

Climate change research and sustainable development



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The July G8 Gleneagles Summit was trumpeted as an opportunity for the UK government to raise the dual issues of Africa and climate change with world leaders. Both of these global concerns are very important for NERC-funded research. This issue of *Planet Earth* has several articles on climate change, and so it seems timely to relate what environmental research my colleagues and I proposed to Government to address these concerns. Of course, there are many research problems relating to climate change and development, and I apologize that I can only cover a few here (incidentally, I also argued that the effects of aviation on climate change was another key area deserving detailed scrutiny).

Sustainable development in Africa is extremely vulnerable to disasters like flooding and drought, and the effects of weather and climate on agriculture and vector-borne diseases. Human-induced climate change—largely produced by the developed world—will have a disproportionately large impact in Africa because of this vulnerability. We have only rudimentary knowledge about the regional effects of climate change in Africa, and this needs to be improved substantially and quickly if further and more extreme environmental, and consequent human, disasters are to be averted.

Extreme weather can affect nearly all aspects of African society, and accurate forecasts days, weeks and even seasons ahead could let countries take action to mitigate and adapt to such events, for example droughts, to save lives and promote economic development. The advances made in weather and climate forecasting in the UK and other developed countries have not yet been transferred to Africa because of the lack of infrastructure and resources in the UK, but also and particularly in Africa. For example, the network of weather observing stations across the globe that underpins forecasting skill is severely deficient in Africa, with little current prospect of improvement. I argue that it is the developed world's responsibility to assist the developing world by transferring this technology.

And there are reasons why this would be acting in our own self-interest. Weather and climate features in different parts of the world are frequently linked because of the global circulation of the atmosphere and oceans. These 'teleconnections' are becoming much better understood and modelled. An example is how an El Niño event in the tropical Pacific influences temperature and rainfall in many parts of the world. Another example is that hurricanes, often triggered over the tropical Atlantic by westward moving atmospheric waves emanating from over Africa, move pole-wards as they approach the US. They eventually re-curve, and head back eastwards across the Atlantic towards the UK as part of mid-latitude storms. For example, the Great Storm of October 1987 was an extra-tropical cyclone that was influenced early in its life cycle by a re-curving hurricane. So better observations over Africa could improve UK weather forecasts for several days to a week ahead.

We proposed an international programme of research and technology development to assess more completely climate change risks to Africa, and to propose adaptations that will promote sustainable development. The UK possesses world-leading expertise in climate change science, in assessing the socio-economic impacts of climate change, and in weather and climate forecasting. This expertise needs to be mobilised and co-ordinated to focus on Africa. Such a programme could lead to an action plan for mitigating and adapting to the effects of climate change and environmental hazards in Africa. It could build on existing but much smaller-scale research projects. An example is the UK's NERC-funded contribution to the African Monsoon Multidisciplinary Analyses, a programme that aims to increase knowledge about how seasonal monsoons affect climate variability in West Africa.

We don't yet know the full outcomes of the G8 process, although some commentators have been pessimistic about the significance of the various communiqués. But I think our emerging better dialogue with a number of government departments and organisations, such as DFID, Defra and the Met Office, is a positive sign in moving the linked topics of African development and climate change up our agenda.