Building new research networks: Climate change in South East Asia

Building resilience to climate change is a global issue, and it will be especially important in South East Asia, which is expected to be seriously affected by climate change because many of its economies rely heavily on agriculture and natural resources. Extreme climatic events such as floods, droughts and tropical cyclones are already experienced throughout the region, and these are expected to become more frequent as our climate changes. Events such as these do not respect national borders, and so to deal with the cross-boundary issues, regional cooperation and information sharing is required.

The University of Reading will be opening a campus in EduCity at Iskandar, Malaysia, in 2015, and part of this new development will include building and establishing new research networks within the area. Collaboration through integrated projects and partnerships will enable Reading to use our expertise to support research in these matters and gaining from that already existing within the region.

To mark this development and indicate our commitment to the region, the University recently organised a symposium to enhance our research connections within Southeast Asia, looking to build a series of collaborative projects with partner universities. Fifty participants from universities, research organisations, government and industry from Southeast Asia and from the University of Reading, participated in the International Symposium on Resilience to Climate Change in Southeast Asia. The symposium was held at the University of Reading Malaysia in Johor Bahru from 16 to 18 April 2013.

‘Atmospheric rivers’ set to increase winter flooding in UK

Research published in IOP Publishing’s Environmental Research Letters, by scientists at the University of Reading and University of Iowa, has suggested that winter flooding in the UK is set to get more severe and more frequent under the influence of climate change as a result of a changes in the characteristics of atmospheric rivers (ARs).

Dr Richard Allan, from Meteorology, said: ‘Previous research at Reading linked flooding in the UK with vast flows of atmospheric moisture. The current work has exploited this knowledge in the context of climate change and has found that these atmospheric rivers become more intense in a warmer world.’

ARs are narrow regions of intense moisture flow in the lower troposphere of the atmosphere, that deliver sustained and heavy rainfall to mid-latitude regions such as the UK. They are responsible for many of the largest winter floods in the mid-latitudes and can carry extremely large amounts of water. The link between ARs and flooding is already well established, so an increase in AR frequency is likely to lead an increased number of heavy winter rainfall events and floods. More intense ARs are likely to lead to higher rainfall totals, and thus larger flood events.

Weather reports aid life or death decisions in Africa

The Africa Climate Exchange (AfClix), a University of Reading led project, is helping to bring vital drought and flood information to the people of sub-Saharan Africa. Rainfall information is crucial; sub-Saharan Africa depends more directly on rainfall than any other region on Earth, and yet has the fewest number of rain monitoring stations. There are also significant delays in the time between measurements being made and the resulting data being made available.

For example, when a failure of the monsoon rains brought severe drought in 2011 and floods submerged farms and polluted water supplies in 2012, AfClix was working hard with the US-funded Rainwatch project, Oxfam and Practical Action to warn of the impending dangers. Rainwatch helps provide information in real-time, helping the Niger government to predict and react to the drought of 2011 and deluges of 2012, and informing NGOs and western governments with requests for international relief aid.

While the system, created at the NOAA Cooperative Institute for Mesoscale Meteorological Studies (CIMMS) at the University of Oklahoma, has been gathering data for several years and working in Niger, AfClix has helped extend its reach and broaden its application by putting the information into the hands of other African governments and NGOs such as Practical Action.

Dr Ros Cornforth, Director of AfClix, is a researcher at the University of Reading’s world-renowned Department of Meteorology and in the Climate Directorate of the National Centre for Atmospheric Science (NCAS-Climate). She said: ‘There are communication problems between scientists and policy-makers all over the world. But in Africa the problem is particularly acute and, given the extremes of climate facing many people, particularly dangerous. By communicating directly with organisations and individuals on the ground, AfClix has been uncovering the issues that really matter to people, and matching them with solutions that can save thousands of lives.’

For more information please see **www.afclix.org**

Biodiversity loss among bees and wild flowers slows

Declines in the biodiversity of pollinating insects and wild plants have slowed in recent years, according to new research published in the journal Ecology Letters. Researchers, including scientists at the University of Reading, found evidence of dramatic reductions in the diversity of species in Britain, Belgium and the Netherlands between the 1950s and 1980s. But the picture brightened markedly after 1990, with a slowdown in local and national biodiversity losses among bees, hoverflies and wild plants.

Professor Simon Potts, professor of biodiversity and ecosystem services at the University of Reading, was a co-author of the study. He said: ‘This latest research is evidence of some of the successes in Britain and elsewhere in Europe in conservation programmes preventing the decline of pollinator species. It also shows there is still much to do. By working together, scientists, farmers, governments and the public can all help to improve our natural environment.’

MPs use Reading expertise for Select Committee report on the link between pesticide and bee decline

The University of Reading has provided important evidence for a House of Commons report in April 2013 which has recommended a pesticide linked to bee decline be suspended from use on ‘flowering crops attractive to pollinators’.

Bees are critical to Britain’s food supply and economy, but numbers of some species have fallen dramatically in recent years. Disease, habitat loss and climate change can all affect insect populations, but a growing body of evidence suggests that the use of one group of insecticides is having an especially damaging impact on pollinators – neonicotinoids.

While giving evidence to the Committee Simon Potts, Professor of biodiversity and ecosystem services at Reading, said: ‘What we need is a longer-term phased reduction in all pesticides, not just neonicotinoids, and increasing uptake of integrated pest management strategies such as biocontrol and better crop management. A lot of those tools are out there and if we are going to get co-benefits of good production, food security and good environmental quality, then we need to be a lot smarter about the way we intensively farm.’

The Committee’s report cited research carried out by Professor Potts and his team that found pesticide use rose by 6.5% between 2005 and 2010, increasing the risk to bee populations, and that it would cost the UK an extra £1.8billion every year to hand pollinate crops without bees. In a report by Professor Potts, published last year by Friends of the Earth and cited by the Select Committee, Reading scientists found that two British bumblebee species have become extinct, solitary bees have declined in over half the areas they were studied in and managed honey bee colonies fell by 53% between 1985 and 2005.

The select committee report has recommended a full ban on the sale of neonicotinoids for public domestic use in order to create an urban safe haven for pollinators.

Fasten your seatbelts: climate change doubles turbulence risk to aircraft

The aviation industry has long been accused of contributing to climate change. Now, in a new study published in the journal Nature Climate Change, scientists have found that climate change will affect aviation – by increasing air turbulence and causing flights to get bumpier. In the first study to examine the future of aviation turbulence, Dr Paul Williams from the University of Reading, together with Dr Manoj Joshi from the University of East Anglia, analysed supercomputer simulations of the atmospheric jet stream over the North Atlantic Ocean.

The study found that, by the middle of this century, the chances of encountering significant turbulence will increase by between 40% and 170%, with the most likely outcome being a doubling of the airspace containing significant turbulence at any time. The average strength of turbulence will also increase, by between 10% and 40%.

Dr Williams said: ‘Most air passengers will have experienced the uncomfortable feeling of mid-flight air turbulence. Our research suggests that we’ll be seeing the ‘fasten seatbelts’ sign turned on more often in the decades ahead. Air turbulence does more than just interrupt the service of in-flight drinks. It injures hundreds of passengers and aircrew every year – sometimes fatally. It also causes delays and damages planes. The total cost to society is about £100 million (US$150 million) each year. Any increase in turbulence would make flying more uncomfortable and increase the risk to passengers and crew. Re-routing flights to avoid stronger patches of turbulence could increase fuel consumption and emissions of atmospheric pollutants, make delays at airports more common, and ultimately push up ticket prices.’

Tough limits on global greenhouse gas emissions could reduce some climate change damage by two-thirds

Tough limits on global emissions of greenhouse gases could avoid 20 to 65% of the damaging effects of climate change by 2100, according to new research led by the University of Reading’s Walker Institute and published in Nature Climate Change.

The most stringent emissions scenario in the study keeps global temperature rise below 2°C, and has global greenhouse gas emissions which peak in 2016 and then reduce at 5% per year to 2050. The 2 degree target is the focus of international climate negotiations, however, relatively little research has been done to quantify the worldwide benefits, in terms of avoided or reduced impacts, of the 2 degree target.

Of the impacts studied, crop productivity, flooding and energy for cooling are the areas that see the greatest benefit from emission reductions: global impacts in these areas are reduced by 40% to 65% by 2100 if warming can be limited to 2 degrees. In contrast, the adverse impacts of climate change on water availability are only reduced by around 20% when emission limitations are imposed. This is because even a small amount of warming can alter rainfall patterns sufficiently to reduce water availability.

Limiting emissions also has the effect of delaying climate change impacts by many decades. One example from the new research shows global productivity of spring wheat could drop by 20% by the 2050s, but such a drop in yields is delayed until 2100 with stringent emission limits. Similar delays are seen in increased exposure to flood risk and rising energy demand for cooling.

Professor Nigel Arnell, Director of the Walker Institute, at the University of Reading, said: ‘Reducing greenhouse gas emissions won’t avoid the impacts of climate change altogether of course, but our research shows it will buy time to make things like buildings, transport systems and agriculture more resilient to climate change.’