



# QWeCI

## Quantifying Weather and Climate Impacts on Health in Developing Countries

Newsletter

February 2013, No. 6

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### EDITORIAL

Dear Reader,

A very warm welcome to the sixth edition of the QWeCI Project newsletter!

Commendations must be noted to partners in ILRI after a successful project meeting – an excellent event!

The Management Board continues to be grateful to all those working on QWeCI Project, as well as those who are associated with us.

We have been enthused by the collaboration and are confident it will continue beyond the project.

All management board members look forward to seeing you in Barcelona in May.

– *The QWeCI Management Board*

### Coordinator’s report

With the New Year comes a new enthusiasm that has re-entered the project as we enter our final months, consolidating and disseminating the important research we have undertaken since QWeCI started.

The second FP7 reporting period has been completed in all aspects and we now start the third and final reporting periods. Already work is being done to ensure this is a similarly sound process and I am confident that we have the right people across the project that will be able to conclude the research that has been carried out and look to future areas of development that can further enhance our contribution to the field. We are

taking on additional part-time staff in the Project Office to provide additional support for this final reporting phase. Peris and Andrew will continue to be the points of contact with you.

Our third project meeting was held in Nairobi and I know colleagues will join me in thanking our hosts – ILRI – on facilitating an engaging and collaborative meeting. I was glad to see so many partners were able to travel to Kenya and welcomed the input of all those involved and external to the project.

A great range of events lays head for the project; in particular, I look forward to the joint HEALTHY FUTURES – QWeCI Symposium in Rwanda on 29<sup>th</sup> March. This will be an excellent opportunity for further collaboration with our sister project and an opportunity to show case the ground-breaking work QWeCI has led. Furthermore, in May, the project will meet in Barcelona for our final project meeting. Please make every effort to come to IC3, it will be an important event in the life of the project and will allow us to reflect upon and promote the work we have undertaken in QWeCI.

With best wishes,

Andy



## Third Annual Meeting



From 23<sup>rd</sup> to 25<sup>th</sup> October 2012, partners in the International Livestock Research Institute hosted the third QWeCI Annual Meeting. In the Kenyan capital, most institutions were represented and many of those who were unable to attend were able to contribute through teleconference systems.

A presenter for each Work Package shared progress on the specific area and welcomed analysis from those present.



Following the presentations, the management board met to discuss project progress, to address any ethical or more general issues identified and to update participants on the appointment of the advisory board. On the third day, a series of excellent science talks were presented to the meeting, covering a wide and varied array of topics.

At the meeting, a plan was agreed to ensure effective and timely completion of the periodic and final reporting to the European Commission. Deadlines for partners to complete reporting to will be circulated by the Project Office to those involved.





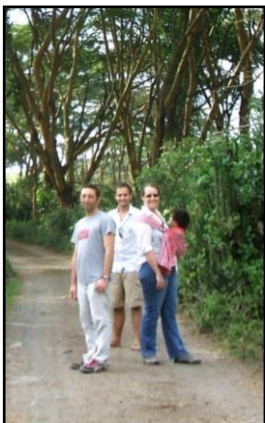
Professor Andy Morse wishes to extend his thanks to all those who contributed to the presentations and management board meeting.

The delegates were also grateful meet with Tara Wambugu, former Project Manager who left the project in 2011 to relocate to Nairobi. Tara met with some attendees for a meal and spent some time with old friends. We are happy to report Tara, Jesse and Claire continue to do well in Kenya.

We also were grateful to our EC Project Officer, Lara-Grazia Passante, who join the meeting through the teleconference system. Dr Passante continues to be a great support for the project.

The meeting was a great success and collaborative opportunity. In addition to those who spoke, special thanks are offered to all those in ILRI and beyond – both front of house as well as behind the scenes – who made the event so successful.

The project looks forward to the final project meeting in Barcelona in May 2013.



## Spotlight: Senegal Pilot Project

The main findings of the Work Package, to date, are related to 2011 rainy season field activities profile (inter-annual and intra seasonal variability), pond (that are breeding sites) dynamics in relation to rainfall, entomological considerations (composition and biodiversity of anopheline fauna, malaria vectors biting rates and cycles, parity rates, estimation of the other entomological parameters, Rift Valley Fever (RVF) vectors, population dynamics, host attractiveness, etc.), water body monitoring based on remote sensing data, land cover changing in ecosystems based on remote sensing data, first validation of LMM in Senegal.



The principal findings were submitted for the 4<sup>th</sup> AMMA international conference in Toulouse (France); and some were presented during the 17<sup>th</sup> CoP of UNFCCC in Durban (South Africa). In the same way, the QWeCI Project International Workshop for End Users in Dakar (Senegal), 14<sup>th</sup> – 16<sup>th</sup> November 2011 hosted by Senegalese partners was a fruitful opportunity to share some results and to interact with end users.

In the case that Senegal has not recorded any case of RVF event during the rainy 2010 and 2011 seasons, partners in Centre de Suivi Ecologique, the University of Liverpool and Institut Pasteur de Dakar have analysed the 2010 RVF event occurred in Mauritania. The main results help us to verify assumptions founded in Ferlo area (Senegal) and to understand exactly how the outbreak happened.



## Participant Profiles

### Dr Francesca Di Giuseppe

European Centre for Medium Range Weather Forecasts, UK



Francesca Di Giuseppe has a broad background in numerical weather prediction which spans from modelling radiation interaction within clouds, data assimilations and surface parameter initializations. She has worked for seven years in the research meteorological service in Italy leading model development efforts in data assimilation, model validation, evaluation and bias correction.

For the last two years, Francesca has been working at ECMWF on the QWeCI project where a new EOF-based spatial bias correction was designed to allow the monthly and seasonal forecast systems to be joined seamlessly. As part of QWeCI, she has developed the first prototype pan-African operational forecasting system for malaria by coupling initially the malaria model VECTRI (Tompkins and Ermert, 2013) to the seamless bias-corrected monthly and seasonal forecasts (Di Giuseppe *et al.*, 2012). Thanks to the collaboration with Anne Jones at University of Liverpool, Liverpool Malaria Model (LMM) is now being included in the system as well.

Since July 2012, the malaria early warning system has run weekly malaria predictions with African

coverage and forecast lead time up to 4 months. In addition, each week the system is also run for the previous 18 years using the hindcast set. These supplementary simulations are used to establish the relevant climatic malaria conditions for a region of interest so that anomalous transmission conditions can be diagnosed. Fig. 1 shows some of the products available on the dedicated web site. The anomaly of “parasite ratio” is a measure of the intensity of malaria transmission when compared to climatic defined conditions, while the length of transmission defines the number of days in the 120 days simulation period in which malaria transmission occurs.

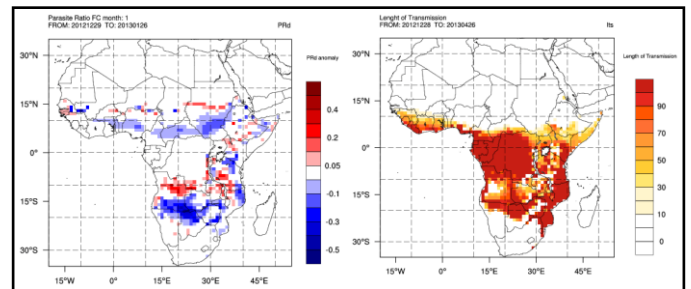


Figure 1: Example of experimental malaria products available through the Malaria Early warning system (MEWS).

(a) The anomaly of “parasite ratio” is a measure of the intensity of malaria transmission when compared to climatic defined conditions; (b) the length of transmission defines the number of days in the 120 days simulation period in which malaria transmission occurs

While the system is still at its infancy and a proper validation is being carried out with colleagues from the ministries of health in Malawi, Uganda and Rwanda, Fig. 1 already highlights its potential for operational use. The system is in fact able to correctly locate where malaria is endemic and stable transmission occurs (Fig 1b) or epidemic (Fig 1a). The current momentum and investment in strengthening health systems and reducing disease in sub-Saharan Africa is unprecedented. Investment in research and operational delivery of climate information products for climate sensitive-disease control is highly valuable in helping to maximize the effectiveness of control program planning and implementation. However,

experience to date has shown that it is difficult in terms of availability, timing and cost to obtain meteorological observations from national meteorological services in Africa. The MEWS system implemented at ECMWF could serve the purpose of filling this gap.

## James Chirombo

Ministry of Health, Malawi

James Chirombo is a statistician working for the Ministry of Health (MOH). His primary job is to analyse data from all health facilities in Malawi to help the government monitor progress made in the health sector as well



as for policy formulation. He works in conjunction with statisticians posted at the district levels and statistical clerks in the health facilities.

After his first degree, James taught mathematics and physical science at secondary school for two years before joining the MOH in May 2010. In 2012, James completed his MSc in Biostatistics at Chancellor College, of University of Malawi, where he had also completed his BSc in statistics and mathematics.

For his thesis, James used the malaria indicator survey data with the primary aim to produce a continuous under five malaria risk map for the whole country by making use of Bayesian-structured additive regression models implemented in the free software Bayes X. These models allow the modelling of continuous covariates in the model as nonlinear effects which is not possible in standard in GLM. The thesis was co-supervised by

Dr Rachel Lowe of the QWeCI project and his MSc was funded by the Health Research Capacity Strengthening Initiative (HRCSI), a project within the National Commission for Science and Technology which is funded by the Wellcome Trust and Department for International Development (DFID).

James Chirombo is the QWeCI Project focal person in the Ministry of Health in Malawi and has worked closely with Dr Rachel Lowe (IC3) and Dr Adrian Tompkins (ICTP) on the development of statistical models for malaria by providing the malaria data from Malawi and other datasets. He was introduced to the QWeCI team that visited the MOH in late 2010 together with its Malawi based partners (College of Medicine and the Malawi Polytechnic, both constituent colleges of the University of Malawi). James then organized a meeting where the principal investigator, Professor Andy Morse and Dr Tompkins met representatives of Baobab Health Trust which is a local NGO working on electronic medical systems in hospitals in Malawi and the National Malaria Control Programme to build a working relationship. This visit built the relationship that has continued to this day. Through the QWeCI, James has developed an interest in spatial statistical methods and hopes to continue on this path.

James said “QWeCI has opened my eyes to a wide range of interesting research areas” and, in the future, he would like to further his studies to PhD level. Studying health-climatic interactions using statistical methods is the area that he would like to do further research into.



James Chirombo at the summer school on ‘Climate impacts modelling for developing countries: Water, Agriculture and Health’ in Trieste, Italy, September 2011

## Living with Environmental Change

From physicist John Tyndall's ground-breaking discovery of greenhouse gases in the 1800's, to evidence of rising global temperatures in the last 50 years, scientists have been investigating the impact of human activity on the earth's climate. Today the consequences of climate change for ecosystems, health, infrastructure and sustainability are among the most pressing global challenges.

Researchers at the University of Liverpool, including QWeCI investigator, Professor Matthew Baylis, have come together from across science, engineering, life sciences, social sciences and arts, to pose new questions about climate change and promote further debate amongst policy makers and members of the public on environmental issues affecting the planet.



The Liverpool team is working with national and international partners, such as the Met Office Hadley Centre and Duke University in the US. Research is also strengthened with support from Liverpool-based organisations and institutions including the National Oceanography Centre, the National Centre for Zoonosis Research and the Liverpool School of Tropical Medicine.

For more information and to watch the 'Living with Environmental Change' video, click [here](#).



## Professorship for Project Coordinator

In December 2012, QWeCI was pleased to announce that the project's Principal Investigator, Andy Morse, had been awarded a personal chair by the University of Liverpool.



Andy joined the lecturing team of the University of Liverpool's Department of Geography and Planning (later School of Environmental Sciences) in 1988, being promoted to Senior Lecturer in 2004 and being made a Reader in 2007.

Professor Morse's distinguished career has seen him successfully secure funding from an eclectic host of funders and, in 2006, was co-awarded the World Meteorological Organisation's Norbert Gerbier-MUMM International award.

In addition to being coordinator of the QWeCI Project, Professor Morse is coordinator of the Indraas Project and is co-Investigator of three further projects with Professor Matthew Baylis of the University of Liverpool. Andy is a partner in the FP7 Healthy Futures Project and the NERC EQUIP Project.

Congratulations Professor Morse!

## Congratulations to Fadel!

On Monday 1<sup>st</sup> October 2012, the QWeCI Project was pleased to hear of the safe arrival of Taibou.

Taibou's father, Fadel Kebe has played an instrumental role in the research conducted at UCAD.

Many congratulations to Fadel and family!





## Symposium Programme

*Serena Hotel, Kigali, Rwanda 29<sup>th</sup> March 2013*

(Only the presenter's name is listed below)

08.00 – 08.45 **Registration**

08.45 – 09.00 **Welcome**

QWeCI Coordinator: Andy Morse, University of Liverpool, and HEALTHY FUTURES Coordinator: David Taylor, National University of Singapore

09.00 – 09.30 **Plenary speech**

Dr Magaran Bagayoko, Protection of Human Environment Programme, World Health Organization – Regional office for Africa, Brazzaville, Congo Republic

09.30 – 09.50 **Climate change and the discourse of environmental health in eastern Africa**

David Taylor, Department of Geography, National University of Singapore, Singapore

09.50 – 10.10 **Community Perceptions of Health Risk Management in Changing Climate in Tanzania**

Sheila Chemjor, Eastern Africa Regional International Federation of Red Cross and Red Crescent, Nairobi, Kenya

10.10 – 10.30 **Uses of seasonal forecasts in Africa for malaria prediction**

Andy Morse, University of Liverpool, Liverpool, UK

### 10.30 – 11.00 COFFEE

11.00 – 11.20 **Rainfall and RVF emergence in Senegal: beyond twenty years of investigation, lessons learned and perspectives**

Jacques Andre Ndione, Centre de Suivi Ecologique, Dakar, Senegal

11.20 – 11.40 **Mapping the distribution of potential Rift Valley Fever hotspots in East Africa**

Bernard Bett, International Livestock Research Institute, Nairobi, Kenya

11.40 – 12.00 **Identification of Malaria Transmission Hotspots for Targeting Malaria Control in Kigali City**

Jean Pierre Bizimana, National University of Rwanda, Butare, Rwanda

12.00 – 12.20 **Mapping the underlying causes of vector-borne diseases in East Africa**

Stefan Kienberger, University of Salzburg, Salzburg, Austria

12.20 – 12.40 **Climatic and socioeconomic determinants of malaria in Rwanda and Uganda**

Felipe de Jesús Colón-González, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy

### 12.40 – 14.00 LUNCH

14.00 – 14.20 **Geostatistical modelling and analysis of under five malaria risk in Malawi**

James Chirombo, Malawi Ministry of Health, Lilongwe, Malawi

14.20 – 14.40 **A spatially-explicit simulation model for Rift Valley fever transmission**

John Gachohi, International Livestock Research Institute, Nairobi, Kenya

14.40 – 15.00 **VECTRI – A new high resolution regional model for malaria that accounts for population density and surface hydrology**

Adrian Tompkins, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy

15.00 – 15.20 **21st century projections of *Anopheles gambiae* sensu stricto population dynamics in Africa**

Nils Hempelmann, Climate Service Centre, Hamburg, Germany

15.20 – 15.40 **EUPORIAS dynamical downscaling of global seasonal forecasts for East Africa**

Grigory Nikulin, Swedish Meteorological and Hydrological Institute, Norrköping, Sweden

15.40 – 16.00 **Comparative Study of the Impact of Climate Variability on Prevalence of Urinary Schistosomiasis**

Sammy Crowther Kofi Tay, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

#### 16.00 – 16.20 COFFEE

16.20 – 16.40 **Providing regional climate change information for East Africa: CORDEX and HEALTHY FUTURES**

Grigory Nikulin, Swedish Meteorological and Hydrological Institute, Norrköping, Sweden

16.40 – 17.00 **The prototype Malaria Early Warning System of ECMWF and ICTP (MEWS)**

Francesca Di Giuseppe, European Centre for Medium-Range Weather Forecasts, Reading, UK

17.00 – 17.20 **Conclusion of the day and acknowledgments**

Theophile Niyonzima, National University of Rwanda, HEALTHY FUTURES

#### 18.00 – 20.00 Reception (with posters)

### Recent Publications

- Di Giuseppe, F., Molteni, F. & Tompkins, A. M., 'A rainfall calibration methodology for impacts modelling based on spatial mapping', *Quarterly Journal of the Royal Meteorological Society* (2012) [available [here](#)]
- Di Giuseppe, F. & Dutra, E., 'The correction of ERA-I rainfall and its benefit for its modelling base', *Quarterly Journal of the Royal Meteorological Society* (2013) [forthcoming]
- Ermert, V., Fink, A. H., Morse, A. P. & Paeth, H., 'The Impact of Regional Climate Change on Malaria Risk due to Greenhouse Forcing and Land-Use Changes in Tropical Africa', *Environmental Health Perspectives*, Vol. 120, No. 1 (2012) [available [here](#)]
- Ermert, V., Fink, A. H., Morse, A. P., Jones, A. E., Heiko, P., Di Giuseppe, F. & Tompkins, A. M., 'Development of dynamical weather-disease models to project and forecast malaria in Africa', *Malaria Journal*, Vol. 11, No. 9 (2012) [available [here](#)]
- Knippertz, P., Fink, A. H., Schuster, R., Trentmann, J., Schrage, J. M. & Yorke, C., 'Ultra-low clouds over the southern West African monsoon region', *Geophysical Research Letters*, Vol. 38, No. 9 (2011) [available [here](#)]



## Future events

- **Fourth Annual East Africa Health & Scientific Conference – Kigali, Rwanda  
27<sup>th</sup> – 29<sup>th</sup> March 2013**

QWeCI and Health Futures will, jointly, be hosting a symposium during the conference.

Proposed programme for the symposium can be found on Pages 7 and 8.

Please contact the project office for more information.

- **School on Modelling Tools and Capacity Building in Climate and Public Health – (ICTP) Trieste, Italy  
15<sup>th</sup> – 26<sup>th</sup> April 2013**

The deadline for applications has now passed but more information can be found [here](#).

- **Final QWeCI Project Meeting – (IC3) Barcelona, Spain  
16<sup>th</sup> – 18<sup>th</sup> May 2013**

The final meeting of the QWeCI Project will be hosted by partners in IC3.

To receive further information about the meeting, please contact the [Project Office](#).

- **Impacts Conference and ISI–MIP Meeting – Potsdam, Germany  
27<sup>th</sup> – 31<sup>st</sup> May 2013**

More information can be found [here](#).

## Contacts

### Project Office

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The QWeCI Project Office is open Tuesday mornings, Wednesdays and Fridays. Please feel free to get in touch whenever you have a query or question.

### Coordination

The Coordinator and Principal Investigator of QWeCI is Professor Andy Morse of the NERC University of Liverpool ([A.P.Morse@liv.ac.uk](mailto:A.P.Morse@liv.ac.uk)) with Dr Adrian Tompkins acting as Deputy Coordinator at the International Centre for Theoretical Physics, Trieste ([tompkins@ictp.it](mailto:tompkins@ictp.it)).

### Publications

The Project Office would be grateful if partners and researchers could send details of any publications as part of the QWeCI Project.

Please use the following wording when acknowledging QWeCI funding in your publications:

*This study was funded by the EU project QWeCI (Quantifying Weather and Climate Impacts on health in developing countries; funded by the European Commission's Seventh Framework Research Programme under the grant agreement 243964)*

## Further Information

### Keep up to date

Please visit the QWeCI website for project details, partner information, and regular updates:

<http://www.liv.ac.uk/qweci>

### Our Friends

Please see below the pages of related projects:

[www.HealthyFutures.eu](http://www.HealthyFutures.eu)

[www.liv.ac.uk/ENHanCE](http://www.liv.ac.uk/ENHanCE)

[www.BaobabHealth.org](http://www.BaobabHealth.org)

### DMC now downloadable

The Disease Cradle Model, including the Liverpool Malaria Model, can now be downloaded [here](#).

### Photo Acknowledgements

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James Chirombo

Fadel Kebe