

The logo consists of a vertical bar with horizontal stripes in red, orange, yellow, light blue, dark blue, and green, representing a stylized landscape or climate gradient.

FUTURE CLIMATE FOR AFRICA



MID-TERM CONFERENCE REPORT

**CAPE TOWN LODGE, SOUTH AFRICA
4-7 SEPTEMBER, 2017**

Compiled by: Jean-Pierre Roux, Zablone Owiti, Sultana Mapker, Julio Araujo, Nkulumo Zinyengere and Kristen Kennedy



Table of Contents

Acknowledgements.....	5
Executive Summary.....	6
Research Highlights to Date.....	7
Looking Ahead: 5 Key Outcomes of the Conference.....	8
Conference Proceedings Digest.....	9
Agenda.....	10
Session Reports.....	11
Conference Opening and FCFA Highlights (2015-2017).....	11
Keynote Lectures.....	14
FCFA Impact and Legacy.....	17
Poster Sessions.....	18
Thematic Parallel Sessions.....	19
Parallel Session 1: WASH (Water, Sanitation and Hygiene) in Urban African Contexts.....	19
Parallel Session 2: Information Distillation and Communication.....	20
Parallel Session 3: Model Evaluation to Support Development and Confidence Assessment.....	21
Parallel Session 4: Decision-making Under Climate Uncertainty – Experiences in FCFA.....	22
Parallel Session 5: FCFA Experiences with Co-exploration / Co-production.....	23
Parallel Session 6: CP4-Africa and CMIP/CORDEX Data - Analysis and Use.....	24
Parallel Session 7: Rural Livelihoods and Agriculture.....	24
Parallel Session 8: Climate Narratives.....	25
FCFA Synthesis Products.....	27
FCFA Learning at the Mid-Term Conference.....	28
Appendix 1: List of Poster Titles and Authors.....	29
Appendix 2: FCFA ToC Diagram.....	32

List of Acronyms

AMMA-2050	African Monsoon Multidisciplinary Analysis - 2050
AR5	IPCC's Fifth Assessment Report
BADC	British Atmospheric Data Centre
BAMS	Bulletin of American Meteorological Society
CCKE	Coordination Capacity Development and Knowledge Exchange Unit of the FCFA
CDKN	Climate and Development Knowledge Network
COMRECC	REgional COMmittee on Climate Change, Senegal
CORDEX	COordinated Regional Downscaling EXperiment
CMIP	Climate Model Inter-comparison Project
CP4-A	Convection Permitting for Africa
DFID	UK Department For International Development
DMUCU	Decision-Making Under Climate Uncertainty
FCFA	Future Climate For Africa programme
FRACTAL	Future Resilience for African CiTies And Lands
GCM	Global Climate Model
GFCS	Global Framework for Climate Services
HIW	High Impact Weather
HyCRISTAL	Integrating Hydro Climate Science into Policy Decisions for Resilient Infrastructure and Livelihoods in East Africa
IMPALA	Improving Model Processes for African cLimAte
IPCC	Intergovernmental Panel on Climate Change
JASMIN	A multi-petabyte fast data storage facility co-located with data analysis computing facilities in the UK
LMSRB	Lake Malawi and Shire River Basin
NERC	Natural Environment Research Council
PI	Principle Investigator (for the FCFA research consortia)
PIDA	Programme for Infrastructure Development in Africa
PIPA	Participatory Impact Pathways Analysis
PRECIS	Providing REgional Climates for Impact Studies
SPM	IPCC Assessment Report's Summary for Policy Makers
ToC	Theory of Change
UMFULA	Uncertainty reduction in Models For Understanding deveLopment Applications
WASH	WATER Sanitation and Hygiene

Acknowledgements

NOTES FROM THE FCFA CONFERENCE SECRETARIAT

The FCFA Mid-Term Conference was generously supported by the UK Department for International Development (DFID) and Natural Environment Research Council (NERC). The conference was held in Cape Town, South Africa and organised by the Climate and Development Knowledge Network (CDKN) with support from a Scientific Steering Committee, chaired by Dr Cath Senior and including representatives of all the FCFA research consortia; Dr Amadouye Gaye, Mr Gino Fox, Dr John Marsham, Ms Alice McClure, Prof. Declan Conway, Prof. Bruce Hewitson, Dr Celia Way and Ms Estelle Rouhaud. The conference secretariat would like to extend their thanks to the steering committee and the funders for making the event possible.

This report presents an overview of conference activities and outcomes for FCFA partners and the wider public. It has been compiled by Mr Jean-Pierre Roux, Dr Zablon Owiti, Ms Sultana Mapker, Mr Julio Araujo, Dr Nkulumo Zinyengere, and Ms Kristen Kennedy

Thank you to all participants who actively contributed to making the FCFA Mid-Term Conference a success.

Cover photo by Lindy Bester, obtained from Freeimages.com

All other photos courtesy of Gregor Rohrig

THE CONFERENCE WAS ORGANISED BY:



FCFA IS FUNDED BY:



FCFA IS IMPLEMENTED BY:



Executive Summary

Future Climate For Africa is a £20 million (US\$30 million) programme funded by the UK Department for International Development (DFID) and Natural Environment Research Council (NERC). It is generating fundamentally new climate science focused on Africa and piloting the use of improved medium- to long-term (5 – 40 year) climate change information in development projects that are being designed today.

The ultimate goal of FCFA is to reduce disruption and damage from climate change and to safeguard economic development and poverty eradication efforts over the long-term. The programme is being implemented by five world leading research consortia: [AMMA-2050](#), [FRACTAL](#), [HyCRISTAL](#), [IMPALA](#), and [UMFULA](#), with support from a cross-programme Coordination Capacity Development and Knowledge Exchange Unit. It runs from 2015 – 2019. For more information, visit www.futureclimateafrica.org

The FCFA Mid-Term Conference was held from 4–7 September, 2017, in Cape Town, South Africa. The primary goal of the conference was for the FCFA community to share and engage critically on research conducted in the first two years of the programme. A secondary goal was to reflect on progress and share a roadmap for the second half of the programme and its legacy. The conference was an internal FCFA event, with the majority of the 103 participants being researchers from the five FCFA research consortia. Select high profile experts and partners were invited to contribute independent perspectives and links to related initiatives.

The photo story of the event can be accessed here:
<https://www.southsouthnorth.photos/future-climate-for-africa>





Research Highlights To Date

FCFA Principal Investigators (PIs) presented on research progress since programme kick-off in May 2015. Key achievements include:

1. The first ever simulations with a high-resolution convection-permitting climate model (CP4-Africa) are now available and demonstrate radical improvements in the model's ability to replicate observations over Africa, which will contribute significantly to decision-relevant, robust climate information products and tools in future.
2. New insights have been gained into African climate, including the increase in frequency of extreme storms in the Sahel over the last 30 years due to climate change ([Nature paper](#)), controls on the spread of rainfall in central Africa, and through the evaluation of climate models with an African lens ([BAMS paper](#)).
3. A diverse range of climate information products and tools have been produced and there is evidence of wide uptake.
4. All 11 pilot studies are progressing well. Novel approaches such as “City Learning Labs” and embedded researchers in city councils have already resulted in significant engagement of decision makers to identify climate-vulnerable sectors in the cities of Lusaka, Windhoek and Maputo. Three more cities (Cape Town, Durban and Johannesburg) are now self-funding their participation in FCFA.
5. Involvement and leadership of African researchers in the consortia, and capacity development initiatives supporting early career researchers from across, Africa have received widespread positive feedback.

There was consensus amongst the PIs that whilst there have been several examples of significant improvements in the science and progress in how climate information is brought to bear on particular development issues and contexts, progress needs to be made over the coming years to demonstrate “hard” development impacts.



Looking Ahead: 5 Key Outcomes of the conference

1. **Ramping up programmatic learning:** There are many commonalities across FCFA projects and participants are eager to share learning from successes and failures. There is a particular emphasis to learn from processes rather than outputs, including lessons from collaborative approaches to pilot case studies. The CCKE Unit and research consortia will collectively set out concrete steps for cross-programme learning initiatives for 2018-2019.
2. **Improving monitoring and evaluation of change:** The FCFA Monitoring Evaluation and Learning (MEL) workgroup will continue work on sharing and improving methods to track and measure more nuanced outcomes such as mind-set change, attitude and behaviour change, new relationships, institutional capacity and learning from failures.
3. **Ensuring accessibility and use of data and tools:** Work will be prioritised to ensure that a wider community of (African) researchers have long-term access to climate data (particularly CP4-A data on JASMIN) and impact modelling data and tools, and are assisted in appropriate usage. Guidance documents on use of data and tools will be developed.
4. **Producing FCFA synthesis outputs:** A series of synthesis knowledge products will be produced that will target specific audiences of interest to FCFA. These synthesis products may be publications of various formats, but are not restricted to being written publications, and will link elements of research across FCFA research pillars and consortia for a particular audience profile.
5. **Programme legacy:** FCFA is seeking to “hand over” work rather than “wrapping up” activities in 2019. Enabling localised leadership and capacity, both at an individual and institutional scale is key and should be prioritised going forward. The FCFA Impact and Legacy Strategy will be completed in 2017 and give an overview of key principles and initiatives to support programme legacy.



Conference Proceedings Digest

- **Keynote lectures were presented by four independent experts:** *Dr Raffaello Cervigni (World Bank); Mr Paul Watkiss (Paul Watkiss and Associates); Dr Arame Tall (Global Framework for Climate Services); and Prof. Ted Shepherd (University of Reading).*

Dr Cervigni presented a provocative economic analysis demonstrating that smart adaptation can lead to billions of dollars of benefits for the Programme for Infrastructure Development in Africa (PIDA).

Mr Watkiss emphasised the diverse sets of available methodologies for informing cost-effective adaptation decisions, illustrating the wide ranging bespoke climate information input requirement for each method.

Dr Tall argued for supporting different programmes and institutions (and improved coordination) along the entire climate information value-chain.

Prof. Shepherd highlighted the challenges in striking a balance between overly conservative and overly confident communication of climate risks through practical examples, and emphasised the need to consider storylines or narratives to communicate climate risks.

- **Cross-programme collaboration:** The conference hosted eight thematic parallel sessions (see agenda) through which substantive technical engagement between research consortia was progressed. Over and above the noted decision to develop synthesis outputs, a further outcome included a proposal for an African model evaluation hub to improve region-specific model evaluation in collaboration with African experts and coordinate future efforts to fill gaps in evaluation.
- **Science posters:** 55 science posters were presented at the conference across the following themes: Information distillation and communication; Co-exploration and co-production; Decision-making under uncertainty; Physical climate variability and change science; Urban planning and water resources; and Agriculture and rural livelihoods. A list of all poster titles and presenters are provided in Appendix 1.

Agenda

FCFA Mid-Term Conference								Early Career Researchers Training Workshop
TIME	4 th Sep 2017		5 th Sep 2017		6 th Sep 2017		7 th Sep 2017	8 th Sep 2017
08h30 – 10h30	(08h30-09h00: Registration) Plenary 1: Welcome and FCFA Highlights Opening address: Dr Helen Pearce (NERC) Highlight Talks from FCFA Projects: AMMA-2050, FRACTAL, HYCRISTAL, IMPALA, UMFULA Plenary Q&A		Plenary 3: Keynote Talks Prof. Ted Shepherd (University of Reading) Paul Watkiss (Paul Watkiss and Associates) Dr Raffaello Cervigni (World Bank) Dr Arame Tall (GFCS) Plenary Q&A		P4: Feedback from Parallel Sessions		P5: Cross Program Learning P6: FCFA Synthesis Outputs and Conference Closing	Session 1: Communicating Climate Change
coffee								
11h00 – 13h00	Poster Session 1 Themes: Information distillation and communication Co-exploration and co-production Decision-making under uncertainty		Poster Session 2 Theme: Physical climate variability and change science		Poster Session 3 Themes: Physical climate variability and change science		Side Meetings IMPALA WP3 meeting on model evaluation FRACTAL/AMMA-2050 meeting on ARF2	Session 2: Pathways to Impact
lunch								
14h00 - 15h30	Plenary 2: FCFA Impact and Legacy		PL2: Thematic Parallel Sessions: Decision-making Under Climate Uncertainty: FCFA Experiences with Co-exploration/ Co-production Climate Science: CP4-Africa and CMIP Data Analysis and Use		Poster Session 4 Themes: Urban planning and water resources Agriculture and rural livelihoods	Side meeting: Pillar 1 Gap Filling Fund ¹	Side Meetings UMFULA HYCRISTAL	Session 3: Proposal Writing and Collaboration Café
coffee								
16h00 - 17h30	PL 1: Thematic Parallel Sessions: Urban Water, Sanitation and Hygiene Information and Communication Climate Science: Model Evaluation to Support Development and Confidence Assessment		PL3: Thematic Parallel Sessions: Rural Livelihoods and Agriculture Climate Narratives Additional Parallel Slot		FCFA Synthesis outputs ²		Afternoon trip to tourist site (optional)	
dinner					Conference Dinner			

¹ Introduction and Brainstorming: For all pillar 1 (climate science) researchers involved in FCFA, including PIs, Co-Is, pillar leads, researchers, and partners.
² Closed Session for PIs, Pillar leads and coordinators

Session Reports

Conference Opening and FCFA Highlights (2015-2017)



The FCFA Mid-Term Conference opened with a welcome from the local hosts, Jean-Pierre Roux and Zablon Owiti, representing the FCFA Coordination, Capacity Development and Knowledge Exchange (CCKE) Unit and Conference Secretariat. Dr Helen Pearce from NERC made the opening address on behalf of NERC and DFID. She emphasised the need for work to sustain a focus on the overarching programme objectives

- To produce world-leading science to advance knowledge of African climate variability and change and enhance prediction of future African climate.
- To drive improved interdisciplinary knowledge, methods and tools on how climate information and services can be better designed for, delivered and integrated into medium and long-term decisions today.
- To support international collaboration and the development of scientific capacity in Africa.

Dr Pearce also reaffirmed DFID and NERC's continued interest in, and support for the programme, and reminded the audience of the UK Research Councils' Global Challenges Research Fund call.

The opening address was followed by brief highlight presentations on the progress the five research consortia have made since programme kick-off. The presentations aimed to provide a broad overview of progress on scientific research and implementation of pilot studies, to generate discussion on linking research to development impact, and finally to set the scene for the conference. Below we provide snapshots of the presentations.

AMMA-2050 Highlights Presentation - Dr Chris Taylor

- Findings are emerging from pilot studies on urban planning in Ouagadougou and agriculture in Senegal
- Participatory Impact Pathways Analysis (PIPA) project planning, and monitoring and evaluation approaches are leading towards “action”.
- New observations of water levels and flows around Ouagadougou are providing useful insights for city planners.
- Crop research is highlighting the impacts of climate change and the necessity for rapid adaptation in maize breeding and seed systems.
- Climate research links historical trends in extreme rainfall to global warming and understanding of drivers of uncertainty in CMIP5 ensemble projections.
- CMIP5 data for High Impact Weather (HIW) metrics is being used to build capacity and promote deeper engagement with African researchers.



FRACTAL Highlights Presentation - Prof. Bruce Hewitson

- Pilot case studies are complex and FRACTAL aims to invert traditional approaches to stakeholder engagement with transdisciplinary collaboration.
- Narratives are proving to be a promising approach for communicating complex climate information in Lusaka and issues around contradictory data/information
- Building appropriate messages for decision-makers remains a priority
- There are tensions and lessons in relation to top-down climate information supply and bottom-up context.
- Good lessons are being learnt from engagement within city-level pilot studies, as well as from various research approaches



HyCRISTAL Highlights Presentation - Dr John Marsham

- The consortium work will inform integration of hydroclimate science into policy decisions for climate resilient infrastructure and livelihoods in East Africa.
- CMIP and CP4-A simulations, with existing and new observational data are used to address key questions unique to East African climate, such as urbanisation and land-use change, the role of major lakes, and regional changes in aerosol emissions; and to understand the range of changes in user-relevant metrics.
- Improved climate science is being used in co-production research for urban Water, Sanitation and Hygiene (WASH) infrastructure decision-making on a 5-40 year time scale in two pilot cities: Kampala and Kisumu.
- Tools and guidance are being developed to inform cost-effective WASH interventions with the aim of reducing the health burden and account for climate change in planning.
- Rural livelihood methodologies are used to develop pathways for new climate research to support the resilience of rural communities vulnerable to climate change, with an emphasis on the water, agriculture and fisheries sectors.



IMPALA Highlights Presentation - Dr Cath Senior

- There is need for a step change in performance of GCMs for Africa to understand key climate questions such as the annual rainfall changes over West Africa and the East Africa climate paradox.
- The consortium's approach is to improve understanding of important local processes; to understand critical interplay between remote and local processes; and to deliver improved model projections, methodologies and metrics to assess the robustness of multi-model projections.
- Improvements have been made in simulating African climate processes and user-relevant metrics using the convective permitting, CP4-A model. Examples include diurnal cycle of precipitation, spatio-temporal characteristics of African rainfall, convection propagation over the Lake Victoria basin, the number of wet days in the monsoon season, and precipitation frequency in West Africa.
- There is good progress in CP4-A simulations for the present and future climates, including plans for simulations data exchange to enable African scientists access the data via the JASMIN platform.



UMFULA Highlights Presentation - Prof. Declan Conway

- Progress has been made in understanding climate processes in Central and Southern Africa using observations and climate model simulations, including the effects of El Niño on cloud bands.
- Future work will examine how models simulate climate change.
- A Rufiji basin model has been developed, with initial impacts assessed with global climate model scenarios.
- Co-development of a water model for the Lake Malawi basin with agriculture, energy and environment stakeholders is ongoing.
- Planned activities include; linking the Rufiji basin model with decision analysis software to consider performance against multiple metrics; and understanding decision contexts via policy analysis of key sectors, staff surveys on capacity, motivation and work environment.



The highlight presentations raised key issues for a plenary discussion. Box 1 synthesises key points from the plenary discussion.

Box 1 - Conference opening plenary: Key discussion points

- 1 Emerging lessons, common learning and concrete steps for collaboration: Noted commonalities across FCFA projects such as collaborative approaches to pilot studies and lessons from them need to be shared internally and with wider audiences.
- 2 Moving from science progress to development impact: Whilst there have been several examples of significant improvements in the science and progress made in how climate information is brought to bear on particular development issues, it is premature to point to “hard” development impacts. There is a need to think more about impact beyond improved data, models and scientific publications.
- 3 Monitoring and evaluating “soft” impact: It is premature to identify “hard” development impact but partners ought to track “softer” changes such as mind-set, attitudes, behaviour and capacity of participants in FCFA pilot studies.
- 4 Engagement with policy makers: Engagement with relevant policy makers needs to be improved in some instances.
- 5 Supply and demand for long-term information: Several questions focused on the demand and usefulness of long-term information and the trade-offs between shorter and longer-term priorities. There is need for approaches that integrate climate and impact information provision across short- and long-term scales for policy makers to understand trade-offs between seasonal, 5 year and decadal scales.



Keynote Lectures

Four independent experts presented keynote lectures on topics spanning the breadth of FCFA work, focusing on climate science, economics of adaptation, and delivery of climate services in Africa. The following are summaries of the talks.

[Integrating Climate Resilience in Investment Planning: Progress and Challenges for Africa \(Dr Raffaello Cervigni - World Bank\)](#)

The presentation was made via WebEx video conferencing interface. It focused on integrating climate resilience in infrastructure investments and planning decisions in Africa, and drew on research commissioned by the World Bank under the [“Enhancing the Climate Resilience of Africa’s Infrastructure”](#) project, looking at power, water, and roads and bridges sectors. These sectoral impact studies applied a consistent approach at a continental scale to the PIDA pipeline of infrastructure projects. The headline finding is that climate change can’t be ignored as projections reveal large impacts on physical performance of infrastructure. Detailed analysis of

the impacts of climate change on hydropower revenues, power consumers and agricultural imports was shared including various adaptation options across scales, indicating that regrets from mal-adaptation can be greater than the regrets from inaction in some instances. Smart adaptation can lead to billions of dollars of benefits for the infrastructure projects considered and a min-max adaptation strategy (that minimises the maximum possible losses that could occur) can significantly reduce regrets, and have promising cost benefit ratios (in hydropower). However, given the wide spread of climate scenarios, the adaptation potential in some locations and sectors appear limited. Participants were informed of forthcoming work of the new Africa Climate Resilient Investment Facility, to work with infrastructure developers and financiers to manage climate risks and improve long-term sustainability of infrastructure investments in Africa.



Climate Information Needs for Cost-effective Adaptation Investments: Experiences from African Contexts (Mr Paul Watkiss - Paul Watkiss & Associates)

Mr Watkiss' presentation focused on climate information needs of medium-to long-term cost-effective adaptation investments, with emphasis on the diverse sets of available methodologies for informing decisions, the implications for FCFA, and examples from Rwanda's tea expansion project. The complexity of real world long-term decisions was highlighted. Within each method for informing the decision process, be it cost-benefit analysis, robust decision-making or real options analysis, the climate information input requirement is wide ranging and needs to be tailored for each method. The importance of accounting for the context in which decisions are made as well as how this influences the type of information required, was outlined. As evidenced from the Rwanda pilot, there are often multiple decision-makers, with multiple decisions, with different criteria. The presentation ended on a critical question for the participants: Who should be providing interpretation and derivative products from the climate data?



From Climate Research to Operational Climate Services: Emerging Needs from Africa (Dr Arame Tall - Global Framework for Climate Services)

Dr Tall's address looked at the translation of climate research into operational climate services, with a focus on emerging needs from Africa and how the landscape is changing. It outlined four landscape changes:

1. There is increasing recognition of the need to serve the end-user in the value chain while understanding the unique and important role at each point of the value chain.
2. Increased, better articulated demand from users is already common: It is possible to work with users to tailor climate information to enable a culture of forward planning and realise the potential of climate services to prevent catastrophes.
3. Coordination of climate services across the continent: As we understand each step in the value chain, we can coordinate to provide services from local to regional levels.
4. Improved communication of intra-seasonal products and uncertainty: Less than seven years ago, climate scientists did not feel comfortable communicating uncertainty. Today we must acknowledge that users can engage with probabilities.

Four climate output needs in Africa were identified as: Improve lead time of climate information across all scales; render seamless forecasting as the norm; bridge the gap between climate research institutions and NHMSs; and focus on user needs.

Climate Change: The Challenge of Uncertainty Assessment and Communication (Prof. Ted Shepherd - University of Reading)

The presentation focused on finding a balance between overly conservative and overly confident communication of climate risks based on observed and projected climate behaviour. It began by illustrating cases of overly conservative communication of uncertainty. Changes in precipitation projections were used to show the dilemma in communicating climate information. Compared to temperature, precipitation projections are normally not robust, either due to models not agreeing, or because changes appear small compared to internal variability, while the associated changes in risk may not be small. The likelihood scale used in the IPCC statements, where uncertainty is understated, was used as an example. The emphasis is on what we know and as such, statements of confidence are tailored to global-scale

quantities such as mean precipitation, and to time averages, which may not have much relevance for regional climates. Furthermore, the terminology used in the scale does not correspond to common usage. Even the “unlikely” category with likelihood outcome within a range of 0-33% is quite possible.

Use of heuristics (trial and error methods) to rapidly assess probabilities and predict outcomes is prone to errors that may lead to unconscious biases. The result of this is a tendency to pay more attention to the content of a message than to its reliability, and jump to conclusions or fitting stories to chance. The resultant information is overly confident. An example is the IPCC AR5 SPM “wet-get-wetter, dry-get-drier” paradigm that led to statements of confidence about regional changes in water cycle. Recent research has shown that basic assumptions behind this paradigm fail to hold over land.

Based on the examples of challenges, there is need to consider narratives, which are based either on how past events physically unfolded, or of plausible future events; and where emphasis is placed on the understanding of the factors involved, and the plausibility of those factors or changes thereof. A consensus-based approach seems simultaneously too conservative and too confident and therefore the call to develop a scientific language for expressing uncertainties, without losing sight of robust aspects.



FCFA Impact and Legacy

The second plenary session of the conference shifted the focus from the science being produced to looking at the values and objectives that connect the diverse research interests and outputs, and what the community has learnt from implementing the programme over the past two years. The session included a short play, plenary presentations, and a world café session.

The session started with a play that dramatised five vignettes of developing and implementing a trans-disciplinary research programme. Participants were reminded that learning entails taking risks, and that stakeholder needs and research questions shift within a complex context and co-production approach. This highlighted the value of being responsive and adaptive to changing dynamics as one brings climate science into a real-world context.

Participants were then introduced to the FCFA Theory of Change (ToC) and draft Impact and Legacy Strategy. This focused on the three “pathways to impact” in the FCFA ToC through which FCFA participants will move from deliverables (outputs) to maximise further direct and indirect benefits beyond the lifespan of the programme

(outcomes and impact). This introduction informed the world café component of the session where participants engaged in group discussions on the pathways to impact, based on following prompting questions: What recommendations do you have for improving the impact pathway and enablers of impact in the strategy? What are the practical actions you can take (or are already taking) that link your work (at the output level) to the overarching objectives of FCFA at the outcome and impact levels? The discussions served to raise questions and offer critical engagement and familiarisation within a wider network of FCFA researchers. Box 2 lists synthesised cross-cutting points that came out during discussions about FCFA Impact and Legacy.

Box 2 - Six cross-cutting considerations for FCFA impact and legacy

- 1 Programme legacy:** Local leadership should be involved in order to sustain engagement and improve legacy.
- 2 Capacity development:** Research consortia should share learning about capacity development, particularly of “decision-makers”, and developing localised leadership, individual and institutional capacity in complex pilot study contexts, given challenges such as high staff turnover in government agencies.
- 3 Learning from / about processes:** There is a demand to share learning on the processes by which outcomes are achieved, particularly for the pilot case studies.
- 4 Monitoring and evaluating change:** There is a need to refine how we track and measure more nuanced outcomes such as mind-set change, attitude and behaviour change, new relationships, institutional capacity and learning from failures.
- 5 Accessibility and use of data and tools:** Work is required to ensure that a wider community of (African) researchers are able to access and use data (e.g. CP4-A data on JASMIN, or impact modelling data and tools) appropriately. Developing guidance documents on use of data and tools is a priority.
- 6 Informing an African research agenda beyond 2019:** FCFA is exploring the feasibility of co-hosting an agenda-setting conference in collaboration with other programmes to take stock of and update the African climate change research agenda.

The session concluded with a reminder to participants to view the FCFA Theory of Change and Impact and Legacy Strategy as living documents that offer useful tools to link individual work to “greater than the sum of the parts” impact and should be critically revisited and refined with time.



Poster Sessions

All poster sessions began in the plenary venue with each presenter giving a one-slide one-minute introduction to his or her poster. The participants then moved out to poster-viewing venues with conversations continuing via an unstructured gallery walk of posters. The first poster session featured 15 posters under three themes: Information distillation and communication, co-exploration and co-production;

and decision-making under uncertainty. The second poster session featured 12 posters under the theme of physical climate variability and change science. In the third poster session, 15 posters were presented on physical climate variability and change science, five posters on urban planning and water resources, and one poster each on rural livelihoods and gender and decision-making case studies. The lists of session poster titles and authors are provided in Appendix 1.



Thematic Parallel Sessions

The conference hosted eight thematic parallel sessions with the objective of substantive technical engagement on cross-cutting thematic areas in order to progress collaboration between research consortia and scoping of FCFA synthesis outputs. The parallel sessions were spread across Day 1 and 2 of the conference. Feedback from the sessions and input from participants to the thematic discussions were provided in a plenary session on Day 3. In this report the plenary feedback has been integrated into the individual parallel session summaries. Parallel sessions followed different structures, including group discussions and presentations. The following sections provide summaries of parallel session discussions.

Parallel Session 1: WASH (Water, Sanitation and Hygiene) in Urban African Contexts

Session Leads: *Dr Celia Way (HyCRISTAL) and Dr James Cullis (FRACTAL)*

This parallel session discussion focused on a guiding question for a collaborative FCFA output: What are equitable and sustainable water sanitation and drainage services in the context of climate change?

It was concluded that the synthesis work will produce two outputs: a guidance to working through political processes of integrating climate considerations into city WASH planning, and a technical resource book including case studies and systems. The work will promote reflexive, systemic approaches to delivering WASH services, rather than a narrow, fixed long-term infrastructure mind-set.

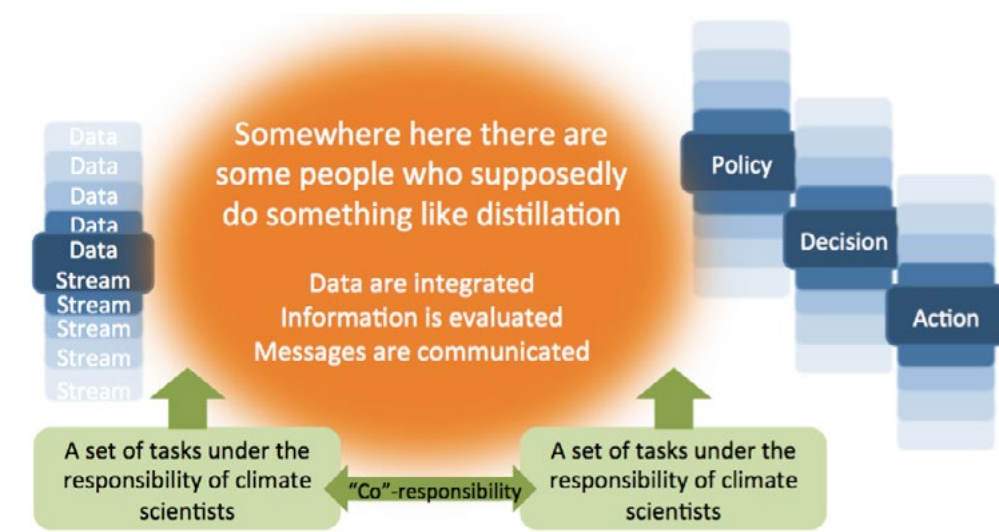
The target audience would be middle government level urban water planners. Researchers are also considering community based organisations and disempowered communities and how an output could empower them. Alongside published and online versions of the reports, the group is also considering creative ways to package the information, potentially via audio formats (such as podcasts or radio slots), and slides.

The plenary discussion highlighted the need to develop climate change messages for the urban WASH sector: How might climate change alter current good practice? Given the uncertainty in future forecasts and weather stressors, one needs to critically consider whether a primary focus on long-term infrastructure investments in drainage systems (and adapting these decisions) are optimal or whether one should advise city planners to shift from thinking of sanitation as a 75-year investment business to thinking of it as an annual service business. The City of eThekweni was cited as having done a good job in this regard.

Parallel Session 2: Information Distillation and Communication

Session Lead: Prof. Bruce Hewitson (FRACTAL)

The following visualisation framed the challenge of “distillation”:



Group discussions highlighted different facets of the distillation challenge. The following points summarise feedback from table discussions:

- Describing different perspectives on distillation: Decision-relevance should be included by bringing the perspectives of other physical/social system “models” to assess impacts/decisions. It is necessary to generate a timeline and sequencing and a set of quality thresholds in the distillation process. Tests should be devised to verify the effectiveness of distillation for simple, clear, powerful messages, which gain general acceptance.
- Managing contradictions: The result of distillation may widen the range of probable outcomes rather than reduce it and the possibility space needs to be mapped out. Imagining different futures is really important for decision-makers and narratives can help highlight contradictions that matter to decision-makers. There is value in contradictions as it gives a point of leverage.
- Prioritising foundational science challenges for distillation: Scientists need to develop a structure for dealing with contested values (can we draw from non-climate arenas?); understand the causative reasons for differences; address the contradiction between scales of analysis and decision-scales; integrate the issues of ethics in constructing and managing information;

build the intellectual rigor and develop the community around distillation; and understand what constitutes information in context (information is relative to what you already know).

- Needs-driven versus needs-informed perspectives: A variety of products are needed to suit different user contexts. This entails skilled intermediaries / knowledge brokers. There is need for a typology of users and a decision tree approach that users can navigate. Needs-driven services are very difficult. We need the equivalent of a “tasting room” for both “brewers” and “customers” to sample the products. Building capacity of intermediaries and users is required and facilitation of a community of researchers / practitioners / disciplines to build trust between the communities.

Parallel Session 3: Model Evaluation to Support Development and Confidence Assessment

Session Leads: *Prof. Richard Washington and Dr Rachel James (UMFULA/IMPALA)*

The objectives of this session were to discuss:

- On-going model evaluation efforts
- Cross-FCFA coordination of evaluation results and diagnostics
- Options for synthesis products, and
- The legacy of improved understanding of models over Africa through the development of a model evaluation hub

Different approaches to model evaluations were discussed with unique ideas, as well as strong alignment across FCFA partners in focusing on process. The following are key points from the discussions.

- Coordinated efforts: There is alignment across FCFA consortia to focus on processes, however more region-specific evaluation is needed. Increased sharing and coordination of efforts is a good idea and could entail sharing ideas, priorities, results, and code. Sharing of code provides opportunity to share analysis tools to avoid duplications, and contribute to evaluation infrastructure at a global level.
- Gaps in evaluation: There are regions where research consortia do not have a strong focus, particularly areas between regional climate regimes of East, Southern and West Africa: Chad, Sudan, and Malawi. There are gaps around land-atmosphere coupling and maybe observed past trends in precipitation (except in the case of East African droughts and West African monsoon, which may be used as a test-bed for the models). There are also gaps in different timescales and especially sub-daily timescales.
- Challenges identified: Model evaluation is not the kind of research that is easy for science funders to resource. Perhaps it is the kind of thing that a national model development centre would fund if it were in region, but there is no model development centre in Africa. There is need to consider technical support (e.g. programmers) to make it work, and keep it focused on the science and not get lost in technical challenges.

- Overcoming challenges: A model evaluation hub for Africa may serve to overcome some of these challenges. The hub may consist of a network of researchers and GitHub-type repository. There is need to ensure that African research perspectives are taken into account and integrate capacity development on model evaluation. This can build on CORDEX/PRECIS experience.

Parallel Session 4: Decision-making Under Climate Uncertainty – Experiences in FCFA

Session Leads: *Prof. Declan Conway and Dr Ajay Bhawe (UMFULA)*

The session commenced with short presentations on experiences in Decision Making Under Climate Uncertainty (DMUCU) followed by a wide-ranging group discussion. The inputs were structured around three areas:

- Experiences with DMUCU approaches, including commonalities, differences, challenges and opportunities.
- Potential for a FCFA synthesis activity/output on DMUCU, and
- Identifying key points to feedback to FCFA.

Group discussion focused on the use of DMUCU approaches in complex decision, institutional, and governance contexts alongside the ethics of conducting experimental science and delivering services, including:

- Identifying and framing imperative decision(s) in moving from frameworks and strategies to informing actions.
- Working with resource constraints, limited data, “light touch approaches”, and integrated teams.
- Framing of issues or decisions in complex contexts and power relations to acknowledge multiple legitimate framings and sources of knowledge.
- Division of responsibility and ethical considerations when spanning scientific and experimental work and service-driven engagements.

It was noted that narratives are emerging from the FCFA pilot studies on how to apply different approaches to DMUCU in different sectors and across governance and decision scales as well as working through cross-cutting challenges. Further comments from plenary feedback included the need for continued discussion on the link between distillation and DMUCU approaches; prioritising a move away from frameworks to application in actions; capturing rural voices; reviewing different approaches and sharing outputs with other programmes.

Parallel Session 5: FCFA Experiences with Co-exploration / Co-production

Session Leads: *Dr Katharine Vincent (UMFULA) and Dr Anna Steynor (FRACTAL)*

Each consortium gave an overview of their approach to co-production, challenges, and lessons learned. This was followed by a world café discussion around 3 themes:

1. What is the scope for the “co’s” within the dominant funding cycle and tendency for project-driven climate services?
2. What are the elements of good “co’s”?
3. What is good practice in managing the “co’s”?

Selected points from the presentations include:

- Co-production can be impeded by funding cycle modalities and time commitment expected from partners and users that are not funded.
- Co-exploration is good at bringing everyone together, building trust and framing the issue, but not trying to solve it.
- Co-production is sometimes used as jargon for referring to “consultation” or “collaboration” hence the need to clarify its meaning and usage.

The following discussion points emerged from the world café session:

- Co-production definition: There is need for a definition, even if contested, so that it doesn’t become an empty term. Co-production principles include (i) trust and relationships, (ii) recognising different types of knowledge (and what knowledge is/how it is given legitimacy by culture and values), (iii) addressing implicit and explicit power relations
- Circumstances when co-production is appropriate: Researchers have to be careful not to assume co-production is appropriate in all circumstances (which is what tends to happen with buzzwords). It does not just take place between researchers and users, but also between researchers.
- How can co-production be managed ethically? It is important to agree on a common understanding at the start of roles and expectations (potentially through an MoU), which can then inform M&E. This helps to manage expectations. Does the ethics of “do no harm” (which is a standard in social science) need to extend to implications of outcomes? A commitment to co-production principles is key.
- How does co-production fit with the research project-funding paradigm? Relationships are key, but time-consuming to develop. Funding cycles mean that in-country partners or users are often brought in too late. “Users” need to see the value in the engagement and prioritising them in the budget is a good way to start.
- Recognising co-production through M&E: Focus on process as well as outputs and create incentives/rewards. Revise parts of the FCFA MEL framework to factor in co-production.
- Role of researchers: Should they be involved in co-production and if so, where should researchers be involved? That decision will need to be made quite early in a process.
- Learning from other sectors: The climate community can learn from the weather community, as they have experience with co-production and a track record of success. FCFA should consider the linkages we have with other programmes (e.g. Blane Harvey’s research on social learning).

Parallel Session 6: CP4-Africa and CMIP/CORDEX Data - Analysis and Use

Session Leads: *Dr Cath Senior (IMPALA), Dr Richard Jones (FRACTAL), Dr Dave Rowel (HyCRISTAL) and Dr Chris Taylor (AMMA-2050)*

The session started with one-slide presentations and discussion on the CMIP/CORDEX data used in many FCFA projections and the newly available CP4-A convective permitting model (4.5km grid) data, raising awareness of the different model capabilities and limitations and addressing questions of data availability, analysis methods and tools. Following presentations, discussion focused on:

- Data access and processing: Wider use of JASMIN for data processing depends on in-country technical and IT capacity and UK support, but with guidance written and the system now proven, it should be easier for new users. Security issues around access to JASMIN are significant and will need buy-in from BADC. NERC policy on data retention should cover long-term support for access to data but action needs to be taken to develop human capability and supporting systems to process data. The issue of the size of the data was noted, which makes it very attractive to process on JASMIN than having to only download the results (even more so for CP4-A data).
- CMIP/CORDEX analysis: It is important when analysing model results to assess confidence in these as well as focus on their uncertainty. A useful way of framing the problem can be to identify and resolve contradictions. A focus on the reasons for the contradictions can lead to their resolution and thus an increase in our confidence. Looking at climate system behaviour over a range of models (e.g. the drivers of important aspects of the climate) in regions where observations are poor can provide guidance on how the real climate system behaves there as each model atmosphere simulation is generated from combining approximations of the relevant physical processes. It is important to recognize that analysing large ensembles, in itself, needs significant computing facilities.
- A network of African climate scientists: Creation of a network to extend the legacy of CP4-A beyond FCFA-affiliated researchers needs to be prioritised. Long-term access to CP4-A and JASMIN by external climate scientists is crucial.
- Responsible and clear guidance on CP4 data/application: The internal knowledge on CP4-A (which is wide-ranging and nuanced) needs to be reflected in guidance. It is important to note that CP4-A is only one scenario so it should not be provided to policy-makers.

Parallel Session 7: Rural Livelihoods and Agriculture

Session Leads: *Dr David Mkwambisi (UMFULA), Dr Grady Walker (HyCRISTAL) and Dr Nkulumo Zinyengere (CCKE)*

The discussion focused on the question “How can we best inform agriculture and rural livelihoods decisions under FCFA timelines (5-40 years) given short term priorities?”

Three FCFA consortia work on rural livelihood and agricultural applications of medium- to long-term climate information:

- UMFULA addresses agriculture decisions through water and irrigation planning at the national level, and private sector farming of sugar and tea.
- HyCRISTAL is sharing climate information with officers in the respective

ministries of water, agriculture and fisheries in Uganda and Kenya as well as engaging decision-makers at the community level using different sources of data.

- AMMA-2050 is informing climate smart agriculture practices in the Fatick region in Senegal. Climate information is being exchanged with various different stakeholders through already existing platforms for decision processes, such as COMRECC, which involves various stakeholders at the regional level in Senegal.

The following issues were highlighted in the group discussion:

- It is challenging to bring long-term climate information into the planning and policy cycles used in these different cases due to mismatch of timelines.
- Making use of existing multi-stakeholder platforms such as COMRECC (in Senegal) may be a good avenue for engaging decision-makers with climate information.
- Knowledge can be framed in the form of scenarios for it to be better understood by decision-makers.
- Lack of high resolution future climate information is a challenge
- Short-term political interests and high turnover of government staff affect decision-making processes
- Conversation platforms are vital for future climate information exchange but are currently driven externally and through short-term projects and are not institutionalised.
- Decision-makers tend to want direct and practical solutions, even where it is beyond the science to provide

Potential avenues for overcoming barriers to information uptake include:

- Targeting of regional level (sub-national) existing institutions with future climate information.
- Increasing efforts to translate data into information and knowledge.
- Supporting platforms for sharing data, information and communication.
- Generating of more localised climate information.
- Identifying and supporting individual champions in-country to promote use of climate information and institutionalise it.

Parallel Session 8: Climate Narratives

Session Lead: *Dr Ajay Bhave (UMFULA)*

The aim of this parallel session was to explore the potential for developing climate narratives for the Lake Malawi and Shire River Basin (LMSRB). Specifically, the parallel session sought to:

1. Identify key climate processes influencing LMSRB rainfall over the last 40 years
2. Discuss key drivers of future rainfall change (next 40 years – FCFA time horizon)
3. Identify other experts in this region's climatology for future interaction

The overarching message from the session was that developing narratives for this region will not be easy - for climate scientists or for adaptation / impact scientists. There is limited understanding of the intricate details of how different climate processes interact to generate rainfall in the basin. An important reason for this is insufficient observations and analysis. The river basin is on the cusp of two different climatological regions, which makes the narratives development difficult, particularly from a rainfall perspective. There are inter-dependent and inter-linked processes influencing long-term rainfall change and deep uncertainty in plausible changes including non-linear changes.

The parallel session and approach to bring together climate and impact scientists also highlighted the following:

- Deep uncertainties around the above factors emphasise the importance of DMUCU approaches to identifying vulnerabilities.
- Discussion is useful for developing a case study, clarifying the idea of narratives amongst climate scientists, improving understanding of impact scientists, and revealing disagreements and new issues worth researching.
- The importance of integrated teams that include impact modellers and climate scientists in the development of new climate information.
- Narratives are a good example of co-production within the consortia. The difficulty in reaching consensus on climate processes and impacts strengthens the case for FCFA's research. Consortia should pay more attention to narratives as alternatives to technical model outputs and what this means for communications. For example, considering relevance for particular usage contexts (sectoral impacts) and interpretation issues between English and local languages.
- Clarifying terminology: A glossary of definitions would be helpful to advance clarification of the meaning of certain often-used words that may have multiple meanings. Examples of words include "narratives", "drivers" (e.g. of rainfall), and "co-production".





FCFA Synthesis Products

Two sessions at the conference explored opportunities to produce collaborative cross-programme outputs. These sessions built on opportunities identified in the thematic parallel sessions.

It was agreed that FCFA researchers would produce a series of synthesis products that will draw together findings from across the consortia for specific audiences or thematic areas of work. These synthesis products may be publications of various formats, but are not restricted to being written publications, and will have a clear audience focus. Synthesis outputs will link elements of research across FCFA research pillars and/or work packages and/or consortia for a particular audience profile. An initial mapping of target audiences, potential outputs, and champions to drive the process were conducted during the conference (refer to Table 1 for target audience). Following the conference, work will continue to confirm the list of synthesis outputs. An internal FCFA process, coordinated by the CCKE, will prioritise outputs, convene writing and review teams, and scope content.



Table 1: FCFA synthesis outputs target audience mapping	
Climate science and modeling community	African universities, African regional climate centres, African and international modelling centres, Impact modellers, hydrological and crop modellers, crop breeders, African Research Universities Alliance, African Academy of Science, National Research Foundation, International Council for Science, World Climate Research Programme, Future Earth Climate Research for Development (CR4D)
Climate information Services providers	National met services, regional climate centres, Climate Services Partnership, Global Framework for Climate Services, World Meteorological Organisation, private sector, agricultural advisory agencies
City municipalities, local governments	Urban water planners, middle managers, mayors, climate change champions in cities, community based organisations
National political institutions	Ministries of water, energy, and agriculture, treasuries, national planning departments, South African Department of Science and Technology, national inter-ministerial climate change committees, engineering standards authorities (Transport, Hydro, WASH), regulators
Donors	DFID (HQ and Country Offices), KfW, IDRC, AfD, USAID, ...
Infrastructure and adaptation financiers	World Bank, AfDB, Infrastructure Consortium for Africa, GCF
Media	Science and environmental journalists, development journalists, PAMACC, NECJOGHA
Private sector	Agriculture - tea, coffee, horticulture, sugar
Sub-Regional and regional political institutions	SADC (FANA grouping), ECOWAS, EAC, African Union, river basin authorities, African Climate and Policy Centre (ACPC)

FCFA Learning at the Mid-Term Conference

At the outset of Day 4, a learning and reflection session helped to identify common threads that emerged over the conference period. Discussion threads that flowed brought attention to overlapping areas of research as well as processes employed to learn and communicate between consortia, research “pillars”, and institutions.

Highlighted observations include:

- The conference provided a good opportunity for consortia to share and learn from complementarity approaches. Identifying light touch opportunities to share information across FCFA going forward is important and concrete steps are needed for this.
- There is still a challenge to speak across scientific disciplines - it is important to generate interest in other disciplines and expose the different disciplines to each other.
- There are often multiple interpretations of concepts/terminology; a glossary of terms would be useful, as trans-disciplinary work will benefit from a common language.
- There is a huge potential for impact in science and development and the FCFA community needs to look outward to realise this impact. The conference has supported conversations around practical activities in this regard.
- Having strong support from funders, and champions in DFID and NERC for this work adds a lot of value.

Appendix 1: List of Poster Titles and Authors

Box 3-a: Poster Session 1

- Poster 1: 'Exploring the possibility of developing a common language for climate and development within a multi-disciplinary city context' – A Steynor et al
- Poster 2: 'From a clean slate to multiple options – eliciting user needs for climate information in Malawi.' – K Vincent
- Poster 3: 'Climate Risk Narratives' – C Jack
- Poster 4: 'Climate information for supporting decision-making: putting principles into practice' – E Visman
- Poster 5: 'Climate Information for Resilient Tea Production – CI4Tea project' – Neha Mittal et al
- Poster 6: 'Designing and implementing processes for co-producing climate knowledge in African cities; FRACTAL's embedded researcher approach' – K Lipinge and B Mwalukanga
- Poster 7: 'Climate Resilient Decision-making: A city-centric approach to achieving water security for African cities in an uncertain climate future' - R Rebecca
- Poster 8: 'The Role of Capacity Building for Development and Implementation of Climate Change Adaptation Programs and Policies in Malawi.' - D Mataya, K Vincent and A Dougill
- Poster 9: 'Climate games: Understanding out-grower responses to a changing climate through play' - J Pardoe
- Poster 10: Identifying entry points for climate science in urban decision-making: the case of artificial aquifer recharge in Windhoek' - A Taylor
- Poster 11: 'Water and energy systems, urban governance and decision-making in Harare' - M Ndebele-Murisa and C P Mubaya
- Poster 12: 'Governance, decision-making and climate change in Lusaka: preliminary understandings – D Muchadenyika, B Mwalukanga and D Scott
- Poster 13: 'Expert-elicited climate narratives to characterise uncertainty in regional climate change' A Bhave et al.
- Poster 14: 'Climate Risk Narratives: Case Studies within FRACTAL' - T Janes

Box 3-b: Poster Session 2

- Poster 1: 'Projected changes in tropical cyclones over the southwest Indian Ocean under different degrees of global warming' – M Muthige and F Engelbrecht
- Poster 2: 'The interaction between moist diabatic processes and the atmospheric circulation in African easterly wave propagation' – L Tomassini
- Poster 3: 'Pan-African and regional climate in the CP4-A convection-permitting simulations' – D Finney
- Poster 4: 'The CP4 Africa control simulation – an initial assessment of the run' – R Stratton
- Poster 5: 'Analysing tropical-extra tropical cloud bands over Southern Africa: How far can we trust model representations of climate variability and change?' R James
- Poster 6: 'Understanding variability in the Eastern African short rains' - L Hirons
- Poster 7: 'Genealogy of Gridded Precipitation Datasets over Southern Africa' – V Indasi et al
- Poster 8: 'Investigating Drivers of convection over Central Africa' (W. Pokam)
- Poster 9: 'The dependence of subtropical Southern African circulation on the representation of convection in climate simulations' – N Hart
- Poster 10: 'Using regional climate model experiments to improve our understanding of Southern Africa climate' – F Desbiolles et al
- Poster 11: 'Surface water balance in a convection permitting model' – S Folwell et al
- Poster 12: 'Characteristics of sub-seasonal wet and dry spells over Southern Africa: observations and high-resolution models - Kolusu et al.'

Box 3-c: Poster Session 3

- Poster 1: CP4 Africa future climate simulations' – S Tucker
- Poster 2: 'Improvements in the Precipitation Distribution over West Africa using Convection-Permitting Simulation at Climate Timescales' – S Berthou
- Poster 3: 'An investigation on the drivers of the asymmetrical rainfall pattern over Lake Victoria - M. Gudoshavasimulation – an initial assessment of the run' – R Stratton
- Poster 4: 'IMPALA Work Package 1: The impact of large scale variability teleconnection on African climate variability & change' – A Turner
- Poster 5: 'Physical Climate Variability and change science'
- Poster 6: A simple set of indices describing characteristics of the ITCZ rain belt over Africa – G Nikulin and B Hewitson
- Poster 7: Analysis of hydro-meteorological extremes and their representation in regional models, Y Sane
- Poster 8: 'Madden-Julian oscillation and West African extremes daily precipitation events sub-seasonal predictability - M Diakhaté et al
- Poster 9: SCUS-2050: Exploring the future of the Southern Canary Upwelling System - S Ndoye
- Poster 10: Constraining Congo Basin rainfall in the CMIP5 ensemble: a process - based assessment, A. Creese and R. Washington
- Poster 11: 'Causes of the Uncertainty in CMIP5 Rainfall Projections over East Africa (Dave Rowell and Rob Chadwick)'
- Poster 12: 'Evaluation of Spatio-temporal Rainfall Variability and Teleconnection Signals in CMIP5 Models Over Eastern Africa' – Geoffrey Sabiiti
- Poster 13: 'Frequency of extreme Sahelian storms tripled since 1982 in satellite observations' C Taylor et al
- Poster 14: Why are climate models too wet in Southern Africa? (and too dry in the Western Indian Ocean?) - C Munday and R Washington
- Poster 15: The El Niño event of 2015-16. Climate anomalies and the impact on groundwater over Eastern and Southern Africa – S.R. Kolusu et al.
- Poster 16: 'HyCRISTAL Hydrological Impact Modelling' - M. Ascott
- Poster 17: Integrating climate change information into long term planning and design for critical water related infrastructure for African Cities - N Walker
- Poster 18: 'Addressing Impacts of climate change in the Maputo Municipality' - H Mucavele and G Maure
- Poster 19: 'Hydrological research for AMMA-2050' - P Rameshwaran et al.
- Poster 20: 'Rural Pilots in Homa Bay, Kenya and Mukono, Uganda' - G Walker
- Poster 21: 'Gender and decision-making among sugar cane growers in Malawi' (Rebecka Malinga)
- Poster 22: Benefit-cost of climate-resilient sanitation - B. Evans

Appendix 2: FCFA ToC Diagram

