Strategic Planning
Decision Analysis for Strategic Planning

FRMRC2 has produced:
A next generation decision analysis framework for strategic planning
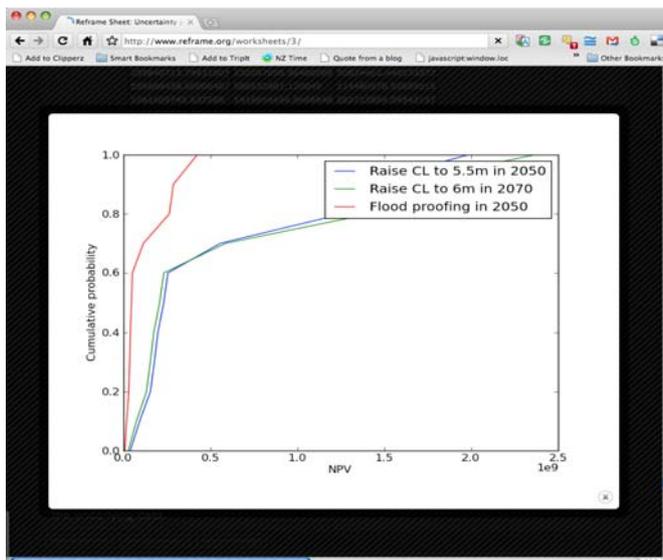
Intended readership:
- Strategic planners
- Modellers / risk analysts
- Researchers

Where to find more information:
- www.floodrisk.org.uk

Summary

Cumulative probability of option Net Present Value. The result of a simple example application of the decision analysis framework.

Better, more defensible decisions are enabled by a new framework for fully integrated decision analysis under uncertainty in strategic flood risk management.

Options are defined by simply specifying which management interventions to apply when. Possible futures are simulated, accounting for long-term change and interventions. Option implementation costs are estimated during simulation.
- Makes practical an iterative approach to strategic option design.
- Allows assumptions about long-term change to be systematically tested.
- Enables consistent treatment of costs and benefits under scenarios of socio-economic and climate change.

Uncertainty is part of the essence of decision making. Uncertainty analysis is integrated into the new framework from the ground up.
- Uncertainty analysis is applied directly to option performance metrics.
- The framework is designed to enable robustness analysis.

The framework imposes a clear structure on a complex analysis process, improving transparency and facilitating audit.

The cost and effect of implementing each intervention is modelled as an intervention function. Once these functions have been developed, options are specified by simply listing the interventions to apply through time. The decision analysis can be extended to a new option in moments.

	intervals (5)				
cases (4)	'nothing'	'nothing'	'nothing'	'nothing'	'nothing'
	'repair'	'repair'	'raisecl(5.5)'	'repair'	'repair'
	'repair'	'repair'	'repair'	'raisecl(6.0)'	'repair'
	'repair'	'repair'	'floodproof(0.5)'	'repair'	'repair'

Cases (base case and three options) specified as interventions at intervals through time in an example decision analysis. Interventions can be parameterised, as with providing the target crest level to "raisecl" (raise crest level).

The analysis is entirely captured in software and requires no human intervention to run once specified. This enhances reliability and transparency. It also minimises the marginal cost of exploring new options, allowing more options to be analysed, for example building on insights arising from the analysis process.

The framework will be demonstrated in an application to the Thames Estuary.
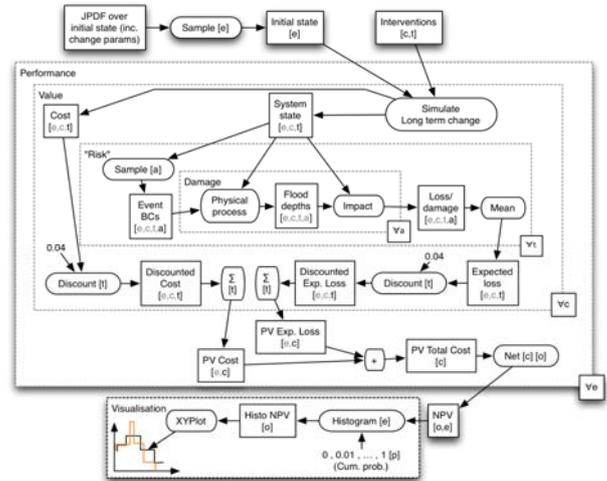
The data flow of a complete decision analysis for strategic planning in flood risk management.

Most of this structure is valid for any analysis using Benefit-Cost Ratio or NPV risk reduction as a performance metric. Changes are limited to the impact model, intervention functions and input data.

Other sources of information

An example implementation of the framework can be explored and modified using the Reframe tool at http://reframe.org/ (see http://reframe.org/help/dafwk once logged in).

A paper on the framework was delivered at MODSIM09 in Cairns: http://goo.gl/93mG.

Research Team

This work was conducted by Hamish Harvey, Jim Hall and Roger Peppé at Newcastle University.