THE UNIVERSITY OF NEWCASTLE AUSTRALIA

INSTITUTE FOR REGIONAL FUTURES

Bellingen Shire Water Security and Resilience

Report to Council

16/11/2022

Document preparation

This report was prepared on Awabakal and Worimi Land by the Institute of Regional Futures for Bellingen Shire Council.

The University of Newcastle acknowledges the traditional custodians of the lands within our footprint areas: Awabakal, Darkinjung, Biripai, Worimi, Wonnarua, and Eora Nations.

We also pay respect to the wisdom of our Elders past, present and emerging.

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1 Background and Context

1.1 BACKGROUND

Australia is the driest inhabited continent on the planet, with a highly variable water cycle and around 70% of the country's landmass defined as arid or semi-arid[1]. In recent decades the country has faced an unprecedented challenge when it comes to the security and resilience of water.

The capacity of a population to safeguard sustainable access to adequate quantities of an acceptable quality water is important for sustaining livelihoods, wellbeing, socio-economic development, protection against water-borne pollution and water related disasters, and the preservation of ecosystems.[2] Resilient water management is central to achieving climate adaptation, managing and better preparing for natural and public health threats and addressing water scarcity issues.[3]

In Bellingen Shire, drought and bushfires are real and constant threats, placing a greater focus on the need for ensuring the region is adequately prepared and able to continue to meet the water needs of the community both in good times and times of emergency. Additionally, peak demand for water in the Shire is expected to increase significantly, from the current demand of 1018 megalitres per year to 1579 megalitres per year by 2049[4].

In 2021 Council commissioned a report to assess whether the Shire's available groundwater resources can adequately meet various demands for water, particularly during droughts and under climate change conditions. The assessment found that the Shire's aquifer was able to meet various levels of demand and provided recommendations to improve further water resilience in the Shire, including additional wells, and a groundwater monitoring network.

Council is working to strengthen water security and resilience within the Shire by updating its Integrated Water Cycle Management (IWCM) Strategy. The Strategy is a 30 year plan that identifies an integrated water, sewage and stormwater supply scenario in consideration of social, environmental and economic considerations and is designed to ensure that Council can provide a safe drinking water supply whilst managing the community's wastewater.

To inform the updated Integrated Water Cycle Management Plan, Council engaged the University of Newcastle's Institute for Regional Futures to understand the community's views and values around water security and resilience, particularly in terms of best practice for community education on water to ensure they are reflected in the Plan.

[1] Chappel. E., (2022). *Understanding the importance of water security in Australia and globally:* https://www.agilient.com.au/2019/06/17/understanding-the-importance-of-water-security-in-australia-and-globally/
[2] United Nations Water. (2013). *What is water security?*: https://www.unwater.org/publications/what-water-security-infographic
[3] Asian Development Bank. (2022). *Meeting the challenge of water security and resilience in Asia and the Pacific: https://www.adb.org/news/features/meeting-challenge-water-security-resilience-asia-pacific*
[4] Prathapar. S.A., (2021). *High level assessment of sustainable extraction of groundwater for Bellingen town water supply*.

1.2 NEED FOR A COMMUNITY FORUM

1.2.1 Bellingen Shire Community Resilience Deliberative Panel

In 2020, the University of Newcastle conducted a deliberative panel on behalf of Council to explore community views about locally led ways to strengthen community resilience.[5] The panel comprised 25 participants, selected as a representative sample of the Bellingen Shire community in terms of age, gender, location, and other relevant criteria.

Water security emerged as the key issue for panel participants and was nominated as the most important domain for the Shire's community resilience efforts. Of key concern was the ability to secure water supplies in times of crisis, particularly following challenges faced by the community during the 2019-20 Australian bushfire season. A key recommendation from this process was for actionable projects to be delivered to make sure the Shire is prepared and has access to water.

The deliberative panel process revealed that further discussion and engagement with the community about the security and management of water was needed and could be achieved through a community forum.

1.2.2 Policy context

Two key policy and planning activities informed the need for a community forum:

Integrated Water Cycle Management (IWCM) 30-year Strategy

> Council operates as a Local Water Utility (LWU) and is responsible for providing portable water supply and managing wastewater for the community. As an LWU, Council is also required to develop a strategy for long term planning. The IWCM Strategy is being prepared by the Council in consultation with the Department of Planning and Environment (DPIE). An important part of the process in developing the strategy is community engagement and the water security and resilience community forum is a key part of this procedure.

Assessment of water supply schemes

Council worked with DPIE and the Public Works Advisory (PWA) to assess the suitability of the Dorrigo Water Supply System (DWSS) and the Lower Bellingen Water Supply System (LBWSS). The findings were presented in a report titled, *High Level Assessment of Sustainable Extraction of Groundwater for Bellingen Town Water*. This report was used to inform the aims of the community forum, including the key finding that there is more storage available for sustainable use than initially understood.[6]

1.3 METHODOLOGY

Community views on water security were sought through two key streams of engagement: a community forum on water security and resilience and a community survey. A summary of the process and the links with other strategies and planning is outlined in Figure 1.

Section 3 discusses the process and findings from the water security and resilience forum, while Section 4 discusses the process and findings of the community survey.

[5] The University of Newcastle (2020). Bellingen Shire Community Resilience Deliberative Panel: Report to panellists.
[6] Prathapar & Associates 2022, High Level Assessment of Sustainable Extraction of Groundwater for Bellingen Town Water Supply.

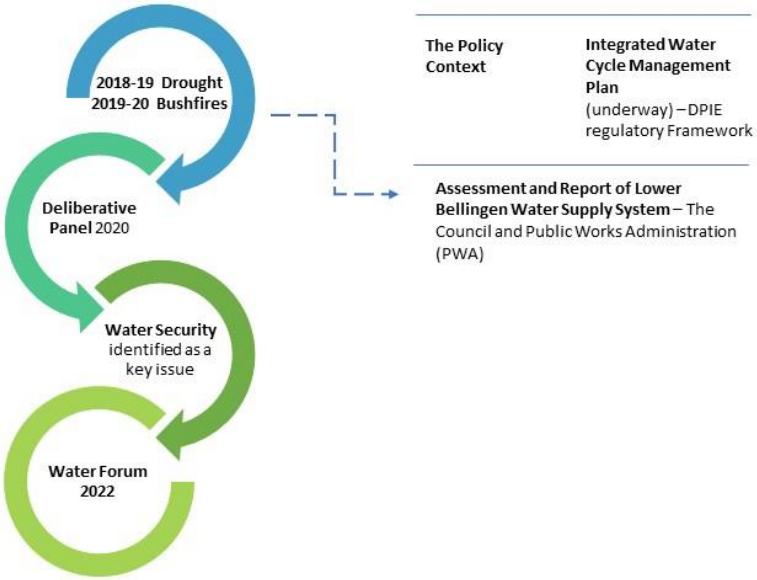


Figure 1: Project background summary infographic

1.4 EXECUTIVE SUMMARY

This report will present the results and findings from the Bellingen Shire water forum and community survey. The need for this further community consultation was identified during a deliberative panel run by the University of Newcastle in 2020 on behalf of the Bellingen Shire Council which also found water security to be a key issue. Participants in the water forum were provided with tours of relevant water facilities and background information to contextualise discussions and allow participants to present an informed opinion while those surveyed only had their own knowledge and research representing a baseline opinion.

The forum participants largely agreed that resilient water sources were important for managing water security going forward with strong preferences for self-sufficient water options, and no desire to be attached to an external water supply. Environmental concerns shaped the discussions around several of the presented options for water security with participants preferring options with limited impacts on the local environment and river system, though some form of off-river storage was popular and managed aquifer recharge was viewed favourably. As a result of environmental and power grid concerns, there was mixed support for a desalination plant. Generally, participants were in favour of sharing water management knowledge with neighbouring jurisdictions and providing the community with better tools and techniques to manage water effectively. Further education around water management and self-sufficiency were the most popular of the options presented.

The online survey was open to all residents of the Bellingen Shire and while covering similar topics to the forum, was inherently more limited in scope. The survey identified that a majority of participants had experienced water supply issues, and while issues with the town supply were most common all sources of water had experienced some issues. Those least impacted by water supply issues were those solely reliant

on rainwater tanks, which may explain the communities' preferences for self-reliant water options. As also found in the forum, there is a general preference for locally stored and managed water sources and a concern for the environment, though those directly reliant on the river were more concerned than other parties. The survey reinforced the rejection of sourcing water externally, especially among those not reliant on the town water supply. Survey participants were less convinced of the merits of a desalination plant than those in the forum. There was an overall high level of concern about future water security and a general belief that the Council has a meaningful role to play in managing this water security. It was found that environmental concerns and supporting ways to save water were the most important considerations, largely in line with those found in the forum, and rainwater tanks remained the most popular option that Council should consider for assisting in water security. Community interest in attending workshops or field days was mixed but may still be popular enough to consider exploring.

Overall, both the community forum and survey identified similar concerns amongst the community for ongoing water security and the environment and identified a clear preference for a locally managed, resilient, water supply. This preference and the overall fewer issues suffered by rainwater tank users may explain why further investment in this area was popular. There was a seemingly greater appetite for a desalination plant among forum participants, though not without some concerns, than those surveyed, but this may be due to the additional supporting information presented to those at the forum. This would indicate that there may be education options available to the council to support uptake of water saving measures, though while the forum displayed an interest in education around the water supply, those surveyed were more interested in education around practical water saving measures. Both the survey and forum indicated that the community would prefer support in taking measures to improve their own water resilience through storage and improved water usage. It was also found that there was general support for a variety of water initiatives, but that they cannot come at the expense of the local environment.

2 Water security and resilience community forum

2.1 OVERVIEW

The Bellingen Shire Water Security and Resilience Forum was held on Saturday 7th May 2022 at the Bellingen Golf Club. The purpose of the forum was to discuss the issue of water security in the Shire.

The key objectives of the forum were to:

- Help Council understand the range of views on water sources for Bellingen Shire.
- Discuss which water resilience recommendations Council should prioritise for investment to ensure future water security.
- Explore ways to deliver effective community education about water.

Tours of Bellingen Shire's water facilities (a water supply facility and sewage treatment plant) were provided to participants in the lead up to the forum to assist in contextualising the discussion.

The forum included relevant presentations by the following subject matter experts,

- **Ashley Greenwood** - Deputy General Manager Operations, Bellingen Shire Council. Ashley spoke about the role of Council in water supply and security, provided information about the IWCM strategy and discussed findings from the *High Level Assessment of Sustainable Extraction of Groundwater for Bellingen Town Water Supply* report.
- **Penny Joseph** - Head of Resilience & Climate Change Adaptation Sydney Water. Penny spoke about the importance of water resilience and the role of the community.
- **Professor Stuart Khan** - Director of the Australian Graduate School of Engineering, UNSW. Professor Khan provided a grounding to participants on broad areas for consideration regarding the building of water security, and particularly in regards to the water options available to the Shire.

The information shared during discussions at the forum, which are presented in this report, will be considered by Council to inform future consultation, education, and decision-making.

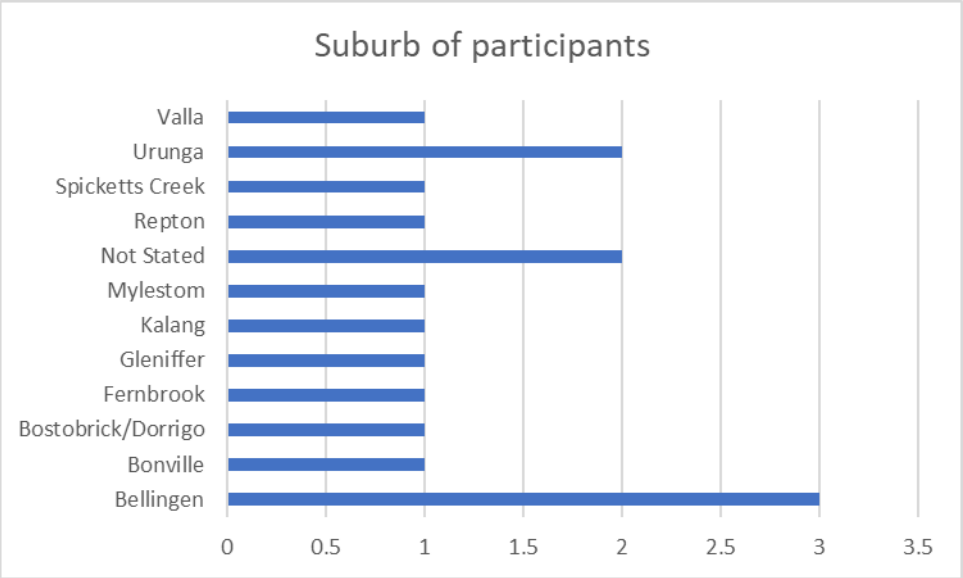
2.2 PARTICIPANT SELECTION PROCESS

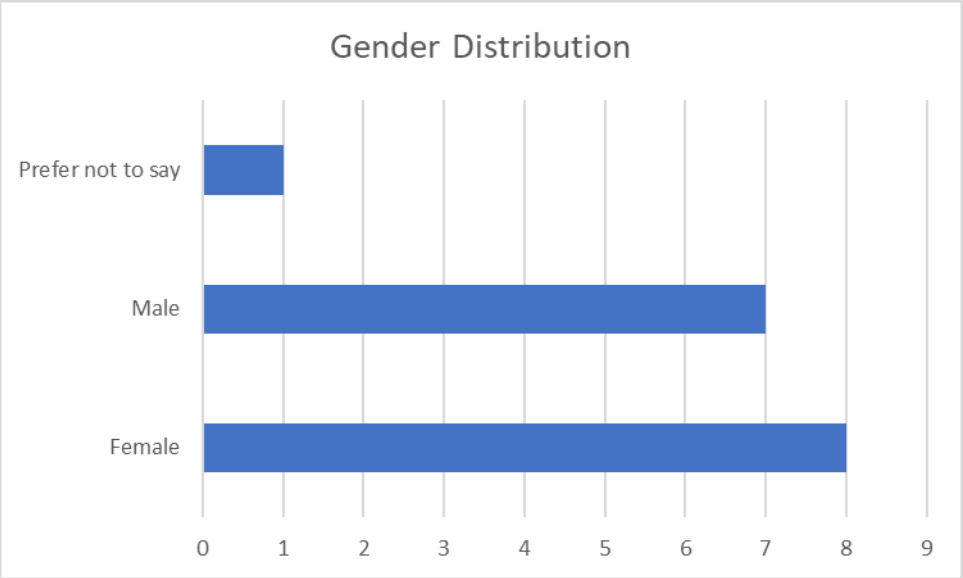
Community members were invited to participate via two channels:

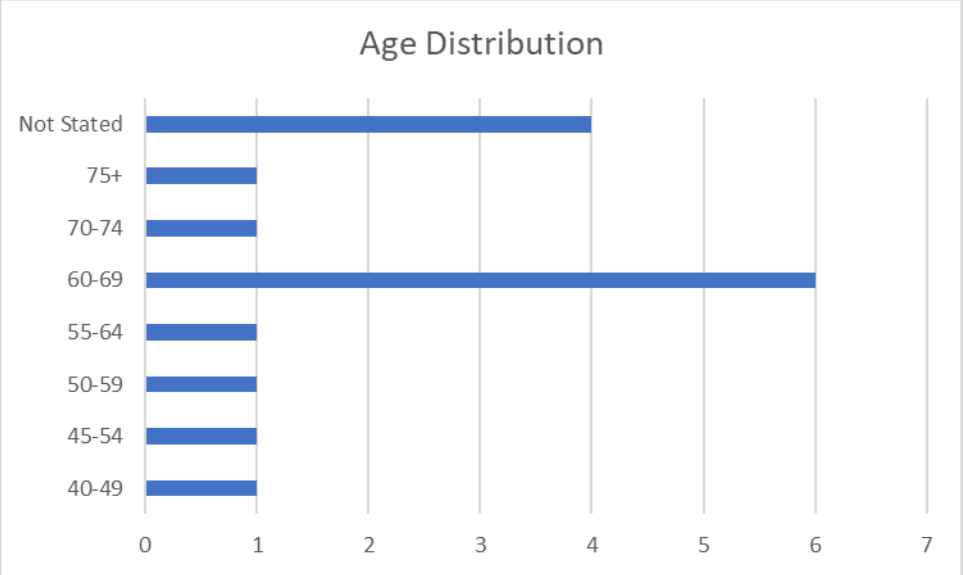
1. Previous participants from the deliberative panel were contacted by the Institute
2. Via online survey managed by the Institute that explored views about water security and interest in participating in the forum.

Participants were then selected based on their values, demographics, geography (location) and the way in which they access water (Dorrigo water supply, seaboard water supply, residents on tank water, those with private water arrangements and farmers and producers with dams and water storage) to form group representing a wide range of water user.

The selection process yielded a number of expressions of interest, with 16 participants being selected to participate in the forum. The demographic distribution of the participants was as follows:


Suburb of participants
Valla
Urunga
Spicketts Creek
Repton
Not Stated
Mylestom
Kalang
Gleniffer
Fernbrook
Bostobrick/Dorrigo
Bonville
Bellingen
0
0.5
1
1.5
2
2.5
3
3.5


Gender Distribution
Prefer not to say
Male
Female
0
1
2
3
4
5
6
7
8
9


Age Distribution
Not Stated
75+
70-74
60-69
55-64
50-59
45-54
40-49
0
1
2
3
4
5
6
7

2.3 WATER SECURITY AND RESILIENCE: UNDERSTANDINGS FROM THE FORUM

The forum revealed how the Bellingen Shire community understands water security and resilience. As predicted by the deliberative panel in 2020, water security was, and remains, a priority for the community. A discussion towards the beginning of the forum was held to give participants the opportunity to contribute their understanding of water security to the group. Together, those in attendance at the forum developed a multifaceted picture of the concept of water security in the Bellingen Shire, which included the following attributes:

- Considering the cost of inaction versus action
- Education of the community
- Being proactive
- Ensuring water quality
- Keeping water in the water system
- Transparency (i.e., making relevant data available for the community)
- Localisation (i.e., having the option to share water or expertise about water management locally)
- Ensuring financial viability
- Incorporating a historical understanding of water into decision making
- Managing evaporation
- Taking the Shire's population growth into account
- Community engagement that can have an impact on decision making
- Integrating a holistic understanding of the water system into decision making.

Forum participants were generally engaged and knowledgeable about water in the Shire. Some key points emerged from the discussions throughout the day regarding participant understanding of water security and resilience.

Firstly, the discussions about drought and community resilience showed that some participants highly valued water self-sufficiency at the household level. They argued that providing the Shire's community with suggestions and options for resilience should form part of Council's role. For example, Council could suggest individual tools for monitoring and saving water usage, such as real-time metering to detect leaking taps or water-efficient toilets. Penny Joseph's presentation supported this understanding of water security for participants, who widely agreed with her conclusion that it is preferable to encourage water conservation via behaviour change rather than strict rules. There was also particular interest in the implementation of 'smart meters'.

Secondly, many participants emphasised environmental considerations in their understanding of water security in the Shire. Issues such as climate change, river health, and logging were discussed multiple times throughout the day as participants expressed concern about how these factors may affect water security. For example, there were numerous discussions about preventing logging to reduce runoff and fire risk. Participants valued the unique environment of the Shire and understood water security through the wider lens of environmental conservation.

2.4 COMMUNITY PERCEPTIONS: COUNCIL'S WATER MANAGEMENT PRACTICES AND STRATEGY

The forum prompted discussions amongst attendees which provided a good understanding about how people view Council's water management practices and strategy. The presentation delivered by Council on water resilience and the IWCM strategy was well received by the participants. While some people were well informed about water management, following the forum there was a general appreciation for Council's role as an LWU. For example, in the post event survey made available to participants to express their thoughts, one participant noted that:

> *[The] workshop has reaffirmed that Bellingen Shire (BS) is actively working toward water security with provision of clean, safe and long-term availability of water to its shire. I learnt the strategies that BS is undertaking in a short, medium and long-term setting to be able to commit to this. Also, I better understand the social, environmental and economic considerations of water security and the LBWSS.*

One goal of the water forum was to collect community feedback on aspects of Council's water management practices, specifically groundwater extraction and water supply options. Firstly, participants were presented the results of the High-Level Assessment of Sustainable Extraction of Groundwater for Bellingen Town Water Supply. A summary of the report was supplied to participants as pre-reading prior to the forum. The study was received favourably by the group, who supported it as emblematic of the beginning of a long-term planning approach to water management in the Shire. Some community members felt that there has not been enough long-term planning about water established by Council. But many also believed they were improving and had more information about water sources. One participant stressed the need for informed water management given the likely future growth of the Shire's population and associated urban expansion. There were also questions from participants seeking clarification on how the available capacity of the Bellinger River aquifer was calculated. This led to an important finding related to the report, as the participants' support for what it represented in long-term water management planning contributed to their approval for one of the report's conclusions. The report recommended further detailed investigations, such as monitoring bores, and to model the capacity of the aquifer. To this end, one participant suggested that Council integrate analysis of existing privately-owned bores in Gleniffer into the monitoring.

Secondly, the forum indicated the community's opinion of the water supply options which may support the existing aquifer for the LBWSS. Participants were primed through presentations to think about these options from a range of perspectives, incorporating social, economic, and environmental considerations. They built on the information presented to as a group to come up with a list of principles for assessing different options to guide the way that Council thinks about water management. The principles they identified were:

- Flexibility
- Stability
- Cost (capital expense and operating expense)
- Feasibility
- Sustainability
- Interdependency
- Localism
- Demand Management.

Of these principles, flexibility emerged the most consistently throughout the discussions of the water management options. Participants broadly agreed that flexibility is key to creating resilience and were supportive of Council's direction with the IWCM plan to reinforce the Shire's water supply with an additional option. For example, some participants pointed out that the current water supply is not very flexible, as many parts of the Shire rely on a single aquifer whose water supply could be compromised by contamination in the Bellinger River.

Community opinion on the specific water supply options identified by Council was quite varied, although useful implications for Council's IWCM plan did emerge. Participants were most united in their disapproval of the first surface water option, which would involve connecting the Shire's water supply to that of Coffs Harbour or Nambucca. There was concern about the implications that this would have for water security in the Shire, with a perception that it may undermine control of the Shire's supply. Participants were more supportive of initiatives to share knowledge about water management with neighbouring jurisdictions, as well as the remaining water options that were presented to them. Managed aquifer recharge was popular among forum participants as part of a potential strategy for wastewater treatment. There was also a call for more information from Council about wastewater management.

There was mixed support for a desalination plant on the Bellinger River, with some community members recognising its feasibility and approving of the water security it offered, yet also expressing concern about its potential environmental impact and high energy use. Concerns were also expressed about the need for a significant and reliable power supply, which could potentially undermine the water security the plant would offer. Similar opinions about the option of constructing a dam were also expressed but these were also met with concerns about potential impacts on the local environment. However, some form of off-river storage on the Bellinger River was popular with a section of the forum. The post-event survey also indicated a lot of support for off-river storage, as participants suggested Council could improve water security by increasing surface water storage capacity and, to quote a participant, "proper off-stream storage."

An important issue for many participants was supplementing the existing water supply in the Shire through additional groundwater. The option presented to the group by Council was to investigate an alternate borefield in the Shire's coastal sand aquifers, but some participants expressed concern that this would mean that the Shire could be placed under water restrictions in line with state government policy. This was an important issue for many in the forum, who, as one participant expressed, are concerned about how "we can be on restrictions when we are such a wet Shire." However, some participants countered that they do not inherently oppose water restrictions, as they raise community awareness about water usage. Additionally, the discussion of the specific groundwater option created by Council revealed a more general tension between participants over additional groundwater extraction. Some forum participants were supportive of additional bores in the Shire's river systems, such as in the Kalang River because it would increase water security. Currently, community members feel that the water supply is vulnerable because the bores are concentrated at one point of the Bellinger River. As a participant expressed in the post-event survey:

> *"We have available one source of water and that is our river Bellinger. [W]e need to have a backup supply."*

In contrast, other forum participants were strongly opposed to additional bores due to environmental concerns. These participants felt that the Shire's river systems are a unique asset that should be protected, and they were particularly concerned about the suggestion of tree removal to improve river flows. Despite these differences, it was clear that most participants were supportive of and concerned about the protection of the Shire’s rivers and catchment areas to ensure there was access to clean and safe water.

2.5 COMMUNITY PERSPECTIVES: WATER SECURITY AND RESILIENCE EDUCATION

2.5.1 Content

In terms of the topics to include in community education on water, participants approved of further education around water security as it was approached at the forum. some participants, however, felt the discussions of water should expand to include considerations of adaptation along with security and resilience. This was also evident in their views about community education on water security, which was considered a good starting point for encouraging the Shire to think more about the community's ability to respond to water-related issues over time, but which should integrate additional topics such as adaptation and how to increase water self-sufficiency. For example, one participant suggested that Council put out an instructional flyer outlining the best practice for rainwater collection in the Shire. Thus, there was significant support for Council-led initiatives to promote water self-sufficiency. This was parallel to a desire for more informative workshops similar to the forum, which was prompted by the explanation of the Shire's water supply that many participants found illuminating. Some participants were unclear on where exactly water supply came from, and thus believed that the general community would benefit from this type of education.

Through a survey of forum attendees, participants indicated their preferences for the topics they think Council should cover in community education initiatives about water. Education on water supply in the Shire was the most popular topic for respondents, one which resonated highly with many. One participant explained that further education on water supply in the Shire would be beneficial because "very few of my contacts know much about our water". Another popular topic was integrating Gumbaynggirr perspectives on water in the Shire into community education initiatives. This was also mentioned by some participants in the forum as in important element lacking in the discussions about water security and resilience on the day. The inclusion of Gumbaynggirr perspectives would aid Council in delivering a well-rounded response which appeals to all members of the Bellingen Shire community.

2.5.2 Format

For suggestions regarding the format of Council directed education on water management, the inclusion of water management in school programs was overwhelmingly popular amongst forum attendees. Participants approved of this option because it would also ensure that young people in the Shire are introduced to their living environment, thus raising awareness of "what it takes to be water-wise". Other popular delivery options for water education were flyers, factsheets, and workshops. Many participants considered the water security and resilience forum as a type of workshop, and their suggestion for more workshops was given on the basis that they emulate the forum in form.

Following this, participants offered suggestions for Council to improve future workshops and forums. Participant suggestions will form useful insights into designing community initiatives in the Bellingen Shire that are effective and developed with a local mindset as central. Some participants felt the scope of the discussion was too narrow, suggesting that future initiatives on water management ought to include discussions on flows in rivers and the impact that water users as individuals have on water supply, relating to different water needs and usage levels amongst Shire residents. Related to the suggestion that Council should complement water education in the Shire with flyers and factsheets, some participants suggested that factsheets could be used in the future to provide residents with more context on water management prior to community discussions, freeing up time for discussion. In the post event survey, some people advocated for a better cross section of the community at future Council workshops and events on water, and some wanted more information on best practices for water management. The inclusion of examples of management practices from outside of the Shire was suggested as a useful way of encouraging community engagement and discussion.

2.6 Recommendations from the Forum

As a result of the forum, recommendations concerning water security and management for Council were shaped. Participants were generally appreciative of Council's efforts to create an IWCM strategy, although many were unaware of the details of Council's role in water management until after the forum. This indicates that there is an opportunity for Council for positive community engagement around water management practices in the Shire. Educative initiatives would be well received in this respect.

The findings from the forum, irrespective of community survey responses, support the recommendation that Council should look into managed aquifer recharge and the desalination plant. This option was popular at the forum, indicating that it may be well received by the wider Bellingen Shire community if provided clear and specific information. Requests for specific information were common amongst forum participants, something which Council needs to address in future community engagements to build support for water management and resiliency options.

The protection of the Shire's natural environment was of a high importance to forum participants, with it becoming a prominent theme of discussion. Interestingly, when disagreements arose between participants on different issues or water options, such as over additional groundwater extraction, protecting the environment was cited by both sides as a key argument. Council has room here to make information regarding water management as clear as possible, considering the complex nature of the matter. Greater clarity in this domain will also help people to understand *which* environments (rivers, forests etc.) are affected by certain management practices, and *who* is affected by these potential choices.

Further recommendation emerging from the forum concern best practice models for community education in the Shire on water. Council should consider implementing educative initiatives on a range of topics related to water management, including water security and resilience, Indigenous perspectives on water in the Shire, where water is sourced, and how to be self-sufficient with water. The recommendation for the format of these engagement activities around water includes school programs, flyers and factsheets, and workshops. These can work in tandem with each other, as a breadth of initiatives ensures community discussions about water are more fruitful as people become more informed about the complex topic of water.

3 Community Water Resilience Survey

In addition to the water security and resilience community forum, community views on water security were sought via an online survey.

The online survey sought the views of the community regarding their experiences of water supply issues, preferences for long-term water supply, important considerations in the planning of future water supply, and water security education and training. The survey was open to all residents in the Bellingen Shire aged 18 and over and consisted of 22 questions including open ended questions. The survey was open for completion for a period of 4.5 weeks, from 18 September 2022 to 20 October 2022.

The survey was advertised via a variety of channels, including local newspapers and radio, the Bellingen Shire Council website (Council news and updates) and Council social media and distribution lists. It was also publicised via various other social media channels including the Bellingen Environment Centre and Resilience at BelloShire Facebook pages. The survey yielded a total of 89 responses.

Of the 88 participants that responded to what type of water supply they had, 48 are connected solely to the towns water supply while 11 have both the towns supply and their own rainwater tanks. A further 20 have rainwater tanks (and no access to town water, though some have other secondary sources, ie wells), 6 have some form of private water sharing agreement, and 3 have other sources (creeks and springs mostly).

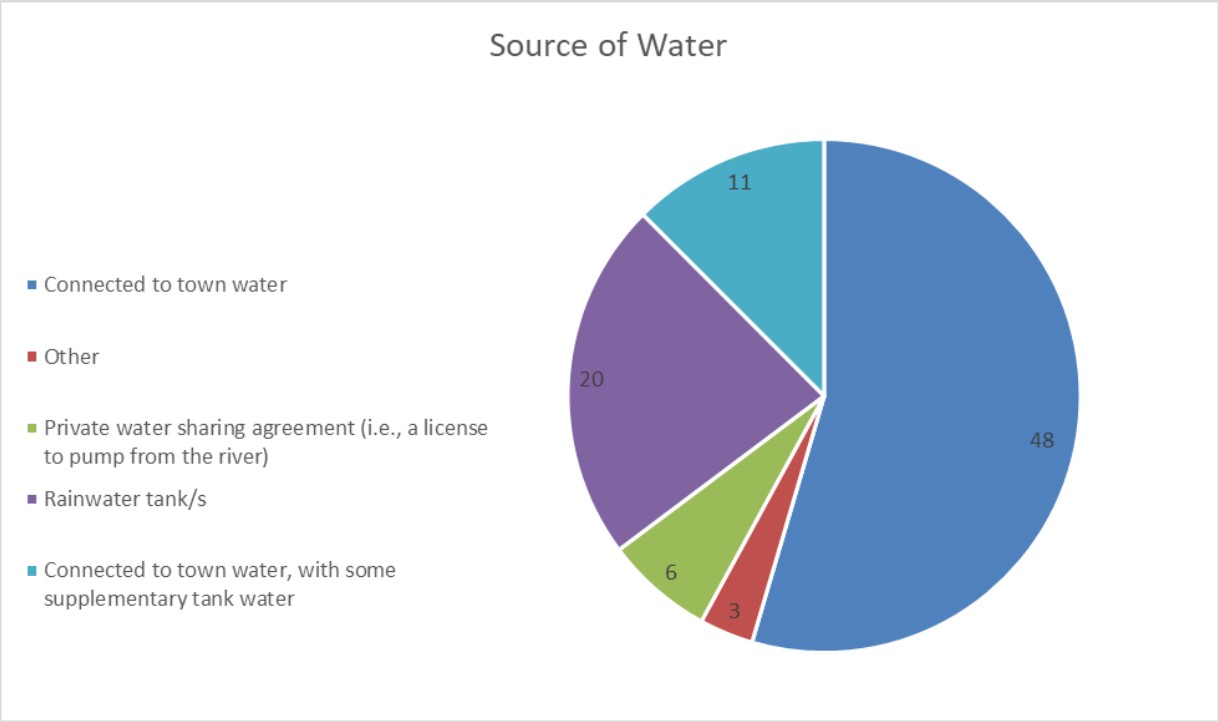


Figure 2, Source of Water, n=88.

3.1 EXPERIENCES OF WATER SUPPLY ISSUES IN THE BELLINGEN SHIRE

Of the 89 members of the Bellingen Shire Community who responded to the Community Water Resilience Survey, a majority (N=53) of respondents indicated that they had experienced water supply issues of some kind. Water security remains a pressing issue for the Bellingen Shire, impacting the lives and industries of the local population. Community members have expressed that experiences of issues relating to the

availability and supply of water are unfortunately common, with grievances in the way water is sourced and distributed present in survey responses.

The most common water supply issue experienced by members of the Bellingen Shire Community was in town water restrictions, as indicated by 37 respondents, which disrupted access to water for drinking and non-drinking purposes. Another issue experienced was an inability to keep farms, gardens and agricultural land adequately supplied with water, expressed by 18 respondents. Members of the community also indicated that at various times they were unable to carry out household activities due to shortages in available water, as noted by 13 respondents. Concerningly, 12 community members indicated that their water supply had been contaminated from natural weather events and/or disasters, and 6 were at one point reliant on water carriers to provide drinking water to their homes. Overall, a majority of Bellingen Shire residents have experienced issues with the quality and quantity of available water in the Shire. 26 out of 80[7] respondents identified that they had never experienced issues with the supply of water.

Of note, 4 respondents were worried about the presence of fluoride in the water supply, possessing limited information on the way Council manages and treats water in the Shire, 2 respondents were unable to access water due to a lack of rain and/or drought, and another 2 identified an unspecified source of contamination affecting their water supply.

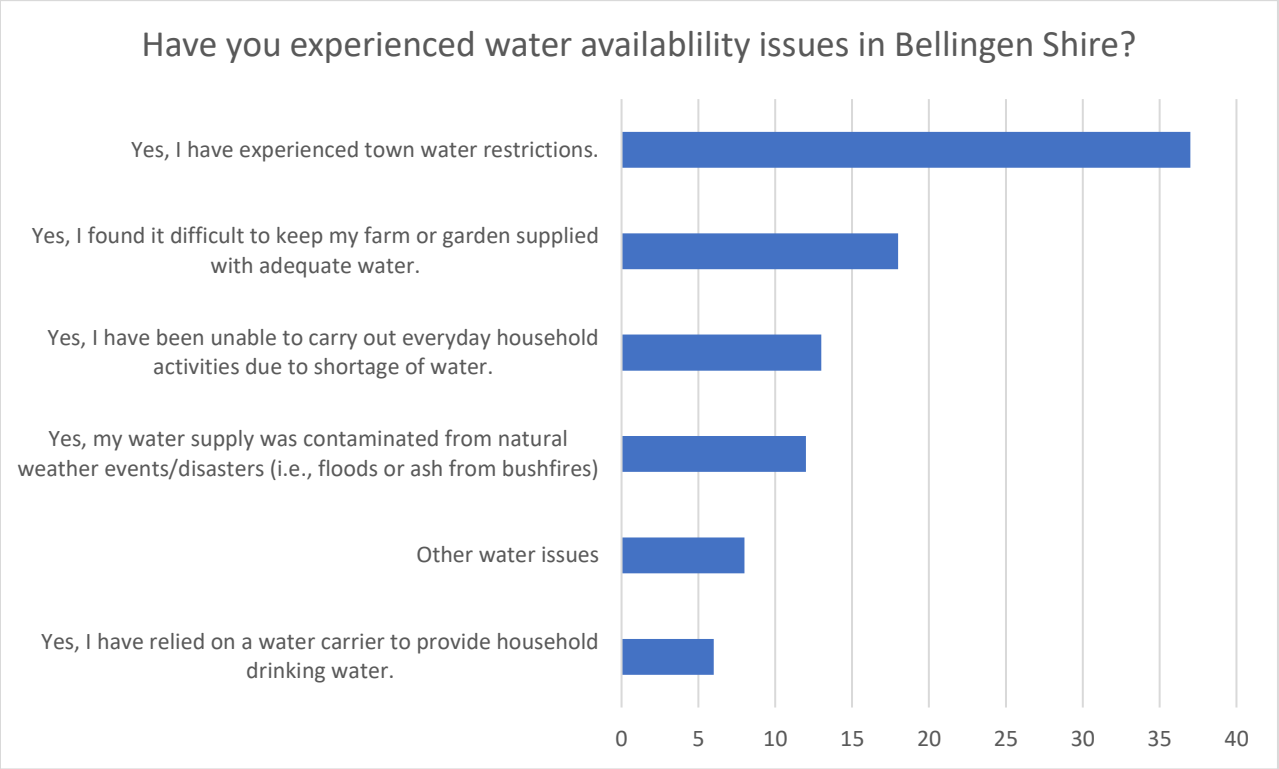


Figure 3, Water availability issues in Bellingen Shire, participants were able to select as many issues as applicable, n=80

[7] Numbers below the total sample size indicate respondents didn't answer every question

Water Source	Yes, I have had supply issues.	No, I have never had issues with supply of water.
Connected to town water	32	11
Other	1	2
Private water sharing agreement (i.e., a license to pump from the river)	5	1
Rainwater tank/s	7	10
town water, with some supplementary tank water	9	2
Grand Total	**54**	**26**

Figure 4, Issues by source of water.

As mentioned above, a majority of the survey participants have experienced water supply issues in some form or another. However, those reliant on only rainwater having experienced the fewest issues. The areas with only 1 or 2 responses aside, there are consistent water issue present across Bellingen, Kalang, and Urunga, while Dorrigo has had comparatively few issues despite participants there using a similar mix of sources of water.

3.2 Community Preferences for Long-Term Water Supply in the Bellingen Shire

3.2.1 Community Preferences

Of the options presented to the Bellingen Shire community for long-term water supply in the region, there was a strong preference towards using water which is collected and stored locally. Amongst survey responses from community members there was a trend in favour of expanding residents' capacity for collecting and storing water within one's own home/property for non-drinking purposes. For long-term supplies of drinking water, there was a preference amongst respondents of using stormwater which has been recycled and cleaned.

The most highly preferred ways for community to save, collect and/or reuse water in the long-term was for Council/government to provide incentives for the use of water tanks by Bellingen Shire residents, with 48 respondents (n=48) scaling this with a 1 (Strongly preferred). After this, using cleaned recycled wastewater for non-drinking purposes was strongly preferred (n=38), followed by using recycled and cleaned stormwater for drinking (n=28). Both water recycling options were very popular with those on water sharing agreements and relatively less popular with those accessing town water in any fashion. Following this was building a dam to collect more water when it rains (n=26), although this option was unpopular with those who are not connected to town water, with 11 participants of this group ranking it as 'not at all preferred'.

The least preferred option for saving, collecting and /or reusing water was the idea of building a pipeline to source water from outside of the shire, where 36 respondents indicated that this was not at all preferred (n=36). This option was especially unpopular with participants with private water agreements, and while generally disliked, the most positive reaction was from those solely using the town supply. Generally, Bellingen Shire residents expressed a desire for their water supply to be sourced and managed locally. The desalination of seawater was also highly unpopular, with 26 respondents not at all preferring it for drinking use, and 24 respondents not at all preferring it for non-drinking purposes. These results indicate that there is a desire amongst Bellingen Shire residents to have the means to source and store rainwater within the community, either through water tanks on personal property, or a public dam so that water can be sourced locally.

Bellingen Shire residents held a preference for using locally collected water for non-drinking purposes to support industry and agriculture. Interestingly, the idea of using cleaned recycled wastewater for drinking, after purifying it to drinking water standards was fairly contested, with 14 respondents not at all preferring it, 28 respondents strongly preferring it, and another 14 scaling the idea in the middle with a 3.

3.2.2 Community Concerns About Water Security

Concerns about water security in the Bellingen Shire were prominent amongst survey respondents, considering water supply issues have been a common issue for the community.

The majority of respondents were very concerned with the future of water security on the Bellingen Shire (n=45). 23 respondents were a little concerned, 10 were not concerned, and 2 had not really thought about it. However, this was not equally split across all sources of water. 5 out of 6 of those with a private water sharing agreement and those with town water and water tanks were very concerned while 24 of those with only town water were also very concerned. In contrast, just 6 of those with only rainwater tanks were very concerned and 5 of this group were not concerned at all. The majority (n=45) of Bellingen Shire residents are concerned with the future of water security in the region, where efforts to address the issue would likely be well received. Based on respondent's survey comments, a significant number of them are concerned about the negative impact of logging on waterways. Of note, 13 respondents commented that they were concerned about the impact of climate change and drought, and 9 were highly concerned about the impact of logging on water security in the Bellingen Shire.

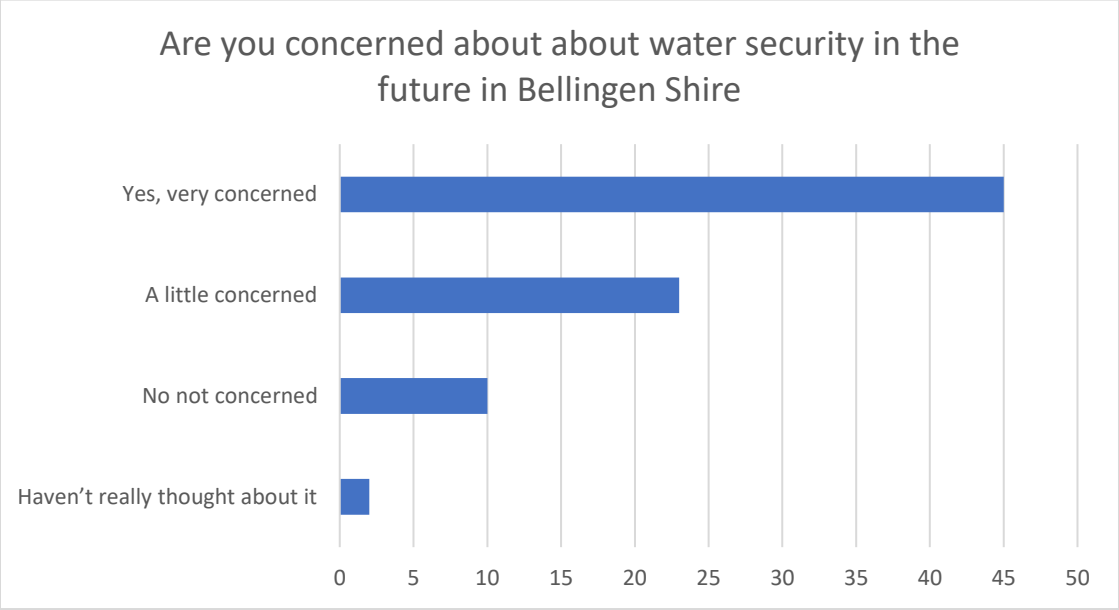


Figure 5, Concern about water security in the Bellingen Shire, n=80.

3.2.3 Preferred Role for Council in Managing Water Security

From the survey, all but 1 respondent indicated that Council has a role in managing water security across the Bellingen Shire. Amongst respondents, there was a consensus that it was the duty of Council to manage water security for the Bellingen Shire and to assist residents to responsibly source, save and manage drinking and non-drinking supplies of water.

64 respondents identified that Council should be involved with creating and implementing a water management plan for the shire, 59 wanted Council to ensure residents accessing town water had an ample supply of water, 53 respondents wanted Council to educate residents of water-saving measures, and 47 respondents thought implementing water restrictions and enforcement was Council's responsibility. Across all of these queries, the people reliant on water tanks had consistently lower rates of agreement, potentially indicating a preference for independence in these matters.

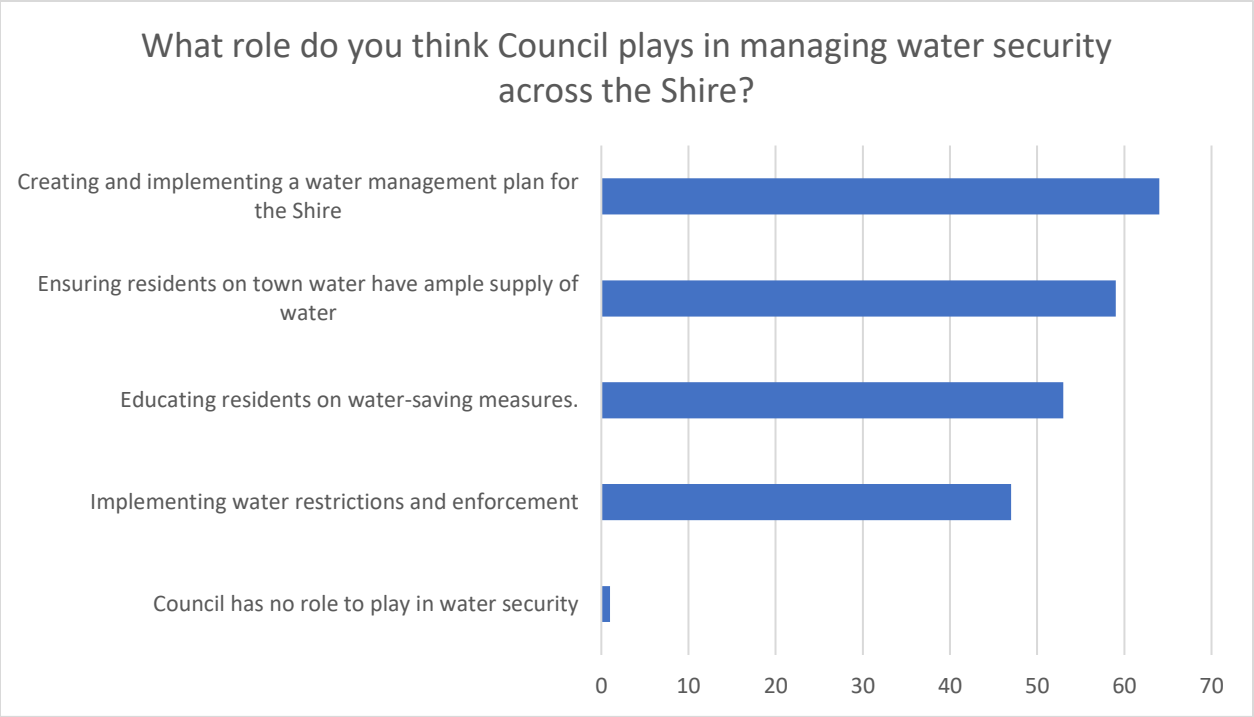


Figure 6, Council's role in managing water security, participants were able to select as many options as applicable, n=75.

3.3 IMPORTANT CONSIDERATIONS IN THE PLANNING OF FUTURE WATER SUPPLY

3.3.1 Important Considerations

Water supply planning was an important issue for respondents, with water quality, the sustainability of water use and collection, and the reliability of water sources being the considered as most important for the Bellingen Shire.

Respondents indicated that the reliability of water supply (n=55), water quality (n=52), impact on our environment and natural resources (n=45), supporting ways to save water (n=43), and climate change modelling and adaption (n=37) were most important to consider when planning future water supply, with the majority of respondents ranking these as a 1 on a 1-3 scale. The options for keeping the water supply local (n=29 for rank 1, n=25 for rank 2), and cost to households/businesses (n=25 for rank 1, n=33 for rank 2) were less supported but still ranked as important. The option of sharing water sources with other regions was not considered as most important, with 24 respondents ranking this as least important (a 3 on the scale), 34 participants in the middle ranking it with a 2, and only 6 respondents believing it to be most important and ranking it with a 1.

Those with private water sharing agreements were particularly concerned regarding environmental issues with all 6 of respondents ranking the 'Impact on our environment and natural resources' and 'Climate Change Modelling and Adaption' as most important. This stands to reason as those directly accessing water stand to lose the most from any environmental impacts. This group also almost universally (n=5) rated sharing water sources as least important.

Overall, respondents indicated that they were in favour of amending water supply planning to better promote sustainability and reliability.

3.3.2 Important Considerations for Council

In terms of planning for the future water supply of the Bellingen Shire, survey respondents indicated that Council could consider the impacts of sourcing water from natural rivers and waterways, and changes in

the climate, as most important. Environmental concerns regarding the sustainability of sourcing water from local river systems, including the Bellinger, Kalang and Bielsdown Rivers, were chiefly expressed by respondents, with concern given to the impact climate change will have on these water systems.

According to the top three concerns of respondents, the most important issues requiring the attention of Council include the management of environmental impacts on rivers and waterways, with 28 respondents ranking this as most important, with those using private water agreements again ranking this highly. Following this, respondents indicated that the need to adapt to a changing environment was also an important issue for Council to consider, with 12 participants ranking the issue as most important. 8 respondents ranked equity fairness over water access as of the most importance to them.

The issues of the cost of providing water, supporting ways to save water, and considering the environmental impacts of water use were also considered important, with the majority of respondents ranking the issues as being the second, third or fourth most important, out of 8 issues. The taste of drinking water was of least concern to respondents, with only 3 respondents ranking it as most important. The management of environmental impacts on rivers and waterways is a clear outlier in importance, but for the rest of the issues, respondents were generally of a mixed opinion.

When it comes to assisting Bellingen Shire residents to improve their water security and ability to reuse water, respondents were highly in favour of adopting means of water storage and recycling. Respondents indicated that water tanks and greywater recycling for future developments were important options for Council to consider in assisting households improve water security and reuse. Water tanks were the most important initiative to respondents, with 56 identifying it as such. This was closely followed by greywater recycling with 54 respondents considering it to be important. Education resources and workshops on water saving and reuse were generally supported with 42 respondents marking it as important. Counter to this, only 25 respondents thought that water audits were of importance. From this, if Council wishes to improve water security and reuse in the Bellingen Shire, then initiatives in the areas of water tanks, greywater recycling, and education on water use are most likely to be well received. The majority of respondents indicated that they would install a water efficiency system in their home if a rebate were available (n=45), and nearly all (n=57) respondents would install a water tank if a rebate were available, 5 who would not, and 3 who were unsure. Survey comments provided by participants identified various suggestions relating to storing water on private property. Two respondents also recommended increasing the cost of water usage to better reflect its value.

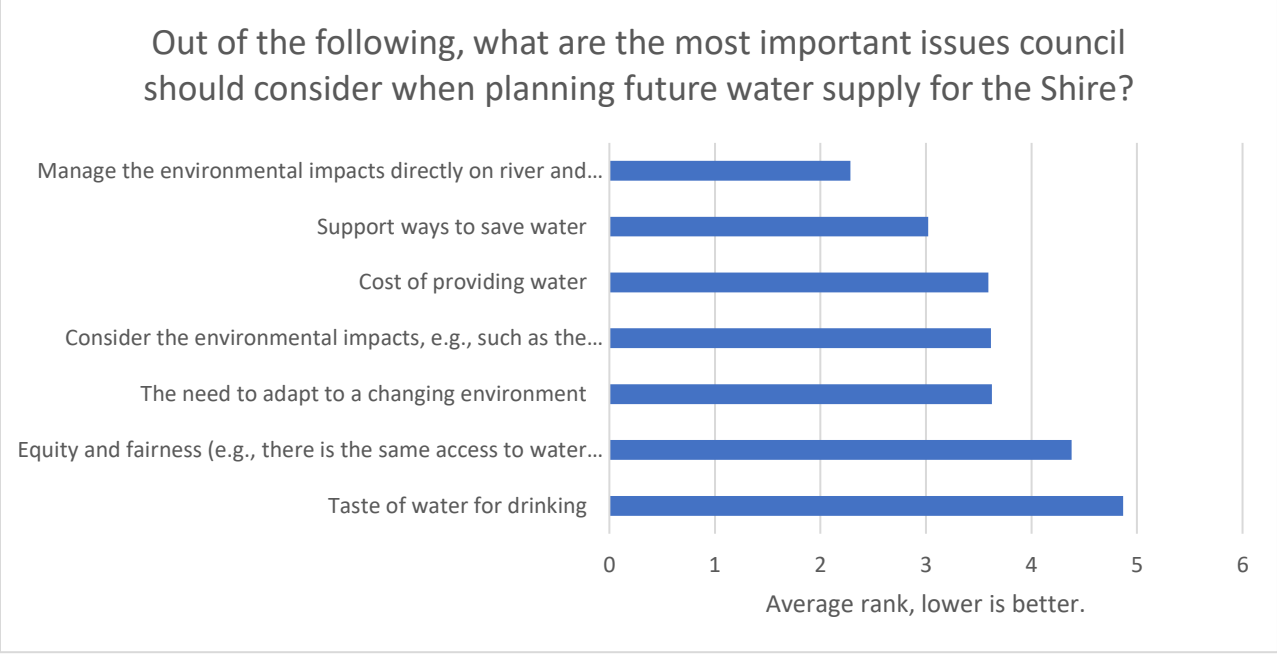


Figure 7, Average rank of importance of issues council should consider when planning future water supply, n=69.

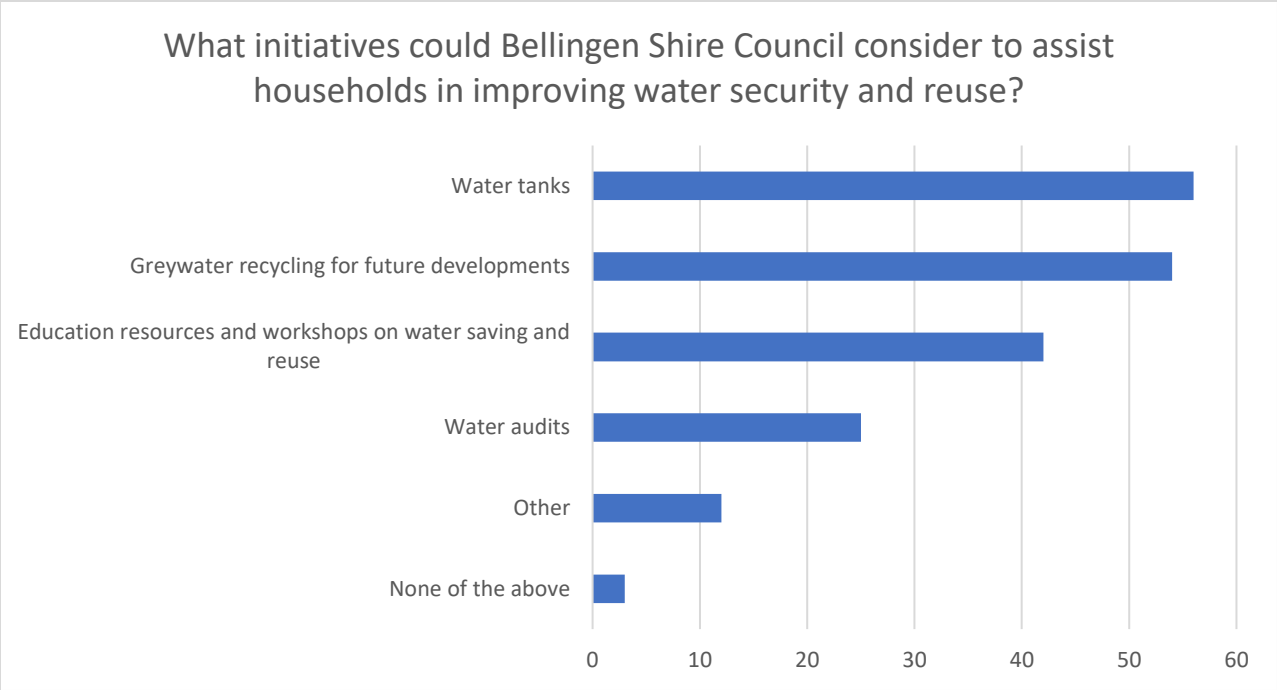


Figure 8, Initiatives the Council should consider regarding water security and reuse, participants were able to select as many options as applicable, n=67

3.4 Water Security Education and Awareness

3.4.1 Community Perspectives on Useful Educational Resources

Generally, Bellingen Shire residents viewed the most useful educational resources to be those that did not require extensive amounts of time to understand and were quick to disseminate knowledge. Respondents ranked social media posts as the being most useful for learning about water supply and saving, with 20 respondents ranking this first as most useful, and 7 ranking it second. Information pamphlets were ranked as the second most useful resource, with 12 respondents ranking it first, and 11 ranking it second. A short video series covering topics from water use to landscape hydration was ranked the third most useful resource, with 10 respondents ranking it first, and 18 ranking it second. Only 6 respondents ranked workshops as the most useful resource, while 14 ranked it in fifth place. Market stalls were ranked as the least useful resource, with 14 respondents placing it in fifth place, 10 in fourth place, and 11 in third place. For Council, the most useful educational resources, which would be well received by the community would be those that can quickly and efficiently disseminate knowledge about water supply and saving, being social media posts and pamphlets. A short video series would similarly disseminate knowledge, but smaller videos distributed through social media would be more effective and would be able to reach more people.

Of the minority of responders who own or work in a business connected to town water, it was indicated that they would be most interested in learning about ‘water efficiency audits to identify leaks or water saving opportunities’, with 5 respondents scaling this as most useful. Following this, 5 participants were most interested in ‘using recycled water for things like irrigation’, scaling it first. Conversely, 4 respondents indicated that they were not interested in learning about any of the topics, ranking that option first. 2 respondents ranked ‘industry specific water saving tips first’, another 2 ranked ‘water saving equipment on farms’ first, and 1 ranked ‘developing water management plans or policies’ first.

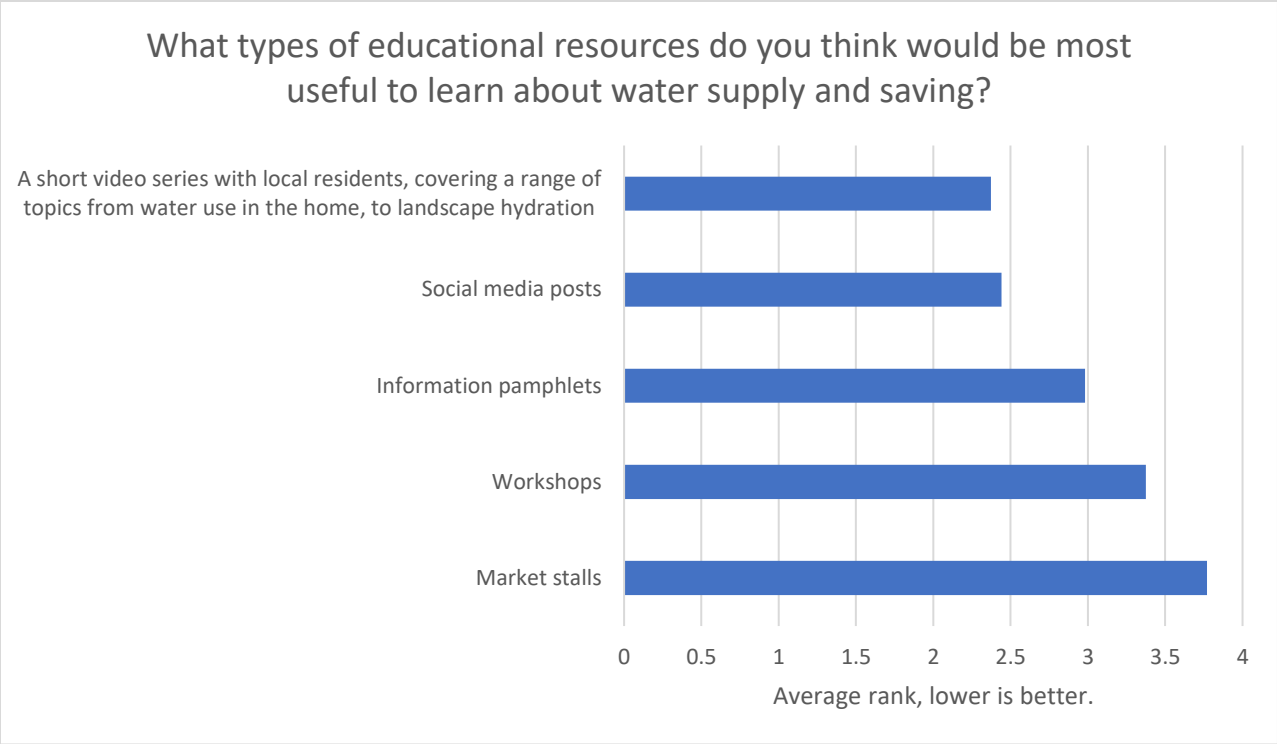


Figure 9, Average rank of education resources about water supply and saving, n=69

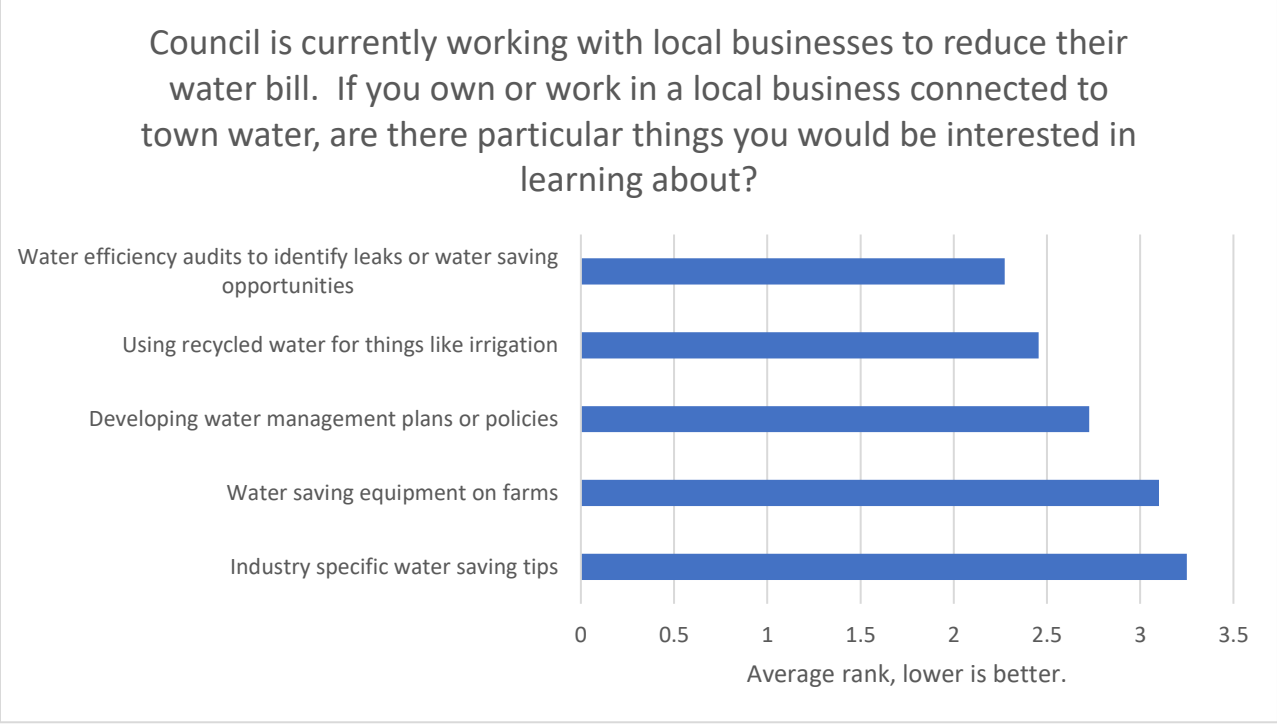


Figure 10, Average rank of learning opportunities for businesses. n=20.

3.4.2 Community Interest in Attending Workshops or Field Days

Community interest in attending educational workshops was mixed, yet still strong enough so that workshops on the topics of water tanks and greywater systems would be popular. Respondents indicated that the most useful workshop/field day would be on the topic of 'what type of water tank is right for you?', with 19 respondents ranking this first. Conversely, 13 respondents indicated that they were not interested in attending a workshop, ranking the option first. The 'diversion systems and greywater systems' topic had the second highest expression of interest, with 15 respondents ranking it first, and 19 ranking it second. 8 respondents ranked 'checking and maintaining tank water quality' first, and 7 ranked

waterwise gardening first. These results identify that workshops would not be utilised by all of the Bellingen Shire community, but for the majority of those who are interested in them, the topics of water tanks and water systems would be the most useful.

Only half of respondents indicated they were interested in attending a tour of the Water Supply Treatment Plant (n=35), while 24 said they were not, and another 8 did not know. The majority of respondents would be interested, however.

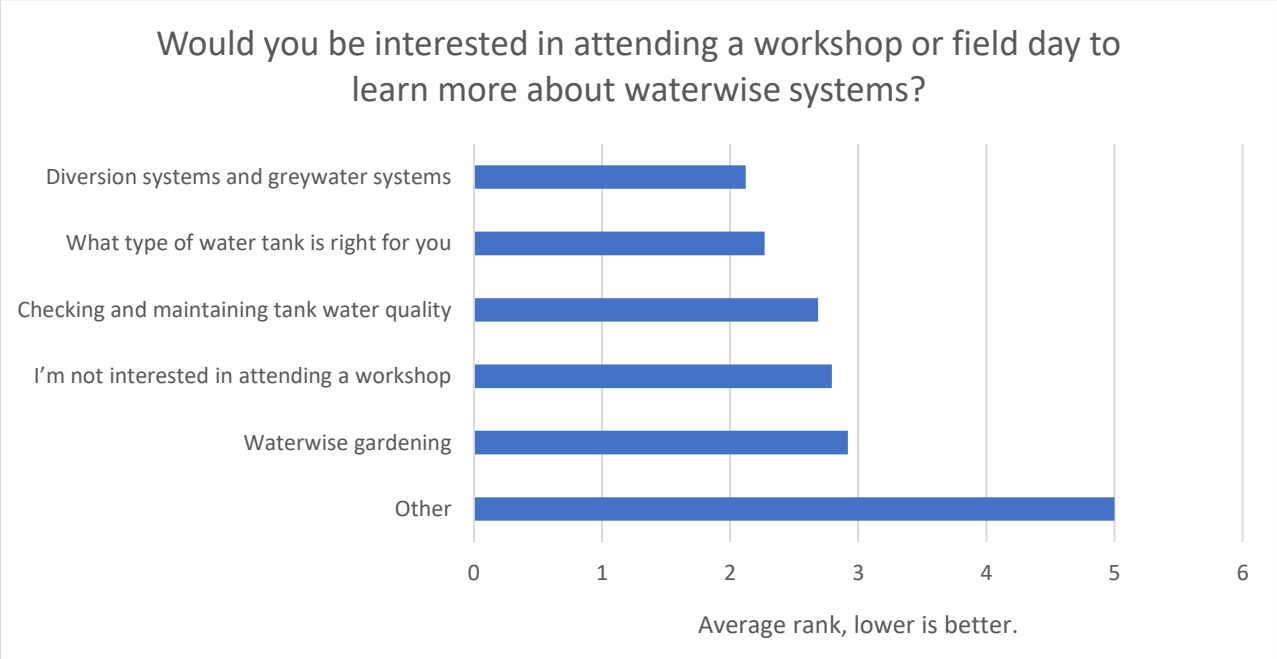


Figure 11, Average rank of interest in attending a workshop/field day on a particular topic, n=67.

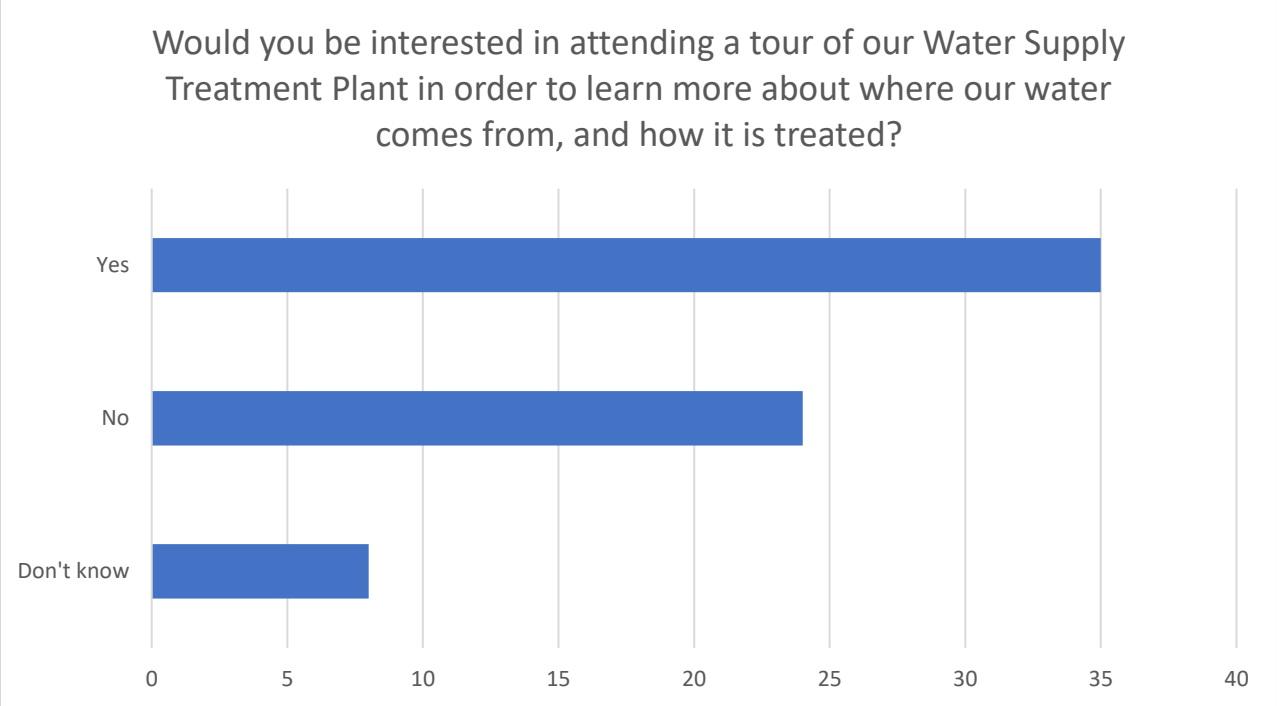


Figure 12, Interest in attending a tour of a waste treatment plant, n=67.

3.5 Implications of the Survey

The following key points were identified in the survey:

3.5.1 Water Supply

- A majority of respondents are reliant on the Bellingen Shire Council for their water supply.
- Some respondents access water directly from natural sources and are reliant on these sources.
- The Bellinger River is the primary source of water for most respondents.
- Most Bellingen Shire residents have experienced issues with the quality and quantity of available water.
- There is a desire amongst Bellingen Shire residents to have the means to source and store rainwater within the community, either through water tanks on personal property, or a public dam so that water can be sourced locally.
- Bellingen Shire residents held a preference for using locally collected water for non-drinking purposes to support industry and agriculture.

3.5.2 Water Security

- The majority of Bellingen Shire residents are concerned with the future of water security in the region.
- Respondents indicated almost entirely across the board that Council has a role in managing water security across the Bellingen Shire.
- Respondents indicated that they were in favour of amending water supply planning to better promote sustainability and reliability.
- The management of environmental impacts on rivers and waterways is a clear outlier in importance for respondents.

3.5.3 Council Opportunities

- If Council wishes to improve water security and reuse in the Bellingen Shire, then initiatives in the areas of water tanks, greywater recycling, and education on water use are most likely to be well received.
- Respondents are in favour of rebates for installing water tanks and water efficiency devices.
- For Council, the most useful educational resources, which would be well received by the community, would be those that can quickly and efficiently disseminate knowledge about water supply and saving, being social media posts and pamphlets.
- Workshops would not be utilised by all of the Bellingen Shire community, but for the majority of those who are interested in them, the topics of water tanks and water systems would be the most useful.

3.5.4 Key Findings

Based on survey responses, for where Council could focus efforts in building community water security and resilience, are in sustainable environmental management and providing Bellingen Shire residents with the means to collect and store water independently. The impact of climate change, drought and unsustainable environmental management and water collection practices and uses were of a high concern for Bellingen Shire residents, with residents particularly worried about damage occurring to the regions water table, from which their water is sourced. Residents were keen to learn more about the prospect of installing water tanks and greywater management system in homes and on properties, identifying that having better access to natural sources of water, such as rainwater, would improve water security for many residents.

4 Conclusion and Recommendations

The responses to both the community forum and survey indicated that there was need for the Council to take an active role in managing water security for the future of the Bellingen Shire, with the survey identifying that water supply issues were common in the Bellingen Shire, especially among those on the towns water supply and that there is a high level of concern for ongoing water security. Both the forum and survey participants preferred water sources that were locally managed and resilient, strongly rejecting options involving connecting to external water sources and showing concern for options that may expose the council to further water restrictions. Both groups showed strong concern for the environment and largely rejected options that may put the local river systems at risk or under further stress. The main differences identified between the two groups were that participants of the forum were more open to a desalination plant than those surveyed, but they were also provided with more information and the ability to ask experts questions. Participants of the forum were also more interested in general education surrounding the water supply while those surveyed displayed a preference for specific actionable information around water management and storage.

Based on the preferences identified in both the forum and the survey it is recommended that the council explore initiatives around improving the uptake and use of rainwater tanks. They fit the communities desire for a locally managed self-reliant source of water and those currently using rainwater tanks have experienced fewer supply issues than those reliant on other sources. But given that flexibility was identified through the forum as key to creating resilience, rainwater tanks should not be the only water management initiative implemented for the future. Next to rainwater tanks, the most popular options involved grey/wastewater reuse, so it is suggested that the Council explore these options further for possible future implementation. There was also a preference from survey respondents for greater access to water monitoring and management tools to assist in lowering water use. The differing opinions between the forum and survey would indicate that sufficient information campaigns may make other water supply options more palatable, but it is clear that nothing that puts the local environment at risk will be embraced by the community. It is suggested that further information around possible water security options is made available to the community and that where possible residents are able to seek clarification on questions and concerns.

5 Appendix

Location	Connected to town water	Private water sharing agreement	Rainwater tank/s	Connected to town water, with some supplementary tank water	Other	Total
Bellingen	24	1	2	3		30
Bostobrick			1		1	2
Coffs Harbour	1					1
Darkwood		1				1
Deer Vale					1	1
Dorrigo	3		4	2	1	10
Fernbrook			1			1
Fernmount	2					1
Gleniffer			2			1
Hungry Head	1					1
Kalang		3	6			9
Mylestom				1		1
Raleigh	1			1		2
Tallowwood Ridge	1	1				2
Thora			2			2
Unknown	1					1
Urunga	14		1	4		19
Valla Rural			1			1
Total	**48**	**6**	**20**	**11**	**3**	**88**

Figure 13, Water source by location

Location	I have had supply issues	No, I have never had issues with supply of water.	Total
Bellingen	22	6	28
Bostobrick	1	1	2
Coffs Harbour	1		1
Darkwood	1		1
Deer Vale		1	1
Dorrigo	2	7	9
Fernbrook		1	1
Fernmount	1	1	2
Gleniffer		1	1
Kalang	8		8
Mylestom	1		1
Raleigh	2		2
Tallowwood Ridge	1		1
Thora		2	2
Unknown	1		1
Urunga	13	5	18
Valla Rural		1	1
Grand Total	**54**	**26**	**80**

Figure 14, Supply issues by location.

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