Towards developing a common language for climate change in the City of Cape Town

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The Future Resilience for African Cities and Lands (FRACTAL) project aims to address the challenge of providing accessible, timely, applicable and defensible climate information that is needed by decision makers operating at the city-region scale in southern Africa. FRACTAL has been running since June 2015. It is part of the Future Climate for Africa (FCFA) multi-consortia programme. FCFA's major objective is to generate fundamentally new climate science focused on Africa, and to ensure that this science has an impact on human development across the continent. FCFA is funded by the Department for International Development (DFID) and the Natural Environment Research Council (NERC).

These knowledge products have been developed to share findings from the research in the hope of fostering dialogue and eliciting feedback to strengthen the research. The opinions expressed are therefore the author(s) and are not necessarily shared by DFID, NERC or other programme partners.

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Table of Contents

Abstract

There is differential use of language/terminology within a multidisciplinary user group, with the selection of terminology often presenting a barrier to broad engagement with climate change and development issues. This was particularly noted within the City of Cape Town as an impediment to moving forward with multidisciplinary climate change decisions within the City.

In collaboration with the City of Cape Town, using the development of the City's Climate Change Policy document and the Green Economy, Energy and Climate Change forum as a basis, this research aimed to engage in a transdisciplinary process to better understand and attempt to circumvent language discrepancies at a city scale. Through this process, the project has elucidated a nuanced understanding of the terminology discrepancies at play. The findings show two main kinds of discrepancies - conceptual and contextual - and that confusion around terms are a result of either or both categories.

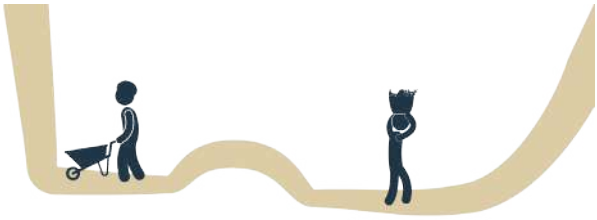
According to the transdisciplinary literature, understanding terminology discrepancies and coming to a common meaning of terms, or at least making explicit the differential understandings, is fundamental to successful transdisciplinarity. As FRACTAL aims to demonstrate transdisciplinarity, these results are particularly pertinent in the ongoing work of the FRACTAL project. In this regard, the team should remain cognisant of potential conceptual and contextual discrepancies when working in transdisciplinary groups as well as actively attempting to pre-empt terminology barriers. The tools developed as a result of this project can be used as conduits towards this aim.

1. Introduction

The Climate Systems Analysis Group (CSAG) and the City of Cape Town were awarded a Small Opportunity Grant (SOG) under the Future Resilience of African Cities and Lands (FRACTAL) Project. The grant project was conceptualised through a need emanating from the City of Cape Town, leading to the co-production of a research proposal. The City recognised that there is differential understanding and use of language/terminology within a multidisciplinary user group. The selection and use of different of terminology often presents a barrier to broad engagement with climate change and development issues. This barrier presents obstacles at multiple levels in the decision-making and implementation processes, including during attempts by technical staff to incorporate climate change considerations into policy and practical implementation.

An example was highlighted within the City in discussions around, for instance, adaptation and mitigation. Participants in meetings would use the word "adaptation" to mean "energy efficient" because being energy efficient is seen as adapting to producing less carbon. To climate change specialists this would be a mitigation activity. Similarly, meeting participants would refer to mitigating the impacts of climate change while, in climate change parlance this would be referred to as adaptation. Green is also a frequently misunderstood word. When green energy or green economy was spoken about, after some discussion someone in the meeting would raise the issue of "what do you really mean by green [issue]"? (Davison, pers. comms. 07/08/2017). In these cases, there was often a lack of guidance as to what should be included or excluded when using a particular term (Morgan pers. comms, 31/07/2017). This lack of common understanding often lead to meetings not reaching a conclusion, going in unintended directions or going around in circles with general disagreement.

Ambiguity in the meaning of terms is common in the climate change field. It is argued that these multiple meanings arise out of the functional needs of different disciplines (Adger, 2006, Janssen et al 2006), and evolve over time (Fussel and Klein 2006). Though the meanings of terms might be suitably tailored to certain fields, a plurality of definitions and interpretations may impede understanding and communication across disciplines (Gallopin, 2006).



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FRACTAL, as a project, aims to demonstrate transdisciplinarity. Taylor et al (2017) define transdisciplinarity as "entailing the integration of other forms of knowledge outside of academia to address the complexity of contemporary problems in society". According to relevant literature, common language should be developed across disciplines for a project to be truly transdisciplinary (Newell et al. 2005). A common language is required to support mutual comprehension which, in turn, is the precondition needed for integrative research. Importantly, this common language should not be understood as merely a shared language, because words can have multiple meanings when applied through the lens of different speakers (Newell et al. 2005, p301) but rather a common meaning should be agreed upon which goes beyond agreeing on a definition towards developing something in common i.e. "creating something new together" (Bohm 1996). In this regard, Newell et al. (2005) state that members of a team need to dedicate considerable time in detailed discussion to unpack the meanings of words. Despite this need, it is often not attempted within transdisciplinary projects, likely because it is neither a trivial nor an easy task and may have varying degrees of success.

With this knowledge in mind, this project set out to undertake research that would facilitate the process of co-exploring climate knowledge, particularly by understanding and addressing the barriers to multi-disciplinary working posed by differential terminology use. Within this broad goal, the project aimed to improve the understanding of different ways that terminology is used by various user groups from different backgrounds and disciplines, with the objective of shaping a process where users converge towards a common understanding of climate science, climate response and development terms. For the purpose of this paper, in the given context of climate terminology, a "common understanding' should be understood as (a) shared meaning – that is when two or more parties share the same conceptual definition of a term or (b) when there is no agreement on the meaning, either because it is not yet achievable, or when a shared definition is not applicable[1], we argue that there should be an acknowledgment by parties involved that they hold different definitions, and shared knowledge of these differences.

As a tangible output, the project sought to develop a toolkit to better understand terminology barriers in the field of climate change and development while contributing to overcoming these barriers.

1 This is the case with contextual discrepancies, which will be expanded on further in our findings.

2. Methodology

2.1 The embedded researcher

The primary mechanism for completing the research was through the placement of an embedded researcher (ER) into the City of Cape Town. The appointed ER, started working in the City of Cape Town's Environmental Management Department at the beginning of January 2017. During her time at the City, the ER has engaged with city officials, attended multi-disciplinary portfolio meetings, department meetings, councillor workshops and had one to one consultation meetings with relevant City officials. She has presented the project to two multi-disciplinary working groups, gaining traction for the project within the City. She also took part in the FRACTAL ER workshop and the International Conference on Climate Services 5. She has attended all City Learning Cluster calls as the representative ER from the City of Cape Town. Finally, the ER was responsible for undertaking investigation into the commonly misinterpreted terms, driving the development of the resultant tools and contributing to the draft of the FRACTAL working paper resulting from the project.

2.2 Analysis of the Climate Change Policy and comments

The initial phase of the project entailed identifying "barrier"[2] terms and their interpretations across sectors. The first step in this process was to identify potential barrier terms used in the City's Climate Change Policy draft. A frequency count of the terms defined in the policy's glossary was compiled from both the policy document and its associated comments to identify which of the glossary terms was most frequently used. The context in which these terms were used was further investigated to elicit any potential discrepancies in understanding of the term. As a result of this process, a list of potentially problematic terms was compiled to take forward in the project.

2.3 Expert elicitation

These terms were then presented in one-on-one interviews with external experts. Five experts were identified. These were people that commented extensively on the policy and do not work at the City. Experts were given the opportunity to add terms they thought were missing from the list. They were then asked to prioritise terms from the list to be taken forward in the project. They were also asked to provide interpretations for those terms as they would define them, and as they might be defined by others.

In addition to one-on-one interviews, an online survey was carried out with the FRACTAL team asking for identification of barrier terms together with examples of how these terms are understood. There were eleven online responses.

2.4 Co-exploration forums

In February, the first co-exploration forum was held during the Green Economy, Energy and Climate Change (GEECC) monthly committee meeting. The GEECC forum is comprised of City

2 In this context a "barrier term" would be a term that is interpreted differently across individuals within a multi-disciplinary audience or a term where the meaning is poorly understood.

officials representing different departments and line functions and was identified as a prime example of a multi-disciplinary working group grappling with the terminology discrepancy issues identified in this project. The initial interaction was used to explain the project, deepen our understanding of how these terms are both interpreted and used, and finalise which terms would be carried into the second phase of the project. GEECC members were also asked to prioritise terms from the list, provide definitions of terms and to use them in a contextual sentence.

In March, the second co-exploration forum was held with the City of Cape Town Coastal Working Group. They were also asked to vote on terms they would prioritise for tool development through the project. The voting results from both the expert elicitations and the co-exploration forums are shown in Table 1.

No.		Expert elicitation (5)	GEECC (18)	Coastal (11)	Sum Total
1	Adaptation	3	7	4	14
2	Adaptive capacity	1	10	8	19
3	Global warming	1	1	2	4
4	Climate change	1	0	1	2
5	Ecosystem services	0	10	2	12
6	Hazard	1	3	2	5
7	Low carbon	1	8	2	11
8	Mitigation	2	4	2	8
9	Probability	0	0	3	3
10	Resilience	4	12	9	25
11	Risk	1	1	2	4
12	Uncertainty	2	4	2	8
13	Vulnerability	2	7	9	18
14	Scenario	0	1		1
15	Sustainability	0	8		8
16	Green	identified at GEECC	13	5	18

Table 1: Combined voting on which terms should be taken forward for tool development

Tool development and testing:
Given the results of the voting, a series of project team workshops were held with the objective of developing appropriate tools to address the top-ranking terms. Three tools were developed as a result of these workshops. To assess the efficacy of the tools, they were then tested internally multiple times and revised accordingly.

Results dissemination:
In the final stages of the project, a special meeting of the GEECC committee was called to disseminate the results of the project to the City. During the meeting, the learning from the research was presented together with the presentation of the final tools. There was general agreement that the insights of the project were appropriate and helpful in better understanding the terminology barriers at the City.

3. Findings and products

The hypothesis on beginning this project (and the general understanding of both practitioner and academics) is that the barrier posed by climate change terminology is a result of conceptual misunderstandings of the terms. Though this is, at times, the case, this project has elucidated a more nuanced picture.

The findings show two main kinds of discrepancies - conceptual and contextual - and that confusion around the terms listed above are a result of either or both categories.

3.1 Conceptual discrepancies

According to the literature, confusion around the meaning of terms occurs as a result of conceptual differences arising from formulations that best suit the relevant disciplines (Gallopin, 2006; Ionescu et al, 2008 and O'brien et al, 2004). This was reflected in our findings where the definitions provided by participants revealed a variation in the conceptual meaning of the terms. For example, two contrasting interpretations for "resilience" emerged. For some participants resilience is understood as a system's ability to return to its previous state after a stress or shock, i.e. bouncing back. In other instances, however, resilience is understood to be the ability of a system to move on from a stress or shock and involves transforming and strengthening pre-existing structures, i.e. 'bouncing forward'. Further examples are shown in the terms "green" and "uncertainty". Participants provided varying definitions of green including "better", "extreme perceptions" and "a place with lots of vegetation", to list a few. With respect to uncertainty, one participant said that some people understand "uncertainty" as being "not sure of something" whilst in science it is understood as something that "falls within a certain band of probability".

Another participant highlighted that some terms which might be considered quite distinct in many cases are at times used synonymously in order to entice engagement from otherwise disinterested parties. For example, Disaster Risk Management staff are likely to engage in conversations with respect to resilience, but are put off by the term adaptation. As a result, practitioners tend to use the term interchangeably to promote engagement. This introduces further confusion as to the distinction in meaning between the two terms.

In other instances, conceptual confusion results from a poor understanding of the term, rather than differing definitions. This is similar to the barriers introduced through the use of jargon terminology.

We found this to be the case for 'adaptation' and 'adaptive capacity'. While some participants explicitly stated that confusion around these terms was due to poor understanding, others showed difficulty in understanding what these terms mean in the climate change space, as evidenced by the range of answers they provided. Some definitions for 'adaptation' provided included: "the ability to form resilience within everyday processes", "the alteration of a system to suit its environment", "to use something and change it to work in a different system". Some examples of definitions provided for 'adaptive capacity' were: "how much something can change and still function", "adaptive capacity is the ability to withstand and function through environmental shocks", "the resource level available to allow adaptation to a changing environment".

3.2 Contextual discrepancies

There is very little in the current literature with regards to contextual nuances present in the use of terminology, particularly in the climate change field. Pickett et al. (1999) and Bohm (1996) recognise a more nuanced "common language" that goes beyond conceptual misunderstandings and advances towards the development of common meaning. In support, Newell et. al 2005 state the need to be wary of superficial approaches to bridging the communication divide by simply trying to remove conceptual confusions.

The concept of working towards a common meaning is reinforced in the results of this project which shows that, in some cases, participants have very different meanings when a particular term is applied in a sectoral context other than their own. Importantly, our interactions have also revealed that when there are contextual terminology discrepancies, users are often completely unaware that terms are being used to mean different things across multidisciplinary groups. For example, the general definition for the term "mitigation" is the action of reducing the severity of something. However, it is the subject that the term refers to - the thing being mitigated - that differs across sectors. In the climate change field, "mitigation" refers to mitigating the severity of climate change, while in disaster risk management "mitigation" means to reduce disaster risk. In both cases the conceptual definitions are the same, but in each case they pick out different subjects. It is quite easy to see how this could lead to confusion - if "mitigation" is being used in a conversation between someone in the energy sector and someone from disaster risk management they might be referring to different subjects when using the term without realising it. This could be quite easily solved by bringing this discrepancy to attention to allow for clarification. This may also be the case for other words which have been adopted for frequent use in the climate change field, such as; robust, capacity building, innovation and transformation. Words such as these may have different nuances outside of the climate change field.

Some terms, however, are not as well understood and relate to more complex problems. Many climate related terms, including but not exhausted by the list identified in this project, refer to emerging concepts and practices. As such, officials are likely still in the process of defining and applying them within their own contexts. It is no surprise, therefore, that there is not a common understanding of the application of these terms across multiple sectors.

This was the case for "green" - a term that the GEECC working group argued had very high discrepancy across sectors. Although, as discussed earlier, there were some variations in their conceptual definitions of green, many participants indicated a relatively shared conceptual understanding of 'green', defining it as "environmentally conscious", "environmentally beneficial", or "environmentally friendly". On further investigation, it was found that the confusion lies primarily in how the term is applied in specific sectors. For example, someone working in the technology sector might have a very clear understanding of green practices in their own field (e.g. implementation of energy efficient technologies such as LED lighting) but may have little knowledge of green practices in the economy sector (e.g. incentives for environmentally friendly manufacturing or environmentally friendly public procurement).

Importantly, while fewer than anticipated terms showed conceptual barriers, many of them showed contextual ones. Additionally, it was noted that there is often a combination of conceptual and contextual barriers at work.

3.3 Tools

As a result of this research, three stand-alone tools were developed which aim to address these terminology discrepancies and unpack them further, in an effort to move toward a common understanding. Each tool addresses a different concern identified in the research (conceptual barriers, contextual barriers and a combination of both). It is hoped that these tools will be utilized by city officials at the City of Cape Town in processes such as multi-disciplinary planning and during procurement procedures. Each tool has the potential to be transferable across all cities in the FRACTAL project.

The first tool, Spilling the Beans, is a game that addresses discrepancies in the conceptual understanding of the term 'resilience'. The game takes participants through a range of scenarios in order for the participants to come to understand two common conceptual formulations of resilience. Importantly the game does not indicate which formulation is the "correct" one. It is at the discretion of the users if they would like to agree on a single definition or not. The aim is to make explicit different interpretations. The second tool is an e-learning module aimed at deepening understanding of poorly understood terms, namely: adaptation and adaptive capacity. This tool explores these concepts in the city context, unpacking various features of adaptation and adaptive capacity, providing local city examples, and guidelines on determining adaptation pathways.

Figure 1: Testing the spilling the beans tool with CSAG staff

The third tool, named the Wheel of Context is an activity that addresses both contextual and conceptual discrepancies for any term. The activity facilitates a discussion between people from different sectors, allowing them to unpack and explore climate change terms in different contexts. It is an interactive wheel that requires players to provide definitions and contextual examples from their sector. Once participants have unpacked the term in their own sector, the wheel is rotated, allowing participants to explore how the various definitions apply in different sectors. By doing this, discrepancies in meaning across sectors can be highlighted. Furthermore, asking participants to offer examples of the term applied in their own context provides an opportunity for participants from other sectors to deepen their understanding of the term as it is applied in sectors beyond their own. The strength of the tool is also evident in the discussion that it elicits around the nuanced focal areas of each of the departments.

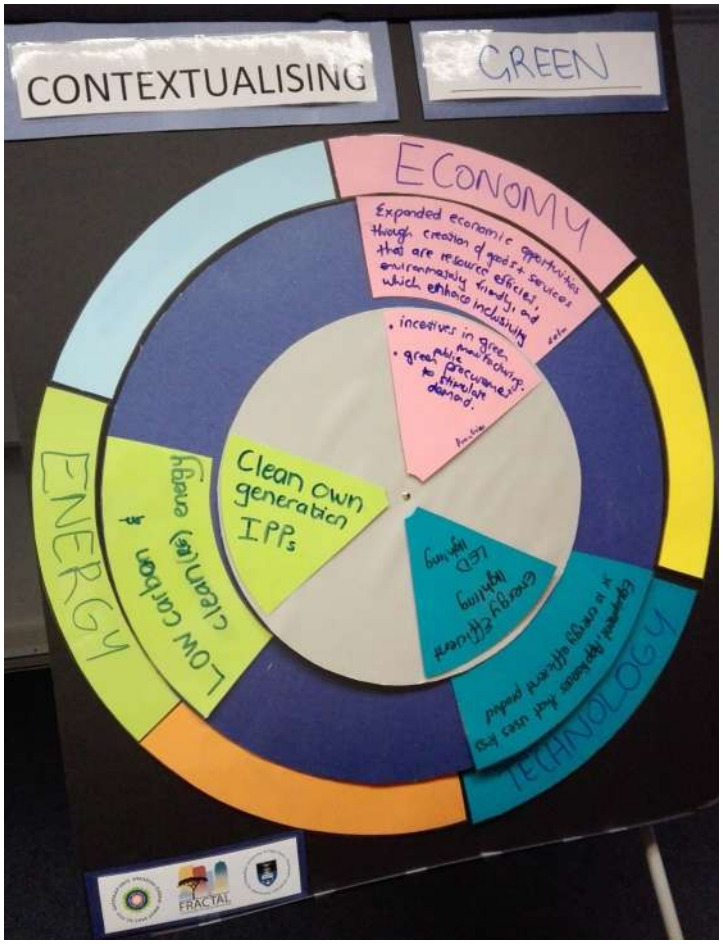

Figure 2: The Wheel of Context tool after testing the word "Green" at the final GEECC forum

All the tools from the project were received well. In particular, the "Wheel of Context" tool was met with enthusiasm because it is seen as having tremendous potential for use within multi-disciplinary fora within the City. It was described by one of the officials as a "useful, gentle and empowering way to bring people into the discussion".

The e-learning tool was also well received, with potential application within the City's Project Portfolio Management training. It is envisaged that when the term 'adaptation' or 'adaptive capacity' is mentioned, there could be a hyperlink to the e-learning module for further information. The development of further e-learning modules around other terms would be similarly useful for this purpose.

4. Informing FRACTAL

4.1 Lessons learned for FRACTAL

According to the transdisciplinary literature, understanding terminology discrepancies and coming to a common meaning of terms, or at least making explicit the differential understandings, is fundamental to successful transdisciplinarity. This project has highlighted that there are terminology nuances to working within a transdisciplinary space that were perhaps previously overlooked. In this regard, the FRACTAL team should be especially alert to the potential for less obvious contextual discrepancies introduced in multi-disciplinary groupings.
At a fundamental level, the terms identified through the project will have common problems across all FRACTAL cities. They signify red flags when continuing to engage through FRACTAL. But at a conceptual level, the learning on the nuances to the terminology discrepancies should allow for an enhanced understanding of the complexities of transdisciplinarity. Going forward in FRACTAL, the team should remain cognisant of potential conceptual and contextual discrepancies when working in transdisciplinary groups as well as actively attempting to pre-empt terminology barriers. The tools developed as a result of this project can be utilised in this regard and are transferable between city contexts.

4.2 Reflections on the embedded researcher process

The placement of the ER at the city for the duration of the project aimed to (a) foster relationships between city partnerships and gain knowledge of the functioning and dynamics of the City as part of the FRACTAL project and (b) undertake research for this SOG.

Through her placement, the ER was able to attend multi-disciplinary portfolio meetings, departmental meetings, councillor workshops and carry out one to one consultations. These engagements contributed to the wider FRACTAL agenda which aims to "better understand the un-codified everyday practices of governance that influence the ability to engage with climate information and the perceived limitations to existing climate information" (FRACTAL Proposal). By attending these meetings, the ER was given insight into city decision-making processes, governance structures and the general workings of the city. These opportunities would not have been so readily available to the researcher were she not physically placed in the City municipality.

Importantly, by serving as the boundary agent between both institutions, the ER provided an opportunity to form relationships between the academics and city officials. This meant that the officials at the city were more willing and felt more able to make contact with academics and the wider FRACTAL community, and vice versa.

In addition to this as the ER was the primary driver of the SOG, she was responsible for setting up meetings and workshops at the city and for gathering data for the research. From within the City, the ER was able to identify entry points for research as well as suitable participating officials. An example of this was the identification of the Green Economy and Climate Change Forum, a transversal working group which served as an ideal platform to undertake some of the SOG research. Furthermore, attracting interest and participation in these forums was made easier through the ER's formal and informal relationships with City officials.

However, some challenges to the ER process should be noted. The primary limiting factor was time. The ER role aims to lay the foundations for long-term sustained partnerships between the city and the academic institution. These relationships need to form in an authentic manner and cannot be a rushed or contrived process. Although the ER's placement for six months allowed for these relationships to be initiated, more time is necessary for them to be properly established.

In addition to this, time and resource constraints on the project meant that the ER's primary focus was on carrying out research required for the SOG and as a result she was not able to involve herself in various other projects at the city. This was compounded by the fact that many projects ran over the six month contract period and hence her involvement was unfeasible. As such, the ER was not given insight into some of the small-scale decision processes in the city. The ER's lack of involvement also limited contact time with city officials thus inhibiting relationship forming and knowledge sharing. For the purposes of the SOG this limitation was minor, however, for the greater FRACTAL agenda, the ER's involvement in city projects and processes is imperative to understanding and mapping out the decision-making space in a city context.

During the six month placement, the City underwent a structural reshuffle in the form of an Organisational Development and Transformation Plan (ODTP) in order to "reverse the legacy of apartheid spatial planning, modernise government, improve service delivery, and become more customer-centric" (The City of Cape Town, 2017). However, this provided an unforeseen challenge to the SOG. Business as usual was halted as the city officials primary focus was on carrying out the reshuffle. This constrained the usual city processes making it difficult for the ER to have proper insight. Opportunities for learning about process within the reshuffle were often not possible due to the sensitive nature of the restructuring. Furthermore, the reshuffle put considerable strain on the officials, and, as a result they had less time and resources available to engage with the SOG and with the ER more generally.

Despite these limitations and constraints, the placement of the ER was invaluable to the project as it provided the opportunity to carry out necessary research from within the City and, importantly, lay the foundations for long term sustained partnerships between the City and the academic institution.

4.3 Reflections on the co-exploration process

This project set out to be explicitly co-exploratory in nature. As defined by Taylor et al. (2017), co-exploration refers to a "participatory relationship-building process that brings climate scientists, policy-makers and practitioners together to ask questions of each other, share knowledge, and develop a joint understanding of what is potentially needed from climate science by decision-makers". In this regard, the project can be considered very successful. The knowledge products resulting from the project are a direct result of the collaborative process between the City and the researchers. Locating the ER at the City for the duration of the project resulted in the burgeoning of a trust relationship between the university researchers and the City officials as well as elicited buy-in and confidence in the results of the project.
It is worth noting here that the FRACTAL programme intends to go a step beyond co-exploration into co-production. Taylor et al (2017) define co-production of knowledge as about "finding ways to foster collaboration between scientists, decision-makers and practitioners (in the public, private and civil society sectors) resulting in tangible outcomes". This project has made

clear that true co-production of knowledge is very difficult to achieve. In reality, the majority of knowledge products that are labelled as co-produced are actually user-informed products. The FRACTAL team should remain aware of this distinction and critically assess whether knowledge has been truly co-produced before labelling it as such.

4.4 Study limitations and further research

As it was only a six-month project, the learning is based on one case study of a transversal working group within the City of Cape Town. This is a small sample size for drawing any conclusive results but does provide insight into some of the complexities of language nuances across multiple sectors.

Going forward, the applicability of these results could be tested across the FRACTAL tier 1 and tier 2 cities to assess transferability of learning across the cities. Additionally, the concept of contextual nuances could be further unpacked to assess what and where the sectoral differences lie. This could be achieved by determining which words are unique to a single sector or rarely used outside of that sector, and which are commonly used across sectors. This could take place both within a city decision-space but also across other multi-disciplinary decision-making contexts. Critically, the language discrepancies across the academic and practitioner space could be further investigated for their underlying contextual nuances.

4.5 Recommendations for integrating results into the FRACTAL work plan and the way forward for the City of Cape Town

Recommended tasks/activities for upcoming work plan:

1) ***Integrating the wheel of context into learning lab activities:*** Perhaps the most widely applicable tool developed through this project is the wheel of context, which can be applied across different groupings and cities. The wheel of context is also not tied to a specific term so can be used to unpack contextual discrepancies in any identified terms. Given the learning around contextual discrepancies that is now apparent, the wheel of context tool seems to be a fundamental tool for inclusion in city engagements (such as the learning labs) going forward. As a first step, the reports from the first learning labs could be analysed for potential areas where contextual discrepancies may be present. This analysis could inform the planning for the subsequent learning labs where the wheel of context could be included as a tool to clarify the contextual meanings of the identified term(s).

2) ***Development of further e-learning modules:*** Of note in the project is also the potential for the development of further e-learning modules for addressing commonly poorly understood terms. A module on 'adaptation' and 'adaptive capacity' has already been developed as a result of this project, but further modules could be developed as and when the need arises. The need could be identified through the activities of the ERs or through the learning lab/learning dialogue processes. A joint initiative towards drafting digestible jargon pieces was initiated between UMFULA and FRACTAL in the first year of the FRACTAL project but was not sustained. Identifying and clarifying jargon terminology could be taken forward as a cross-consortium activity.

3) *Integrating "Spilling the beans" into capacity development activities:* Spilling the beans was received well by the City's transversal working group but it was noted that, as a knowledge transference game, it may have more value during capacity building exercises. FRACTAL is undertaking ongoing capacity development activities in each city. Going forward, the 'spilling the beans' game should be considered for inclusion in the training material as and where appropriate.

4) *Development of a FRACTAL reflective piece on the challenges of embedded research:* Aside from core learning objectives of this project, it has also provided an opportunity to gather learning on the challenges of embedded research, which are varied. An important output of the FRACTAL project will be to document the challenges of this relatively new approach to research across each of the cities benefitting from an ER This could be in the form of a collaborative reflective piece, a series of journal entries or a formal academic paper.

5) *Integration of City of Cape Town as a self-funded city:* This project has provided an opportunity to have an ER based at the City of Cape Town for the six-month project duration. Unfortunately, the tenure of the ER has now come to an end but the City of Cape Town will still remain active in the project as a self-funded city. Discussions are underway for a learning lab to be held in the City in October of this year. This learning lab will be the first step towards continuing the collaboration with the City going forward. There is also potential for the revitalization of the City's climate change think tank. The think tank was an initiative that began at the City in 2009 to bring together academics and specialists to address the challenges posed by climate change. The think tank was successful in the initial co-exploration of climate change issues but was not sustained. It is hoped that FRACTAL can be pivotal in revitalizing the think tank process at the City.

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