General enquiries on this form should be made to:
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SID 5 Research Project Final Report

- **Note**
  In line with the Freedom of Information Act 2000, Defra aims to place the results of its completed research projects in the public domain wherever possible. The SID 5 (Research Project Final Report) is designed to capture the information on the results and outputs of Defra-funded research in a format that is easily publishable through the Defra website. A SID 5 must be completed for all projects.
- This form is in Word format and the boxes may be expanded or reduced, as appropriate.
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Project identification

1. Defra Project code: FD2617
2. Project title: The Appraisal of Adaptation Options in Flood and Coastal Erosion Risk Management
3. Contractor organisation(s): Risk Solutions
4. Total Defra project costs (agreed fixed price): £ 128110
5. Project: start date ..... 14 November 2008
   end date ..... 18 March 2010

6. It is Defra's intention to publish this form.
Please confirm your agreement to do so.....**YES** ☒ **NO** ☐

(a) When preparing SID 5s contractors should bear in mind that Defra intends that they be made public. They should be written in a clear and concise manner and represent a full account of the research project which someone not closely associated with the project can follow.

Defra recognises that in a small minority of cases there may be information, such as intellectual property or commercially confidential data, used in or generated by the research project, which should not be disclosed. In these cases, such information should be detailed in a separate annex (not to be published) so that the SID 5 can be placed in the public domain. Where it is impossible to complete the Final Report without including references to any sensitive or confidential data, the information should be included and section (b) completed. NB: only in exceptional circumstances will Defra expect contractors to give a "No" answer.

In all cases, reasons for withholding information must be fully in line with exemptions under the Environmental Information Regulations or the Freedom of Information Act 2000.

(b) If you have answered NO, please explain why the Final report should not be released into public domain

Executive Summary

7. The executive summary must not exceed 2 sides in total of A4 and should be understandable to the intelligent non-scientist. It should cover the main objectives, methods and findings of the research, together with any other significant events and options for new work.

Government spending in flood and coastal erosion risk management has increased substantially in recent years, but there could still be several hundred thousand properties at risk of flooding in the future. Adaptation is expected to grow in importance as the speed and extent of climate change increase, particularly given the expected effects on flood and coastal erosion risk from increased sea levels, more severe and more frequent storm surges, and more frequent extreme weather such as prolonged heavy rainfall. "Making Space for Water" highlighted the importance of alternative approaches to managing flood risk, including promoting adaptation and resilience measures with individual households, communities and businesses in England. The research reported here explores the challenges and barriers to adaptation measures and identifies potential means of overcoming those barriers.

The terms adaptation and adaptability mean many things to many people. After some consideration we define adaptability, for the purposes of this research, as those characteristics of a plan, strategy or scheme that sustain and enhance the function of a system in the face of continuing change or uncertainty. Adaptability is about building in flexibility, not closing off future options prematurely but enabling evolution of both the strategy or scheme, and also the function of the system. Change and uncertainty arise from many sources, and climate change is an important source.

We sought evidence on the nature and extent of barriers to more adaptable responses through interviews with a range of stakeholders, and a stakeholder workshop, along with a technical review and examination of a number of case studies. We found some barriers potentially posed by the appraisal system, but these were not significant in nature. Other barriers relate to the context in which the system operates.

System thinking:
The client brief and guidance can be too narrow so that problems are often framed in terms of maintaining protection rather than maintaining system functionality, or considering change. One improvement would be to ensure that those commissioning work on Flood and Coastal Erosion Risk Management (FCERM) produce briefs and specifications that do not constrain solutions any more than is appropriate. Initial briefs should be broad, and should not be framed in terms of protection unless there is clear justification for such an approach. They should also ensure that the community is considered at an early stage, and that specifications require explicit consideration of future change and associated uncertainty.

Two other specific improvements would be useful. Firstly, considering whether objectives should generally be expressed in terms of both frequency and consequences, rather than in terms only of frequency, and secondly, considering whether there should be guidance on the extent to which the use of

passive (i.e. responses such as a seawall that require no human or other input for operation) rather than active interventions should be preferred.

Funding considerations constrain thinking so that practitioners identify and eliminate options that have little chance of getting funding early in the process to prevent wasting resources on unnecessary appraisal work. Also, practitioners are aware of the boundaries associated with funding sources includes a perception of which benefits can be paid for from which sources and consequently which benefits and costs are taken into account in funding decisions.

Multi-agency issues Many of the more adaptable responses will have multiple owners and stakeholders and will require funding from multiple sources. There do not seem to be enough institutional incentives in place at the present time to develop socially optimal solutions (as opposed to each institution seeking to maximise its own internal interests) and it is complex and time consuming to allocate funding for a single project across different public spending budgets.

It is not clear who is in a position to tackle this "multiple agency" problem, but without clear guidance practitioners and operational authorities tend to fall back on tried and tested processes associated with specific single funding sources. Many of the barriers described below have their origin in this basic concern: The issues here may not be directly related to appraisal, they may be more concerned with leadership, how appraisal is used, and how practitioners and funders interpret guidance.

Consideration should be given to whether any of the perceived constraints on funding sources can be relaxed, or whether there is a need to establish where funding should be sought for different types of works. In addition, consideration should be given to whether more flexible 'funding in principle' approvals could be offered by the National Review Group to facilitate matched funding applications.

Handling Uncertainty:
Risk and uncertainty aversion constrains thinking: Longer term thinking can be constrained by uncertainty. In these situations the "best" solution may be a short term solution that does not close off future options but allows time for more research, monitoring, or investigation of additional funding options to be undertaken.

Identifying and valuing costs and benefits:
The full range of benefits may not be identified and the full value of benefits may not be included in the appraisal: There has been little need to look particularly broadly in the past, and little incentive to do so. Traditional coastal protection appraisals have relied on benefits derived using standard systems and databases, and have seldom 'required' additional, wider benefits to be identified to justify responses.

There is a lack of robust, affordable methodologies for quantifying or monetising some wider benefits and including uncertain benefits in appraisals. "Intangible" benefits, even if monetised may be given less weight than other benefits such as damage avoided. Some benefits, such as environmental benefits, may not be being appropriately valued over time.

Comparing costs and benefits:
We support the imminent introduction to FCERM appraisal of Appraisal Summary Tables (AST) and Multicriteria Analysis (MCA[1]); these have the potential to improve greatly the generation and comparison of options. Consideration should be given to positive action to ensure that adaptability is considered and given its due weight, both in the design of the AST and in the development of criteria for MCA. It is important, however, that the use of such approaches is seen as increasing the understanding of the system being managed, not merely a further process that will give a definitive answer.
We also support the imminent introduction of a disaggregated approach to the presentation of costs and benefits, which should assist with negotiating contributions from other agencies and from third parties, and may also assist in issues associated with social justice. This will also increase the understanding of the issues.

In addition, we suggest that the appropriate denominator for benefit: cost ratios is reviewed, in particular the treatment of offsetting sales, which we suggest should be treated as a negative cost, not as a benefit. There also appears to be a need for explicit guidance that monetary valuations are normally all in the same numeraire of market prices so that 'soft' benefits that have been monetised have the same weight as other benefits. We further suggest that guidance on appraisal periods is reviewed to ensure that appraisers recognise that there is no standard appraisal period and that they can and should select whatever period of time is most appropriate.

[1] MCA may also be known as Scoring and Weighting.

Lack of an evidence base:
Many of the barriers are exacerbated by the lack of evidence relating to more adaptable responses to flood and coastal erosion risk. There is a lack of awareness of examples of more adaptable responses with evidence of their efficiency, effectiveness, costs and benefits, options for funding etc for practitioners to draw on. Our case studies suggest that while good examples of more adaptable responses exist, they are not always recognised as such (which is, in itself, a barrier). There may be value in collecting information on these and sharing it to encourage practitioners to think more widely about adaptation. Consideration should be given to how best to publicise such a repository of knowledge.

Project Report to Defra

8. As a guide this report should be no longer than 20 sides of A4. This report is to provide Defra with details of the outputs of the research project for internal purposes; to meet the terms of the contract; and to allow Defra to publish details of the outputs to meet Environmental Information Regulation or Freedom of Information obligations. This short report to Defra does not preclude contractors from also seeking to publish a full, formal scientific report/paper in an appropriate scientific or other journal/publication. Indeed, Defra actively encourages such publications as part of the contract terms. The report to Defra should include:
   - the scientific objectives as set out in the contract;
   - the extent to which the objectives set out in the contract have been met;
   - details of methods used and the results obtained, including statistical analysis (if appropriate);
   - a discussion of the results and their reliability;
   - the main implications of the findings;
   - possible future work; and
   - any action resulting from the research (e.g. IP, Knowledge Transfer).

Please see Technical Report.

FD2617 TR (7).pdf

References to published material

9. This section should be used to record links (hypertext links where possible) or references to other published material generated by, or relating to this project.