Educating the climate advisors for agricultural and natural resource managers

Tim Wheeler

Walker Institute for Climate System Research
t.r.wheeler@rdg.ac.uk
Skills and training for climate advisors

• The challenge
• Key attribute 1 - a thorough grounding in the sciences
• Key attribute 2 - generic skills
• The role of the individual and the team
• New modes of education and training
• Conclusions
Why do we need climate advice?

to provide a basis for decision-making

... by practitioners

... in research or extension programmes

... by governments or business
“A leaky May and a warm June, brings on the harvest very soon”

“With respect to the coming months and seasons, or future harvests, the learned meteorologist is only on a level with the peasant”

Richard Inwards, 1898
On seasonal timescales …

“Crop performance forecasting systems … could substantially improve operational decision making in agricultural management”

Stone and Meinke 2005
How can seasonal forecast ensembles be used to inform decisions?
“warming of the climate is unequivocal”
IPCC WG1, 2007

“Adaptation will be necessary to address impacts resulting from the warming which is already unavoidable due to past emissions”
IPCC WG2, 2007
With these projections of runoff for the 2020s, how should London manage its water supply?
What are the skills and training needs for climate advisors?
A thorough grounding in the natural or physical sciences
Biological processes are complex...

\[ \text{S}_{\text{rad}} \downarrow \text{CO}_2 \uparrow \text{H}_2\text{O} \]

...and affected by the interplay of climate, genotype, management, pests, diseases, ...
and so is the climate system

from www.cmar/csiro.au
but, natural systems link to social and economic systems

From Gregory et al 2005
we need to account for uncertainty
Key attribute 1

1. Expertise in the natural sciences (meteorology, biology, agricultural science, …)

2. Quantitative and modelling skills to make and interpret predictions

3. Awareness of social and economic systems, and commercial practice
We need multi-talented individuals

Cross-discipline teams are very important

<table>
<thead>
<tr>
<th>crop science</th>
<th>astrophysics</th>
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<tr>
<td>meteorology</td>
<td>animal ecology</td>
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<td>physics</td>
<td>agricultural botany</td>
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<td>mathematics</td>
<td>horticulture</td>
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‘Understanding Our Climate, Understanding Our Future’

Walker Institute for Climate System Research

A new interdisciplinary institute that draws together Reading’s unique breadth and depth in climate system science under one umbrella organisation.
Australian and UK scientists working together on Climate Change

Australia is in the grip of its worst drought on record. Draught water restrictions are in place and the 2006/2007 winter crop yields were the lowest for over 10 years. Is this a sign of climate change? Will this year bring an end to the drought?

To address the critical issue of climate change, the Queensland Government in the north eastern state of Queensland has formed a collaboration with the Walker Institute of Climate System Research at the University of Reading in the UK.

Scientists from the Walker Institute and Queensland Department of Climate Change
A high level of generic skills
“Crop performance forecasting systems, linked with appropriate decision and discussion support tools, could substantially improve operational decision making in agricultural management.”

Stone and Meinke 2005
Modelling the impacts of climate change on rice

<table>
<thead>
<tr>
<th>Climate model</th>
<th>GFDL</th>
<th>GISS</th>
<th>UKMO</th>
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<tr>
<td>SIMRIW</td>
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Changes in rice production across Asia under 2 x CO₂

from Matthews & Wassmann (2003)
New modes of education and training
The Bologna process in Europe

To increase mobility of students across Europe

- Signed in 1999 by 29 European countries, now 40.

- Adoption of comparable degrees across Europe by 2010 in two cycles (UGrad and PGrad)

- Establish a common system of credits (ECTS) as a means of promoting student mobility (60 ECTS for each year)
New forms of PhD programmes

• The joint doctorate
  awarded by two or more universities in international networks

• The professional doctorate
  aims to meet the specific needs of a professional group external to the university. Focus is on embedding research into professional practice.

• Open and E-learning graduate degrees
  for example the Open University, UK (1200 PhDs) and Massey University, NZ (4 doctorate programmes)
UK PhD training of generic skills

• To include:
  – Research skills and techniques
  – Research environment
  – Research management
  – Personal effectiveness
  – Communication skills
  – Networking and teamworking
  – Career management

From the Research Councils UK
Joint Statement 2003
Conclusions

• Climate advisors of the future should be multi-talented individuals, well-grounded in the natural sciences, but open to cross-disciplinary dialogue and with a high level of generic skills

• Multi-disciplinary teams will be necessary

• Ongoing developments in graduate education are opening up new modes of training that can help meet these requirements for climate advisors for agriculture and natural resource management
Thank you

Visit www.walker-institute.ac.uk

Email t.r.wheeler@rdg.ac.uk