RELU DISCUSSION PAPER: RISING TO THE LAND-USE CHALLENGE: ISSUES FOR POLICY-MAKERS

FEEDBACK FROM THE CATCHMENT SCIENCE CENTRE, THE UNIVERSITY OF SHEFFIELD

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1. RELU's strategic policy questions addressed

- How do we achieve multiple objectives from land and water?
- How do we achieve more democratic and accountable decisions?
- How can our use of land and water help tackle climate change?

2. Background to our response

This response is based on work and current thinking developed at the Catchment Science Centre (www.shef.ac.uk/csc) at the University of Sheffield in the context of developing the science base for a more holistic approach to the management of land and water, and their associated ecosystem goods and services. In particular we are interested in an Integrated Catchment Management (ICM) approach for the UK, building on the opportunities presented by current and future implementation of the Water Framework Directive (WFD).

We recognise that the focus of the RELU programme is predominantly on understanding and managing the rural environment, and that a range of interesting and important work is emerging from the programme. However, we believe that solutions to the broad, strategic policy questions posed by the RELU discussion paper will require that rural land, and the management of rural land, are explicitly recognised as parts of a wider socio-environmental system. Delivering multiple ecosystem goods and services from land and water requires us to integrate understanding and management of rural land with that of other 'types' of land. Rural land is inextricably connected to other land use 'zones', including for example urban land. A myriad of examples could be presented to demonstrate such connections. Here we briefly present three to highlight the range spanning across the physical-chemical-social-economic spectrum:

i) the emerging debate surrounding the use of rural land for storage of flood water raises significant questions about the economic viability and need for diversification of farm businesses. However, it is also of broader interest for the management of flood risk in downstream towns and cities, for example due to the potential of flood storage on rural land to attenuate the flood peaks experienced in urban areas. Such connections between rural and urban land with respect to flood risk are explicitly recognised in recent policy-relevant publications, including the Pitt Review of the 2007 summer floods and Defra/EA guidance on catchment flood management planning;

ii) whether the costs for the removal of nutrients and other pollutants, such as pesticides, from potable water should be met by the water consumer through continued treatment of water at the receptor, or through more stringent controls on the sources of these pollutants, raises questions about the accuracy of source apportionment and the effectiveness of regulatory, voluntary and incentive schemes in *both* rural and urban environments;

iii) the recreational use of rural environments, often linked to human well-being, provides direct links between rural and urban populations. For example, whilst the urban area of Sheffield

contains one of the highest numbers of rod licenses in the country, the vast majority of license holders actually fish outside the city boundary in the predominantly rural environments of the Peak District and the Yorkshire Dales.

We believe these examples and the many others that could be given illustrate that an integrated approach to understanding and managing land and water is required. The approach should be organised around physically meaningful and socially tangible spatial units, rather than around sub-divisions of various land 'types' or abstract administrative units. Building partnerships alongside local stakeholders with top-down institutional support, and an underpinning adaptive management philosophy, are key elements of the approach. Termed Integrated Catchment Management, we believe this is a useful framework within which solutions to the broad social-environmental challenges highlighted by the RELU discussion paper can be found.

Our response was stimulated by a number of the consultation questions raised in the RELU discussion paper, but with the ICM framework in mind. The fundamental challenges do not differ substantially whether the focus in on rural land or on the ICM approach. However, the technical solutions, decision-making processes, and institutional structures needed to deliver solutions may differ substantially.

3. Key issues to address for ICM

3.1 UK approach to environmental policy

The UK appears to lack a coherent, cohesive and integrated policy approach to the environment, and largely follows the lead set in Brussels, implementing legislation to minimum requirements with minimal economic and social impacts, whilst avoiding infractions. A UK environmental policy that prioritised expenditure on legislation that matched its environmental policy aims, and sought to exploit synergies between the different pieces of legislation, would deliver greater benefits.

A clear example of this can be seen in the agricultural policy agenda in the UK. Agri-environment policy has not been coherently integrated to deliver the protection of river catchments. For example, the Catchment Sensitive Farming Delivery Initiative was originally focussed on areas where eutrophication was believed to be caused by excessive phosphate levels, and there was little to no policy interaction with the Nitrate Vulnerable Zones initiative or other schemes. Similarly, the Environmental Stewardship (ES) agri-environment scheme, which contains elements such as buffers, beetle banks and hedge restoration that can also be considered as relevant land management measures for water quality protection, have not been implemented in a way that has given priority to contributions to reductions in diffuse pollution. In developing win-win situations it is important to focus on the issue that delivers most benefits. By focussing on conservation in the ES scheme, measures to address diffuse pollution, which need to be location sensitive, were sidelined. However, if the focus had been on diffuse pollution it is likely that the conservation goals could also have been met. The clear challenge here is to develop approaches to prioritising separate policies that reflect the need to deliver multiple objectives.

The traditional environmental policy implementation process in the UK by government and its agencies has typically been to focus on individual pieces of legislation. Whilst this type of implementation has been relatively successful in focussing on defined problems, it is poorly suited to addressing a range of inter-related problems and to achieving multiple objectives. For example, a key opportunity within river basin management plans under the WFD would be to address competing ecosystem services in relation to river floodplains. Floodplains can deliver a range of ecosystem goods and services including the mitigation of agricultural diffuse pollution, the alleviation of flood risk, and biodiversity gain. However, there appears to be little will to consider a

joined-up approach to floodplain management at policy level, although the relevant research base is becoming more holistic.

The WFD seeks to move beyond this tradition of compartmentalisation and lack of integration, and achieving the aims of the Directive is dependent on how the terrestrial environment is managed as much as the freshwater or marine environment. However, the extent to which the opportunity afforded by the WFD will be fully exploited will depend in part on how strongly the historical legacy of UK approaches to environmental policy remains embedded in current and future thinking.

3.2 UK institutional framework

We believe that there needs to be a combination of a top down *and* bottom up approach to deliver multiple ecosystem goods and services within the ICM framework. However, the management framework is not currently in place to undertake this. The UK approach is to drive legislation and other initiatives from a national perspective, with ownership of resulting plans residing clearly with the associated government agencies. This often presents a barrier to engagement with local stakeholders. For example, stakeholders carrying out relevant management actions at the local level will not be incorporated within the management processes as currently envisaged within the WFD, with a consequent lack of co-ordination and synergistic benefits.

Whilst higher-level regional bodies have been put in place under the WFD (river basin liaison panels), the scale at which they operate is too large to have any real connection to stakeholders on-the -ground. There is a clear need for new co-ordinating bodies to facilitate the delivery of multiple ecosystem goods and services through integrated land and water management in the UK. In our opinion this body must act at river catchment scale, as this represents a physically meaningful and socially tangible organisational unit. The role of such a body would be to traverse between top-down international, national and regional policy and bottom-up local action. The specific format of such a body is a focus for on-going debate, but similar institutional arrangements have been implemented successfully in South Africa, Australia, New Zealand and the USA.

3.3 The role of 'new' science and of the science-policy interface

Calls have grown in recent years from both policy makers and scientists for 'new', 'interdisciplinary' science to help address the significant challenges associated with delivering integrated land and water management. These calls are, in part, reflected in specific research programmes which seek to develop the required evidence base, the RELU and the LOCAR programmes being two good examples. Undoubtedly the level of uncertainty in our understanding of the integrated land and water system remains very significant. The specific challenges for research to address are clearly too numerous to list here, but priorities still remain at the so-called interfaces between the biological, physical, chemical, social and economic sciences.

The implementation of actions within ICM should be incorporated into an adaptive management approach linked to scientific understanding. Thus the best conceptual understanding should underpin the selection of management "solutions", the success of which is then validated by monitoring. Where they can be shown to be unsuccessful, it is likely that our understanding of the processes governing their uptake and effectiveness is imperfect, and further information and/or research is required. Such an adaptive management approach would be more appropriate to the challenges of ICM than the traditional linear management model, which seeks to alter measures to requirements rather than moving from one measure to the next.

A related challenge concerns how to combine different types of knowledge to evaluate how the multitude of available management actions can be integrated, and to determine how actions may interact to identify either synergies or conflicts, given the complexity of the aquatic and terrestrial

environments. The development of such decision-support tools requires new modelling approaches to be employed, such as agent-based techniques and Bayesian Belief Networks (BBNs), which are able to cope with the complexity of the combined land and water system and the different types of knowledge (data, model outputs, expert judgement) with which we can characterise different parts of the system. The Catchment Science Centre is currently testing the scope for BBN technologies to underpin future decision-support tools for the WFD. A related challenge, recognising that we are dealing with linked socio-ecological systems, is to link models of social networks to environmental system models.

The science-policy interface needs to be re-considered within the process of integrated land and water management. Such considerations form part of the work of the Catchment Science Centre (see Surridge and Harris, 2007), and relate to how science is funded and evaluated, and to how scientists are trained and evaluated. Science and scientific knowledge should also be part of a three way equal partnership with policy makers and local stakeholders if an ICM approach is to be successfully developed (see Figure 1). We believe this partnership does not currently exist in the UK, and that without significant institutional changes it is difficult to envisage how such a partnership will develop successfully in the future.

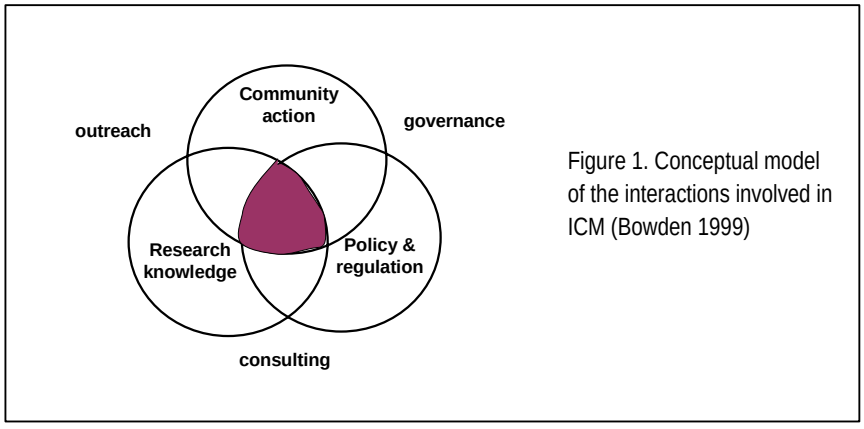

Figure 1. Conceptual model of the interactions involved in ICM (Bowden 1999)

It is questionable whether innovative management measures will be adopted under the current structures. This is in part due to the lack of appropriate knowledge transfer internally within the Environment Agency, partly due to policy drivers and partly due to the perception that innovation leads to increased cost. The technical approaches to management adopted by the Agency may also cause communication difficulties with local stakeholders and other organisations, such as local planning authorities. The most intractable issues are likely to be hydromorphology, floodplain management and diffuse pollution, which will require strong local co-operation to resolve. It is notable that in other EU countries, the regulatory agencies adopt an arms length approach to management at the local level to avoid antagonising stakeholders through direct dictat.

References

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