NSW Local Government progress and needs in adapting to climate change

Final report

NSW Office of Environment and Heritage

Local Government NSW

July 2015

Acknowledgments

This work was completed with the assistance of Suzanne Dunford from the NSW Office of Environment and Heritage (OEH) and Denise Anderson from the Local Government NSW (LGNSW).

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Abbreviations and acronyms

CC   Climate Change

GIS   Geographic Information System

EIANZ   Environment Institute of Australia and New Zealand

IPCC   Intergovernmental Panel on Climate Change

LGA   Local Government Area

LGNSW   Local Governments New South Wales

NRM   Natural Resources Management

NSW   New South Wales

OEH   NSW Office of Environment and Heritage

Executive summary

Background

Climate change is a global phenomenon, but its impacts are felt locally and regionally. Councils are responsible for a range of functions likely to be affected by climate change, including the provision and protection of public infrastructure, the delivery of local services, the regulation of development and planning, and environmental management. The NSW Government has committed to assisting Local Government, business and the community build resilience to future extreme events and hazards by helping them to understand and adapt to the impacts of climate change (*NSW 2021 A Plan to Make NSW Number 1* Goal 23, page 46).

Since 2007, the NSW Government has worked with Local Government, including the peak industry association that represents the interests of this sector, to empower Local Government with tools and information they need to minimise the impacts of climate change in their local communities.

In previous years, the Office of Environment and Heritage (OEH) and Local Government NSW (LGNSW) had conducted separate surveys of Local Government to assess progress and evaluate the effectiveness of their support and approaches; namely:

- Preparing for Climate Change in NSW Local Government responses to a global problem March 2010, by Urbis Consulting
- Local Government Needs in responding to Climate Change in NSW December 2010, by Local Government and Shires Associations (LGNSW's predecessor)

In 2015, OEH and LGNSW agreed to work together to survey NSW councils on their needs, and opportunities to assist them minimise the impacts of climate change on NSW communities.

The survey

In May 2015, OEH and LGNSW contracted ARTD Consultants to design and implement an online survey of NSW Local Government, building on the two previous surveys. The results of the 2015 survey are presented in this report, and will inform future program development and support to the Local Government sector in adapting to climate change.

The online survey was implemented in June 2015, collecting 186 responses, which covered 74 per cent of all NSW councils. Compared to previous surveys, the 2015 survey achieved a significantly higher number of responses, ensuring a good response rate from a broad range of councils, across all State Planning Regions. Almost half of the respondents (48%) were from the Environment or Natural Resources Management (NRM) functional area of council.

Findings

What has changed?

Since 2010 there has been considerable progress in the capacity of the NSW Local Government Sector to assess and plan for climate change impacts. This is evidenced by

- at least 82 per cent of the councils surveyed have undertaken a climate risk assessment, compared to 33 per cent in 2010
- 23 per cent of respondents have participated vulnerability assessments (not assessed previously)
- 44 per cent of respondents have developed an adaptation plan, compared to only 19 per cent in 2010.

The growing presence of these organisational processes and plans to understand and respond to climate change risks is coinciding with an increasing awareness of the impacts of climate change. Over two-thirds of respondents (69%) have experienced impacts from climate change in their Local Government Area (LGA), and no respondents felt that climate change would never impact their LGA. The experience of climate change is relatively consistent across the State; with a higher proportion of respondents experiencing it in the South East and Tablelands, Illawarra and North Coast regions.

Interestingly, the perceived level of impact has lessened slightly across the respondents, now 70 per cent thinking climate change will have some impact on their council, compared to 85 per cent in 2010, and only a quarter estimating a great deal of impact compared to 41 per cent in 2010. And while there has been an increase in the proportion of respondents feeling prepared from 23 to 38 per cent between 2010 and 2015, more than half (57%) still don't feel sufficiently prepared (48% not very prepared and 10% not prepared at all).

What is new?

Councils are now more interested in receiving support related to technical, high quality climate information, tools to assess and reduce risk exposure and localised climate information, potentially reflecting the shift from assessing climate risks to implementing adaptation actions. Noticeably lack of information and data, and uncertainty in the role of local government now rank lower in the list of barriers by level of prominence than in 2010.

More than half (54%) of respondents feel that their local community has some to high expectations with regard to managing risks or impacts of climate change. Accordingly adaptation actions are appearing in strategic policy documents: including Community Strategic Plans (71%) Delivery Programs (60%) and Operational Plans (56%). However only 28 per cent of respondents think that their council is giving a fair amount to a great deal of priority to adapting to the impacts of climate change; the majority of respondents (56%) feel that their council is giving 'some priority, but not much' to adapting to the impacts of climate change.

Unsurprisingly, the type of impacts with the highest expected level of impact on councils' operations varies according to the location of respondents: reduced water supply in the Murray-Murrumbidgee and the Far West regions; drought in the Murray-Murrumbidgee, New England - North West and Central West and Orana regions; sea level rise in the Central Coast and Hunter regions; flooding in the Central Coast, North Coast and Hunter regions; a diverse range of impacts in the Metropolitan Sydney region with a similar expected level of impact as across the whole range of NSW councils.

What is next?

Councils welcome any kind of support to prepare and respond to climate change impacts, with increased interest in technical, high-quality information compared to 2009, and growing interest in tools such as costing of adaptation actions. Respondents seem to have a preference for online resources, but find training and workshops also useful. When asked about what type of climate information they need, a lot of respondents mentioned localised impacts information relevant to their geographic area (e.g. sea level, rainfall, precipitation, floods).

A majority of respondents are aware of most of the current OEH and LGNSW resources and information; however the level of actual use or participation is still limited. This indicates that existing resources offer a good basis, but there is a need to ensure appropriate communication, support and training opportunities to assist councils make appropriate use of them.

Senior management support remains the key driver for council adaptation action. However, senior management is less likely to recognise the impact of climate change than operational areas: councillors, general managers and directors are twice as likely to report no impact of climate change on operations compared to respondents from functional areas. Engaged communities and counsellor leadership rank higher compared to other drivers since the previous surveys, indicating a potential need for support to engage with the community and senior management around the need to prepare for and adapt to climate change.

1. Introduction

1.1 Background

1.1.1 Support to Local Government to adapt to climate change

Climate change is a global phenomenon, but its impacts are felt locally and regionally. Councils are responsible for a range of functions likely to be affected by climate change, including the provision and protection of public infrastructure, the delivery of local services, the regulation of development and planning, and environmental management. The NSW Government has committed to assisting Local Government, business and the community build resilience to future extreme events and hazards by helping them to understand and minimise the impacts of climate change (*NSW 2021 A Plan to Make NSW Number 1* Goal 23, page 46). Recently released government climate projections on Adapt NSW website demonstrate that all 152 Local Government Areas (LGAs) in NSW will experience some impacts of climate change. However adaptation opportunities will vary based on regional and local topographical differences and capacities.

Since 2009, the NSW Office of Environment and Heritage (OEH) has been producing climate change science and information for New South Wales, assessing regional vulnerability and providing resources and support to building adaptive capacity in the Local Government sector. In delivering these programs, OEH has worked closely with Local Government NSW (LGNSW), the Local Government peak body, to ensure consistency and complementarity of information and support provided.

1.1.2 Surveying NSW local councils to better understand their needs

In April 2015, in a bid to align resources and provide efficiency for Local Government stakeholders, OEH working together with LGNSW, commissioned ARTD Consultants to survey NSW councils about their actions and needs in addressing climate change, and prepare a comparative analysis building on two previous surveys. The objectives were to:

- determine the levels, barriers and drivers of climate change adaptation across NSW Local Government
- compare these findings to previous levels, to determine progress, changing priorities and potential future directions
- assess the appropriateness and usefulness of OEH and LGNSW resources and programs over the past 5 years
- inform future program development and support to enable enhanced resilience to climate change within the Local Government sector.

1.2   The survey

1.2.1   Questionnaire design

The survey was designed in May–June 2015 by ARTD in close collaboration with OEH and LGNSW. Questions were selected by balancing the need to ensure comparability with the previous surveys on key questions, and the ability to collect useful data for OEH and LGNSW to inform their activities with Local Government. The survey was then piloted with five respondents and feedback provided was incorporated into the design of the survey.

The final survey (0) includes 32 questions across seven sections:

- About you
- Risks and impacts of climate change
- Support for responding to climate impacts
- Preparedness
- Expected impacts
- Support and resources
- Drivers and barriers.

The 'About you' section includes questions about the respondent and where they received the survey from was initially at the end of the survey, in line with survey design good practices. However, after one week, it was decided to move this section to the beginning of the survey as it was identified that a number of responses were partial and it was not possible to assign them to specific councils and consequently have an accurate view of the response rate. This didn't have any impact on responses collected before the change.

1.2.2   Online survey administration

The survey was delivered online, through the survey platform SurveyGizmo. Most questions used radio buttons or check boxes, with the ability for the respondent to add new response categories to some questions. On average, it took 31 minutes and 12 seconds for respondents to complete the survey (excluding outliers over 20 hours).

The online survey was open for three weeks, from Wednesday 3 June to Tuesday 23 June 2015. However, additional responses were received until 2 July and were considered in the analysis.

The survey was distributed through various channels:

- Via direct email by LGNSW to General Managers
- To existing LGNSW networks: Sustainability Snippets, Natural Resources Management (NRM) Local Government Officers

- To OEH mailing lists: OEH Impacts and Adaptation Team networks, including the NSW adaptation Research Hub newsletter, and through Regional Organisations of Councils
- Via an email campaign to council organisations' generic email addresses
- Directly to Local Government contacts and stakeholders.

More than half of the responses collected (57%) were generated from LGNSW emails. Figure 1 provides details about how respondents received the survey, some of them receiving it through several channels.

Figure 1.   Survey distribution channels, by proportion of respondents
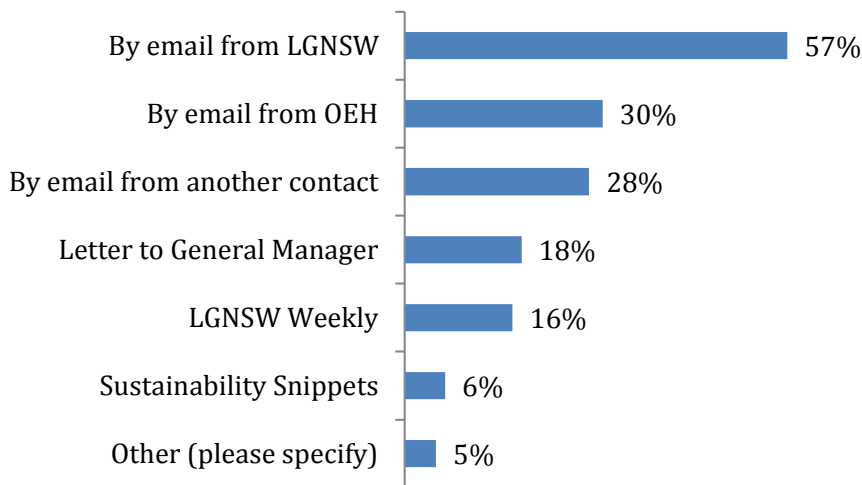
Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 4 'Where did you receive/ hear about the survey?', n=148

1.2.3   Three reminders to maximise the response rate

To maximise the number of responses and the response rate across councils, three reminders were sent and respondents, who were given more time than initially specified (two weeks extended to three). The initial invite was sent out on Wednesday 3 June 2015, the first reminder on Thursday 11 June, the second reminder on Tuesday 16 June advising the deadline extension and a final reminder on Tuesday 23 June.

A total of 186 responses were collected, 166 of them being complete. This is higher than previous surveys: 82 in 2009 and 106 in 2010. Councils provided the majority of responses (182) as they were the main target, with some councils providing several responses – which was encouraged to provide a diversity of views, from across different functional areas of councils. A total of 112 councils provided at least one response to the survey, resulting in a 74 per cent response rate among councils. This response rate and geographical spread of the responses make us reasonably confident to consider the range of responses collected as representative of the NSW Local Government sector.

Table 1.   Number of responses and response rate by type of organisation

Organisation	Population	Partial responses	Complete responses	Total Responses	Count	Response rate
Council	152	19	163	182	112	**74%**
County council	14	0	3	3	2	14%
Regional Organisation of Councils (ROC)	18	1	0	1	1	6%
Anonymous		0	1	1		
Total	184	20	166	**186**	115	

Source: NSW Local Government Climate Change Adaptation Survey 2015

1.3   Characteristics of respondents

All 10 State Plan Regions are represented in the 182 responses provided by councils. Table 2 shows the distribution of councils across the regions, how many responses were collected for each one and their respective response rates. Comparing the proportion represented by each Region among all NSW councils to the proportion of the same Region in survey responses shows that both are well aligned for most Regions. Only the Metropolitan Sydney Region seems to be over-represented in survey responses (9 percentage points difference), while the Murray-Murrumbidgee is under-represented (8 percentage point difference). Only two councils from the Far West Region responded to the survey out of the 8 councils in this Region (25% response rate), however this Region represents only 5 per cent of the NSW councils.

Table 2.   Distribution of responses by State Plan Region

State Plan Region	Number of councils	% of NSW councils	Responses	% of responses	Count	Response rate
Central Coast	2	1%	7	4%	2	100%
Central West & Orana	20	13%	17	9%	12	60%
Far West	8	5%	2	1%	2	25%
Hunter	9	6%	14	8%	6	67%
Illawarra	4	3%	7	4%	4	100%
Metropolitan Sydney	41	27%	66	36%	39	95%
Murray-Murrumbidgee	26	17%	16	9%	12	46%

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State Plan Region	Number of councils	% of NSW councils	Responses	% of responses	Count	Response rate
New England - North West	13	9%	10	5%	8	62%
North Coast	15	10%	23	13%	14	93%
South East & Tablelands	14	9%	20	11%	13	93%
Total	152	100%	182	100%	112	74%

Source: NSW Local Government Climate Change Adaptation Survey 2015

The following map of the New South Wales State Plan Regions (Figure 2) represents the response rate by councils (blue shading).

Figure 2.   New South Wales map of survey response rate by State Plan Region
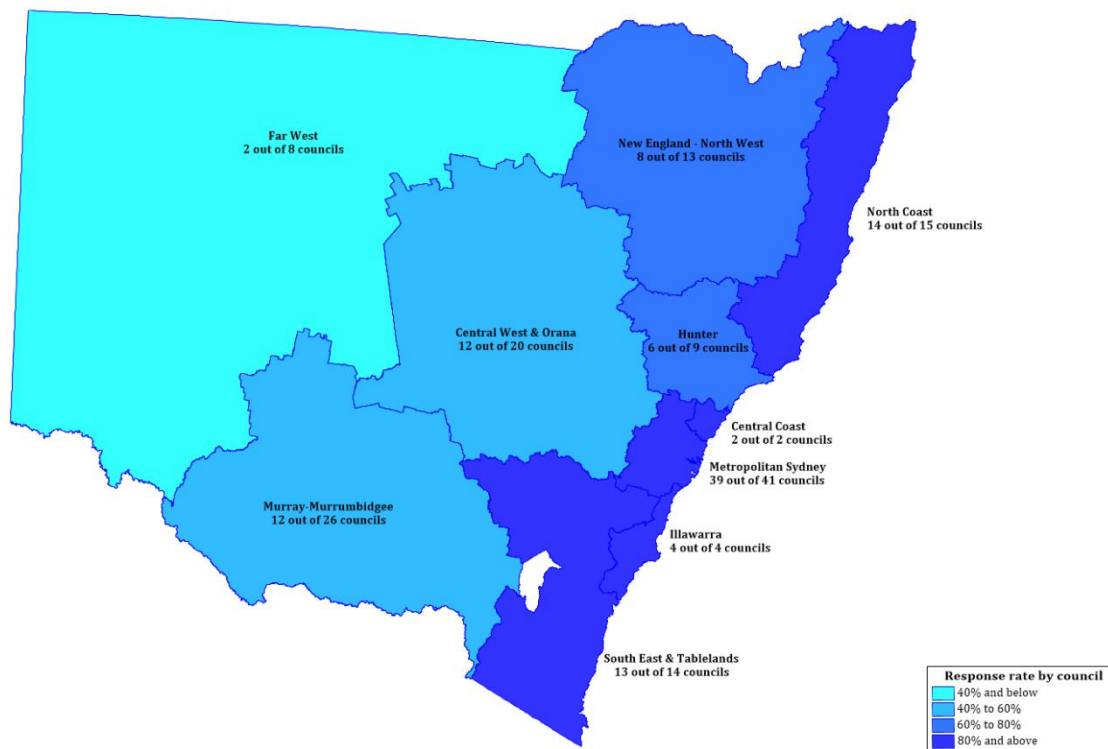
In terms of the functional area of respondents, almost half (48%) indicated representing the Environment or Natural Resource Management (NRM) section of their organisation (Figure 3).

Figure 3.   Distribution of respondents by functional area (council section)
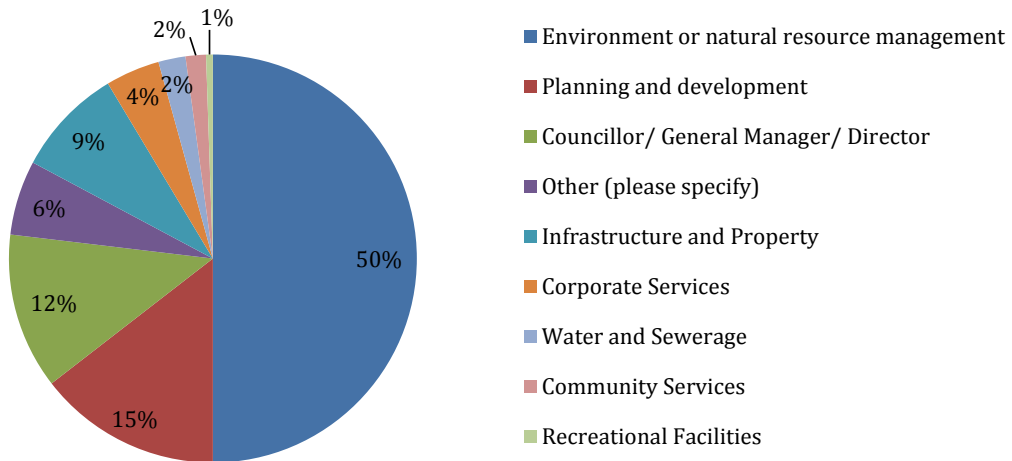
Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 2 'Which section of council do you represent?', n=186. Other categories include: Sustainability (5), All sections (3), Design (1), Environmental health (1) and not specified (1).

Respondents were from a range of mostly senior positions, most frequently:

- Climate Change/ Sustainability officer (19%)
- General Manager (15%)
- Environmental Strategy/ Planner (14%)
- Section manager (12%)
- Director (11%).

1.4   This report

This report presents results of the survey, firstly at the aggregated level across all responses, and then noting differences according to respondents characteristics, in particular in terms of State Plan Regions and functional areas.

The breakdown of responses by these two dimensions is provided across all questions in a companion document, allowing for further exploration of responses from either dimension, for instance to better target certain types of support to Regions or functional areas that showed some greater needs in this regard.

The individual responses to the survey remain confidential and the report does not identify individual councils, rather it presents results at an aggregated level.

Results are not presented as a percentage of councils, but as percentages of respondents. Frequencies should be understood as a proportion of responses provided (n=186), rather than as a proportion of the 112 councils who provided at least one response.

The report also compares results with previous surveys whenever it is possible, i.e. when questions remained similar.

2. Perceived risks and impacts of climate change

2.1 A majority of NSW councils have begun experiencing impacts from climate change

More than two thirds of respondents (69%) to the survey reported currently experiencing some impacts from climate change in their Local Government Area (LGA), most of them to some extent. When asked more specifically about potential impact from climate change on their council's operations or management of assets, a lower proportion, but still more than half of respondents (59%), reported already experiencing some impact (Table 3).

The proportion of respondents experiencing climate change in their LGA is relatively consistent across regions; only the South East and Tablelands, Illawarra and North Coast regions have a higher proportion of respondents experiencing climate change (over 80% compared to an average of 69% across all respondents). The Far West Region and the Murray-Murrumbidgee were more likely to not report any impact yet on operations and management of assets. Interestingly, Councillors, General Managers and Directors are at least twice as likely to report no impact of climate change in the operations compared to other functional areas.

Table 3.　　Councils currently experiencing impacts from climate change

Impact from climate change experienced	...in the LGA		... in the operations or management of assets	
	n	%	n	%
Yes, a great deal	7	4%	5	3%
Yes, a fair amount	19	10%	20	11%
Yes, to some extent	102	55%	84	45%
No	16	9%	40	22%
Not sure	42	23%	37	20%
Total	186	100%	186	100%

Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 5 and 7 'Are you currently experiencing impacts from climate change in your Local Government Area/ in your operations or management of assets?'

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Of those who are not experiencing any impact yet or are not sure (n=58 in relation to the LGA and n=77 for impact on operations), 24 per cent expect some impact in their LGA within the next 10 years, and 27 per cent in operations. Respectively 22 and 32 per cent of respondents expect these impacts to occur beyond 10 years; 53 and 40 per cent are not sure. No respondent indicated never in both cases (Table 4).

Table 4.   **Expected occurrence of climate change impact, when not yet experienced**

If No or Not sure, when do you think climate change will impact	...the LGA		...the operations or management of assets	
	n	%	n	%
Within the year	0	0%	0	0%
Between next year and 5 years from now	3	5%	11	14%
Between 5 years and 10 years from now	11	19%	10	13%
After 10 years from now	13	22%	25	32%
Never	0	0%	0	0%
Not sure	31	53%	31	40%
Total	58	100%	77	100%

Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 6 and 8 '[If No or Not sure] When do you think climate change will impact your Local Government Area/ operations or management of assets?'

2.2 Most councils expect climate change to have at least a fair amount of impact, across a range of areas

In general, the vast majority of respondents think that climate change will have at least some impact on their council; only one per cent indicated that they will experience no impact. Almost half of the respondents (45%) expect climate change to have a fair amount of impact and a quarter estimate it will have a great deal of impact (Table 5). Compared to the 2010 survey, the main difference is that a much lower proportion of councils think that climate change will have a great deal of impact on them (25% in 2015 compared to 41% in 2010). Interestingly, the 2015 survey saw an increase in the proportion of respondents being not sure of the impact or expecting limited impact. Regions where impacts of climate change are expected to be the greatest are the Central Coast (71%), the North coast (48%) and the Hunter (43%).

Table 5.　　Expected level of impact from climate change

Level of impact	2009 survey		2015 survey	
	n	%	n	%
Climate change will have a great deal of impact on our council	34	41%	46	25%
Climate change will have a fair amount of impact	36	44%	84	45%
Climate change will have some impact, but not much	10	12%	34	18%
Climate change will have no impact on our council	0	0%	2	1%
Not sure	2	2%	20	11%
Total	82	100%	186	100%

Source: 2009 survey: Urbis, Preparing for climate change in NSW, March 2010, question A5; 2015 survey: NSW Local Government Climate Change Adaptation Survey 2015, Question 9 'How much impact (if any) do you expect climate change will have on your council?'

When asked to rate the level of impact across a range of potential impacts, more than half of respondents expect some form of impact for most of them; only the loss of rate revenue is not identified by a majority (49%) of respondents to have at least some impact. The top three types of impact are storms, flooding and infrastructure impact (Figure 4).

Obviously the location of respondents influenced how they rated the various types of impacts (detailed cross-tabulations are provided in Appendix 2). Following likely impacts were rated higher by respondents from certain regions:

- *reduced water supply* by respondents from the Murray-Murrumbidgee and the Far West Regions
- *drought* by respondents from Murray-Murrumbidgee, New England - North West and Central West and Orana Regions
- *sea level rise* by respondents from the Central Coast and Hunter Regions
- *flooding* by respondents from the Central coast, North Coast and Hunter Regions.

Respondents from the Metropolitan Sydney region didn't identify specific types of impact likely to have higher level of impact on their operations compared to other regions. In the Sydney region, impacts rated highest are flooding, storms, infrastructure and threats to community wellbeing, which is close to the ranking based on responses of all NSW councils (Figure 4).

Figure 4.   Type of climate change impact, by level of likely impact
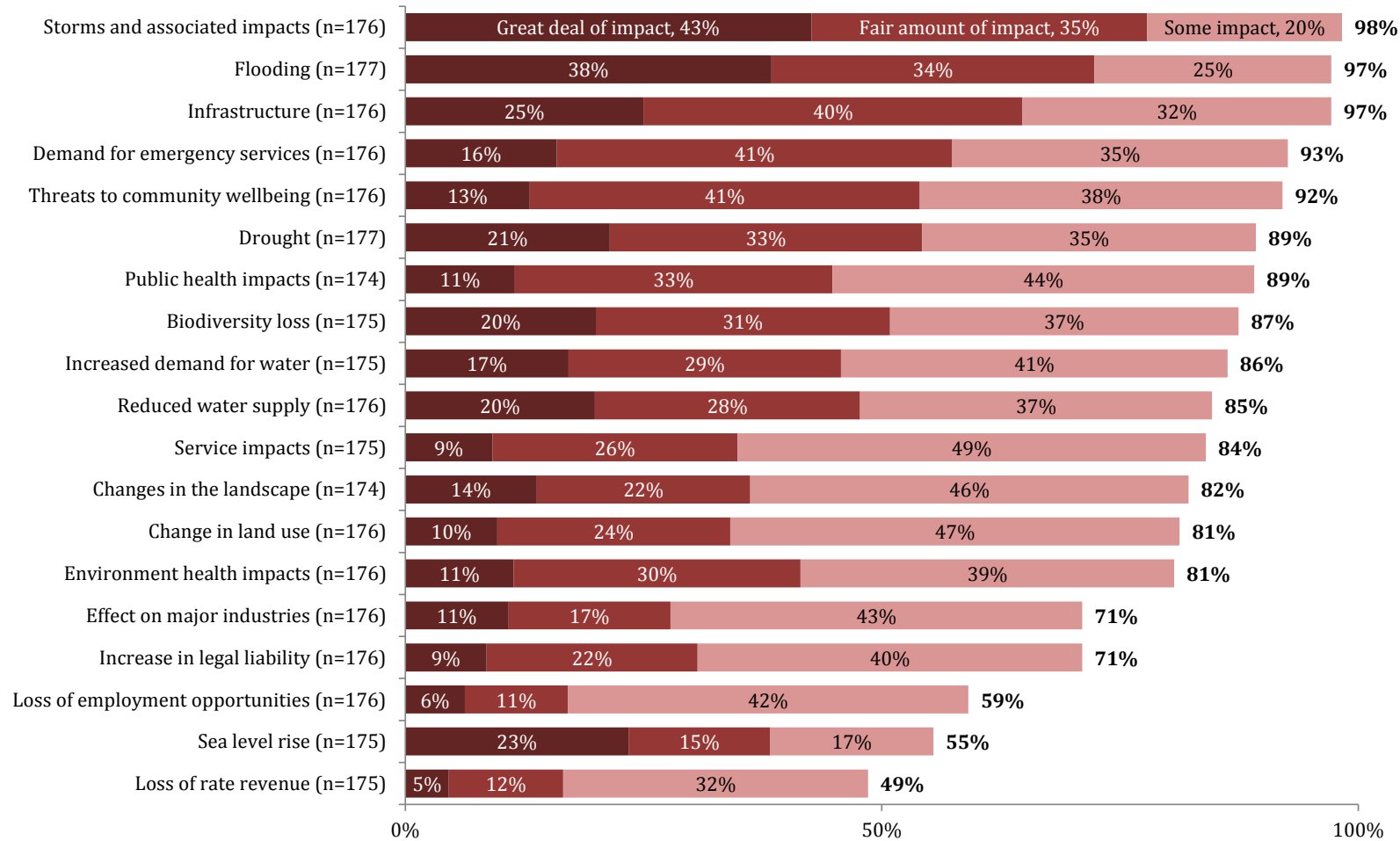
Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 22 'Previous surveys of NSW councils identified the following potential climate change impacts. For each listed impact, please indicate the likely level of impact in your council operations. If there are other impacts that are not listed, please specify the impact.'

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3. Local Government and communities' support for responding to climate change impacts

3.1 Local communities have some expectations for councils to respond to climate change impacts

More than half of respondents feel that their local community have some (44%) or high (10%) expectations of councils to manage climate change impacts; yet one-third feels that there is very little expectation in the community (Table 6). Respondents from the Hunter Region are more likely to report some to high expectations in the community.

Table 6.   Community expectations with regard to climate change adaptation

	n	%
There is high expectation in our community to respond to climate impacts	18	10%
There is some expectation in our community to respond to climate impacts	80	44%
There is very little expectation in our community to respond to climate impacts	58	32%
There is no expectation in our community to respond to climate impacts	3	2%
Not sure about community expectations regarding council's response to climate impacts	22	12%
Total	181	100%
No response	5	

Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 12 'What are your communities' expectations in relation to managing the risks or impacts of climate change on council assets and facilities?'

3.2 Councils give some priority to climate change adaptation, but feel they could do more

In response to community expectations, only 28 per cent of respondents indicate giving a fair amount (23%) to a great deal (5%) of priority to climate change adaptation. The majority of respondents (56%) reported giving it some priority, but not much; 14 per cent reported no priority at all is given to this issue (Table 7). Similar to community expectations, Hunter Region councils were more likely to give some to a high level of priority to climate change adaptation, followed by respondents from the Central Coast. On the contrary, more than 80 per cent of respondents from the New England - North West and Illawarra Regions indicated 'some priority, but not much'.

Table 7.   Level of priority given to climate change adaptation

	n	%
A great deal of priority	10	5%
A fair amount of priority	42	23%
Some priority, but not much	102	56%
No priority	25	14%
Not sure	4	2%
Total	183	100%
No response	3	

Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 10 'Thinking about your council and its activities, how much priority does your council give to adapting to the impacts of climate change?'

The majority of respondents reported having formalised their actions to respond to climate change impacts in some key policy documents: 71 per cent in the Community Strategic Plan, 60 per cent in their delivery program and 56 per cent in their Operational Plan Figure 5). Some respondents also mentioned other types of planning documents, in particular a Climate Change Plan, a Coastal Plan or a Sustainability Action Plan. These findings are consistent with the aims of the NSW Integrated and Reporting Framework for local government as:

- A high level of community expectation would trigger mentions in the Community Strategic Plan.
- A high level of priority should be reflected in the Delivery Program or Operational Plan.

Figure 5.   Local policy documents mentioning climate change adaptation actions
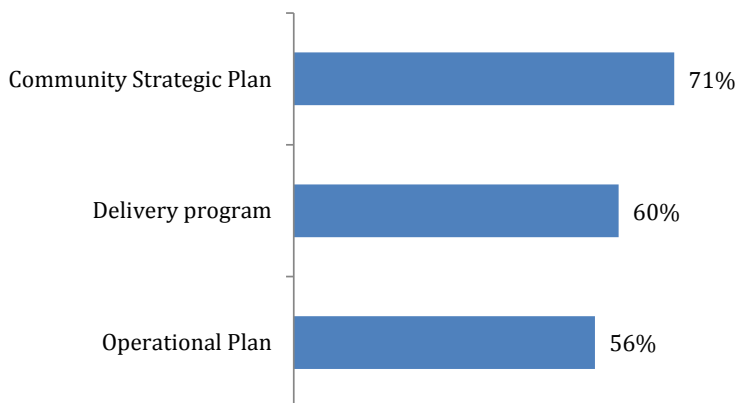
Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 11 'Are actions about responding to climate change impacts mentioned in your…'

4. Level of preparedness

4.1 Most councils have undertaken a climate change risk assessment

Across the Local Government sector there are a range of local planning processes around climate change taking place, the most common one being a climate change risk assessment (Table 8). Close to three-quarters of respondents (70%) reported that their council has undertaken a climate risk assessment. This is more than double compared to the 2010 survey: at this time, only 33 per cent of respondents were reporting having adopted or implemented a climate change risk assessment plan. When considering responses at the council level, at least 92 councils have undertaken a climate change risk assessment, which is 82 per cent out of the 112 councils who provided at least one survey response; 10 councils (9%) didn't undertake a climate change risk assessment and the rest was not sure.[1]

Almost a quarter of respondents (23%) reported having participated in a regional climate change vulnerability assessment with the Hunter Region respondents most likely (64%) to have participated in a vulnerability process.

Finally, around half of respondents have developed or are in the process of developing (44%) an adaptation plan. The Environment or NRM functional area is leading the development of the plan for the majority of respondents (55%). In 2010, only 19 per cent of respondents had adopted or was implementing a climate change adaptation plan.

Table 8.   Climate change risk assessment and other formal planning processes

Has your council	...undertaken a **climate change risk assessment?**		...participated in a **regional climate change vulnerability assessment**		...developed an **adaptation plan?**	
	n	**%**	**n**	**%**	**n**	**%**
Yes	127	70%	42	23%	78	44%
No	21	12%	63	35%	73	41%
Not sure	33	18%	74	41%	28	16%
Total	181	100%	179	100%	179	100%
No response	5		7		7	

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[1] When respondents from the same council had different types of answer, we considered 'Yes' as the council's answer as soon as one response was 'Yes'.

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Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 14, 18 and 20

The reported timing for these planning processes shows that councils started to undertake climate change risk assessments earlier, with a spike in 2010, while regional climate change vulnerability assessments are more recent. Figure 6 show responses by councils – considering the most recent year when respondents from the same council reported different years

Figure 6.   Number of *councils* reporting a climate change risk assessment or a regional climate change vulnerability assessment, by year
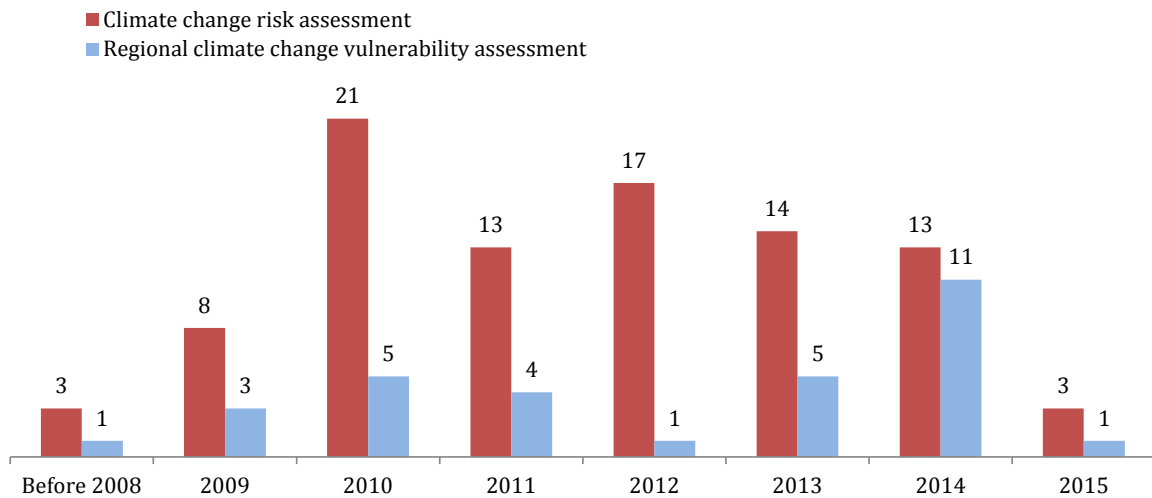
Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 15 and 19

Risk assessments require regular review to ensure their efficacy. A review could be triggered by any number of factors including the availability of new climate data, such as the NSW and ACT Regional Climate Model (NARCliM) projections released in December 2014, the review of council strategic documents such as the Community Strategic Plan, or the introduction of new council infrastructure or services. According to the survey data, 32 councils had their climate change risk assessment undertaken in 2010 or before, indicating it may be in need of revision. However, a high number of councils (51) reported planning to review it in the future, showing councils' commitment to this process.

4.2   The perceived level of preparedness has improved, but still half of respondents don't feel prepared

Despite the work council have done to date, more than half of respondents feel they are not very (48%) or not at all (10%) prepared for responding to the risks and impacts presented by climate change (Table 9). However, this compares very well with results from the 2009 councils survey where 77 per cent indicated they were not very (70%) or

not prepared at all prepared (7%). This reflects the progress made since 2009 – less respondents feeling unprepared, but also indicates room for further improvement in councils' level of preparedness. There are differences between functional areas: 74 per cent of Infrastructure and Property respondents don't feel prepared, compared to 49 per cent for Planning and Development respondents (58% on average across all respondents).

Table 9.   Level of preparedness for responding to climate change impacts

Level of preparedness	2009 survey		2015 survey	
	n	%	n	%
Very prepared	0	0%	3	2%
Fairly prepared	19	23%	65	36%
Not very prepared	57	70%	86	48%
Not prepared at all	6	7%	18	10%
Not sure	0	0%	9	5%
Total	82	100%	181	100%
No response			5	

Source: 2009 survey: Urbis, Preparing for climate change in NSW, March 2010, question B; 2015 survey: NSW Local Government Climate Change Adaptation Survey 2015, Question 13.

5. Useful support and resources

5.1 Councils welcome any kind of support to help them adapt to climate change impacts

When asked about various generic types of support, councils find each of them helpful: more than three-quarters find each type of support either very helpful or fairly helpful (Figure 7). Those types of support with the highest proportion of very helpful responses are:

- provision of consistent, high quality information, knowledge and tools about climate change
- localised climate data and information
- coordination of the NSW effort to adapt to climate change
- statutory planning support.

Respondents had the ability to include up to three other types of support that were not listed. The most frequent types of support added were: funding opportunities and information (n=16), support from the Commonwealth (n=10) and more climate information (n=8). The need for more information was particularly related to dealing with scepticism within the community, as highlighted by the following comments.

> *I think the biggest issue we face out here is scepticism - education will help but it will be a tough sell.*

> *Most people in the local community do not believe climate change exists - stigma that it is just part of the usual season*

Figure 7.   Type of support, by level of helpfulness

Provision of consistent, high quality information, knowledge and tools about climate change (n=176) — Very helpful, 59% | Fairly helpful, 33% — **92%**

Guidance on risk assessment and reducing risk exposure for councils (n=176) — 49% | 40% — **90%**

Localised climate data and information (n=176) — 58% | 31% — **89%**

Assistance to manage the impacts of climate change on Local Government infrastructure and service provision (n=176) — 53% | 34% — **87%**

Statutory planning support (n=176) — 57% | 29% — **86%**

Capacity building (n=176) — 37% | 49% — **86%**

Case studies in effective adaptation planning, strategies and implementation (n=176) — 34% | 52% — **86%**

Coordination of the NSW effort to adapt to climate change (n=176) — 57% | 28% — **85%**

Non-statutory planning (n=175) — 35% | 48% — **83%**

Education and community engagement tools and strategies (n=176) — 34% | 45% — **79%**

Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 23 'Previous surveys of NSW councils identified things that could help Local Government to reduce the impacts of climate change. For each type of support, please indicate how helpful it has been or would be.'

Compared to the 2009 survey, respondents are slightly less unanimous: in 2009, 89 to 100 per cent of respondents found each type of support fairly to very helpful, while it ranges from 79 to 92 per cent in 2015. However, differences in rankings of the various types of support according to their level of helplessness show some changes between 2009 and 2015. Table 10 compares results from the two surveys, identifying, in red, types of support whose ranking has decreased and, in green, those that have increased. Councils remain very interested in consistent, high quality information, knowledge and tools. Two types of support have been added in the 2015 survey and are rated as fairly to very helpful by more than 85 per cent of respondents: 'localised climate data and information' and 'capacity building'. On the contrary, two types of support now rank lower than in 2009: 'coordination of the NSW effort' and 'education and community engagement tools and strategies'.

Table 10.   Ranking of types of support in 2015 compared to 2009

Type of support	2009 survey		2015 survey	
	% Fairly to Very helpful	Rank	% Fairly to Very helpful	Rank
Provision of consistent, high quality information, knowledge and tools about climate change	100%	1	92%	1
Assistance to manage the impacts of climate change on Local Government infrastructure and service provision	99%	2	87%	4
Guidance on risk assessment and reducing risk exposure for councils	98%	3	90%	2
Coordination of the NSW effort to adapt to climate change	96%	4	85%	8
Education and community engagement tools and strategies	93%	5	79%	10
Non-statutory planning	92%	6	83%	9
Case studies in effective adaptation planning, strategies and implementation	92%	7	86%	6
Statutory planning support	89%	8	86%	5
Localised climate data and information			89%	3
Capacity building			86%	6

Source: 2009 survey: Urbis, Preparing for climate change in NSW, March 2010, question C2; 2015 survey: NSW Local Government Climate Change Adaptation Survey 2015, Question 23.

5.2 Technical reports and online specialist websites are the most popular information channels

The most common channels councils use to source information about climate change and adaptation actions are technical reports and scientific articles, as well as specialist websites (Figure 8). Other types of channels identified by respondents include conferences (n=5) and partnering/ networking (n=5).

Figure 8.   Information channels, by level of usefulness
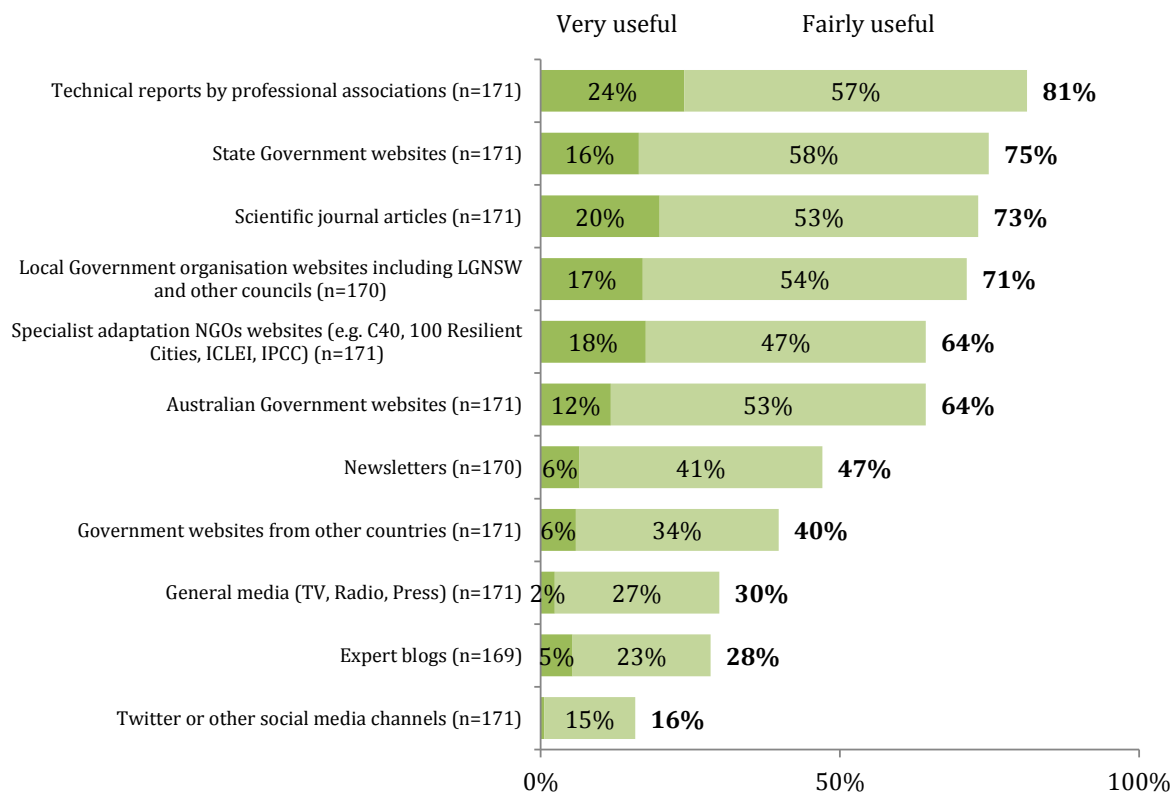
Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 26 'How useful do you find the following information channels for sourcing information that enable you to plan or implement change adaption projects or activities?'

5.3 Councils are aware of most available resources, but use or participation is much less frequent

A lot of resources are already available to NSW councils to prepare for climate change, in particular from OEH and LGNSW. When asked about these existing resources, the majority of respondents were at least aware of them; only four out of the 21 prompted resources were known by less than 50 per cent of respondents (Figure 9, resources from other organisations than OEH and LGNSW are faded). However, only a minority of respondents reported having used these resources. The resources with the highest rate of use or participation are:

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- Sustainability Snippets (47% of respondents reporting using it, not surprisingly with a higher proportion among respondents from Environment or NRM functional areas)
- Intergovernmental Panel Climate Change (IPCC) reports (44%)
- Presentations from OEH staff or LGNSW staff (37%)
- Climate Change Risk Assessment workshops (State-wide Mutual Echelon) (36%).

Responses show awareness of a wide range of resources, from international scientific reports to regular peer-network newsletters (Sustainability Snippets), presentations for OEH and LGNSW, or workshops delivered by the NSW Local Government insurance mutual. They seem to find the information they need from the most appropriate source, revealing an extensive knowledge of relevant resources. Additional resources identified by respondents were mainly specific reports or papers, such as from CSIRO.

Councils are more or less likely to be aware of available resources, depending on where they are located. In particular, respondents from the Central West and Orana region are less likely than other respondents to be aware of the resources. Urban Greening Masterclasses have only been provided to councils from the Sydney Metropolitan region, where 16 per cent of respondents have participated in the masterclasses and 11 per cent have used the technical guidelines.

Figure 9.   Available resources, by level of awareness
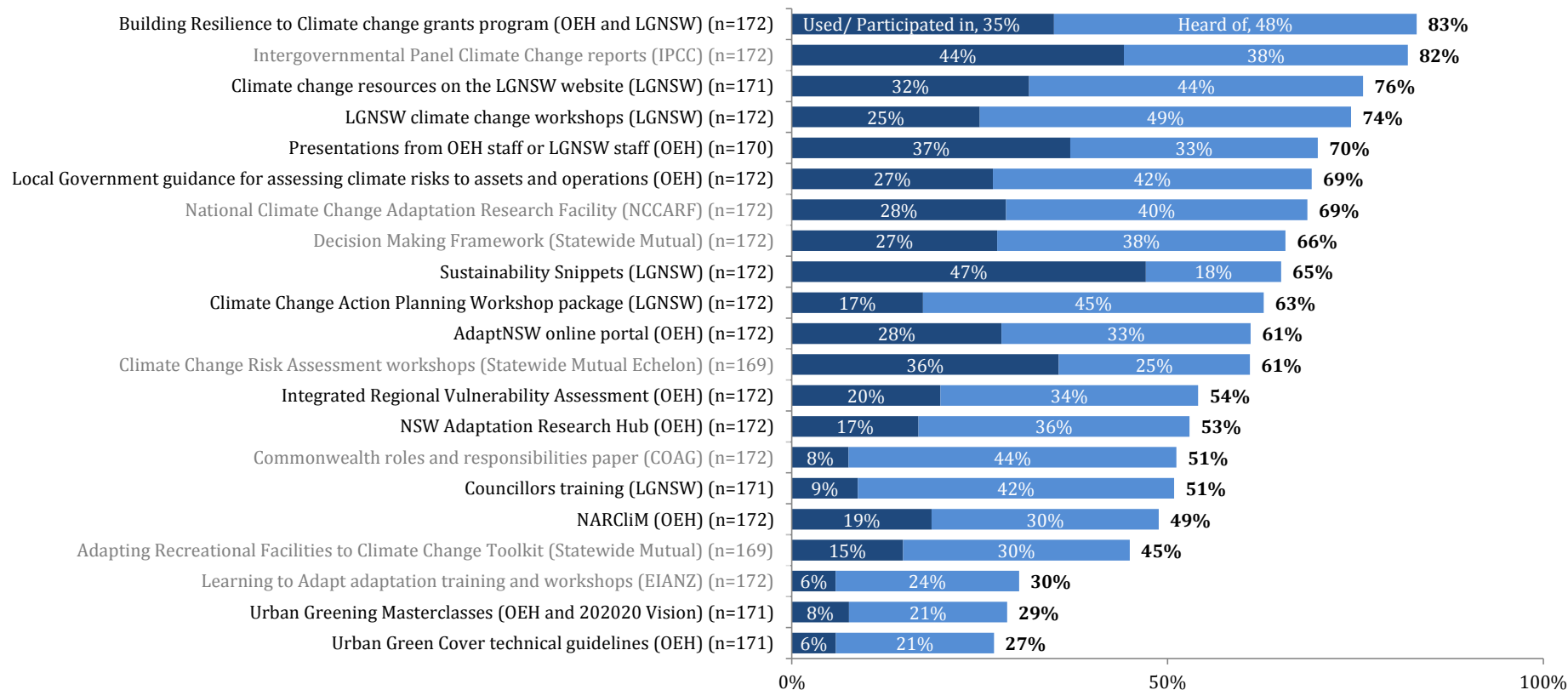
Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 27 'Do you know of any of the following resources? For each resource, please indicate your level of awareness. If there is another resource that is not listed, please specify the resource.'

Preparing for climate change also involves using technical data, in particular Geographic Information System (GIS) data. The most popular formats are the most accessible and user-friendly ones: pre-formatted maps of climate information or spreadsheets (Figure 10). MapInfo was not listed in the survey but was identified by ten respondents as a useful data format for NSW local government.

Figure 10.   Climate data formats, by level of usefulness
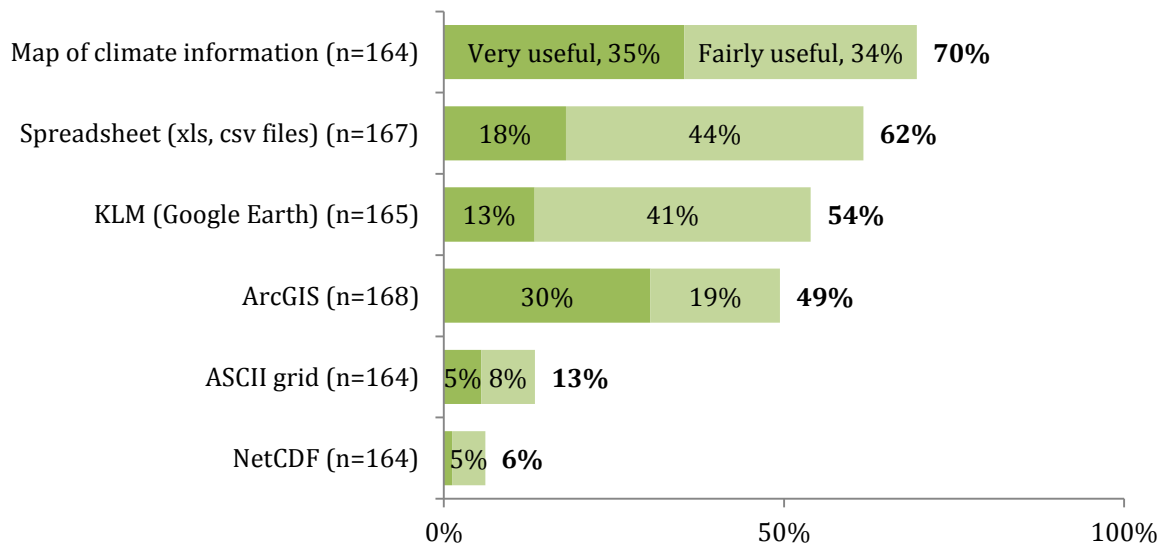
Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 28 'Please indicate how useful you find each of the following climate data formats. If there are other data formats that are not listed, please specify the type of data.'

A majority of respondents (52%) expressed a need for assistance in accessing or applying this kind of climate data; 28 per cent didn't need any support in this regard and 20 per cent were not sure. The preferred format for this kind of support was online guidance material, followed by a half-day workshop (

Figure 11).

Figure 11. Format of support, by level of usefulness
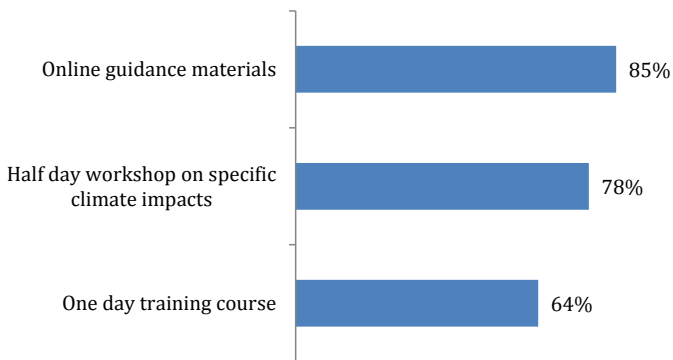
Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 30 'What type of support would be most useful to you? If there is other support that is not listed, please specify.'

5.4 Councils need more localised climate data projections in relevant risk areas

The survey provided respondents the opportunity to elaborate on the specific types of climate information they need through an open-ended question (question 31). A total of 159 respondents provided a valid response (85% of all survey respondents). Around one-fifth of them indicated that they didn't need any more climate information (n=18), that it was not applicable to them (n=9) or that they were not sure (n=7). Remaining responses were coded across five main areas based on the content of responses: the geographic level of data needed, the type of climate risk or impact, the type of data, how it was qualified and the objectives it should meet.

The most frequent cited type of climate information was data that is relevant to their local geographic area (n=29). A much lower number of respondents asked for regional (n=6) or national level data (n=3). The following quote highlights the risk of confusion that may arise from data that doesn't offer enough geographic precision:

> *Regional and local data which is underpinned by the highest accuracy data (usually produced by Councils). Broad scale mapping at poor resolutions creates conflicts with local data and exacerbates community confusion and criticism of local planning processes.*

With regard to the **type of climate change risk or impact**, respondents mentioned a wide range of areas they would like to get climate data about. The most frequently mentioned are sea level rise (n=19) and rainfall prediction (n=17). The types of risks and impacts mentioned included, by order of frequency:

- Sea level rise
- Rainfall prediction
- Flooding/ inundation
- Temperature

- Storms
- Heat events
- Biodiversity
- Water use/ security
- Bushfires
- Extreme events
- Impact on infrastructure and buildings
- River flow
- Heat islands
- Drought
- Coastal hazards.

Respondents referred also to the type or format of data they need. The most frequent type of data mentioned are **modelling/ projections** (n=14), followed by guidance (n=12), in particular about planning processes such as risk assessment and climate change adaptation plans. Other types of data include, by order of frequencies:

- Maps
- Climate records
- Risk management
- Standards/ benchmarks
- What other councils are doing/ case studies
- Trainings/ workshops
- Thermal imaging
- Weather patterns
- Funding
- Costing data
- Research.

A majority of respondents (70%) have already undertaken a climate change risk assessment, and their support needs consequently moved to the next step, which is how to implement resulting adaptation actions:

> *Our council has identified a number of risks, but it is identifying and costing of adaptation actions that we need the most help with.*

Respondents also provided qualifiers around the type of climate data they need: it should be accurate and credible, but also understandable, in 'plain English', making it easier to communicate externally:

> *Information that is understandable and usable by different audiences. I look at a map or some data and think - oh, that's interesting but usually I am unable to come up with a way to effectively disseminate this information.*

Finally, respondents gave insights into the objectives such climate information should help to achieve. This involves getting political acknowledgement for the need to adapt to climate change (n=7), engagement from the community in this regard (n=6) and

counteracting climate scepticism (n=4). Gaining support from councillors and senior management was identified by several respondents as critical:

> *It's not the type of climate information; it's creating relevance and interest in the topic for Councillors, senior management and residents.*

6. Barriers and drivers to respond to climate risks or impacts
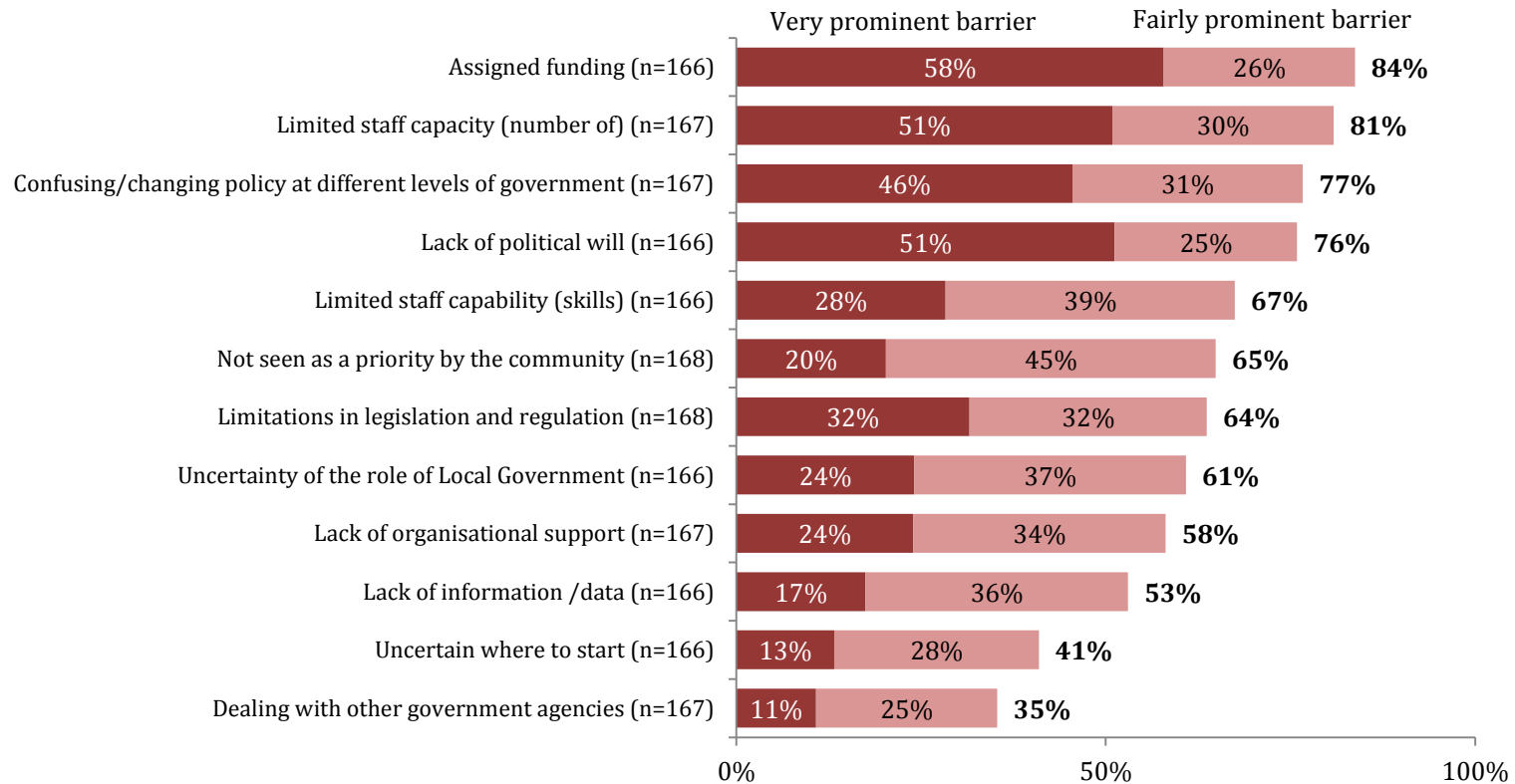
6.1 Barriers

Similar to the 2010 LGNSW survey, councils were asked about potential barriers preventing them from responding appropriately to climate risks or impacts, and to rate how prominent they are. A majority of respondents found most of the listed barriers to be fairly or very prominent. The top four barriers, identified as prominent by over three-quarters of respondents, were:

- Assigned funding
- Limited staff capacity (number of)
- Confusing/ changing policy at different levels of government
- Lack of political will.

On the contrary, only two out of twelve of the listed barriers were rated as not very to not at all prominent by a majority of respondents: 'Dealing with other government agencies' and 'Uncertain where to start'.

A very limited number of respondents identified other types of barriers, the most common ones being 'poorly shared responsibilities' (n=2) and Local Government planning (n=2).

Figure 12. Barriers to climate change adaptations, by level of importance

Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 32 'Previous surveys of NSW councils identified this list of possible barriers impacting on councils' ability to respond to climate risks or impacts. For each listed barrier, please indicate how prominently the barrier prevents your council from responding appropriately to climate risks or impacts. If there are other barriers that are not listed, please specify.'

Compared to responses in the 2010 LGNSW survey, a higher proportion of respondents in 2015 identified each barrier as at least 'fairly prominent'. While the 2010 survey did not have a rating scale, it had tick boxes to select the top 5 barriers. Comparing how barriers rank in 2015 with 2010 provides some interesting insights. The list of barriers prompted to participants changed slightly between the two surveys. In particular, the top barrier in 2009 was 'competing priorities', but was not included in the 2015 survey. However, for the listed barriers that remained the same, key findings are that:

- 'Assigned funding' and 'Limited staff capacity' are still in the top three. Interestingly, not having the right skills is less important than not having the staff to do the work.
- A number of barriers are now ranked lower compared to other barriers, in particular:
    - Limitations in legislation and regulation
    - Uncertainty of the role of Local Government
    - Lack of information/data

This doesn't mean that these barriers don't exist anymore—a majority of respondents qualify them as prominent—but they seem less important now compared to others.

Table 11.   Ranking of barriers in 2015 compared to 2010

| Barrier	2010 survey		2015 survey	
	% ticked	Rank	% Fairly to Very prominent	Rank
Competing priorities	89%	1		
Assigned funding	69%	2	84%	1
Limited staff capacity (number of)	56%	3	81%	2
Limitations in legislation and regulation	39%	4	64%	7
Uncertainty of the role of Local Government	34%	5	61%	8
Lack of information /data	30%	6	53%	10
Lack of political will	27%	7	76%	4
Not seen as a priority by the community	26%	8	65%	6
Waiting for Carbon pollution reduction scheme	25%	9		
Lack of organisational support	22%	10	58%	9
Dealing with other government agencies	20%	11	35%	12
Uncertain where to start	16%	12	41%	11
Confusing/changing policy at different levels of government			77%	3
Limited staff capability (skills)			67%	5

Source: 2010 survey: LGNSW, Local Government Needs in Responding to Climate Change in New South Wales, Australia, December 2010, question 4.1; 2015 survey: NSW Local Government Climate Change Adaptation Survey 2015, Question 32.

6.2 Drivers

Respondents showed an even higher level of agreement across respondents than for barriers, in identifying all drivers as important (Figure 13). All drivers listed were indicated by more than 70 per cent of respondents to be fairly to very important. The most important drivers were:

- General Manager/ senior management support
- understanding of cost/ benefits of adaptation actions
- active and engaged communities
- Mayor/ Counsellor leadership
- external funding.

Figure 13. Drivers to climate change adaptation, by level of importance
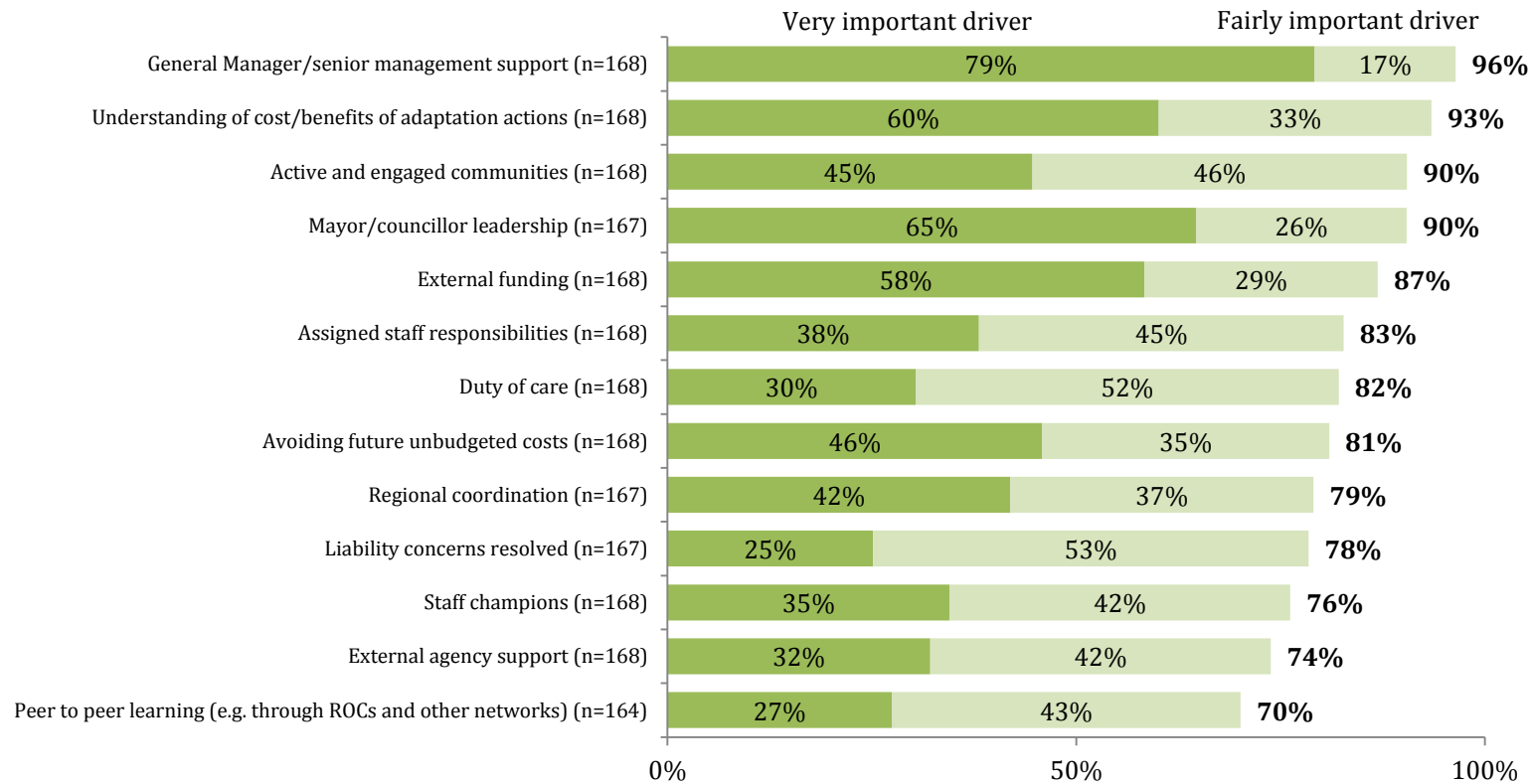
Source: NSW Local Government Climate Change Adaptation Survey 2015, Question 33 'Previous surveys of NSW councils identified this list of possible drivers/ enablers that enhanced councils' ability to respond to impacts. For each listed driver/ enabler, please indicate how important it is currently for support your council's ability to respond to climate risks or impacts. If there are other drivers that are not listed, please specify.'

All drivers listed were identified as important by a higher proportion of respondents in 2015 than those who identified them in the top 5 drivers in 2010. While the list of drivers has changed slightly, councils continue to identify support from the senior management as the most important driver. On the contrary, 'avoiding future budgeted costs' and 'liability concerns resolved' seem to play a less important role in supporting councils' ability to respond to climate change, than in previous surveys potentially as councils understand these better now that more councils have undertaken risk assessments. Drivers that have gained in importance are related to the engagement of the community, the Mayor and Counsellors, as well as some external funding.

Table 12.　　Ranking of drivers in 2015 compared to 2010

Driver	2010 survey		2015 survey	
	% ticked	Rank	% Fairly to Very important	Rank
General Manager/senior management support	62%	1	96%	1
Avoiding future unbudgeted costs	48%	2	81%	8
Part of sustainability agenda	43%	3		
Liability concerns resolved	37%	4	78%	10
Active and engaged communities	34%	5	90%	3
Assigned staff responsibilities	34%	6	83%	6
Staff champions	34%	7	76%	11
Mayor/councillor leadership	32%	8	90%	4
Media coverage of local and global climate change issues	25%	9		
External funding	21%	10	87%	5
Duty of care	20%	11	82%	7
External agency support	17%	12	74%	12
Understanding of cost/benefits of adaptation actions			93%	2
Regional coordination			79%	9
Peer to peer learning (e.g. through ROCs and other networks)			70%	13

Source: 2010 survey: LGNSW, Local Government Needs in Responding to Climate Change in New South Wales, Australia, December 2010, question 4.2; 2015 survey: NSW Local Government Climate Change Adaptation Survey 2015, Question 33.

7.   Conclusion

The adaptive capacity of an organisation is known to determine the extent to which it is able to make well-informed, long-term decisions that will make it more resilient to the impacts of climate change. The 2015 Local Government Climate Adaptation survey shows that adaptive capacity across the NSW Local Government sector is increasing, evidenced by increasing risk assessment processes, growing needs for climate change data and tools, more adaptation plans and the inclusion of climate change adaptation in strategic policy documents.

However, while more than two-thirds of the respondents (69%) are already experiencing impacts from climate change in their local area, 57 per cent still don't feel sufficiently prepared for responding to them (48% not very prepared and 10% not prepared at all). This indicates some room for further support to foster and build adaptive capacity.

Councils welcome any kind of support, with a preference to high quality information and guidance on addressing risks. Online resources are found to be the most useful; however trainings and workshops are also perceived as beneficial. The need for more sophisticated climate change information, such as accessing technical, robust and up-to-date data, seems to have increased, and this should be reflected in the support provided by OEH and LGNSW in the future.

Respondents are aware of most existing resources, from the Intergovernmental Panel on Climate Change to LGNSW online resources or Building Resilience to Climate change grants program. However, the level of participation or use of resources is still limited, showing that a first step in future support could focus on increasing the use of existing resources. Respondents made some clear requests though, particularly for localised projection data in risk areas that are relevant to their geographic location, such as sea level rise or rainfall predictions. Ensuring that data is accurate, credible, but also easily understandable to allow for broad communication will be crucial to enabling broad application at the Local Government level.

Finally, while funding and available staff remain top barriers that may be difficult to address at a state-wide level, support from senior management is still identified as the top driver to support councils' ability to respond to climate change. Some targeted support and information by OEH and LGNSW could help Local Government engage effectively with senior management. This type of information would focus on making strong business cases, and persuasive arguments for investing in adaptation and would complement the climate change information evidence base that has already been produced.

Appendix.   Online survey questionnaire

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