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An Accounting Research Agenda in the Context of Climate Change. Drawing on the Australian Local Government Sector

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With much of the world's attention turning to the possible causes and effects of climate change, it is timely to investigate what role accounting can and should play in this debate. Although widely recognised that there should be a global approach to slowing down the rate of carbon emissions and consequent rise in temperature, recent events such as the latest UN conference on climate change in Copenhagen, Denmark has demonstrated the difficulties and divisions amongst the global community. Notwithstanding this outcome, there appears to be many opportunities for accounting researchers to add to the body of knowledge so that government policy makers and officials can make informed decisions. The focus of this paper is on outlining a series of possible research questions that specifically relate to the types of accounting information that will be required under a climate change agenda. It is also argued that a multidisciplinary approach is required for this to occur because data taken directly from the current accounting information system will be inadequate and incomplete in this new context. The focus of attention in this paper is limited to the local government sector in coastal communities.

1. Introduction

There is much evidence to support the notion that in Australia, governments at all levels are becoming increasingly anxious and concerned about the possible effects of global warming on our communities. More frequent and extreme droughts, storms, bushfires and floods are just some of the consequences of global warming (Flannery, 2005). Two recent government reports stress the need for a collaborative effort in firstly, acknowledging the risks to coastal Australia and secondly, taking a national approach to protect those communities and assets from the effects of climate change. The Australian Government Department of Climate Change Report *Climate Change Risks to Australia's Coast* (2009) is the first attempt at providing a national assessment of the risks of climate change for Australia's coastal zone.

Some examples of critical coastal infrastructure are sewage treatment plants, water and power facilities and telecommunication assets, each of which are located close to the coastal zone of councils. The report also identifies that up to $63 billion (replacement value) of existing residential buildings are potentially at risk of inundation from a 1.1 metre sea level rise representing between 157,000 and 247,600 individual buildings (DCC, 2009:p7).

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The second report *Managing our Coastal Zone in a Changing Climate* (2009) was produced by the House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts. The body of data from this report was collated from submissions made by government departments, local councils, professional associations and academic experts in this field. Coastal infrastructure was also identified in this report as a key area for attention particularly in light of the fact that sea level rise and other climatic events could accelerate the degradation of materials and structures and the potential for increased damage and repair costs. This committee recommended that a comprehensive national assessment of coastal infrastructure vulnerability to sea level change and extreme weather events be undertaken (Recommendation 16:p105).

Further significant issues relate to coastal communities that have been subjected to the 'Sea Change' phenomenon. The term 'Sea Change' is used to describe the population growth away from metropolitan areas into non-metropolitan coastal areas. There are on-going demographic and financial considerations which are yet to be fully resolved and have implications for the provision of infrastructure. For example, this population growth is being driven by the baby boomers and this aging profile of councils suggests that health and community services will be used much more frequently. In addition, there are also younger families moving into these coastal areas. They have grown up with, and are used to a certain level and quality of services that they have received in metropolitan areas. There is an expectation (perhaps unrealistic) that they will receive the same or a superior level of service in the non-metropolitan coastal areas. Many of these coastal areas suffer from high youth unemployment and have a community of aged people who have limited financial capacity to support greater infrastructure capacity building if that is the intent of the relevant council. Finally, many of these coastal regions experience a huge population surge during the summer/holiday period putting further strains on the current infrastructure. For example, in the popular Surf Coast Shire which includes famous surfing beaches such as Torquay and Bells Beach, it is estimated that the permanent population of 24,126 (Census, 2006) more than trebles at peak holiday times (www.surfcoast.vic.gov.au/).

2. Literature Review

The justification for the emphasis on coastal communities is that they appear to be presently the most vulnerable to climate change. Climate change does not only refer to the possible consequence of sea level rise but can include other effects such as animal disease, biodiversity loss, bushfires, coastal flooding, droughts and heatwaves, earthquakes, extreme storms, inland flooding, land degradation and water scarcity (Australia Report, 2010).

Terms such as environmental accounting, social and environmental accounting, triple bottom line accounting (TBL) and the balanced scored card (BSC) have historically been used in the context of a move away from simply providing financial information to users but recognising that non-financial information is also being demanded from stakeholders. More recently the terms sustainability accounting and/or sustainability reporting has been used widely and this term will be used throughout this paper. Although there is no one definition of sustainability a number

of theoretical frameworks have been utilised to guide research in this domain. Sustainability has been defined as:

> ".....not just an efficient allocation of resources over time, but also a fair distribution of resources and opportunities between the current generation and between present and future generations, and, a scale of economic activity relative to its ecological life support systems." (Gray & Milne, 2003:p69)

Although there is no one accepted definition of sustainability, a number of consistent themes provide guidance. For example, there is an emphasis placed on a long-term view and concern regarding leaving the environment to future generations in no worse condition than that experienced by the current generation. It is argued here that no one theory is overwhelmingly applicable to sustainability research. Rather there can be a number of theories that can alone or together provide useful insights and explanations for managerial behaviours and actions. Legitimacy theory has been widely used in this context (Tilling & Tilt, 2010; Deegan, 2002; Gray *et al.,* 1996). It is a theory that is related to other established theories such as political economy theory, institutional theory and stakeholder theory. According to Lindblom legitimacy is defined as (1994:p2):

> ".....a condition or status which exists when an entity's value system is congruent with the value system of the larger social system of which the entity is a part. When a disparity, actual or potential, exists between the two value systems, there is a threat to the entity's legitimacy."

In essence, legitimacy theory posits that there is a 'social contract' between the organisations and individual members of society (Mathews, 1993). Organisations have no inherent right to the use of resources but these rights are provided by the community if it deems that the benefits derived from the goods and/or services provided by the organisation outweighs the costs. That is, the organisation has legitimacy to operate. When there is a threat to that legitimacy, it is assumed that the managers will undertake remedial action to change perceptions. This remedial action needs to be publicised widely and corporate disclosures via the medium of the annual report are a well established mechanism to achieve this objective. Thus, the motivations of management to include sustainability information in the annual report could relate to factors such as adhering to community expectations, to attract finance, to minimise the threat of mandatory disclosures or to manage powerful interest groups (for example, health and environmental lobby groups).

Closely aligned to legitimacy theory is institutional theory which DiMaggio and Powell (1983) have linked with voluntary corporate disclosures. The main premise from this theory is that it can help explain why organisations 'in the organisational field' tend to act and report in a homogeneous manner. The organizational field is often based on 'industry' groups but can be viewed wider such as investigating issues or technologies (Bebbington *et al.,* 2009). The two main elements of institutional theory are isomorphism and decoupling. Isomorphism refers to the process whereby organisational practices and structures tend to become uniform. Where the behaviours of the organisational unit are inconsistent with uniform practices this will attract criticism. Decoupling describes a situation whereby managers acknowledge

the need to conform to institutional practices, however, their actual practice differs from these.

Finally, stakeholder theory can also be used to explain and predict reporting and management practices. Stakeholders can be internal such as employees or external such as investors, special interest groups or government. Stakeholder theory can take on a normative view (that is, what ought to be disclosed to stakeholders) or positive which helps explain and predict the actions of organisations in the face of stakeholder demands. In essence, this theory assumes that the more powerful the stakeholder group, the more likely that management will undertake actions to satisfy their demands. Accountability theory also has possible relevance either on its own or in combination with the three theories already discussed. To be held accountable means that one must justify actions taken and also report on those activities. Being held accountable is particularly relevant for research in the government sector because taxpayers have no choice on whether to fund the government's activities, which is dissimilar to investing in a profit oriented company of which there is a choice to invest.

Focussing more specifically on previous recent research related to the public sector and sustainability issues (of which climate change is a component of), Guthrie and Farneti (2008) adopt the frequently used method of content analysis to investigate the extent of sustainability reporting in seven public sector agencies. The reporting practices were compared with the Global Reporting Initiative (GRI) which is a comprehensive internationally recognised template that also incorporates a public sector supplement. The authors found that most disclosures were non-monetary (only 8% of disclosures were monetary) and narrative in nature. Only 32 percent of the GRI's elements were used by the agencies suggesting that the organisations were only selecting items which *they* thought were relevant.

In a study investigating nine public water companies (controlled by local councils) Larrinaga-Gonzalez and Chamorro (2008) analyse how sustainability information was communicated to stakeholders. Using semi-structured interviews and publicly available documents they found only one of the water companies produced a separate sustainability report. Although there is a mandatory disclosure standard for environmental information, there was a general low level of disclosure amongst the water companies. This was explained as being caused by the water companies having other priorities to focus on, a lack of enforcement of the standard and difficulty in distinguishing whether a particular item was 'environmental' or not. Finally, it was suggested that the issue of sustainability disclosures took a backward step because a serious drought meant that resources were directed towards practical efforts of water conservation away from reporting issues.

Marcuccio and Steccolini (2005) investigated 12 local authorities in Italy to ascertain the rationale for the adoption of social and environmental reporting. They found that the main reason why the local authorities disclosed social and environmental information was due to notions of efficiency, effectiveness and accountability within the general context of public sector reforms. Thus, the reasons were not as closely aligned with legitimacy theory, rather accountability was more the core reason for its adoption. This compares with the work of Farneti and Guthrie (2009) who found that the introduction of sustainability information was instigated because of a key

individual championing the cause of sustainability and influencing others to commence the journey into this type of reporting. A secondary reason for producing sustainability information was because this was required by other external stakeholders. For example, oversight agencies required information on electricity consumption and water usage and therefore, this prompted the collation of the relevant data.

The work of Ball (2005) focuses on how environmental accounting information can act as an agent for organisational change. Using a case study of a United Kingdom (UK) local council, Ball (2005) found evidence that was contrary to some standard beliefs. Most notably, that external public pressure can bring about positive changes to the *modus operandi* of the organisation. In fact, it was the local council that was actively engaging external stakeholders to communicate and demonstrate the unsustainability of current services. In addition, the role of accountants was narrow in the sense that costing data was developed to support decision making for environmental projects, which is not a departure from the usual activity of accountants working in local government.

Although the above review is not exhaustive of all the literature on the topic of sustainability, it does highlight the deficiency in specific research on the nexus between climate change and accounting. A move away from research on sustainability in general, and towards climate change specifically, appears to offer academics with a greater opportunity to influence local government thinking and change. This is particularly the case for infrastructure assets which have traditionally been the mainstay of local councils and which are particularly vulnerable to climate change impacts. This is the area which is addressed in the following section.

3. Accounting Implications of Climate Change on Infrastructure Assets

There is growing recognition domestically and internationally that different reporting requirements are necessary for informed decision making. The issue is identifying what are the possible accounting implications in terms of the recording and reporting function within the context of climate change.

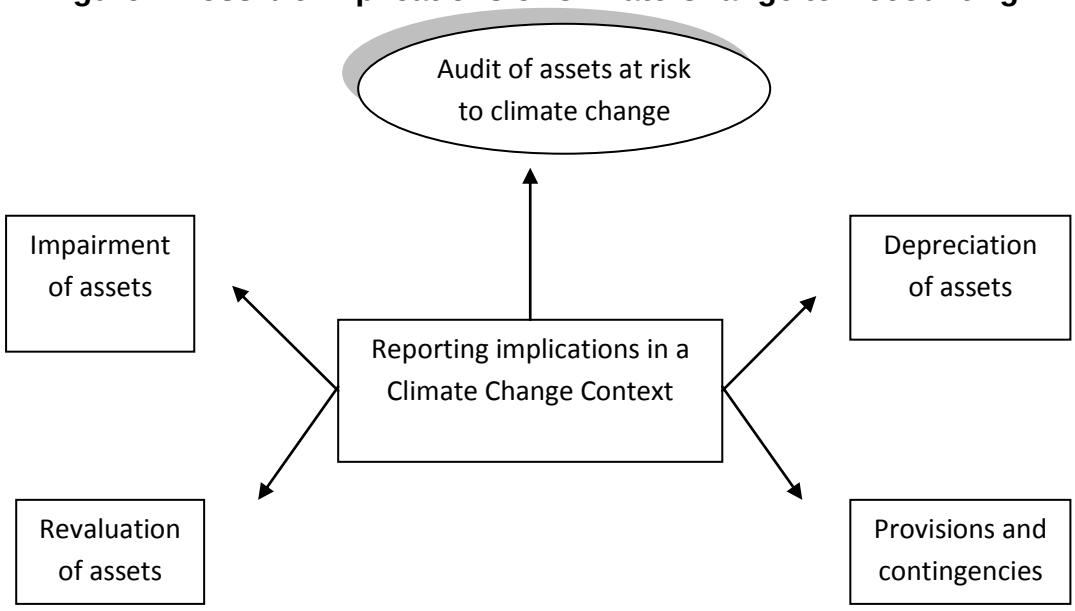
There are two immediate concerns. First, the role of the finance/accounting managers in the local government sector has traditionally been to ensure that services and capital works are accounted for and funded through council's budget. Therefore, there is an emphasis on the cash inflow through the collection of rates and taxes and government grants and the use of those funds to approved projects and services for the calendar year. In terms of infrastructure, it appears that the asset management system is predominantly controlled by council engineers who have traditionally been the focal point for capital works, given the traditional emphasis of councils in maintaining the road and footpath network and other infrastructure assets.

Second, as previously suggested, the current accounting system of local councils is not set up for dealing with the types of decisions that are now required to be made given the predictions of the consequences of climate change on infrastructure assets. The majority of accounting/finance departments within councils will be using

the accounting software package *FinanceOne*. However, the maintenance and data on future capital projects is, in the main, kept by council's engineers under the software package known as *Maximo*. There is no interface capability between these two systems and to develop information regarding for example, identifying which assets are at risk to climate change. A manual collation of the data is required as it is currently not available within the accounting information system. In addition, some councils may have a separate *risk register* which may be held by yet again, a different department such as the corporate risk group. Although most of the risk data at present would relate to workplace health and safety, it is a question for councils to decide in the future which department should hold data relating to risks associated with climate change.

Dealing with data held across various units within council in different software packages that are not interfaced will be an interesting challenge. Data will also need to be accessed from outside council by expert external agencies such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO) for scientific estimates regarding the frequency and severity of climate change impacts. Further discussion of the interdisciplinary nature of climate change research is elaborated upon in section 4. The possible implications of climate change to accounting are presented diagrammatically in Figure 1.

Figure 1 Possible Implications of Climate Change to Accounting



A research question to investigate the financial accounting domain could be:

> *What are the reporting implications of climate change within the local government context?*

Thus, it is incumbent on the Chief Financial Officers/Corporate Managers of local councils to demonstrate that climate change has significant accounting implications and therefore, there is a role for these managers to provide relevant information for

council to consider. At a reporting level, for example, sea level rise may result in reducing the useful life of assets and/or change the value of economic benefits to be derived from those assets. Moreover, there are implications for the depreciation, impairment and re-valuation of assets. Importantly, these new assessments will need to be based on estimates derived from scientific observations and modelling data in relation to sea level rise, storm tide data and other risk assessments such as droughts or bushfires. In addition, the effects of climate change will have implications for the repair and/or replacement of assets. These infrastructure assets are high dollar value items that will need to be funded out of future budgets. Therefore, awareness of this requirement is necessary. What this suggests is that there will be a greater level of uncertainty attached to the reported asset figures, given that these will now be partly influenced by the estimated data provided by the scientific community.

The projections suggested by the Intergovernmental Panel on Climate Change (IPCC) refer to possible consequences in 2100. The main role of the accountant in local government is to prepare the budget and annual report which is naturally of 12 months duration. There are also strategic/planning reports produced as well but these usually coincide with the length of the council term normally being four years. However, depending on the assumption made from the science based projections and past experience, a number of long-term provisions may need to be reported. Although as is usual accounting practice these provisions do not represent any 'cash stored' in specific accounts, they need to be recorded to ensure that the accounts reflect all the future commitments of council.

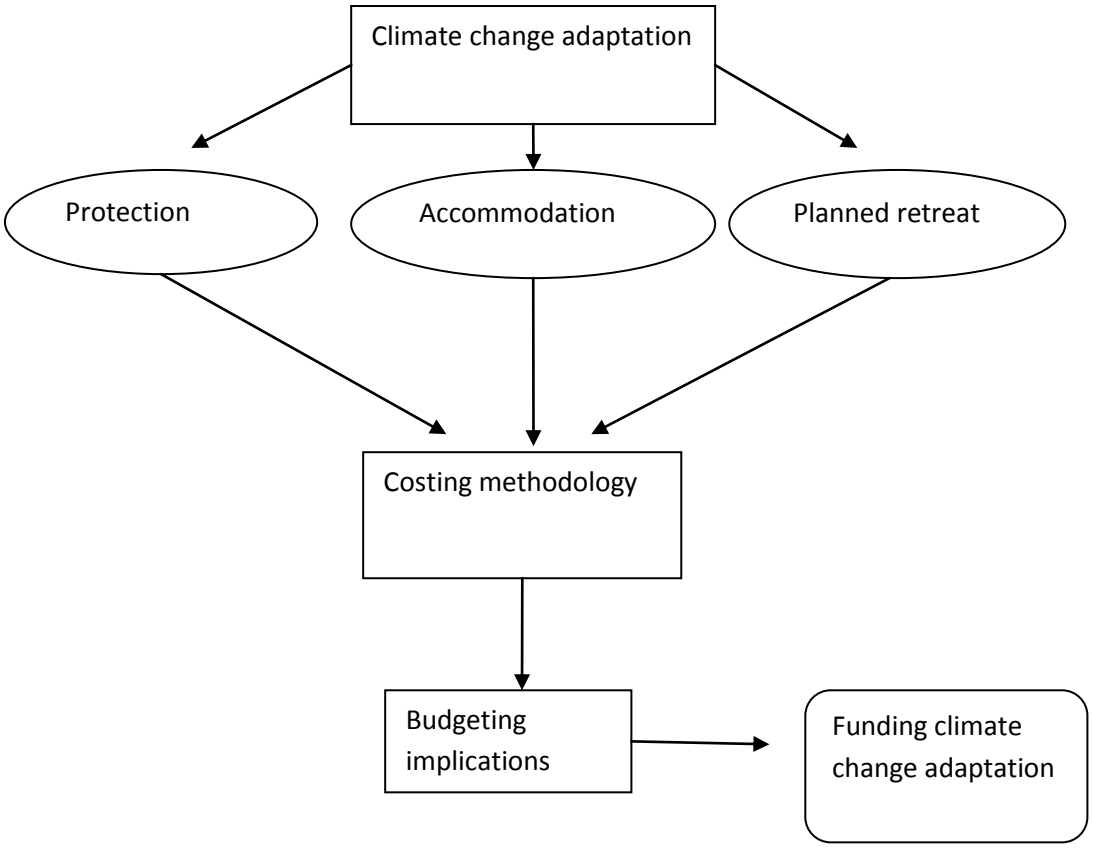
Given the long-term nature of these scientific projections it would be useful to investigate if and how councils will try and influence state and federal governments to fund the costs to mitigate the effects of climate change. It is becoming increasing common for the Federal government to set aside specific accounts to fund special projects. For example, recently (May, 2010) the Australian Federal Government established the *Infrastructure* fund as part of the government's Henry Review of tax policy and makes infrastructure spending a permanent feature of Commonwealth and State budgets. The 'Superannuation Guarantee Charge' is also another example of government policy to support a long-term vision to help fund the retirement years of workers. In the same vein, exploring the need to fund a strategic long-term plan for the effects of climate change would be a welcome addition to the debate. A possible research question related to this aspect of climate change would be:

> *Who and how should the funding of assets at risk to climate change be implemented for local councils?*

As well as reporting implications as a result of climate change, there are also some important costing issues that need to be addressed. These new provisions fall under the context of *climate change adaptation* (CCA). CCA refers to how communities will mitigate the effects of climate change. There are currently three broad methods of CCA in the context of infrastructure (including buildings). *Protection* refers to developing structures to defend coastal assets from climate change events. A typical example would be to erect a sea wall which would minimise the impact from storm surge and sea level rise. *Accommodation* includes minor works which allows for the continued use of the asset such as elevated floor requirements or increasing the 'set

back' in planning guidelines. *Planned retreat* involves relocating or abandoning assets in the coastal risk zone. This may prove to be the most expensive option of the three especially where this becomes compulsory and compensation costs may be sought which is a significant legal issue. Hence, a further opportunity for research would be the costing and budgetary ramifications of CCA. Figure 2 provides a diagrammatical representation of the CCA costing framework.

Figure 2 Costing Climate Change Adaptation



Possible research questions for the management accounting component could be:

> *How are the costing implications of climate change adaptation accounted for by councils?*
>
> *Is the management of assets at risk to climate change treated any differently to other assets controlled by councils? If so, how?*

It follows that legal risks may be another possible accounting implication of climate change. Australian Accounting Standard AASB 137 Provisions, Contingent Liabilities and Contingent Assets are relevant in this context. Depending on the actions of councils and whether the Federal or a State government amends planning guidelines which affects how the assets can and will be utilised in the future, then this may trigger the implementation of AASB 137. For example, council may prohibit the building of a dwelling on private land that previously did not have such a covenant. The restriction may come into effect because of the potential damage that could be

caused by climate change, and being prudent, a council may not want to provide a permit for building with knowledge of the potential future risks.

Thus, climate change is and will have a profound effect on the role of the accountant and how infrastructure assets are recorded and reported.

4. A Multidisciplinary Research Approach

Collaborating and communicating with personnel from different departments/units within a council may not be new for those working in the accounting/finance area. It appears from the discussion above that the nexus between various areas of council and the accounting function will increase in the context of climate change. One of the reasons for this is that the data for reporting and costing including assumptions made, will need to be agreed to and assembled so that appropriate disclosures can be made. For example, climate change data developed by the scientific community will need to be used for assessing the risk to infrastructure, planning departments will need to provide information regarding if and where infrastructure can be developed and the engineering department may insist on design modifications to be complied with prior to council approving such projects. This process will obviously involve a time delay and cost which needs to be taken into account. The same reasoning would apply to the engineering or capital works unit which has been the traditional domain of councils. Again issues such as the useful life of assets, repairs and maintenance costs and replacement estimates will need to be agreed to and reported.

Finally, community/stakeholder engagement regarding climate change may also affect the accounting function. There is a school of thought that suggests that highlighting the risks of climate change and/or producing government guidelines and policy to reduce or counteract the negative effects will have limited impact if the community at large does not support how it is being tackled. Therefore, community engagement is vital to inform stakeholders of the implications of climate change and the possible actions to address these issues. If there is strong opposition to any possible changes, then, councillors may be persuaded not to adopt certain policies in the framework or strategic plans of the respective council. Conversely, if there is community support for action on climate change then this too, may find its way through to council plans and strategic objectives. Hence, the democratic voice of ratepayers and community groups can and will have accounting implications. Possible research questions in this context would be:

> *How has the phenomenon of climate change affected the role and dealings between the accounting and other departments within council?*
>
> *What processes has council developed to provide for community engagement within the realm of climate change? Have they been effective?*

It is quite possible that a new ‘accounting speak’ will develop as managers from various units within council begin to associate with each other more often when dealing with climate change recording and reporting issues. Although, this form of communication may not be new when other issues are considered, it is the number of transactions and substantial sums involved that will be noteworthy. Decisions

regarding infrastructure investments for coastal councils have long-term commitments associated with them and are costly.

As noted above, action to tackle the effects of climate change require the support of the community. Careful planning is required on how climate change information is provided to the community. There is a balancing act required to not create excess fear and pessimism of the consequences of climate change, but at the same time, demonstrate that significant achievements can be made at the community level.

5. Conclusion

It is clear from the level of international and national debate regarding the consequences of past organisational practices that significant damage is being caused to the environment. Potential harmful effects such as coastal erosion, flooding, damage to infrastructure, damage to coral reefs, threats to fisheries, private property and tourism impacts are just some of the issues that require a considered response (IPCC 2007; Henessy et al., 2007). There are currently two pressures on coastal councils, both of which will affect their infrastructure. The first is the Sea Change phenomenon (see section 1) and the second is the global effects of climate change.

Coastal councils will need to undertake an audit of infrastructure that is vulnerable to climate change as an initial step in the recording of relevant information (Gurran, Hamin & Norman, 2008). However, due to their small rate base, disadvantaged communities and remoteness, there is a real need to convince State and Federal governments to provide funding for the cost of climate change adaptation. As a means of disclosing what is being undertaken to mitigate these effects, accounting academics can contribute by providing reliable evidence on the effects of climate change on infrastructure assets. In addition appropriate costing methodologies need to be developed to inform governments at all levels what the potential financial costs are in mitigating these effects.

Therefore, both external financial reporting and management accounting practices will be affected because of the new decisions that need to be made regarding addressing climate change consequences. In other words, the accounting information system of councils will also need to adapt in this new context. Several research propositions are provided, however, this is not an exhaustive list of possibilities. There is a plethora of opportunities to engage with local government to ascertain what methods are being adopted to protect the environment and whether or not these activities have been effective.

It is clear though, that given that research on climate change and the accounting information system is relatively new, it would be prudent for academics to adopt a case study approach for investigating these issues. This is because many coastal councils have yet to address reporting considerations regarding climate change. Identifying a ‘best practice’ council or a council that has commenced this journey would be a better starting point in exploring the myriad issues that they most likely will face.

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