRANSCRIPT

S3, Episode 7: 'Two water stressed nations with one common vision'

Speaker 1: Water's Edge Podcast acknowledges the traditional owners of country throughout the Murray-Darling Basin and Australia, and recognises the continuing connection to lands, waters, and community. Coming up, in this episode of *Water's Edge*.

AD: Join Inspector-General of Water Compliance, Troy Grant, on a trip along the Macquarie River in central west New South Wales with special guest Pakistan's High Commissioner to Australia, His Excellency Zahid Hafeez Chaudhri.

TG: It's the probably the most contested, controversial, and complex piece of public policy in Australia. And the Basin plan has a lot of critics, but it gives us the opportunity to showcase what we do really, really well, and match that against some world standards. But, as with everything, you certainly learn about lessons in other jurisdictions and other nations.

AD: Two water stressed countries working together on a shared vision to see world-leading water resource management in their nations.

ZHC: Learning from how well you are doing it here, and there are so many things that we can replicate in Pakistan as well.

AD: A fourth-generation farmer near Trangie in the Macquarie Castlereagh catchment, talks irrigation schemes.

TQ: My grandfather, when they talked about irrigating these grey soil plains, he said, 'I'll never get enough water on to fill the cracks up!' I reckon he would be intrigued to think his grandson's been growing cotton on those grey plains for 40 years.

AD: How a water treatment facility looks to drought-proof Dubbo's drinking water.

GC: Water is critical to the survival of the town and the communities. This is the stuff we are putting into people's mouths. So, we've got to make sure that we are meeting our obligations under the drinking water guidelines.

AD: And, how landholders around Warren are sharing their deep understanding of the effects of land and water management on a globally recognised wetlands ecosystem.

TW: We've been involved in the water debate that's raged over the last few decades, since irrigation and the development of Burrendong Dam. We decided that if we were - allegedly - part of the problem, we had better understand the problem.

Speaker: You are listening to *Water's Edge* with your host, Alison Dance.

- AD: Pakistan and Australia share very similar challenges with water scarcity regulation and efficiencies. The Murray-Darling Basin often sparks interest from other nations and agencies around water management. So, when it comes to oversight, they turn to Inspector-General of Water Compliance. Troy Grant.
- TG: The Pakistani High Commissioner reached out to us. He was very keen to get an understanding of what he could learn by way of water management, from storage to water treatment to irrigation practices, and also the benefits to natural assets that he could take back to Pakistan and hopefully implement in his country to get better water management outcomes. I thought that the Macquarie region, and the Macquarie Valley, provides the best area to give him as much access to a varied number of examples, and for answering the questions that he was asking. Essentially, it's got one of the largest water storage dams in Burrendong Dam, in the Murray-Darling Basin and in the state of New South Wales. It also relies heavily on both surface water and ground water. It has innovative channelling systems in the irrigation schemes that are west of Dubbo in Narromine and Trangie, and a lot of water efficiency measures that are happening in the agricultural sector, there. And we have a RAMSR-listed site in the Macquarie marshes, which is just a stunning location where you can see an end-of-system outcome when good water management practice delivers the right amount of environmental water for the environmental outcomes that are being sought.
- TQ: All this area largely grew on the sheep's back, from the first settlements here, in around the 1880s. The gamechanger was the railway coming through this area. It was the new technology of the place, along with the stagecoaches and the bullet wagons.
- AD: That's Tony Quigley, fourth generation cotton and broadacre crop farmer working on one of 33 farms served by the Trangie Nevertire irrigation scheme. Today, this scheme is more than 21,000 hectares of irrigated area, and adds an impressive 35 million to annual production. But, being so far from the Macquarie River, this area looked very different in the past.
- TQ: Merino sheep dominated for probably close to a hundred years, and then in the 1960s and 70s, as machinery got bigger, then the dominant industries become grain growing.
- AD: It's also when the New South Wales government finished Burrendong Dam, in 1967, and interest in irrigation licenses grew among graziers downstream.
- TQ: So that led in 1970 to the formation of the Trangie Nevertire Cooperative Ltd, that set out to start building an earthen channel system, lifting the water out of the river with diesel powered pumps, and then relying on gravity to flow it to the southwest.
- AD: More than 200km of earthen channel brought a water supply and some drought proofing to the area. Until a new challenge hit.
- TQ: By the time the scheme was built in, 1973 - so I'd just went away to boarding school, so I was about 11 or 12 - the bottom had fallen out of the sheep industry because of overproduction. People suddenly had to find another source of income. So, the scheme largely then became an irrigated winter crop, spring irrigation, supplementary irrigation type system. At about the same time, some of the northern cotton growers came down here. So, Oscott [?] came in 1968 and started on Snakes Plain, north of Nevertire and

Warren. Of course, to us, they were a fish out of water. Well, to me it was highly exciting: here was all these bulldozers and tractors and machinery and stuff! They started growing cotton there. It was the next generation, my generation, that came home from school and agriculture college and went, 'I can see the gross margins in cotton, compared both per hectare and per megalitre - because water was always, and still is, our limiting factor.

AD: Throw in a few inevitable droughts and the uptake out of Burrendong Dam continuing to grow, water became a critical issue. Those earthen channels built by the generation before Tony hit a snag - one very familiar for Pakistan's High Commissioner to Australia.

TQ: The problem was, it was so long and the losses in the system, being earthen channels, were just too high to be economically feasible. In fact, we were losing between 20% and 25% of our water from the pump site before it was delivered to all the farms. That 25% losses was actually causing us a problem with the perch [?] water tables. So, that water was coming out of the channel, and then going across on a clay subsoil, and giving us salinity issues and rising ground water

AD: To fix the channel system, the Nevertire-Trangie community negotiated a deal with the Commonwealth government. The community worked to reduce their footprint by around 40%, to have the irrigation scheme modernised. Water saving was 50-50 between users and the provider. So, those willing sold their water rights to the Commonwealth government as environmental water, in exchange for a stock and domestic pipe. And the remaining irrigators put in 10% of their license. Each farm was also required to have about 5 days of water storage on site. Remember that point - we'll come back to it.

TQ: What we wanted to do, and I think we've achieved, is to maintain the production base. So, the town doesn't suffer: we've still got the same amount of production going on, from a smaller number of farms, but with higher power water use efficiency. So, at the end of the day, it's all about how much production you can get from every drop of water that comes out of that pump site that goes off to your farm - whether that's cotton or wheat or canola or chickpeas.

ZHC: The other learning really is that they have reduced a lot of sea pasture and saline ground water.

TQ: That's probably enough from me. We're probably going to go have a look, are we?

TG: If we're going on farm, if it's alright, I'll put His Excellency in with you. I brought a Landcruiser with me so I could take a few people.

ZHC: We are the largest importer of Australian chickpeas.

TQ: Are you?

ZHC: Yes. We import Australian cotton and we also occasionally import Australian wheat. How much water do you consume and how much do you pay for that?

TQ: Chickpeas is all rain fed. All rain fed. For a hectare of cotton, it will generally use somewhere between 7.5-9 megalitres per hectare, for about \$50 per megalitre delivered at that farm gate. We pay for that in two ways. We pay for the actual water, and we pay

a pumping and delivery charge to the irrigation schemes. My farm's actually just behind - just over there, to the right, through the trees.

Speaker 1: Got a question that you would like answered on *Water's Edge*? You can email us via contact@iwc.gov.au. Make sure you put *Water's Edge* podcast in the subject line.

AD: This water's come from Burrendong Dam. How did it get here?

TQ: Shane ordered it, on the Water New South Wales portal, with seven days lead time from Burrendong. The operators at Burrendong released the aggregated orders from all the irrigators, it comes down the Macquarie River, the Gin Gin Weir creates a weir pool. Shane pumps that water that he's ordered with electric-powered, 36 inch - whatever that is in metric - pumps, putting the water into the channel. Then, by gravity and these flume gates, the water's distributed all the way around the farms against the orders that the people have put in. Then it goes on a farm, and people irrigate their crops with it. That make sense?

AD: It sounds good to me. Compared to the chunky metal gate on the bank next to it, the new flume gate is a pretty neat device. It looks kind of like the swinging metal flap of a charity donation bin, acting as a door in the middle of an irrigation channel. It's actually \$30,000 worth of irrigation equipment to support efficiency and compliance through impressive tech.

TQ: If there's not enough water at the next gate down, which was 5km further down that channel, the lower gate can tell the upper gate it hasn't got enough water and please send some more. It's actually that nuanced a system. The other thing is it measures it. Measuring water is a difficult thing, and even though it sounds simple, it's not. But irrigators are firmly of the opinion, generally, that it's important to measure the water coming onto your farm. Firstly, so you can account for it to the supplier, as in Water New South Wales, but to the general public as well, because it's come out of a public storage. Everyone's working pretty hard to be as compliant as quickly as they can. The biggest issues have actually been about technology and making it work in the field - particularly at the scale that irrigators need. I think everyone's understands that, just like trucks on the road, you need to be compliant. For the good of your reputation, but for the good of society, too. I think the big issue is actually taking that intention through to the end point. TG: Jeez, the integrity of the system's amazing.

TG: Yeah. Irrigators are actually 100% confident they're getting the water that they're paying for and that they've ordered. So, there's transparency and there's absolute trust. That's a good thing. And for us, as a regulator and oversight body, that also gives us the confidence then to, you know...

TQ: Yeah. And we've got at Gin Gin Weir crossing, where our primary metering point is, a massive one of those. It's actually the same technology. We're not mixing up any technologies. It's exactly the same - but on a much bigger scale.

AD: Your Excellency, you were saying how Pakistan will be able to catch up so quickly with technology advancements. This is probably a good example.

ZHC: It's a very good example. That's why we would like to undertake a pilot project in Pakistan along these lines.

AD: We've got the two technologies here - the old one and the new. What's Pakistan using at the moment?

ZHC: Currently, we are not using either of these. That's why we are interested in a pilot project. And, once we've gone for the pilot project, we would go with the new technology.

AD: So, your eyes are lighting up when you're seeing this?

ZHC: Yes. Very interesting. Very interesting.

AD: Remember how each farm in the scheme was to have five days of water storage? That's where we are now. And, on a hot day, this man-made dam is looking pretty good.

TQ: We have storage in each farm that is about 500 megalitres - that's about 400m square and 4m deep when it's full. It's not about long-term storage; it's about having a shock absorber in the system so that we can finesse the irrigation dates and timings to the maximum agronomic advantage in the storage.

ZHC: This is something that we must replicate in Pakistan. Also, having dams on the farms, owned by the farmers themselves.

TQ: The size of the farms - can you give me an understanding of what it's like in Pakistan?

ZHC: Mostly, we have small landholdings, but now we have commercial scale farms, big farms.

TQ: Broad acres?

ZHC: Yes, large acreages. I think this sort of sized dams are practicable only for the large farms.

TQ: Explain the difference between these two paddocks. We've got one across from the other. What's the difference of irrigation happening?

TQ: It's called thorough irrigation. It simply uses gravity, for water to get to one end to the other. That's irrigated about every 8 to 9 days. It gets saturated, works its way down to a human induced refill point, where we will irrigate it again to keep the crop in the optimum growth stage for as long as we can. Not quite as controlled as this machine, a linear movement irrigator, we'll put on 30mm over any particular location in less than 10 minutes. That's like a heavy thunderstorm topping it up, backwards and forwards, like painting the Harbour Bridge. We also have soil moisture probes so we can be much more tailored in the amount of water we're putting on the crop here, as compared to a furrow system. And that's where quite a number of our water use efficiencies have come from. And knowing our soils.

AD: What do you think your grandfather would say if he was standing here?

TQ: 'You're crazy! Where are all the sheep?'

- AD: It's farms like this which help produce more than \$1.77 billion in agriculture in the Orana region. In 2020, the New South Wales Department of Primary Industry said a secure water supply is a major driver behind the success. It's made more powerful thanks to drinking water maintaining access to large markets, even in times of drought - like in nearby major regional centre, Dubbo.
- GC: So, we pump to the CBD area, out to Mile Street at the eastern area. And then we also pump out over the river to Rifle Range reservoirs. That's the western part of Dubbo.
- MW: And, sorry, the ones further out - they're villages? About 40km out?
- GC: Yes, out to Murrurundi and Mograni [?], we've got new systems out there as well. They're only a little village.
- AD: That's Glen Clifford, water treatment leader, and Murray Wood, Dubbo Regional Council CEO, giving the Inspector-General and His Excellency a tour of the John Gilbert Water Treatment Plant, a 9.12-hectare site about two kilometres from Dubbo Centre. If you're afraid of heights, be grateful that this one's a podcast, not a video. But from on top of tanks full of rushing water and securely standing on metal gangways, the Macquarie River is in sight. We're at its first point of entry into the water treatment plant.
- GC: If we do have some major issue, we do have the bore back up, and we've got emergency water there if we need it to keep the town going.
- ZHC: I must say, there are two towns where such a service is self-sustainable.
- AD: The water treatment plant serves a connected population of around 35,000 people. It has four key elements: aeration, [in which] the water extracted from the nearby bore fields is exposed to air to reduce hardness and the amount of minerals in the water (which would otherwise cause issues like scale buildup), clarification (combined with Macquarie River water, impurities like dirt and organic matter are removed, so it's not cloudy or murky). The pH is balanced and sludge is removed. Re: carbonation and filtration: carbon dioxide is added to improve the taste and, yes, texture. The water's filtered through sand and has chlorine applied. Drinking water released and backwash reuse. Clean water is pumped out into the city supply for drinking while backwash safely returns to the Macquarie River or irrigates parks and grounds. That's a really simple overview. There's also fault identification, critical control points for something goes wrong, site inspections, regulations... Luke Ryan, director of infrastructure, points out the ebbs and flows.
- LR: It's understanding what's happening in the catchment, not just 'every day is the same day'. It's making sure that we've got systems in place so that we can understand what's coming to us, so that we can know if we've got to gear-up with different types of chemical treatment. We can treat about 1,000L a second.
- AD: Glen, do you want to just describe to me, for the people who can't see a video, the differences in the water here, what it looks like?
- GC: Alright, so the central part of the clarifier is where all the mixing of the chemicals takes place. So, we've got like a different colour for higher sludge levels. The second one there is all the filtered water - like, the clarified water going from the launders. So, this is the

settling chamber part of the clarifier. So, the top part of the water, which we call the supernatant, goes through the holes into those launders, into that narrow channel-type area there, and then that's what actually goes through to the filters.

AD: It looks like a big bike wheel.

GC: Yeah, it does look like a big bike wheel.

AD: Let's go with that. What is that?

GC: This is the stuff that we are putting into people's mouths. So, we've got to make sure that we are meeting our obligations under the drinking water guidelines. If we are not doing that, that's where those bore water alerts and notifications go out to the public. But water is critical to the survival of the town and the community.

Speaker 1: You are listening to *Water's Edge*. Thanks for being part of the conversation.

AD: David Duncan has lived in the Warren area for 35 years and is taking us through the Burrima boardwalk, a 2km circuit in the Macquarie marshes.

DD: They've been wet for two or three years. So, it's gone from looking like a dry land to now looking like a wetland.

AD: It's aimed at restoring and conserving wetland and floodplain habitat. An oasis of river red gum forest, marsh and reeds. I can't believe this is here - after what we just drove through to get here. There was all this orange, red dirt, emus, and now we're at reeds and water!

DD: Yeah, that's this environment. It is a mixture of reds and dry land country that never gets wet or floods, through to country like this that does get flooded every year or two. So, you get that mix of habitat. The whole mix of biodiversity is what comes with that mixture of habitat.

AD: And what do they mean when they call this place a kidney?

DD: They're referring to the function of it as a filter, in that water that enters the marshes tends to come in with a certain sediment load and be murky; as it comes through the marshes and all the vegetation, it filters out all that sediment. So, the water comes out clean. What you'll see today is that that's not happening because there are huge amounts of carp that have come since the flood last year.

AD: So, they'll be adding extra sediment?

DD: Yes, they're stirring it up, keeping it stirred up and suspended. It's primarily the carp, and maybe some of the sediment isn't soil material as it is decaying organic matter as well.

AD: There's a huge number of birds out here, a couple of rare ones, a lot of frogs, a lot of reptiles...

DD: There's a lot of water woodland birds and things in amongst the trees - and the wrens, finches, parrots and so on are all different types. The range of waterbirds is huge from the bigger sort of wading-type ones to - and it'll depend a bit on the conditions as to what you see - but Painted Snipes and Latham Snipes and so on. I guess you're only limited by your time to observe.

AD: There's also an observation tower. No river in sight from here. Just horizon.

DD: Here, you're looking at the middle. There's a 3-4,000 hectares here, and then it's like an onion. The next layer of that onion is these red gums that we've been walking through; then, from around them, is the next layer. And it becomes less frequently wet the further out from there you go. The single patch itself is a few thousand hectares, but the overall area? There might be 12-15,000 hectares.

AD: Burrima hasn't been home to stock since 2005. Instead, it yields insights into the effect of river flow, land and water management on the wetland ecosystem. Tony Wass, from the Macquarie Marshes Environmental Trust, explains. What's been your involvement with the marsh?

TW: They made me chairman of the group that owns it, because I didn't go to the meeting. So I've been chairman for five or six years now.

AD: They did drop you in it!

TW: They did drop me in it, that's right. But they dropped me in with a few good people. We'd been involved in the water debate that's raged over the last few decades since irrigation and the development of Burrendong Dam. We decided that if we were - allegedly! - part of the problem, we had better understand the problem. So, we got together a group of people and they put in a little bit of money each and we bought this. We've had school groups and friends and anybody else who wanted to come walk through the marshes in their gum boots, up to their waist in water, and then the opportunity came along to build a boardwalk.

AD: It's a beautiful job.

TW: We're dead pleased with it, I might say.

AD: You hit on a very common misconception in the water debate. It's often seen as two sides, isn't it? Farmers and irrigators versus environmentalists. But it's one and the same here?

TW: We needed to have some rationality in this debate. We should be able to both live together.

AD: Can you explain how it fits in with the farming and the rivers?

TW: I can only answer that by talking about the geomorphology of the river system. The Macquarie River is 95% terminal. That means, in simple language, that 95% of the water that flows in this valley, stays in this valley. It doesn't end up in the Barwon.

AD: Okay.

TW: So, when you get a big event, like we've had from 2020-23, then water flowing in at the top end of the marshes tends to run out the bottom end of the marsh.

AD: This is how it could end up connecting?

TW: That's how it connects. A lot of the time it doesn't connect at all. The marshes are a large flat bathtub.

AD: Or a big sponge?

TW: A big sponge. It takes about 300,000 megalitres just to get it anywhere near full.

AD: How does it go in the dry?

TW: This is a land of 'drought and flooding rains'. Never forget that. And people do forget that! They expect water to be running here and there all of the time. Macquarie marshes is an ephemeral wetland. That is, it wets and dries. That's its nature. That's what it's done for the 6-8,000 years that it's been in existence.

AD: Your Excellency, how's this comparing to the lands that you're used to?

ZHC: I have seen something new here. One is this institution of Inspector-General of Water Compliance. I haven't seen it anywhere else, and I think it is very important, in addition to the overseeing role, I think compliance is very important. What I have also seen with Mr. Grant - Troy - is that he's a strong team leader and, second, community engagement and then engagement with the stakeholders - that's very important and that's where he's doing a remarkable job.

TG: That's very kind.

AD: As two of the top-most water-stressed nations on Earth, Australia and Pakistan face similar challenges, but they're quite different in other aspects of water use and management. The Inspector-General sums up perfectly.

TG: In the conversations with the High Commissioner, he has a really good grasp and understanding of the issues that are similar and common to us both, but where we can also learn from each other and potentially swap ideas and build even better relationships between the two countries. So, as the Inspector-General, we look at Basin-wide outcomes where each of the jurisdictions do focus on what they're required to deliver to their constituencies, according to their constitutions and state laws. But this is a bigger game that we are playing. It's a Basin-wide outcome, from one end of the system to the other, where everybody's a winner and there's no losers and you don't pick winners and losers. In Pakistan, I learnt that being similar to us with our British origins, they also have a national and province arrangement. The federal side of Pakistan's government certainly leads the way rather than having each of the states compete with each other for access to the water. So, that's a really big takeaway for us. Constitutionally, there are some challenges here that we face consistently. But what we are achieving is better cooperation here and showing how to get out of the silo challenges that the Pakistan people find themselves in currently. It's always an immense honour and privilege to host dignitaries from overseas. And it's a real honour to be asked, as an independent body, without an agenda, to showcase what is being done by those on the ground. It's also a great credit

to the people who are managing water here, whether it be the state bodies, the regional council here, or individual irrigators or irrigation groups who are working so well to get the environmental outcomes that we saw are being achieved. This region demonstrated what can be achieved is wonderful environmental outcomes, when the right amount of water is shared equally and equitably across not only agricultural, socioeconomic, but also environmental needs.

Speaker: Like this episode of *Water's Edge*? Subscribe, like, or follow wherever you get your podcasts, so you never miss an episode. And give a rating to help others join the conversation.

AD: Still to come on this season of *Water's Edge*: decision makers from across the Murray-Darling Basin unite in Canberra at the Inspector-General's regulatory leaders Forum.

TG: This is a great opportunity to bring them together to share best practice ideas, to learn from each other, but also to get more consistency about the application of water theft regulatory practices and other compliance measures more consistent across the basin, which was one of the things that the community were crying out for.

AD: How Australia's largest inland sewage plant proves every drop of water is valuable. ??:
We get the sewage coming in, we remove the solids, we take out the nutrients, and then we deal with the pathogens. It's got a few novel elements that are different to any other wastewater treatment plant in Australia.

AD: And keeping the balance with water infrastructure and the environment at Canberra's Cotter Dam.

?: It's quite unique in Australia, in terms of infrastructure and water security and balancing that with environmental management. We're actually lucky that we have a dam here. Because of the dam, we have protected an endangered species in the Macquarie Perch.

Speaker: *Water's Edge* is produced by the Inspector-General of Water Compliance, Australian Government, Canberra. The Inspector-General of Water Compliance is an independent statutory office holder with oversight, monitoring, regulatory functions and powers established under the Water Act 2007. For more information on what we do, visit our website@igwc.gov.au.