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QWeCI

Quantifying Weather and Climate Impacts on Health in Developing Countries

Deliverable 6.2.d – Completion of Pretoria workshop

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Dissemination Level		
PU	Public	
PP	Restricted to other programme participants (including the Commission Services)	PP
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Deliverable 6.2.d – Report on the completion of the "Pretoria" workshop held in Kigali, Rwanda

The final QWeCI workshop was originally planned to take place at the University of Pretoria in South Africa. However, in the early stages of the project the main researcher at the partner institute changed employers and was as a consequence, the partner organization placed a reduced role in the project. As a result, at an early stage it was decided to look for an alternative venue to hold the final QWeCI symposium.

The QWeCI management team discovered that the East African Community (EAC) were to hold a conference in Kigali, Rwanda on 27-29 March 2013. It was decided that the potential of moving the symposium to a session at the EAC event would be ideal, since it would:

Audience photo during the QWeCI symposium

- Allow the QWeCI research results to be projected to a wide audience from the region due to the key nature of EAC organised events,
- permit further integration and communication between QWeCI and its sister EUFP7 project "HEALTHY FUTURES", since the latter project is focused on the EAC region, and thus was well represented at the EAC conference, and
- take advantage of the excellent timing of the EAC event with respect to the QWeCI calendar (M37 of the project).

The session was thus organised on the conference final day and was co-organised with HEALTHY FUTURES. At the session, participants heard how an improved knowledge of links between environment, including climate, socio-economic conditions and vector-borne diseases (VBDs) such as malaria, schistosomiasis and Rift Valley fever when combined with modern, sophisticated modelling techniques can be used to quantify the health impacts of long term environmental changes and in seasonal to decadal timescale disease forecasting (early warning) systems. This latter point was the focus of the excellent plenary talk ("The potential of climate-based early warning systems for improved management of vector borne diseases in Africa") at the Symposium, given on behalf of Dr Magaran Bagayoko, of WHO Africa.

The talks included a range of foci, and some highlight talks included:

- Sheila Chemjor of the Red Cross, who gave a very insightful perspective of a stakeholder regarding health risk management. The talk was particularly enlightening for the dynamical disease modellers in the session to highlight the issue that require addressing in order for research output to be effectively uptaken by stakeholders in the field.

- Francesca Di Giuseppe of ECMWF, who presented the QWeCI integrated forecast system developed at ECMWF and ICTP for the first time which is of particular relevance to the WHO (fig. 1). The system is available online to partners of the project freely presently located on the ECMWF web server.

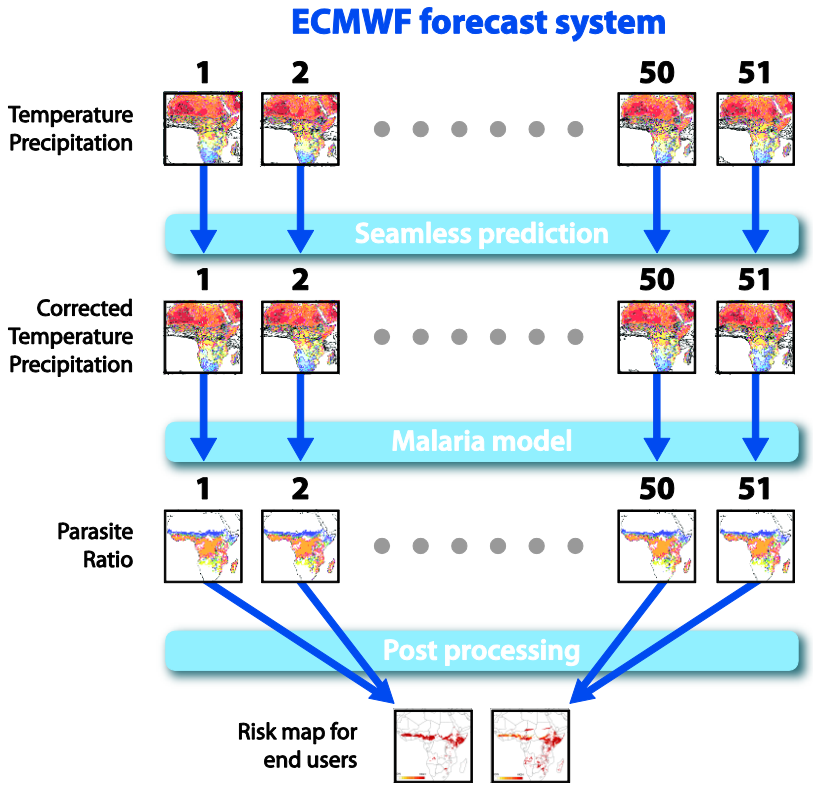

Figure 1: figure from presentation of F. Di Giuseppe outlining the new system developed in QWeCI

- Andy Morse of University of Liverpool, who presented novel results from the Liverpool University malaria model (LMM), which is now being integrated into the ECMWF-ICTP forecasting system. The results showed skill assessments of the LMM driven by renanalysis and ECMWF system 4 seasonal forecasts over some of the key regions of the project, including Malawi.

- James Chirombo of the Ministry of Health in Malawi. This organisation was not funded within the QWeCI project, but the project enabled contacts with the ministry to be made, and finally the organisation played a major unfunded role in the project, with the collaboration between the ministry, ICTP and IC3 expected to continue after the project end. James presented a statistical analysis of malaria cases in Malawi from 2005 to the present (fig. 2) and showed how these related to climate and socio-economic factors. The generalized linear mixed model approach was applied to relate these factors to malaria cases while accounting for random (unmeasured) factors.

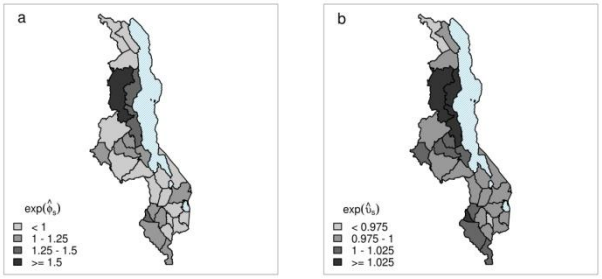

Figure 2: Results from the statistical model of malaria in Malawi presented by James Chirombo, giving expected mean and variance of district cases for 2011 from a generalized linear mixed model framework.

- Adrian Tompkins presented work at partner ICTP which was not originally envisaged in the QWeCI workplan, namely the development of a new dynamical malaria model. The model attempts to build on existing work by incorporating a simple but realistic surface hydrology and a explicit interaction with the host population, allowing the differentiation in transmission intensity between peri-urban and rural environments. The model forms the basis of the present pilot forecasting system developed together with ECMWF which was presented earlier in the session. Results in the talk (fig 3.) showed examples of how the interannual variability was sensitive to model assumptions.

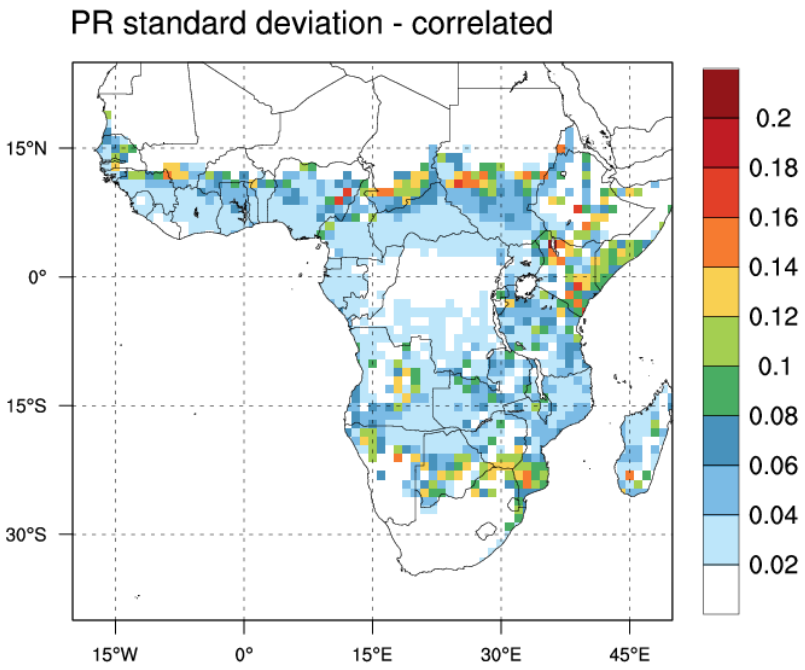

Figure 3: calculation of interannual variability of malaria prevalence from experiments shown in talk by Tompkins.

- John Gachohi presented a new dynamical model for Rift Valley fever developed within the two EU projects at ILRI which models the populations of the two key vectors in addition to the two categories of cattle and sheep. The model assumes that each of the hosts gain life immunity if surviving an outbreak, although in effect, immunity lasts on the order of 3 years for sheep and 10 years for cattle during to the harvesting 'turn over' of the hosts. The model thus assumes that the intermittent >10 year outbreak of the RVF cycles is due to (loss of) immunity. To date the model has only been tested for a recent outbreak in 2005/06 and requires further evaluation over a longer period of time.

It was quite clear that there is a genuine research momentum building that focuses on the impact of climate change on vector borne diseases in Africa over a range of timescales from the seasonal to the decadal and beyond. Relationships between climate and disease, including VBDs, are not simple, however, and this was stressed at the meeting. Using research tools developed and the findings made available work presented at the Symposium can without doubt make a meaningful contribution to improving the health of people in Africa.

More importantly, the environmental but also socio-economic dimension of health issues addressed in various presentations from the symposium can contribute in shedding light on various health problems discussed by scientists under different themes over the three days of the 4th EAC Scientific and Health Conference. The main challenges remain investing in research infrastructure in the eastern Africa region, strengthening synergies between researchers, policy makers and practitioners and developing and holding the political will to implement changes and policies on the ground. The following appendix gives the programme for the talks that were selected from the submitted abstracts for oral presentation.

Environment and health in Africa

Climate and vector-borne diseases Symposium

East African Community Annual Health & Scientific Conference, Serena Hotel, Kigali, Rwanda, March 29 2013

Agenda

08.00 - 08.45	**Registration**
08.45 - 09.00	**Welcome** QWeCI Coordinator: Andy Morse, University of Liverpool, and HEALTHY FUTURES Coordinator: David Taylor, Trinity College Dublin/National University of Singapore
09.00 - 09.30	**Plenary speech** Dr Magaran Bagayoko, Director of the 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 Physic, 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