# CRU STRATEGIC REVIEW – SUMMARY OF EXTERNAL INPUT

## Introduction

As part of the first phase of the CRU Strategic Review, external input was solicited to aid in identifying the strengths and weaknesses of CRU as perceived by external individuals. Input was also sought on issues to be addressed by the second phase: current opportunities that aren't being exploited; future opportunities; and, future threats that need to be overcome.

A series of questions on the following topics was designed:

*Current assessment: Strengths and weaknesses of CRU*

1. *Our research and data (including monitoring) activity*
2. *Our postgraduate teaching and training activity*
3. *Our identity, relationships and reputation*
4. *Our working environment*

*Forward looking: Development of climate science, funding and CRU*

1. *Development of the climate science field*
2. *Development of priorities for the funding of climate science*
3. *Development of CRU*

Answers to these questions were sought in July 2002 from 30 individuals, selected from the following sectors: CRU visiting fellows; ENV; UEA; national and international funding agencies; and UK/non-UK based climate scientists/organisations. In each case, individuals were asked a subset of questions most appropriate to their particular sector/relationship with CRU. It was stressed that all responses would be confidential to the Strategic Review Team and CRU Board. Fifteen individuals have provided input to date and their responses are summarised in this document.

## Overview of responses

The relatively high response rate and the considerable thought that most respondents put into answering the questions suggests that people feel positively about CRU and its future. This is also reflected in the overall nature of the responses – which indicate that CRU is widely and highly regarded. Taking all responses together, the full range of CRU's past and current activities is acknowledged. The responses are thus largely reassuring and do not contain any major surprises so far as our current strengths and weaknesses are concerned – although a number of interesting insights require some thought. While there is good agreement amongst respondents on our strengths, there is more disagreement on our weaknesses and issues such as the optimal size of CRU and our identity in relation to other climate institutions. Views on future developments are more diverse (and in a few cases, contradictory or ambiguous). They indicate that there are many future opportunities for CRU, but the Strategy Review Team acknowledges that these will require careful thought and work if we are to take full advantage of them. In general, the more critical remarks about CRU tend to come from within UEA, rather than from respondents who are more removed from CRU. In all cases, however, the positive comments (on both current and forward looking issues) outweigh the negative. Thus, while a number of weaknesses are identified below, each one was only identified by one or two respondents, whereas the majority of respondents mentioned data provision, for example, as an area of valued research.

**CRU strengths**

Reputation and standing

- High national (e.g., top 2), European (e.g., top 5) and world (e.g., top 10) rating
- CRU as a whole has a good reputation, although individuals, e.g., key figures with long-standing international reputations, are also seen as important
- Good involvement in EU projects and the IPCC (which is what counts)
- Distinct reputation based on 30-year history (starting with Lamb etc.), e.g., historical assets, continuity and experience in studies of past climate
- Reflects 'latest thinking' on climate change and is seen as 'independent' and good at critical interpretation
- Reputation tends to be focused in specific areas, but good links with other key institutions (e.g., Hadley Centre) enhance a comprehensive image
- Individuals who are members of national/international expert and professional bodies/panels
- Being part of a 5* (and multi-disciplinary) department

Valued research

- Data –being involved in collection, collation, analysis and dissemination gives added authority
- Data sets – instrumental, palaeo, climate model (GCM/RCM) and scenario – and expertise in these are all highly valued
- Provision of the data people want: e.g., at useful spatial/temporal scales (i.e., global and regional); definitive UK/European data sets, but also data for less-studied regions, i.e., polar, Southern Hemisphere; NAO and ENSO data sets
- Historical and palaeo-climatology (data and reconstruction/analysis)
- Strengths are in review and statistical analysis rather than physically-based modelling
- Climate scenarios, including model evaluation and downscaling
- Simple climate modelling
- Links between modelling and impacts communities
- Climate impacts and applied climatology, e.g., insurance industry, extreme events
- Analysis of trends (e.g., climate monitoring) and extremes
- Specific projects: e.g., LINK, Tiempo, UKCIP98 and contribution to UKCIP02

CRU as communicator and interpreter of climate science

- Good communicator of science to scientists and of key issues and facts to public (i.e., contribution to public understanding of science and outreach efforts)
- Good publicity and excellent media presence maintain our public profile
- Widely-cited publications and reports
- Important role in interpreting vast subject area for others, e.g., 'small' organisations
- Excellent website – not too many frills but easily accessible to scientists and others (e.g., information sheets and posters)

Centre of excellence for research training

- Good PhD culture and opportunity for students/researchers to work with key scientists
- Postgraduate training essential for ensuring succession and improving international reputation and research output
- Production of world-class scientists now making contributions elsewhere

**CRU weaknesses**

Reputation and standing

- Tendency to be perceived as defensive, territorial, isolationist and dismissive
- Seen as too academic, with emphasis on papers rather than projects
- Too complacent about reputation and identity
- Difficulty of maintaining a leading reputation against other, bigger institutions (e.g., Tyndall Centre and Hadley Centre)
- CRU's input is not always acknowledged/credited, and this may worsen as attention moves to decision-making rather than fundamental climate research
- Better recognition internationally than within UEA

Research areas

- Need to be more aggressive in promoting and obtaining core funding for data activities
- Doubtful that CRU can meet need for commercial data products
- Difficult for CRU to access and exploit business opportunities
- Climate scenarios work is not promoted sufficiently
- Work is less policy-relevant than in the past
- Tendency to focus on past successes rather than on innovation

Strategic position and resources

- Under-resourced compared to bigger institutions
- Lack of strategic alliances
- Need to improve links with NERC atmospheric scientists in NCAS, particularly those involved in climate modelling (e.g., provision of data for model validation)
- Failure to anticipate changes that have occurred/are occurring in science and structures
- Time spent searching for research funds means lack of time for wider activities/perspective
- Insecurity of contract research staff
- Lack of strategic direction and planned programme of activity (in part due to management structure)
- Failure to switch from reactive to proactive mode of operation as the competition has increased and the subject area matured

Identity

- Confusion about relationships with other climate institutions (i.e., Tyndall Centre, Hadley Centre and UKCIP) and the university (i.e., ENV, CSERGE etc)
- Is maintaining a separate identity possible/worth the effort or should relevant UEA institutions merge (e.g., to achieve economies of scale)?

Communication, training and working environment

- Website could be improved, e.g., more transparent data provision, better updating of historical data, need to keep up with 'slicker sites' (e.g., data visualisation), more general background on climate and climate change (e.g., frequently-asked questions)
- The need to communicate effectively is underestimated (in terms of effort and money), particularly in face of activities elsewhere, e.g., (email) newsletters produced by other groups
- Publications are not significant in terms of editorials and review articles (e.g., Nature, Science, New Scientist)
- Research training activities strain resources
- Poor communication at the SRA/RA level with UEA scientists working in associated areas
- Poor and expensive transport links to Norwich are off-putting

**General threats (identified as threats, but some could be viewed as opportunities)**

- Risk of CRU research base becoming too narrow – a broader base is needed to develop the new generation of scientists and to keep up with the trend towards earth systems and multi-disciplinary research, i.e., towards broader-based research (contrasts with risk of having 'shallow depth' in lots of disciplines which accomplishes little)
- Climate change is dissipating as a distinct area of research. In terms of climate change policy, fields are spreading beyond CRU's strengths, e.g., into energy, adaptation and mitigation, sustainability and development
- As climate change becomes 'accepted', research efforts may focus more and more on mitigation and adaptation and climate scenarios will become less important
- Danger of marginalisation as other (bigger, more competitive and integrated) climate centres develop (e.g., development of e-science and virtual trans-national entities)
- Commercialisation of data and forecast products

**General opportunities**

- Potential business opportunities (not defined by respondent)
- Offering training in current CRU areas (e.g., climate impacts, climate statistics and extreme event statistics) and new areas (e.g., remote sensing, model coupling and parameterisation, data assimilation, process modelling, integrated modelling, climate research management)
- Development of unrealised potential for CRU with ENV (would require less defensiveness and building of more partnerships)
- Use of non-academic staff to develop more commercial activities
- Networking of smaller groups and development of strategic alliances
- There will be room for institutions of all sizes, especially with IT developments bringing 'big' science to small institutions
- Increase in computer capabilities will open up new possibilities for higher-resolution and longer-timescale modelling

**Potential development of funding**

- Greater importance of European funding agencies
- Current NERC strategy should be favourable to CRU for the next 5-10 years, and NERC will continue to fund basic research
- Smaller funding bodies may seek to collaborate to share funding costs (already beginning to happen, e.g., local authorities)
- UNFCC should have large funds available for research on mitigation and adaptation
- Non-insurance finance organisations may grow more interested in funding research
- Governments will focus on predicting the impacts of climate change
- Increased stakeholder involvement
- Involvement of social scientists will be sought by funders in any work resulting in public decision-making, thus greater emphasis on cross-disciplinarity and science communication
- Those with the highest international reputations should continue to be funded

**Potential development of climate science in the future**

Growth areas

- Less emphasis on assembling datasets, more on processes, patterns and couplings, and incorporating other elements of the Earth system into models
- Better integration of model-based and empirical research
- Use of new satellite datasets (e.g., global environment monitoring) in conjunction with model development for detection, attribution and prediction
- Earth System Science will grow and become a priority, hence need to involve wider profile of researchers (e.g., chemistry, biology and human dimensions as well as physics)
- More emphasis on system robustness, rather than accuracy in modeling climate change impacts (and hence less demand for high resolution climate scenarios)
- More emphasis on socio-economic aspects e.g., migration, rural policy, transport
- Integrated impact assessment
- Rejuvenation of applied climatology in the context of how societies use climate information
- Greater emphasis on local knowledge and understanding what people want to know
- Better integration of climate change with other sustainability and wider environmental issues
- Information about extreme events on short timescales (i.e., next 10-20 years), including scenario construction and probabilistic data
- Greater emphasis on probabilistic and risk-based scenarios and assessments
- Extreme events and impacts – links with mitigation and adaptation
- Rapid climate change and climate 'surprises'
- Seasonal/long-range forecasting, i.e., seasonal, 12-24 months, decadal
- Upper atmosphere (ionosphere) modelling

Continuing demands

- Demand for climate monitoring and for palaeo and other data will continue, but use of data will evolve
- Proxy data and modelling will remain important and develop through process-modelling (e.g., tree-ring growth, sedimentation of pollen)
- Historical period work will be extended using un-digitised records
- Existing data will be re-assessed and enhanced use of models will expose gaps in the data
- Development of GCMs will continue over the next 10 years, but models will become more 'intuitive' and results/thinking from other disciplines incorporated, and there will be a drive for more consistent model predictions

**Critical mass for CRU**

- Some respondents perceived CRU as being too small, others as 'the right size' (and saw benefits, e.g., creativity and links with outside world, in its current size). In terms of the future, having the right profile (e.g., scientists age/expertise) is the important issue (e.g., for assuring succession) as is the development of appropriate strategic alliances (national and international).

**CRU Strategic Review Team, 6 December 2002**