

## **Future Resilience for African CiTies and Lands (FRACTAL)**

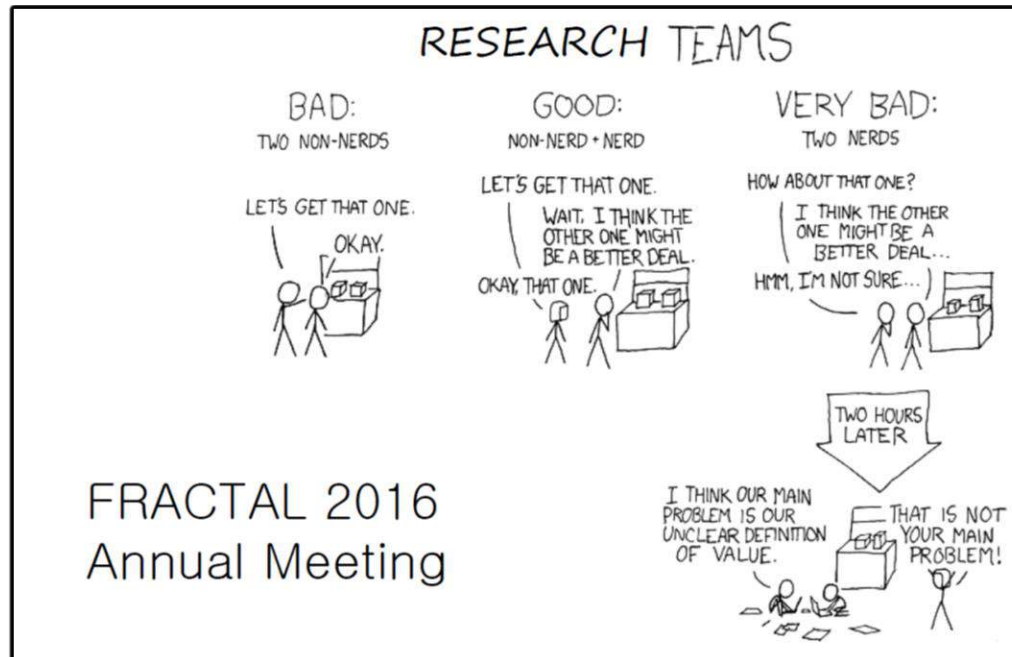
**Annual meeting: 2&3 November 2016**



**Monkey Valley, Noordhoek, Cape Town**

## Context of this document

Following the inception meeting in August 2015, the first FRACTAL annual event was held at Monkey Valley in Noordhoek, Cape Town, on 2&3 November 2016. This document provides information that was both collated and generated at the event, including an overview of and outputs from the sessions. It is hoped that this report will initiate discussion and activity to take the next steps necessary to make progress in FRACTAL. For a list of participants, please see Appendix A. A detailed programme for the event is provided in Appendix B.



(credit: B. Hewitson 2016 – Welcome and opening remarks at FRACTAL annual event)

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## DAY 1 (2 November 2016)

### Session 1: Welcome, opening remarks and order of the workshop

Bruce Hewitson opened the FRACTAL annual event. He introduced the group to the founding meta-questions, explicit meeting objectives and implicit meeting questions for the annual event, which are described in the table below.

Founding meta-questions	Explicit meeting objectives	Implicit meeting questions
<ul style="list-style-type: none"><li>• Where and how are knowledge frontiers advanced?</li><li>• What on-the-ground legacy is being established?</li></ul>	<ul style="list-style-type: none"><li>• Check progress towards objectives of project;</li><li>• Project partners “touch base”;</li><li>• Refine workplan responsibilities and deliverables;</li><li>• Share learning experiences at various levels.</li></ul>	<ul style="list-style-type: none"><li>• What course corrections are needed?</li><li>• Is cross-institutional collaboration happening?</li><li>• Are tangible outcomes emerging from the workplans?</li><li>• How are individuals engaged / new individuals included?</li></ul>

The last section of this report reflects on these meta-questions and meeting objectives in light of the discussions and outputs of particular sessions.

Bruce emphasized that many new people have joined the team, showing a photograph that was taken at the inception workshop. He also presented the outcomes of the pre-event survey. These expectations are also shown in the table below.

Expectations of participants	What participants would like to see	What participants would love to see
<ul style="list-style-type: none"><li>• Update on overall progress</li><li>• Clear plan for going forward</li><li>• Opportunity to connect with partners</li><li>• Understanding of overall research goals</li><li>• How best to contribute</li><li>• Concrete plans for collaboration between clusters</li><li>• Update on climate science aspects</li><li>• Update on city aspects</li></ul>	<ul style="list-style-type: none"><li>• Grasp the trends in measures applied to ensure FRACTAL works in the region</li><li>• Clarity on synergies and governance structures</li><li>• A clearer sense of how all the strands of work are unfolding and how they weave together to create the bigger picture that connects up to our ambitions</li></ul>	<ul style="list-style-type: none"><li>• Reflecting back to the proposal to assess what we are “missing”.</li><li>• Inspiration! Laughter!</li><li>• Exploring new innovative areas of FRACTAL and form smaller teams to work on these.</li><li>• Joint paper action plans with the climate modelling colleagues.</li></ul>

	<ul style="list-style-type: none"> <li>• Stronger engagement with the project by postdocs.</li> <li>• Agreement to more regular meetings in the climate information cluster.</li> <li>• A map of overlapping research activities currently being carried out or planned to take place in Tier 1 and 2 cities.</li> <li>• Guidance and feedback on the methodology that are decided to apply.</li> <li>• A great platform to leverage off future work.</li> </ul>	<ul style="list-style-type: none"> <li>• An exciting new well-framed, clearly articulated research question and/or promising method to work on in collaboration with others.</li> <li>• Awareness of how the project team want us to use the different online platforms - particularly Google Drive - including instruction on how to organise cluster activities and documents on the drive.</li> <li>• Hear examples of what we know now that we didn't know at the start of the project (i.e. new knowledge), and how this is useful.</li> <li>• Understand the methodologies used by others in research activities expected to take place in Maputo and other Tier 1 and 2 cities.</li> <li>• Seeing how our part contributes to the bigger picture.</li> <li>• Some real innovative new ideas/thinking in the climate science space!</li> <li>• Innovative areas of fertilization that we hadn't really planned for or were unsure how they could happen.</li> </ul>
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See Bruce's presentation [here](#).

Thereafter, Bruce and Alice introduced participants to some of the logistical aspects of the event, including the GEC Africa grant posters that were especially developed by city partners and printed for the event (see Appendix C), and the FRACTAL infographic, which is being created to

illustrate an overview of the FRACTAL approach. Participants were requested to review and annotate on a large print out of the first draft of this infographic (see below).



## Session 2: Ice-breaker

Chris Jack facilitated an ice-breaker game during each participant received a card with an illustration of an occupation “character” on it. Participants then had to find their matching characters amongst the group, and think about whether this occupation would benefit from climate change. Thereafter, pairs were invited to share their perspectives on how particular occupations would benefit.

## Session 3: FRACTAL in a nutshell

Alice McClure brought participants up to speed with regards to the status of FRACTAL. She noted that FRACTAL is currently at what could be considered the tail of the *lift-off phase*, and that the past year has been one of continuous learning. Some of the challenges faced in this process include: working with a large number of partners; co-dependencies, and issues around ‘what should come first,’ e.g. providing climate information before getting input from stakeholders; and difficulties zooming into the city scales. Alice highlighted that going forward the road will not be the same for everyone, as each person will each play into different components of the work. Importantly, she noted that everyone will be continuously learning going forward as well, and this learning needs to be documented!

To move the project forward, the following main activities were proposed:



- Continue to develop and improve conceptual framework that is accessible to all, and into which all can plug ourselves.
- Continue to strengthen frameworks for governance and decision making, learning and reflection, communication, knowledge management, capacity building, collaboration
- Lots of facilitated and streamlined communication.
- Further/deeper engagement with climate science.
- Need to “do” or “prototype and tweak” more.
- Know our audience: tailor interactions to contexts, particularly at the city level.

See the presentation [here](#).

While Alice presented, participants were asked to think about one (or more) thing(s) that they are proud to have been part of during the first year of FRACTAL, and one (or more) mistake(s) that they had learned from. Participants captured these thoughts on cardboard flower-shaped cut outs, which were then stuck on a back wall to facilitate the idea of letting “many flowers bloom” (i.e. encourage ideas from many sources). The feedback from exercise is presented below. To follow up on any of these successes or lessons learned, please see Appendix A (list of participants), which includes contact details.

Successes	Mistakes from which we've learned
<ul style="list-style-type: none"> <li>• Contributed toward understanding how methods in FRACTAL might aid in treating uncertainty in climate science – anonymous</li> <li>• Was introduced to the project and welcomed by the team at a very Well organised workshop. So far, so good – new participant</li> <li>• Lusaka learning lab – Richard Jones</li> <li>• Working across clusters: to create ‘framing’ ideas/concepts/methods. 1) DM and CL clusters – 2 working papers. 2) Nexus – conceptual model; TD indicators critical zones – Di S</li> <li>• Inclusion of a participant from the informal settlements brought a different perspective to the learning lab in Lusaka – Wilma</li> <li>• Building of relationship with the: city, participation through clusters – John</li> </ul>	<ul style="list-style-type: none"> <li>• Mistakenly assumed trilateral agreements would be straightforward – Genito</li> <li>• Underestimated language barriers – Genito</li> <li>• I have not engaged with any of the FRACTAL activities yet. I would like to start now – Tania Williams</li> <li>• Underestimated need to be more proactive in communicating with partners when geographically challenged – Niki</li> <li>• Insufficient regularity of momentum from climate cluster meetings – Richard Jones</li> <li>• Missed out on some learning opportunities by missing a webinar session – Burnet/Burrel</li> <li>• Not spending enough time preparing for the meeting by reading background materials – new participant</li> </ul>

<ul style="list-style-type: none"> <li>• Managed to get a very diverse group of people to become excited about collaborating (but that could just be the money speaking) – Bruce</li> <li>• Make the cities work and think about climate change issues involving decision makers – anonymous</li> <li>• Examine how climate models are picking up impacts of climate extremes in FRACTAL regions of interest – Kwesi</li> <li>• Facilitated for the secondment of the Embedded Research from Lusaka City Council for the University of Zambia (UNZA) – Mulimba</li> <li>• Contribute to initial project design – conceptual but not participated enough in interpretation – the hard part – Mark Tadross</li> <li>• Widen ‘climate change’ space – Coleen</li> <li>• Proposal development for further funding to complement FRACTAL activities – Chipso</li> <li>• Pushing climate science away from conventional “top-down” approach – Chris Jack</li> <li>• Feeling very supported in integrating Climate Change into decision making – Helen</li> <li>• Getting engineers to think about climate change risks (and opportunities) – James C</li> <li>• Integrated with other DfID research programmes – anonymous</li> <li>• I have learned to be patient. Frustration – waiting for MoU’s to be signed – doing what we can conceptually until we can work in the cities – Di S</li> <li>• Contributed to city learning lab paper and organising Windhoek learning lab – Eddie</li> <li>• Contributed towards holding of the first leaning lab in Lusaka – Gilbert Siame</li> <li>• Found a ‘niche’ – working on discourse analysis with Di Scott – Katinka</li> <li>• Produced a FRACTAL working paper exploring trans-disciplinarity, knowledge co-production and co-exploration – Anna Taylor</li> </ul>	<ul style="list-style-type: none"> <li>• How I’ve been discriminated from the next user – Kwesi</li> <li>• Waiting for clear instructions – “what to do” and complexity of FRACTAL was underestimated – Grigory</li> <li>• Not making enough time to engage with FRACTAL and in particular to learn from others – James Cullis</li> <li>• Need to allocate additional trip for paper writing prep and coordination – anonymous</li> <li>• It takes time to setup MoUs and partnerships on city level (and important to getting result) – Bettina</li> <li>• Fairly new to the project still trying to find my feel. FRACTAL feels like a very big complicated project – Muthige</li> <li>• I am new to the project so I still need to contribute and learn from successes and mistakes – Lulu</li> <li>• Trying to be too innovative – Chris Jack</li> <li>• Took too long to recognize the depth of intrinsic assumptions and presumptions – Bruce</li> <li>• Pushing reticent municipal departments too hard to engage with climate change or not seizing brief periods of opportunities – Sean O</li> <li>• Underestimated the logistical challenge to convene a learning lab – Gilbert</li> <li>• Underestimating the time required to co-author/co-produce a working paper (especially across disciplines and organisations) and book chapter (especially including review process) – Anna Taylor</li> <li>• Trying to incorporate too much into our outputs and having to choose what was actually feasible – Rebecca Ilunga</li> <li>• The MoU/sub-contract process was onerous and delayed things – Meggan Spires</li> <li>• Should have gone into FRACTAL with a better/clearer idea of what co-exploration is. The definition has been refined during the co-exp/co-prod/transdisciplinary paper production process but made us realize we didn’t have a clear understanding from the start (even as the author of the co-exploration paper) – Anna Steynor</li> </ul>
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<ul style="list-style-type: none"> <li>• Translation of peer-review output from TD partnership to accessible material for city practitioners – Sean O</li> <li>• Managing co-production – Jess K</li> <li>• Contributed to the take-off of FRACTAL in Maputo – Genito</li> <li>• Identification of language as a barrier to engagement with climate information – subject of small opportunity grant in City of Cape Town next year (recently funded) – Anna Steynor</li> <li>• Amazed by the buy-in of skill levels of the city stakeholders we're engaged with. Really enjoying working with them – Meggan Spires</li> <li>• Contributing to paper on learning labs – Julie</li> <li>• Helped organise the Lusaka learning lab – Wilma</li> <li>• Finished a working paper: Framework for Assessing Climate Processes – anonymous</li> <li>• Working collaboratively on several outputs with other partners (and SEI team). E.g.: resilient cities paper, adaptation options inspiration book, city learning paper, DM renew paper – Sukaina</li> <li>• Will contribute with hydrologic impacts of climate variability and change – Feyera Hirpa</li> <li>• Contributed to climate process chain idea – Laura</li> <li>• Examples of involvement of decision makers in FRACTAL project – anonymous</li> <li>• Coordinated the full annual progress report for the FCFA programme – anonymous</li> <li>• Need to clearly understand what I can contribute to FRACTAL – Feyera Hirpa (newly joined)</li> <li>• A list of observational datasets and definition of ITCZ position (Rain belt position) - Grigory</li> <li>• Helping Alice with the bi-weekly digest – Carla</li> <li>• Awarded approximately 150, 000 USD for START's GEC Research in Africa Grants to FRACTAL Researchers from Harare, Lusaka, and Windhoek – Niki</li> <li>• Contribution to Co-exp/Co-prod/Trans – Shle</li> </ul>	<ul style="list-style-type: none"> <li>• Underrated the complexity of how long it would take to set off the ground and implement - John</li> <li>• Underestimated the preparation involved in online planning exercise – Alice</li> <li>• Slow integration into the FRACTAL community – Victor</li> <li>• Not engaging with the online collaboration tools earlier – Laura</li> <li>• Underestimated the time it took to recruit an embedded researcher – Wilma</li> <li>• Haven't engaged in FRACTAL. Would like to get on board in the Decision-making cluster – Carla</li> <li>• The context really matters. Climate change etc. not key for cities – need to immerse yourself in context – Coleen</li> <li>• Thought it would be easier to engage in decision making cluster activities working remotely (6, 000 miles away) – anonymous</li> <li>• Have not found time to properly get going with the actual research – Katinka</li> <li>• To actualize setting up the FRACTAL office of Lusaka City Committee/council – Mulimba</li> <li>• Lost momentum and failed to provide an up-to-date internal FCFA newsletter – a loss for the FCFA family – anonymous</li> <li>• Underestimated time needed to build prototype for model development – anonymous</li> <li>• Still struggling with downscaling due to lack of access to SAWS data (still figuring out how to unblock) – Helen</li> <li>• Assumption that city stakeholders are aware of processes involved in transdisciplinary research – Chipso</li> <li>• Still haven't figured out how to take FRACTAL messaging effectively into city to engage more line functions – Helen</li> <li>• Naïve understanding of the challenges in working in a multi-sectoral group – Bill Gutowski</li> <li>• Staying too conceptual rather than trying things that might fail – Chris Jack</li> </ul>
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<ul style="list-style-type: none"> <li>• Started writing a concept note for the application of decision-scaling in climate informed decision making – Rebecca Ilunga</li> <li>• Lusaka learning lab was an inspiring start and process allowing for engagement (formal and informal) – Bettina</li> <li>• Bringing together people to take a multi-sectoral view of climate change – Bill Gutowski</li> <li>• Contributing to FCFA modular – published (burning questions) – Victor</li> <li>• Lobbying for inclusion of climate data in decision making; and setting a research base (Research Group) – Burnet</li> </ul>	<ul style="list-style-type: none"> <li>• Not enough engagement, both internally at CSAG, and externally – Mark Tadross</li> <li>• My focus is on Windhoek. SO want to be involved in relevant activities but the project is structured through broader themes, so has been hard to be as engaged as I would like – Gina</li> <li>• Underestimating amount of time required to be a cluster co-lead – Sukaina</li> </ul>
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## Session 4: Introduction to FRACTAL learning

During Session 4, Bettina introduced the meeting participants to the first draft of the FRACTAL Monitoring, Evaluation and Learning (MEL) framework. She emphasized the importance of the FRACTAL team recording and communicating project learnings, to feed these learnings back into an adaptive management system. She also made participants aware of the first draft of the MEL framework, which outlines the methods that the FRACTAL team should use to capture, store and communicate their learnings, so that these lessons can be used to improve activities. See the first draft of this framework [HERE](#). **It is highly recommended that all FRACTAL partners become familiar with this document,** which has four overarching objectives, to: i) **instill and maintain a hunger for learning** among project partners and other knowledge holders associated with the FRACTAL project; ii) **create stimulating spaces that allow reflection** and documentation of iterative learning in the process; iii) use this learning, reflection and evaluation to improve project activities, and **inform the broader community of practice**; and iv) ensure sound process of participatory monitoring and evaluation of the project that **produces robust evidence**.

Once Bettina had introduced the participants to the MEL framework, participants put forward some suggestions for learning in FRACTAL (see below). The **MEL task team is mandated with assessing these suggestions and integrating them into the MEL framework.**

- In all reports (trip, events etc.) and deliverables (e.g. working papers, journal articles) a section for 'reflective learnings' should be included
- A select few should try keep a journal to document their own learning journeys. Team members who keep a learning journal will meet annually to share lessons learned.
- More webinars should be organized and dedicated to sharing lessons (link with Task 1.5 in the City Learning cluster workplan).
- Use the 'higher level' introductory presentation slides given at engagements as learning benchmarks

- Have a weekly blog: everyone in the FRACTAL team will write one per annum (at the most).
- Climate cluster needs to feature more strongly in the discussions about learning.

Bettina finished the session by explaining that she would be posing two questions related to expectations for FRACTAL to willing participants at the annual event. *She would use these video clips to put together a short video that can be viewed at the 2017 annual event, and compare what will have been achieved with what was expected.*

### **Session 5: Group work exercise 1 (FRACTAL knowledge products, research questions & ToC)**

Bruce introduced Session 5 by providing an overview of the research context of FRACTAL. He then explained that the exercise was an opportunity to: i) consider work that has been undertaken, or is ongoing; ii) reflect on what stand-alone knowledge has been produced; iii) assess how this knowledge contributes to pathways of impact; and iv) think about the next steps for knowledge production. Research clusters (city learning, climate information, decision making and nexus) then broke away to reflect on these questions/themes. This session was supported by material that had been developed and distributed prior to the event – see [here](#): “Research context”.

During the feedback session, breakaway groups (clusters) were asked to present three “headliners” from their discussions. The feedback from these breakaway sessions is provided below (some groups presented more than three headliners).

#### City learning

Discussions in the city learning cluster focused on the following:

What knowledge frontier we are looking to advance?

**Bridging the science-policy-practice interfaces in city regions; translating and feedbacking between scientific knowledge and management practices in cities; breaking down binaries between government, academia, civil society and the private sector to build sustainable partnerships of learning and action for urban development.** We aim to better understand and articulate this new paradigm (as different from the old, still dominant paradigm) and what the shift between these paradigms entails.

The key **research questions** we are seeking to address, with the cluster in **leading role**, is:

- (1) How do various knowledge co-production and co-exploration methods work in different city learning contexts? (identify and test existing methods AND innovate to create and test new methods that are context sensitive and appropriate)

The key **research questions** we are seeking to address, with the cluster in a **supporting role**, are:

- (2) What are the relative strengths and weaknesses of various decision support methods and tools? (led by DM cluster)
- (3) Is there evidence of decision-making being in the process of changing that FRACTAL has contributed to? (led by DM cluster and cross-cutting cluster through the MEL framework)
- (7) What city-region decision pathways can be identified for the uptake of increasingly detailed climate information? (led by DM cluster and climate info cluster)
- (11) What are the relevant baselines and their associated uncertainties in the observations / observation-based products (both climate and non-climate)? (led by DM cluster and climate info cluster)
- (14) What is the most informative way for climate scientists to quantify and present the range of estimated future climates to co-produce knowledge about climate vulnerability, risks and adaptation with city partners? (led by climate info cluster)

The city learning cluster also **proposed deleting research question 4 as it is covered under question 1 and deleting question 10 as it is an exact repeat of question 3.**

The legacy we hope to build through the work of this cluster is: the basis and continued drive for transdisciplinary, sustainable, integrative partnerships in and between cities

The **outputs or products** we have already delivered or are in the process of crafting include: **holding Learning Labs; Learning Lab workshop report; Learning Lab facilitation guidance document; building new and strengthening existing relationships; embedded researchers in post; monthly ER reports; ER work plans; 2 working papers; reflective reports and journals; Tier 2 city visits; Tier 2 city protocols; city background reports; Lusaka burning issues report; city stakeholder contact list**

### Climate information

The climate information cluster assessed knowledge products related to the activities in the workplan. These activities and knowledge products are further described below.

Knowledge product(s)	Comments
Task 3.1: Data catalogue:	
<ol style="list-style-type: none"> <li>1. SMHI have compiled a list of datasets, available as a spreadsheet on the Google drive.</li> <li>2. SMHI have also developed scripts for processing data to CORDEX grids.</li> <li>3. CSAG has been downloading and formatting datasets for use in the cluster.</li> </ol>	<p>There is a risk of duplication of efforts between SMHI and CSAG on post-processing. There is a need to make datasets available (bearing in mind usage restrictions) to the cluster. An idea was discussed to subset (crop) data for city-regions to reduce data size.</p> <p>Ongoing research question - what is the role of data for cities? The focus of the data catalogue is for the climate science work but another discussion is needed on how this data could be used/useful for city work.</p>
Task 3.2: Climate information for city learning labs	
<ol style="list-style-type: none"> <li>1. The Met Office (Richard) produced information on El Nino for the Lusaka learning lab. However, this was not used as the Lusaka task team was cautious to bring in climate information at an initial lab. There was a negative reaction that climate information wasn't being given, but there was apparent confusion about what climate information was relevant (e.g. related to a discussion on the breaking of the current drought). City participants did not fully appreciate difference between long-term anthropogenic climate change, and a change from normal (e.g. drier season) as a result of climate variability.</li> <li>2. Some preliminary work has been conducted by the Met Office (Laura) to produce information for the Windhoek learning lab. CSAG have been working on trial visualisations and narrative approaches, which will hopefully be ready for Windhoek – this is being led by climate information cluster members in the Windhoek task team.</li> </ol>	<p>CSAG will share the work on visualisations and narratives, with members of the cluster inputting to the narratives.</p> <p>There is a clear need on capacity building for understanding climate change. This presents an excellent opportunity for cluster to engage in communication/teaching about climate variability-versus-climate change.</p>
Task 3.3: Online information platform:	
<ol style="list-style-type: none"> <li>1. CSAG, led by Chris, have been working on producing “plume” plots that can be disseminated. There is caution about creating a new information portal. There has been a call at the Lusaka workshop for an online collaboration platform for participants.</li> </ol>	<p>Information produced for the learning labs should be shared on an appropriate online platform.</p>
Task 3.4: Baseline/uncertainties	

<ol style="list-style-type: none"> <li>1. Victor's work at CSAG on climate trends for whole of southern Africa domain and over 8 cities, from station and gridded products – a paper is being written.</li> <li>2. SMHI (Arun) have also looked at precip, temperature cloud cover etc for southern Africa across observation products (reanalysis), and different RCMs, and GCMs driving RCA4 – CORDEX Africa results. This work is also looking at ENSO and IOD. A poster is available, and a poster will be circulated to cluster. Next step would be to link this to cities, and to process investigations.</li> </ol>	<p>Victor to share the related SASAS poster and consider writing a fact sheet/brief to showcase the results earlier.</p> <p>See Victor's poster <a href="#">here</a>.</p> <p>See Arun's poster <a href="#">here</a>.</p>
Task 3.5: Process drivers	
<ol style="list-style-type: none"> <li>1. The Met Office (Joe, Tammy) have shared a working paper on a framework for assessing climate processes. This work is to inform development/use of relevant metrics to assess models.</li> <li>2. CSIR (Francois) have been progressing regional model experiments on internal versus forced variability, the ENSO teleconnection problem, and 8km downscaled CORDEX runs for city domains (currently covering Cape Town, Maputo and Windhoek).</li> </ol>	<p>There is a shared interest for possible work on simulations focusing on tropical cyclones at CSIR and the Met Office</p>
Task 3.6: Sources of contradictions/added value:	
<ol style="list-style-type: none"> <li>1. CSAG (Izidine) are concentrating on this, but there is insufficient output data from models (need more vertical levels). Izidine is working on a paper. Izidine could share a more concise early release version.</li> </ol>	<p>More work is needed to define task activities and what they should encompass, especially around added value.</p>
Task 3.7: Synthetic time series:	
<ol style="list-style-type: none"> <li>1. Rebecca is preparing a paper which can be shared at some point in the future.</li> </ol>	<p>This work is largely on hold. It is linked to work in Nexus cluster with James and Rebecca (Aurecon) and Piotr and Chris (CSAG).</p>
Contribution to 1.5° C special report	
<p>This work has not progressed. There is a need to think about whether or not to continue with this task and whether it can be useful for cities. If this activity is not continued, could the cluster (as FRACTAL) rather contribute to AR6? Could possibly influence the scoping (if members are involved) and feedback to group. The first scoping meeting is scheduled for May 2017. In addition, there was general discussion about integration within and across cluster and institutions. There needs to be better coordination and formal engagement across the cluster – monthly meetings are essential. Encouraging the sharing of regular updates is also important.</p>	



## Decision making

The decision making cluster identified the following knowledge products associated with the work that people in this group have been undertaking:

- A Blantyre trip report, which includes burning questions and the decision making context for the city.
- “What is a resilient city” think piece, which is linked to cities research but does not directly link to research questions. However, it is linked to co-production, and co-exploration.
- ER documentation (Lusaka) (potentially linked to research question 6). This documentation is/will be linked to interviews with key stakeholders, and the discourse analysis
- Menu of adaptation options (transferrable to Tier 2?)
- Comparative analysis across the three Tier 1 cities (will work with embedded researchers in the future).
- Observer guidelines: how to undertake a discourse analysis
- Review of methods to support the DM process in cities (Q2). Six methods for supporting DM/6 methods for how decisions are made. The next steps are to identify and apply methods, and link the RDM to the WEAP model.
- Adaptation inspiration book: cross-city learning (visual)
- Network analysis – where are decisions made? “the shadow actors”. Need to think about the methodology for a deeper stakeholder mapping exercise. Need to organize a call for methodological approach for stakeholder mapping.

## Nexus

During this session, the nexus cluster: i) defined their purpose and objectives in FRACTAL; ii) identified the knowledge products that have been developed and methodologies that have been adapted; iii) thought about themes to tackle/work with going forward; and iv) presented the headliners from the session. This feedback is presented below.

What is nexus?

- Interaction between physical and social, local and practitioner knowledge.
- Incorporates both Bottom-up and Top-down approach.
- Conceptual physical broad system difficult to engage with partners – dialogues from Lusaka Learning Labs enable easier engagement.

- Lack of time – proceed independently and create physical and social tools for the interface of clusters to implement on-the-ground to meet timeframes.

Objectives of the nexus cluster: the nexus presents the intersection of a number of entities (similarly to the entire project, actually): i) natural and social sciences; ii) water/food/energy; iii) city/regions; iv) formal/informal; and v) local needs/research interests

Knowledge products that have been developed through nexus-related research:

1. work around critical zones concept, extending towards political ecology
2. conceptual model of the city as a vehicle for cross-disciplinary engagement
3. concepts of transdisciplinarity
4. concept of dialogues – extension of LL

In the future, the nexus cluster needs to: i) somehow address official vs. informal aspects of city functioning; ii) explore water sensitivities; and iii) identify critical impacts.

Nexus headlines from breakaway session:

- ❖ This cluster represents the nexus of many faces
- ❖ The dialogues and conceptual model will be used as a main vehicles for engagement (also for products, in a way...)
- ❖ The main barrier experienced by people in the nexus cluster is the time framing of FRACTAL: time starts imposing the need to be prescriptive rather than responsive, moving away from meaningful emergence... This has both good and bad consequences, though.

General comments from feedback session

Mark New suggested to share recent work on blogs as this has been effective for engagement in ASSAR. There was also a request for city specific “fact sheets” (or equivalent) generated from FRACTAL, acknowledging the parallel need to better understand city decision contexts.

## **Session 6: Feedback from city partners**

During session 6, all cities (including self-funded) provided feedback based on the three questions/themes below.

1. What burning issues (i.e. critical areas for research, decision-making and implementation) are emerging as a focus for FRACTAL in this city and how do these link to the FRACTAL research questions?
2. How has the collaboration among city partners and research partners on the project been working and what suggestions do you have for making improvements (if you think it's necessary)?
3. What else is going on in the city, region and/or national level that present important opportunities for synergies with FRACTAL (limit to mentioning top 3 in terms of how good the fit is and how significant the impact could be)?

During this long session, Jess Kavonic (ICLEI) developed a blog entitled “City processes in FRACTAL and an indication of what we have learned thus far”. The text for this blog is presented below (to be shared on the FRACTAL website soon).

**Blog: City processes in FRACTAL and an indication of what we have learned thus far**

A key focus of the *Future Resilience for African Cities and Lands* (FRACTAL) project is linking city environments and climate scientists. As such, continual engagement with cities is absolutely crucial to the success of the project. To date, a learning lab has been held in Lusaka (Zambia) with one currently being prepared for Windhoek (Namibia). Face-to-face meetings have occurred in Maputo (Mozambique) as well as in Harare (Zimbabwe), Gaborone (Botswana) and Blantyre (Malawi). An updated climate projection report was compiled for the City of Cape Town, with this then being presented to key decision makers within the city council. Durban is currently setting up interactions to better understand urban biodiversity and its relation with future regional climate change projections.

Through these various engagements a greater understanding of each city context has been achieved and critical areas for research for each project city has been identified. Interestingly challenges across cities are very similar, including *inter alia*: i) limited water supply to the city; ii) limited energy in informal settlements; iii) over-exploitation of urban natural assets; iv) stormwater and sanitation issues; v) flooding and vi) food security. In Lusaka, the only city to currently have had a learning lab, the burning issues were narrowed down with the primary focus for future engagement relating to water challenges in peri-urban areas.

Through the differing interactions, a key learning is the value of face-to-face meetings. Face-to-face interactions were found to be extremely useful in creating partnerships and momentum in the cities. Key stakeholders and individuals are better identified whilst an understanding of the different programmes and projects currently occurring in each city can be better understood. These individuals and projects provide points for future collaboration and present important opportunities for synergies with FRACTAL. The learning lab was also found to be an extremely important point of engagement whilst the methodology used at the learning lab provided notable learnings. From these engagements, it is clear that the FRACTAL project should build on

existing relations and programmes and fill in key capacity gaps through close collaboration, building on what is currently happening on the ground. The points of collaboration identified in each city will be investigated further as the project progresses.

Through the interactions with the key decision makers at the City of Cape Town, the Lusaka learning lab and during the face-to-face meetings in all other FRACTAL cities as well as during the discussions at the 2016 annual FRACTAL event, the need to understand the institutional arrangement of local authorities has been identified. Understanding the key decision makers is a complex process but does provide significant points of entry for the sustainable influence of governance structures. Often there is an 'official' and 'unofficial' decision-making structure and identifying the key 'gate keepers' or 'knowledge brokers' is crucial. The institutional government structures in African cities are extremely dynamic and so this process should be ongoing through-out the project period. Despite the complexity and rapid shifts of the decision making space, a variety of opportunities will present themselves as a result of this change.

Engaging on topics related to climatic conditions being faced within each city has also been useful to propel the project forward as its relevance is more easily communicated. However, caution must be taken because not all current conditions are linked to climate change (difference between climate change and variability). Existing international platforms are also valuable links and points for synergies (i.e. Compact of Mayors, 100 Resilient Cities programme).

The exercise of providing an updated climate projection for Cape Town, then running sessions with the key decision makers to better understand these projections provided important lessons that can be replicated in the other project cities. One of the most important lessons was the effectiveness of narratives/scenarios in communicating the potential impact of climate change. In the City of Cape Town these scenarios have resulted in increased levels of engagement with key decision makers. A major barrier identified for mainstreaming climate information into city structures is linked to messaging and the way information is communicated.

Despite the increased levels of engagement in the City of Cape Town (described above), there is strong evidence indicating that there is a need for more definitive, concrete information which can be used for decision making going forward. To this end, **further research and engagement needs to occur in order to understand the real reasons that different city departments require more evidence. More research is required to better understand what is really needed to help overcome the reluctance to use the available climate information to make decisions. There is also a real need to better understand what causes mental shifts in the willingness to engage with and use climate information and how to utilise those individuals to continue engaging with this information.**

Linked to the creation of narratives and scenarios for Cape Town, the visionary exercises undertaken during the Lusaka learning lab were also important. It seems that exercises that force decision makers to start thinking and interacting with the future actually prove very useful. In Lusaka Chris Jack presented newspaper headlines and El Nino conditions to spark thinking about how things would change in the future as a result of climate change.

The FRACTAL project has a very strong focus on transdisciplinary and co-production. All FRACTAL project cities have been asked to provide guidance, shaping the engagements based on their city needs. From the face-to-face engagements with a number of cities it was very apparent that this is not the norm and in practice is still met with some resistance. This perhaps talks to the larger issue of international funding which is currently being directed towards Africa in excessive amounts. In the past, these external donors may not have given the cities much say in directing this investment.

From the FRACTAL engagements however, it seems that new science and new methods are needed but that these processes are new, and **stakeholders might need support to adopt the new approaches that don't promise particular deliverables at the get go. Decision-makers might need to be encouraged to step outside the normal ways of doing things whilst given time to adjust when being pushed out of comfort zones. There is a need to better understand the points of leverage or change in city structures so that entries for FRACTAL can be identified.** This approach should facilitate breaking down of binaries. Encouraging transdisciplinary thinking is also about building relationships and with stronger connections and more time building these partnerships it seems that more people are willing to cross into that relatively uncomfortable 'third-space'.

This progress update and overview of some key learnings was compiled from similar themes that were emergent when all the FRACTAL project cities presented feedback at the 2016 annual FRACTAL event. The individual presentations can be viewed [here](#), and will give a better understanding of the 1) progress; 2) emerging burning issues; and 3) points of collaboration in each project city.

See the city-specific presentations [here](#).

## Session 7: Knowledge clinic

During the first day of the annual meeting, a number of people expressed that they felt they had not had enough time for deep, group engagement. As a result, the "paired beach walks" session that was originally included in the programme was exchanged for a "knowledge clinic" session, during which topics were proposed for discussion. The following topics were proposed for discussion: i) climate narratives; ii) conceptual, heuristic model; iii) balancing/integrating national planning with city-scale planning; and iv) potential for issue-based, multi-city labs. Notes from these discussions are presented below.

### Climate narratives

During this session, a group of people (mainly from the climate information cluster) discussed approaches for **developing narratives; a consensus was reached that the process should be built on the background of the IPCC Working Group 2 report.** In the FRACTAL context, these narratives are perceived as "conversation starters" on climate issues such as extremes, time horizons of climate events, response surfaces and should be able to generate a

discourse within FRACTAL cities and learning labs. In addition, they will create awareness on each FRACTAL city's particular climate situation. The group also agreed that there should be iteration through co-production and as such the narratives for each FRACTAL city should be developed together with the city learning cluster. The group also agreed that cities could be paired based on probabilities and commonalities in their climates. The group emphasised the need for feedback from FRACTAL cities on narratives, tracking modifications for narratives, and lessons learned through the iterative process for each FRACTAL city
Conceptual, heuristic model
<p>The focus of this groups was to explain the draft conceptual, heuristic model that has been developed in the nexus cluster (see draft model for Lusaka <a href="#">here</a>) and the thinking behind it, and to further discuss how the model could be applied in the research process going forward.</p> <p>Piotr Wolski, who developed the model, first introduced the group to the online software applied, <a href="#">Insight Maker</a>. He then showed the draft model he developed for Lusaka, where he focused on bringing together physical and non-physical elements related to water delivery in Lusaka, highlighting interactions between the various elements. Piotr noted that his thinking that parts of this model would at some point be converted into a quantitative model, and that heuristic models would be developed individually for each Tier 1 city. However, Piotr emphasised that his main intention behind the development of the model was for it to be a tool for interaction with stakeholders in the cities. There was some push back in the group with regards to using the model as a tool for interaction, with some indicating that it should rather be used as an internal tool, for example for developing hypothesis related to co-dependencies. Katinka Waagsaether noted that the decision making cluster is doing stakeholder and institutional mapping, and that their thinking has been to map this onto the current heuristic model. However the feedback from the group was that overlaying these aspects in the model would only happen much further down the line, if at all, and that a completely separate Insight Maker model should be developed for the stakeholder and institutional mapping as a starting point.</p>
Potential for issue-based, multi-city labs
Initially the group talked about Durban hosting a multi-city lab that would be focused on sea-level rise or biodiversity, but then decided these issues are too narrow (not of interest to all of the cities). Instead, it will be beneficial to identify a cross-cutting issue that is of some level of importance for all of the FRACTAL cities to build a multi-city learning lab around. This would help address some of the concerns raised during the Annual Meeting that there aren't yet many clearly defined opportunities for cross-city learning and interaction. It would also help bring in a comparative aspect, which was another issue raised--that there aren't any comparative research questions (although the DM cluster is trying to build this into our work plan). Participants in the City Learning Cluster agreed that the inter-city learning lab would add value to the FRACTAL partnership and city participants. It was agreed that an application for funding to support this event should be pursued through START (with a clear focus for the learning lab). A water-related theme seems to be appropriate across cities (from both a water security and flood protection perspective). Sean O' donoghue agreed that Durban would invite FRACTAL participants to attend their Coastal Processes, Engineering and Sea Level Rise as well as their Systematic Conservation Planning workshops early in the new year.
Balancing/integrating national planning with city-scale planning

National Adaptation Plans (NAPs) are part of the UNFCCC process. In 2010 at COP16 countries agreed to develop the Cancun adaptation framework describing priorities for adaptation. At COP 17 in Durban a formal decision was made to create NAPS for developing countries. This process is now under way across many countries but now non-LDCs were invited to do the same. NAPs are focused on developing the medium to long term climate change adaptation priorities at a national level and will be a key mechanism to determine the financing of adaptation priorities within a country (prioritizing the local adaptation requirements). It will be key for cities to engage in this process to ensure they are able to access climate adaptation funding in the future.

#### Updates on City engagement with the NAPs

- **Windhoek:** has been involved in the development of the national climate change policy and city issues were included in this process. For example, water and urbanization captured in the policy. With regard to the NAPs there has not yet been involvement and not sure how far this process has progressed.
- **Mozambique:** National Adaptation Programmes of Action developed ten years ago and now local level strategies now developed for cities. Cities face different issues in Mozambique. For instance sea level rise in Maputo and in other cities that is not relevant. Participants here are not sure if anyone in Maputo government is working on the NAPs and not sure where the process has progressed at national level.
- **Zambia:** In Zambia it is also not clear where the NAPs process is at national level and if the city government is involved. Previously the Disaster Management department led a similar process but it was focused on Food Security and therefore Lusaka was not involved.
- **South Africa:** there is a National Determined Contribution and South Africa has also ratified the Paris Agreement. Most city engagement in these processes are reactionary to national commitments rather than having time and space to proactively influence.

#### FRACTAL engagement

It would be beneficial to map out the current level NAP processes in each country and also determine the extent to which city issues are being captured. UCT led a study of the NAPAs and there was almost no focus on urban issues. Determining the extent to which urban is included in NAPs can help to advocate for more inclusion or target inclusion to key focus areas that are a priority for FRACTAL partners. The FRACTAL team needs to engage in advocacy now to position research for future uptake, and be specific with our engagement: who do we want to influence? Why? and How? These issues need to be discussed with management team of FRACTAL, particularly related to communications and policy advancement. Jo'burg and other cities are overwhelmed with implementation of various international frameworks – this is where FRACTAL could offer support to relieve some of the work of city staff. It will also be important to build on existing capacities of FRACTAL partners such as the Climate Centre's engagement in supporting Red Cross and Red Crescent Societies to engage in the NAP process.

#### Next Steps for FRACTAL

- Share notes of discussion with Decision Making Cluster
- Start a Google doc to outline where each country is with the NAP process.

- City representatives to determine if anyone is involved in the NAP process within the city government
- Cities to work on developing their own adaptation plans to localize the national plans.
- FRACTAL team to discuss with cities ways that FRACTAL can support policy advocacy in the NAPs
- FRACTAL management team to discuss increase in communications and policy support
- Check on new World Bank check list for cities to engage in global agreements – maybe called ‘cube’

## **DAY 2 (3 November 2016)**

### **Session 8: Recap from Day 1**

The second day began with a recap (given by Chris Jack) of the first day. He opened the session by informing participants that it was expected to rain in Cape Town. Chris spoke of the cartoon that was presented by Bruce, which prompted researchers and scientists to move from the abstract to real actions. Chris then went on to outline the exercise that was undertaken during the first day of the workshop to record and present the mistakes and successes that had occurred in the FRACTAL project (during the “FRACTAL in a nutshell” session). He thanked everyone who posted their mistakes for being honest as it helped contribute to the FRACTAL learning process.

Chris then informed the participants to speak to Bettina about the Monitoring, Evaluation and Learning (MEL) process. He emphasized that researchers and scientists need to get out of the mindset of thinking that monitoring and evaluation is laborious. He also emphasized that synergies between the various clusters would have to be developed further to facilitate more robust work within the project.

Chris then went on to talk about the city presentations that were given during Day 1 by representatives from Maputo, Harare, Windhoek, Lusaka, Durban, Cape Town, Blantyre and Gaborone, mentioning that they were very enlightening. He spoke about the background reports for these cities, and how they will likely to become repositories for city information. Chris mentioned that these reports will likely be updated periodically, and will be available to all stakeholders.

Chris then reminded the participants that four “knowledge clinics” were set up around four themes (see session 7). After Chris’ opening, Gina Ziervogel showcased a book that has been developed through the [flowafrica project](#). The book, entitled “Fostering local wellbeing in South African communities”, is available for download [here](#).



## Session 9: Revisiting the inception workshop game

Bettina Koelle then facilitated a learning, ice-breaker exercise, during which participants revisited the “ball and sheet” game that was played at the inception workshop in 2015. During this game, Bettina selected participants to represent different people/teams in the FRACTAL project, namely the: i) team undertaking research; ii) management team; iii) Steering committee; and DFID (funders). During the exercise, the “research team” had to collectively maneuver and direct different sized balls around a piece of cloth (representing Work Packages/activities), while taking into account advice from the “management team”, “steering committee” and “funders”. The exercise sparked reflections around working collectively as a team and simultaneously dealing with a number of activities, goals and pressures, in the context of FRACTAL implementation. Participants were requested to do this while taking into account their experiences and lessons learned during the first year of FRACTAL.

## Session 10: Group work exercise 2: Approach and operations in FRACTAL

Session 10 focused on the approaches that are being implemented, and operations that are being developed in FRACTAL to undertake research, and develop knowledge products (see session 5). In particular, the following concepts have been defined and are being operationalized in FRACTAL:

- **Transdisciplinarity:** Transdisciplinarity is a mode of knowledge production that is distinct from disciplinary, multidisciplinary and interdisciplinary modes of producing knowledge since it recognises, values and integrates many ways of knowing. In this context, scientific modes of thought are neither privileged nor dominant, and participatory, democratic and inclusive processes that engage the public are necessary to better understand the complex relations between social and natural systems and address problems of sustainability (Wickson et al, 2006).
- **Knowledge co-production:** Like transdisciplinarity, ideas and practices of co-producing knowledge challenge the positioning of science as a superior source of knowledge and critiques the top-down models of transferring knowledge from academia to ‘users’. This underpins a shift from aiming to produce knowledge that is scientifically robust to (co)producing knowledge that is also socially robust and thereby more readily applicable to addressing real-world problems in a given context (in contrast to theoretical problems). The thinking goes that in order to achieve this requirement of both scientific and social robustness, the boundaries between science, politics and practice need to be blurred or transgressed based on deep engagement and collaboration between academic and ‘non-academic’ or ‘non-scientific’ actors. In essence, knowledge co-production involves the combining of two or more different types of knowledge, skills and working practices by bringing together people who think and act in very different ways to create new knowledge for addressing societal problems of shared concern and interest.

- **Co-exploration:** Partly in reaction and resistance to the product orientation of knowledge co-production, which has new knowledge as the focal point, the idea of co-exploring knowledge and decisions has emerged, particularly in the (sub) field of climate services, propagated by the Climate Systems Analysis Group (CSAG) at the University of Cape Town (UCT), which leads the FRACTAL project (Steynor et al, 2016). Co-exploration is still in its formative stage as a concept. Co-exploration is currently used to mean a participatory process that brings scientists, policy-makers and practitioners together to ask questions of each other, share knowledge, and develop a joint understanding of what is potentially needed of climate science by decision-makers and what is scientifically feasible and defensible in terms of meeting that need. As such, the process of co-exploration does not have the primary intention of using the engagement to inform research and the (co)production of new knowledge. Rather the focus and main aim of co-exploration is to build the relationships and understanding needed to package, provide and communicate existing scientific data, information and knowledge in a way that is more relevant, accessible and useful to decision-makers, by relating the science more directly to what they know and need.

These definitions, and the operations that are being implemented in FRACTAL to facilitate these approaches (MEL, communications, governance etc.) are described in supporting material that was distributed to participants prior to the event – see [here](#): “Approach and operations”.

At the beginning of the session, Di Scott introduced participants to the concept of transdisciplinarity and how this approach is being (should be) operationalized in FRACTAL. See Di’s presentation [here](#). After this initial presentation, Alice McClure provided an overview of co-production and co-exploration, and how these concepts are being facilitated in FRACTAL (see presentation [here](#)). Thereafter, participants broke out into groups to discuss the following themes/questions:

1. Why are these approaches necessary in projects such as FRACTAL?
2. Exploring barriers to being involved in FRACTAL (from pre-event survey AND discussions within groups): i) which of these barriers would you say hinder project activities most substantially? Are these a result of the FRACTAL approach? (i.e. large, transdisciplinary project with multiple partners) How could we attempt to address these barriers - are framework or operations relevant?
3. What have we learned about being part of and delivering in a project like this that is important to take forward?
4. What skills need to be built (and for whom - within and outside project team) to work in a transdisciplinary manner?
5. What knowledge sets are important to work in a transdisciplinary manner?

Feedback from these breakaway groups is presented below.

What have we learned about being part of a project life this?
<ul style="list-style-type: none"> <li>• We need a <b>clear picture to frame the dialogue</b>, and talk with people not to people.</li> <li>• We need to <b>define and understand the processes involved</b></li> <li>• Need to <b>connect with similar initiatives</b> who are undertaking work that is aligned with FRACTAL.</li> </ul>
Why are these approaches necessary in projects such as FRACTAL?
<ul style="list-style-type: none"> <li>• We come from multiple disciplines: academics and practitioners.</li> <li>• It's written in our proposal and times are calling for <b>new ways to deal with complex issues</b>.</li> <li>• Because outcomes of FRACTAL will have impacts across different academic disciplines and the real world it is necessary to be inclusive in the production of project outcomes.</li> <li>• Academic work is typically extractive the embedded researcher approach and the other collaborative approaches help to <b>allow learning to continue and be sustained after the project</b>.</li> <li>• This allows work to connect better to development agendas.</li> <li>• Working within FRACTAL for transdisciplinary but <b>need to reach the academic community outside of FRACTAL to promote this approach beyond the project team</b>.</li> <li>• In the case of Cape Town, advancements have been made with regard to city officials influencing research and creating more constructive and creative spaces. Not yet in any transdisciplinary space, mostly multi-disciplinary, actively moving away from silos but still progress to make</li> <li>• <b>FRACTAL should be transgressive to influence donors as well regarding new approaches</b>.</li> <li>• Transdisciplinarity is trying to overcome the denouncement of different voices or knowledge forms which is valuable to a greater shared outcome.</li> <li>• Transdisciplinarity allows for <b>collective responsibility of research aims</b>.</li> <li>• In Aurecon a new approach of trying to work together across areas of expertise for new exploration of ideas.</li> </ul>
Exploring Barriers of being involved in FRACTAL? Which are most substantial? Are they a result of the approach? How could we attempt to address them?
<u>Priority Barriers</u> <ul style="list-style-type: none"> <li>• Emergent nature of projects - new way of working is <b>difficult to see real contributions</b></li> <li>• Difficult to find the time amongst other projects.</li> <li>• Too much planning and not enough doing – everyone is waiting for a city context.</li> <li>• A challenge is when does co-‘whatever’ stop and the path forward is fixed? <b>To what extent can this be an iterative processes?</b> In Jo-burg a task team was formed and they are now driving this kind of approach.</li> <li>• The <b>“third space” is sometimes uncomfortable</b> because people are not used to this type of research</li> <li>• <b>Communications is a very important part of the project – need to streamline the comms in FRACTAL.</b></li> <li>• Lots of work <b>can't be captured by traditional indicators</b> (e.g. relationship building, administration etc.)</li> </ul>

### New Barriers

- **Funding requirements** in place – requirement to spend 50% on the climate science.
- Prioritization of climate change – cities have more **immediate, pressing needs**.
- This is the case for Harare and for Cape Town. Cape Town has made some progress but has a way to go. In Cape Town traction comes from emphasizing that ecosystems can buffer against the impacts of climate change.

### Thoughts on methods to overcome barriers

- Suggestion for a **PI retreat after annual events** to reflect more on outcomes and think about a way forward.
- We should focus on **outputs for Decision-Makers**.
- Consider having a **transdisciplinary committee** – different types of knowledge holders
- **Map skills of the project team** to understand who can offer what.
- Need to build a **common language across the team**
- **Physical connection points** are important to establish and maintain working relations
- The third space is important. **Often the third space is catalyzed by physical presence in the same space.** This is not built into the project enough.
- Need to recognize **remote working** is a reality and from there **compromise and negotiate on approaches** to create a third space virtually.
- It is positive that FRACTAL puts a lens on barriers and issues - we don't need to solve all of them.
- Clusters have not worked very well – in some ways it has created silos. Nexus cluster is most transdisciplinary but it is so dependent on, and in some ways duplicative, of the other clusters that it is difficult to make progress. **City task teams have emerged organically and are developing into very transdisciplinary spaces.**
- To what extent are practitioners and cities actually driving the process or are they still recipients?? For Cape Town wider city hasn't been brought into the discussions in part because of a need to navigate the various scopes of work and identify who to bring in when. For example this meeting is more focused on process and is less relevant to wider city stakeholders. Content focused meetings would be very relevant.
- ICLEI Africa is a touch point between Harare and Gaborone and Blantyre. Through these processes ICLEI keeps those cities connected to FRACTAL. The cities facilitate city level processes and report back on those process to ICLEI. ICLEI therefore acts as a go between for the FRACTAL team and the cities
- Cities are in some ways an external entity
- **FRACTAL role could be to support transdisciplinary groups within the city.** It would be interesting to know if this approach works in large cities only or if also relevant in smaller cities with fewer staff, resources and connections to other stakeholders in the cities. Could we produce other approaches?

### Skills to be built to work in a transdisciplinary manor:

- **Humility, ability to listen**
- Skills to help people **understand decision making tools and methodologies of conducting transdisciplinary work.**

- On the city side building **confidence to collaborate with colleagues in other disciplines**. This also applies to people in academia as well. Need to overcome the reward systems of producing 'good' products to allow room for risk
- In Harare some officials didn't know what climate change is, there is need for **very basic training** as well. In cities staff need mandate to take decisions – we need to foster environments that allow for delegated decision making – to overcome this we need to look at systemic barriers and incentives that overcome these barriers.
- In the Cape Town Green Bond example there is collaboration across line departments such as finance, environ and water.
- Challenges relate to who the real decision makers - are consider for example national remit vs. local government remit – water, energy etc.

## Session 11: Cluster planning and feedback

During session 11, clusters spent time planning for the coming year. Most of the clusters spent time working methodically through their workplans to address any outstanding comments/queries. These workplans can be found here:

A few key points were presented back to the larger group after this planning session, which are presented below.

Nexus
<ul style="list-style-type: none"> <li>• The nexus is exploring the critical zone concept (which has strong synergies with DM cluster).</li> <li>• The conceptual, heuristic model will be used as a learning tool, and will integrate feedback from city partners (synergy with city learning cluster).</li> <li>• The city dialogues will be used as points of engagement (synergy with city learning cluster).</li> <li>• Impact modelling should start happening soon: we need to start developing tools that are relevant to the broader questions (focus on water resources).</li> </ul>
Climate information
<ul style="list-style-type: none"> <li>• The cluster will focus on narratives as points of engagement in the cities – this will link with city learning and task teams in all cities.</li> <li>• Background content (e.g. fact sheets) will be developed for the labs (e.g. change vs. variability)</li> <li>• Analysis of observed data products will be undertaken, which will link with the nexus cluster (input for impact modelling)</li> <li>• The activities on added value (not biased reduction) will link with DM cluster... We could we use the cartoon that has been developed already? And perhaps do a series in a similar format (climate 101).</li> <li>• Deliverables have been developed related to: i) contradictions in GCMs; and ii) observed data products.</li> <li>• Work on climate process chains is underway.</li> <li>• The cluster will also focus on research related to climate data for Robust Decision Making (RDM).</li> </ul>
City learning
<ul style="list-style-type: none"> <li>• The city learning cluster is facilitating TD approaches.</li> <li>• A decision was taken to pull city-level MEL back into the cross-cutting cluster. In line with this, briefs on learning in each city should be developed and distributed.</li> </ul>

- The city learning dialogues/LLs etc. links to all clusters, particularly nexus, which is the cluster driving this process.
- Embedded researchers: have detailed workplans to articulate links with all clusters
- Capacity-building in cities: i) training in cities; ii) app development; iii) inter-city exchanges

#### Decision making

- ICLEI has developed a concept note on “what does a resilient city look like?”
- A discourse analysis is underway: an in-depth discussion was had on the benefits for the projects, and how we can use outputs for the project (to be shared with the broader FRACTAL team).
- The DM cluster feels that we need to create a space to discuss the methodologies used in FRACTAL, and how they contribute to the overarching research questions. We could also use the idea of the “elevator pitch” – real-time sharing of methodologies. Information on methodologies that are being employed in FRACTAL should be shared sooner rather than later.
- Decision-making review using WEAP (synergy with the climate information and nexus clusters).
- Need to be sure that cluster calls include more “meat” than project management/admin.

## Session 12: Reflection session

Richard Jones facilitated the reflection session, during which he presented the expectations from the participants (gathered through a pre-event survey). Prior to the event participants were asked to provide feedback on: i) what they expected from the event; ii) what would like to get from the event; and iii) what they would love to get from the event. The feedback from this is provided below.

Thereafter, participants stood in a large circle and a ball was thrown from one person to the next, prompting them to provide feedback on: i) what was good; ii) what was not so good; and iii) what they would like to see changed for next time. A post-event survey was also circulated so that participants who did not have the time or opportunity to respond during the event could do so afterwards. The feedback from the reflection session and the post-event surveys is provided below.

#### What was good

- Provided a great platform for team building
- There was time and scope to focus on what the group learnt and how to take those lessons forward
- Used the time together to talk about how to work better together
- The climate scientist were forced to talk and interact
- The presentations from the different project cities were really valuable
- That there was a lot of time for reflection – time to listen and appreciate
- The time spent for closer interactions and engagements

- Shared facilitation and the way the programme flowed
- The energy in the room – noted that this was the same as last year and so motivation has not dropped
- Felt more like a team than at the inception meeting
- Sense of relief as could see things ‘gelling’ very nicely
- Conversation was happening
- Felt like the project has gotten traction on a few key ideas
- The venue was really good
- Great to see everybody again
- Was an open process and extremely easy to talk to everyone
- Great level of interactions
- Great learning experience
- Great platform to share ideas
- After the event now feel connected again – not only to the FRACTAL process but also to each other
- Finally met people that have been chatting to over emails
- The interactions made more sense this time
- Focus was on face to face interactions
- Opportunity of hearing from the cities was great
- Few new people added a different dimension (differed from the inception meeting)
- More detailed discussions than at the inception meeting
- Finally figured out what FRACTAL is all about
- Good to make some contacts
- The camaraderie so strongly evident among the participants
- It was great to have everybody in one place and to experience the great welcoming and inclusive energy. The venue was also conducive to that atmosphere. I think adapting the agenda as we went was good too.
- The people, the discussions, the venue, the vibe.
- It provided a platform for learning from other Fractal Partners; the organisation and pre-event communication was excellent!!

#### **What was bad**

- More time was needed for discussions (this was re-enforced by many of the participants)
- Not much time to finalise the work plans and chat about the actual activities and the outcome and how to go about these
- Too much focus on content and not enough on process
- There wasn't a brief about the different clusters which kept being mentioned
- Time is running out – do need to see results

### What would you like to change

- More problem based research around burning issues in the City – want to chat around issues and not in clusters
- Allow more time to hear from the cities
- Have a 'symposium' to talk more about the core science that the project is bringing in – where actually are pushing knowledge frontiers (more content to be labelled as knowledge advance)
- More space for smaller conversations
- More conversations with city leads
- Allow the cluster heads to interact with other clusters/groups and get the 'bigger' picture
- More offline discussions
- Poster of what has happened to date so that all can reflect rather than spend time getting everyone up to speed
- Want to see more focus on results or activities
- More discussion on methods and details
- Need to keep evolving as we work as a team
- More time for concrete doing
- Fewer Powerpoints
- More time for cross cluster interactions
- Need more time – propose a 3 day workshop
- More space to stand, move and interact freely
- Use strategic outputs/ideas from the presentation to inform the progress i.e. in the city presentations the points of collaboration were listed. These should be used to discuss ways to build those partnerships
- Focus around city problems rather than clusters
- Have an optional meeting/day before the actual annual meeting starts which provides an update on the project so those that feel they need to attend can catch up prior to the event
- Allow time at next year's event to talk about how FRACTAL fits in with the broader FCFA consortium
- Perhaps focus more on update, rather than background. any newbies should be advised to read project documentation to hit the ground running. A key focus should be on feedback from cities/ partners.
- Minimise the feedback sessions to only one key point per group and be strict on time keeping. Further details could be written down and read back by individuals later.
- The session on the importance of transdisciplinary working was very similar to the imbizo so could have been skipped.
- Creative ways to get quieter people involved could be thought about (e.g. more use of post-its, small break out groups) so that the same people's voices aren't the only ones being heard.



- I liked Bruce's idea to have a day for the science so that we don't lose discussion on the research issues, methods, and outputs. Again, it comes down to having a third day so that we can have enough time to deal with process/administrative matters without neglecting the substance, or science aspects.
- More opportunity to meet and discuss with other clusters, not only your primary cluster.
- Some plenary sessions on the last day could be shortened so that the last day is half day; or most end around 3.00pm
- City delegates should have more time to present on their issues

### **Session 13: Feedback from the Participating Advisory Team (PAT) team**

The FRACTAL Participating Advisory Team (PAT) provides higher-level, strategic input when requested, or in an opportunistic manner (e.g. at international conferences). It is envisaged that representatives from PAT will attend all annual events and provide strategic guidance upon request. At the 2016 annual meeting, Prof. William J. Gutowski (Iowa State University) and Prof. Timothy Carter (Finnish Environment Institute) represented the PAT. These representatives developed a PAT report that has been shared with the broader team, and can be found [here](#). This report presents feedback in five main themes: i) organization and group dynamics; ii) city case studies and learning labs; iii) transdisciplinary research; iv) Monitoring, Evaluation and Learning (MEL); and c) communications.

### **Session 14: Cross-consortia learning**

At the end of Day 2, a cross-consortia learning session was organized with another Future Climate For Africa (FCFA) consortia: Uncertainty Reduction in Models For Understanding Development Applications (UMFULA). The UMFULA consortia held their annual event during the same time as FRACTAL (2,3 and 4 November) in Cape Town, which provided an opportune moment for this cross-consortia learning. During this session, representatives from FRACTAL and UMFULA presented “burning issues” that they were hoping to discuss in groups with mixed representatives from both consortia. The following topics were discussed during the learning session:

- Challenges of working in large consortia (Bettina Koelle)
- Converging research messages of information for common regions/managing contradictions (Bruce Hewitson)
- Leaving a legacy beyond FCFA (Jean-Pierre Roux)
- Developing joint information products (Kath Vincent)
- Coordinating and sharing policy and practice engagement in-country/region (Malawi) (Mark New)
- Climate science focused discussion (Richard Washington)

Groups were requested to develop tweets in line with the discussions in which they were involved. The tweets that were developed are presented below.

#co-produce for capacity, influence and impact

undressing #climate science/tists. Revealing meaning for the real world.

#FCFA legacy: Shaping #future leaders & #climate sensitive investments

"We need to talk about..." #insertclimateissuehere

#consortiummemberanon. Explore the darker secrets & glimmers of hope.

#WTF [CFA]

#The future – probable, possible, plausible

### **Linking all sessions back to opening session and expectations**

The closing section of this report will focus on linking back the discussions that were had over the two days to the opening session, which presented the founding meta objectives, and explicit and implicit objectives for the meeting.

#### Founding meta questions

##### *Where and how are knowledge frontiers advanced?*

This meta question was explored explicitly through Session 5, and to a lesser degree through a number of other sessions. FRACTAL is pushing boundaries through the knowledge co-production processes within the framework of the city learning dialogues. This includes methodologies related to identifying timely and contextual "burning issues", and building climate narratives with stakeholders in FRACTAL cities in an attempt to address these questions. FRACTAL is also advancing frontiers through the transdisciplinary processes that are being implemented, and recording learnings from these processes (see Session 10) to influence future knowledge co-production processes.

### What on-the-ground legacy is being established?

Questions related to long-term FRACTAL legacies (June 2019) are arguably some of the most important that should be considered. Often, the after-effect of projects (particularly those that push frontiers or introduce new ways of leaning and producing knowledge) can be quite vacuous if sustainability or legacies are not adequately considered during the design and implementation of projects. Evidence from the annual meeting (based on the feedback presented from all partners) points to an encouraging legacy for city learning processes, and the methodologies that are proposed to co-produce climate knowledge. In particular, city partners (who are operating in a similar capacity to other project partners) seem excited about the learning labs and the climate narratives. Feedback from the City of Cape Town indicated that this type of knowledge co-production process has the potential to effectively influence decision-making related to climate change. Although there is much to be learned over the next two and half years of FRACTAL, it seems that a long-term legacy is being established.

### Explicit meeting objectives

#### Check progress towards objectives of project

Session 5 presented an opportunity for project partners to showcase knowledge products that have been/are being produced within FRACTAL, and link these back to the objectives (pathways towards impact) of the project.

#### Project partners “touch base”

Although many participants felt time was too limited, the event provided an opportunity for partners to touch base in both formal and informal settings. The venue (Monkey Valley Resort, Noordhoek) facilitated these interactions.

#### Refine workplan responsibilities and deliverables

Clusters had time during both the first and second day to discuss cluster workplans and responsibilities. This objective could have been improved by facilitating more cross-cluster interactions and planning.

#### Share learning experiences at various levels

A number of sessions provided the opportunity to present feedback on lessons learned. In particular, the following four sessions presented opportunity to report on learning:

- ❖ Session 3: participants reflected on lessons learned at a personal level

- ❖ Session 9: the “ball and sheet” game presented an opportunity for participants to reflect on lessons learned/expectations of working in a team.
- ❖ Session 10: during Session 10, participants reflected on what they’d learned about being part of a project like this
- ❖ Session 13: during Session 13, participants offered feedback on the annual event, including what they had learned. This was also explored through the post-event surveys.

#### Implicit meeting questions

##### *What course corrections are needed?*

- ❖ Communications channels need to be improved/streamlined (update, refinement and implementation of communications strategy).
- ❖ More opportunities for cross-city learning
- ❖ Climate information cluster should improve communications and feedback to other clusters (to be facilitated through feedback in other cluster calls).
- ❖ Sharing of methodologies, and how outcomes/outputs will contribute to FRACTAL: so that the whole team is familiar with the processes.
- ❖ Increase in pace of producing deliverables, while being sensitive to the fact that processes are emergent and city driven.
- ❖ More effective processes for sending budget to city stakeholders
- ❖ Identify ways to develop short-term/showcase explicit benefits from FRACTAL to decision makers, or other stakeholders in the city.

##### *Is cross-institutional collaboration happening?*

In some areas of research, cross-institutional collaboration is more apparent than others (e.g. the climate information cluster should focus efforts on coordinating more efficient cross-institutional collaboration). Importantly, the city task teams, which comprise a variety of different organisations, are emerging as effective mechanisms for cross-institutional and transdisciplinary collaboration.

##### *Are tangible outcomes emerging from the workplans?*

It is expected that the pace at which deliverables are being produced will increase substantially after this initial “lift off” stage. However, a number of project partners reported feeling inspired by the outputs and knowledge product that were showcased during the event.

How are individuals engaged / new individuals included?

There is room for improvement regarding ways for keeping project members (and the broader community of practice) up to date, and engaging new individuals. Currently, people are mostly keeping up to date through the slack channels, and the bi-weekly digests.

## Appendix A: List of participants

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## Appendix B: Workshop programme (original)

**Objectives of annual meeting: i) check progress towards objectives of project; ii) project partners “touch base”; iii) refine plans for the future, responsibilities and deliverables; iv) share learning experiences at various levels**

Detailed programme for the annual event

<b>day one (2 November 2016)</b>	
09h00-09h30: Registration of participants	
Session A: Introduction and touching base	
09h30-09h50: 1. Welcome, opening remarks and order of the workshop	
Facilitator	Bruce Hewitson
Rapporteur	Alice McClure
Overview	This session will open the 2-day workshop, with brief introductions and expectations of the participants.
Structure	<ol style="list-style-type: none"> <li>1. Bruce will provide a brief overview of the purpose of the event</li> <li>2. Participants will introduce themselves</li> <li>3. Bruce will provide feedback on the expectations of the participants for the event (based on a pre-event survey) will be presented</li> <li>4. Bruce will provide information on things to bear in mind and comment on/contribute to during the annual meeting: i) posters; ii) infographic; iii) last session (“burning issues” session shared with UMFULA).</li> </ol>
Main aims	All participants understand the objectives of, and hopes for, the workshop, and know which partners and individuals are attending the workshop.
Outcomes/ outputs	N/A
Supporting material	Pre-event survey
09h10-10h00: 2. Ice breaker (Chris Jack)	
10h00-10h10: 3. FRACTAL in a nutshell (1,5 years in): an honest review of progress	
Facilitator	Alice McClure
Rapporteur	Katinka Waagsaether

Overview	All participants will be brought up to speed with regards to the status of FRACTAL, the challenges experienced and the main lessons learned, and think about how they've been involved in FRACTAL (many ideas from many sources).
Structure	<p>1. Presentation on current FRACTAL status (10 minutes)</p> <p>While listening to the brief presentation, participants will write down on pieces of card: at least two things (actions, activities, ideas) that they've done in FRACTAL in the past 1,5 years. One of these should be a <b>"success"</b> that they'd like other participants to know about. The other should be a <b>"mistake"</b> that they have learned from (which might arguably be more important to share). These pieces of card (including names) will be stuck up on the wall of the event so that attendees can follow up with others and make connections where desired.</p>
Main aims	Participants understand the current status and context of FRACTAL, and the role they've played in shaping the progress.
Outcomes/ outputs	Offerings from participants in terms of how they've contributed to FRACTAL.
Supporting material	Flower-shaped cards.
10h10-10h30: 4. Introduction to FRACTAL Monitoring, Evaluation and Learning	
Facilitator	Bettina Koelle
Rapporteur	Jess Kavonic
Overview	FRACTAL team members will be introduced to the first draft of the Monitoring, Evaluation and Learning (MEL) framework.
Structure	TBC
Main aims	Participants are aware of MEL objectives, framework and expectations at the city, project and team level. This session will serve to present information on how each member can learn from and contribute to Monitoring, Evaluation and Learning (MEL) in FRACTAL.
Outcomes/ outputs	N/A
Supporting material	N/A
10h30-11h00: Tea	
11h00-13h00: 5. Group work exercise 1: FRACTAL knowledge products, research questions & ToC	
Facilitator	Bruce Hewitson
Rapporteur	Carla Petersen (for introductory presentations) Group rapporteurs

Overview	This session will spark thinking about the knowledge that has been/is being/should be produced within FRACTAL, providing an opportunity to showcase work that has been undertaken, or is ongoing in clusters. In particular, participants will reflect on what stand-alone knowledge has been produced, and how this knowledge contributes to the pathways of impact that have been defined in the FRACTAL and FCFA research contexts. Groups will also spend time thinking about the next steps for knowledge production.
Structure	<ol style="list-style-type: none"> <li>1. Bruce to provide a short introduction on research context and research objectives in FRACTAL, and what it means to have an incomplete answer (20 minutes).</li> <li>2. Participants split into clusters and interrogate FRACTAL knowledge products. Discussions will be guided by the following questions (1 hour): <ul style="list-style-type: none"> <li>➤ <b>Stand alone knowledge:</b> what stand-alone knowledge has been/is being produced in the cluster? (opportunity to showcase stand-alone work that has been produced)</li> <li>➤ <b>Research questions:</b> which FRACTAL research questions frame these outputs (i.e. these knowledge products contribute to answering) and are we expecting to have complete answers? Should these questions be refined?</li> <li>➤ <b>Contribution on pathways to impact:</b> Which FCFA and FRACTAL output(s) and pathway(s) towards impact do these different knowledge products contribute to?</li> <li>➤ <b>Next steps:</b> What are the next steps to produce knowledge that contributes to the research output (on the pathway to impact) that you are focusing? What do we need to do in order to achieve these next steps?</li> </ul> <p>Discussions to be recorded by rapporteur in each group</p> </li> <li>3. Feedback session (40 minutes)</li> </ol>
Main aims	FRACTAL partners interrogate the progress of FRACTAL according to research questions and FCFA expected outcomes
Outcomes/ outputs	<ul style="list-style-type: none"> <li>• Refined research questions, action steps for knowledge production</li> <li>• Overview of knowledge products</li> <li>• Meeting notes</li> </ul>
Supporting material	<ul style="list-style-type: none"> <li>• Supporting material: overview of FRACTAL research context (including FCFA ToC, FRACTAL ToC, summary of FRACTAL annual report) - full online report <a href="#">here</a></li> <li>• Research questions (printed) - online version <a href="#">here</a></li> <li>• FCFA/FRACTAL ToC (printed)</li> </ul>
13h00-14h00: Lunch	
Session B: city focus	
14h00-16h00: 6. Feedback from city partners	
Facilitator(s)	Anna Taylor and Meggan Spires

Rapporteur	Jess Kavonic
Overview	<p>During this session, city “teams” will provide an overview of the FRACTAL-related activities that have occurred in each of the cities, and the main lessons learned from these activities. The feedback will be guided by the following questions:</p> <ol style="list-style-type: none"> <li>1. What burning issues (i.e. critical areas for research, decision-making and implementation) are emerging as a focus for FRACTAL in this city and how do these link to the FRACTAL research questions?</li> <li>2. How has the collaboration among city partners and research partners on the project been working and what suggestions do you have for making improvements (if you think it's necessary)?</li> <li>3. What else is going on in the city, region and/or national level that present important opportunities for synergies with FRACTAL (limit to mentioning top 3 in terms of how good the fit is and how significant the impact could be)?</li> </ol>
Structure	<ol style="list-style-type: none"> <li>1. Tier 1 city feedback (15 minutes each - 45 minutes in total)</li> <li>2. Q&amp;A Tier 1 cities (15 minutes)</li> <li>3. Tier 2 and self-funded city feedback (10 minutes each – 50 minutes in total)</li> <li>4. Q&amp;A Tier 2 and self-funded cities (10 minutes)</li> </ol>
Main aims	All project partners understand the process in each of the cities, and are provided an opportunity to ask questions related to these processes.
Outcomes/ outputs	Blog: city processes in FRACTAL – one year 1, what have we learned? (Jess Kavonic)
Supporting material	N/A
16h00-16h30: Tea	
Session C: Reflections	
16h30-17h30: 7. Paired beach walks & wrap up	
Facilitator	Julie Arrighi
Rapporteur	Tania Warners
Overview	This session will enable honest reflection between two FRACTAL partners (these partners will be selected beforehand), guided by questions. These reflections will occur while FRACTAL partners walk along Monkey Valley Beach.
Structure	<ol style="list-style-type: none"> <li>1. Overview of exercise (5 mins)</li> <li>2. Participants pair up and walk with three main questions to reflect on (40 mins) <ul style="list-style-type: none"> <li>➤ What have I learned or what do I hope to learn?</li> <li>➤ What do I find most inspiring about FRACTAL?</li> <li>➤ What do I find most challenging about FRACTAL?</li> </ul> </li> </ol>

	<p>3. Participants return to the meeting room, jot down notable thoughts from the discussions on sticky notes (10 mins). After this session, the reflections will be grouped and used for the opening session of day 2. These sticky notes will remain in the workshop room for team members to read.</p> <p>4. Participants are invited to share any notable reflections (10 mins)</p> <p>5. day one wrap up (5 mins)</p>
Main aims	FRACTAL team members reflect on personal growth through the project
Outcomes/ outputs	Sticky notes that capture notable thoughts will be left in the room for the remainder of the workshop (for all attendees to view), and used as input for a word cloud. These notes and those from the “FRACTAL in a nutshell” session will sit side-by-side.
Supporting material	N/A
<b>Day 2 (3 November 2016)</b>	
08h00-08h30: coffees and catch ups	
08h30-08h40: 8. Recap from day one	
Facilitator	Chris Jack
Rapporteur	Brenda Mwalukanga
Overview	The first session of day 2 will provide a recap from day one, including an overview of the content presented and how day one has framed the activities/sessions for day 2. A short overview of the main lessons from FRACTAL captured through the beach walk exercise will be shared.
Structure	<p>1. Recap of day one (5 mins)</p> <p>2. Brief overview of patterns emerging from reflections (5 mins)</p>
Main aims	Participants are reminded of day one, and feel comfortable to begin working during day 2
Outcomes/ outputs	N/A
Supporting material	Sticky notes from the last session of day one (reviewed beforehand)
<b>Session D: Positioning ourselves</b>	
08h40-09h00: 9. Revisiting inception workshop game	
Facilitator	Bettina Koelle & Eddie Jjemba
Rapporteur	Izidine Pinto
Overview	During this session, Bettina and Eddie will revisit a game that was played at the inception workshop: the ball and sheet game. Taking lessons from Year 1 into account, the game will either provide an opportunity for reflection – what does the ball represent and what does the sheet represent? Was it easier this time around? Or the game could be updated based on lessons learned.

Structure	TBC
Main aims	Participants reflect on how “the game” has changed as a result of the tasks and operations of the FRACTAL project.
Outcomes/ outputs	TBC
Supporting material	Ball and sheet material
09h00-11h00: 10. Group work exercise 2: Approach and operations to facilitate knowledge production in FRACTAL	
Facilitator	Dianne Scott and Sukaina Bharwani
Rapporteur	Mawanda Shaban (for introductory presentations) Group rapporteurs
Overview	Participants will interrogate the approach to undertaking research in the context of FRACTAL, and the operations that should support this approach. Participants will be introduced to the expectations of the transdisciplinary project, and will be provided time to discuss what is challenging and exciting about a project such as FRACTAL, and how operations could be improved, and skills in the team built, to facilitate this approach.
Structure	<ol style="list-style-type: none"> <li>1. Di Scott to provide a short introduction to transdisciplinarity research projects and expectations (based on nexus research and lessons learned during Year 1) (20 minutes)</li> <li>2. Alice to present on foundational concepts and operations and approach for knowledge production in FRACTAL - how are these ideas being operationalised and supported? (10 mins)</li> <li>3. Breakaway groups to reflect on five main themes/questions related to FRACTAL approach and operations (50 mins). Discussions to be recorded by rapporteur in each group. These groups will also reflect on the following questions: <ul style="list-style-type: none"> <li>➤ Why are these approaches necessary in projects such as FRACTAL?</li> <li>➤ Exploring barriers to being involved in FRACTAL (from pre-event survey AND discussions within groups): i) which of these barriers would you say hinder project activities most substantially? Are these a result of the FRACTAL approach? (i.e. large, transdisciplinary project with multiple partners) How could we attempt to address these barriers - are framework or operations relevant?</li> <li>➤ What have we learned about being part of and delivering in a project like this that is important to take forward?</li> <li>➤ What skills need to be built (and for whom - within and outside project team) to work in a transdisciplinary manner?</li> <li>➤ What knowledge sets are important to work in a transdisciplinary manner?</li> </ul> </li> <li>4. Feedback from different groups (40 minutes) (including tea)</li> </ol>
Main aims	All participants are aware of the TD criteria towards which FRACTAL is working, and have time to reflect on how these operations enable or inhibit this way of working, and think about how these operations could be improved.

Outcomes/ outputs	<ul style="list-style-type: none"> <li>• Meeting notes</li> <li>• Refined concepts and operational guidelines for FRACTAL</li> </ul>
Supporting material	Supporting material: overview of FRACTAL approach and operations (covering <a href="#">governance</a> , <a href="#">MEL</a> , <a href="#">communications</a> ) TD indicators & TD reflections from first learning labs (printed). See <a href="#">MEL document</a> for online version
11h30-12h00: 11. Reflection session (of event)	
Facilitator	Richard Jones
Rapporteur	Jess Kavonic
Overview	In this session, participants will be provided time to reflect on the event, and capture ideas to inform future planning processes.
Structure	<p>TBC</p> <p>Participants are likely to reflect on the following questions:</p> <ul style="list-style-type: none"> <li>i) what was good about the meeting?;</li> <li>ii) what was not so good about the meeting?; and</li> <li>iii) what should be changed for next time?</li> </ul>
Main aims	Participants are provided an opportunity to share reflections on the annual event process
Outcomes/ outputs	Lessons learned: Year 2 annual event
Supporting material	TBC
12h00-12h30: 12. Feedback from Bill and Tim	
Facilitator	Bill Gutowski and Tim Carter
Rapporteur	Alice McClure
Overview	During this session, Bill and Tim will provide feedback on the progress of FRACTAL from a Participatory Advisory Team (PAT) perspective
Structure	<ul style="list-style-type: none"> <li>1. Brief feedback session from Bill and Tim (20 mins)</li> <li>2. Q&amp;A (10 mins)</li> </ul>
Main aims	Participants receive strategic, objective feedback and guidance from members of the Participatory Advisory Team (PAT)
Outcomes/ outputs	Blog: an objective overview of FRACTAL (Alice McClure)
Supporting material	N/A

12h30-13h30: Lunch	
13h30-16h00: 13. Planning in clusters, brainstorming	
Facilitator	James Cullis
Rapporteur	N/A
Overview	<p>This session will be used for project partners to finalise Year 2 workplans, update organisational statements of work, and discuss/brainstorm any other relevant topics. Examples of topics for these sessions include:</p> <ul style="list-style-type: none"> <li>➤ Small Opportunity Grants (SOGs)</li> <li>➤ Capacity building</li> <li>➤ City learning dialogues taking shape</li> </ul>
Structure	<p>Cluster co-chairs will lead the cluster planning breakaway meetings. During these sessions, cluster members will have the opportunity to address outstanding comments and questions in the workplans. All participants will also be provided the opportunity to lead discussions on additional topics. Participants (not leading sessions) will be free to move from one planning/brainstorming discussion to the next - if participants feel they have contributed to their planning session and would like to take part in another, parallel brainstorming session, they will be free to move.</p> <p>To increase synergies with other clusters, “linkage people” could be nominated in each cluster to visit other clusters and contribute to planning/obtain relevant information. Clusters are encouraged to be innovative to increase synergies.</p>
Main aims	Project partners are provided an opportunity to plan or engage in relevant brainstorming sessions.
Outcomes/ outputs	<p>Finalised cluster workplans</p> <p>Updated SoWs</p> <p>Idea/detailed plans for activities/research (e.g. city dialogues, SOGs, etc.)</p>
Supporting material	<ul style="list-style-type: none"> <li>• Access to year 2 workplans (electronic) - online versions here: <a href="#">city learning</a>; <a href="#">climate information</a>; <a href="#">decision making</a>; <a href="#">nexus</a>; <a href="#">cross-cutting</a></li> <li>• Gantt chart (October 2016) - online version <a href="#">here</a></li> <li>• Access to SoWs (electronic) - online versions <a href="#">here</a></li> </ul>
Session E: Cross-consortia learning	
16h00-17h30: 14. FRACTAL/UMFULA burning issues discussion	
Facilitator(s)	Anna Steynor
Rapporteur	Victor Indasi (for introductory presentations) Group rapporteurs
Overview	Participants from FRACTAL/UMFULA will have the opportunity to discuss “burning issues” that have been raised during the two-day workshops..



Structure	<ol style="list-style-type: none"> <li>1. Overview of the process (5 mins)</li> <li>2. Overview of FRACTAL: Bruce H (5 mins)</li> <li>3. Overview of UMFULA: Declan C (5 mins)</li> <li>4. 30-second intro to each “burning issue” by facilitators (about 5 minutes)</li> <li>5. Breakaway group discussions - to be facilitated by those who suggested topics and recorded by rapporteur in each group (45 minutes)</li> <li>6. Creative feedback session (25 mins)</li> </ol>
Main aims	Facilitate cross-consortia learning
Outcomes/ outputs	<ul style="list-style-type: none"> <li>• Tweets on contemporary FRACTAL/UMFULA topics</li> <li>• Learning notes</li> </ul>
Supporting material	Flip charts (with discussion topics) from meetings
17h30: FRACTAL/UMFULA beach braai and drinks	

**The programme was updated on Day 2 to reflect the following sessions:**

11h00-11h30: tea

11h30-13h00: Cluster planning

13h00-14h00: Lunch

14h00-15h00: Cluster planning and feedback

15h00-15h20: Tea

15h20-15h40: Reflections

15h40-1600: Feedback from PAT

16h00-16h30: Tea

16h30-17h30: cross-consortia learning (FRACTAL and UMFULA)

## Appendix C: GEC Africa grant posters that were developed by city partners (and printed for the event)



**WATER AND ENERGY SYSTEMS, URBAN GOVERNANCE AND  
DECISION-MAKING IN HARARE**

**START**  
Global change System for Analysis, Research & Training

Lead institution: CHINHOYI UNIVERSITY OF TECHNOLOGY  
Supporting institutions: HARARE CITY COUNCIL, ZIMBABWE NATIONAL WATER  
AUTHORITY (ZINWA), UNIVERSITY OF ZAMBIA  
Contact details [mubaya@cp@yahoo.com](mailto:mubaya@cp@yahoo.com); [myriza.mzime@gmail.com](mailto:myriza.mzime@gmail.com)




### Main objectives

**Investigate the water-energy nexus for the city of Harare including critical decision making institutions and key thresholds for decision making at all scales from household to national scales**

**Conduct a risk and vulnerability assessment for Harare**

**Compare the dynamics of the water-energy nexus and associated climate change risk and vulnerability assessment identified for Harare with that identified for Lusaka and Windhoek**

**Investigate the issues of co-dependence derived from the mutual use of Kariba dam for water and hydropower**

**Explore potential adaptation options based on best practice from both cities and joint operations of Lake Kariba**

### Project activities and location

The project will focus on Harare City, Zimbabwe. Main activities will include:

- ❖ Analysis of historic and current climate data
- ❖ Hydrological data collection and modeling
- ❖ Assessment of city specific and national-regional policy documents and national-regional literature on water and energy, with a focus to identify best practices for management
- ❖ Inter-city visits and learning exchanges: Lusaka, Windhoek and other South African cities

### Contribution to FRACAL objectives

This proposed research is motivated by and will contribute to the FRACAL project in many ways that include:

- The city-to-city learning approach which will be between Harare and Lusaka in the proposed initiative
- Concentrating on city-climate-energy-water nexus. As shown through FRACAL many of the studies that have focused on climate have been done for peri-urban and mostly rural and/or ecological systems. The urban centers particularly in sub Saharan Africa have largely been ignored despite the fact that in these same regions it has been shown that climate change and variability will also be impactful. This is also in cognizance of the rapidly expanding populations and influx into these major cities.
- Use of early career and junior researchers in the proposed program as Embedded Fellows.





## Global Environmental Change (GEC) funded project

*Understanding interactions between urban floods, municipal solid waste and urban planning in the Lusaka city region*



**Wilma Nchito, Gilbert Siame, Progress Nyanga and Moses Chisola**  
University of Zambia, Centre for urban research and planning

### Overview

Floods in Lusaka City are experienced on an almost annual basis. These floods are perpetuated by poor municipal solid waste management systems, leading to negative implications on people's lives (particularly the most vulnerable). Damages experienced include loss or disruption of people's livelihoods and infrastructure, compromised public health and reduction in the quality of urban environment.

Waste interacts with climate change to effect urban flooding and flood risk. The Urban infrastructure planners and city decision makers are unclear on how municipal solid. The response [pays less attention to issues of solid waste as a way of mitigating against the effects of extreme weather events in the city region

### Project activities and location

The project will be carried out in the Lusaka city region. Work will be undertaken in three main work packages:

1. Urban flood mapping and analysis
2. Quantification and categorisation of municipal solid waste
3. Institutional arrangements and decision making analysis

### Project objectives of the research

**To understand the link between past and current municipal solid waste systems and urban floods in the Lusaka city region.**

**To build a proactive response model to urban floods by promoting municipal solid waste internalisation in urban/infrastructure planning.**

**To promote institutional systematic coordination in the area of flood management, planning and municipal solid waste management.**



### contribution to fractal activities

- **Work package 1** will **reconstruct flood magnitudes frequencies and impacts** by analysing climate data for the city of Lusaka, there by contributing to the co-production of knowledge at a city region scale.
- Linked to the first work package, the **second work package** aims to **categorise municipal solid waste and integrate such issues into urban infrastructure planning**. Knowledge generated in the work package will contribute to enhanced knowledge on decision making and resources in Lusaka. Similarly, **work package 3** will **analyse institutional arrangements and decision making related to water**.

### References

Photo credit: Millennium challenge account





## Water Security in Windhoek: Governance, water demand and supply and livelihoods in the context of Climate Change and urbanization



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 NAMWATER: Mr J. Sirunda ([sirundaj@namwater.com.na](mailto:sirundaj@namwater.com.na))  
 City of Windhoek: Mr O. Makuti ([Olavi.Makuti@windhoekcc.org.na](mailto:Olavi.Makuti@windhoekcc.org.na))

**NAMWATER**  
 Namibia Water Corporation Ltd

### Main objectives

- **Analysis of governance issues** through a case study of the Windhoek Industrial effluent water reclamation plant.
- **Analysis of policies** relevant to the Windhoek Industrial effluent water reclamation plant in view of the Namibia Climate Change Policy
- **Quantification of the severity and duration of drought** in Windhoek
- **Determination if water supply sources** (and associated assumptions for Windhoek) are **sufficient and appropriate** to meet the growing water demand. This research will also include an investigation of how climate change and urbanization affect this process.
- **Assessment of the synergetic links between livelihoods and water security** in the City of Windhoek.
- **Investigation of the spatial distribution of hotspots accumulating from water supply and demand** in Windhoek and how this changes in context of urbanization and climate change.



### Contribution to FRACTAL objectives

Water supply and security is a serious issue in Namibia especially in the city of Windhoek. This project will contribute the following to FRACTAL objectives:

- Production of information on the quantity and quality of water in the entire water supply area network.
- Quantification of synergetic links between livelihoods, resilience and water security in the City of Windhoek (critical at designing responsive policies and interventions to the dynamic demand of water in Windhoek in the context of urbanization and climate change).
- Gathering of information on the interactions and interdependencies in water demand, supply and management and how this process is influenced by climate change and rapid urbanization.
- Understanding of the policy making and decision-making process at the city of Windhoek- help identify issues for dialogue in Learning Labs.

This information will also be useful for future water and other infrastructure and urban development.

The project will be undertaken in the city of Windhoek and the central area water supply network (Swakop-Omaruru catchment and Omatako-Okavango catchment)

#### Project Activities:

- Analyze policy and decision making process at the city of Windhoek
- Use Drought Indices (DI) such as Standardized Precipitation Index (SPI) and Effective Drought Index (EDI) for monitoring of drought progression, onset and termination, and ranking of drought based on severity, duration, and peak intensity.
- Collect historical and current hydrological data on dam levels, rainfall, groundwater table level and from wastewater treatment plants
- Collect data on livelihoods, socio-ecological variables, water security, as well as historical and current data on population growth and urbanization in Windhoek.
- Geographical mapping of water supply and demand at sub-constituency (enumeration area) level to identify hotspots