

ACTIVITIES AND ACHIEVEMENTS QUESTIONNAIRE

1. Non-Technical Summary

A 1000 word (maximum) summary of the main research results, in non-technical language, should be provided below. The summary might be used by the Research Councils to publicise the research. It should cover the aims and objectives of the project, main research results and significant academic achievements, dissemination activities and potential or actual impacts on policy and practice.

The aim of the project was to design and evaluate decision support tools and processes for participatory risk management and communication across the food chain that fully integrate the views and values of all stakeholders, particularly those in the rural community.

The work centred on three case studies: (CS1) pesticide residues on apples and pears; (CS2) campylobacter in chickens; (CS3) a crisis scenario related to contaminated chicken feed. There were several streams of research drawing on the natural and social sciences and these case studies served to integrate across these different approaches.

Participation was investigated in 11 workshops (including one web-based) bringing together different combinations of experts and stakeholders. Although the debates in CS1 were predominantly technical the workshops were successful in highlighting new areas of concern (such as mixtures of pesticides) and this did not differ greatly between a group of experts on the one hand and experts and members of the public on the other. In the CS2 workshops we investigated the importance of representativeness in participation, with workshops involving rural populations who understood the impacts of a change in regulation, urban populations who may be impacted only indirectly and a mixture of the two. We also tested the web-enabled interface of 'fuzzy felt' food chain modelling method (see below) and belief-net modelling and found these to be effective visual modelling techniques for explaining the issues to these groups. In CS3 we investigated the value of involving stakeholders in the early stages (problem formulation and deliberation) for managing an unfolding crisis situation. Our findings provided no evidence to suggest that greater participation was of any benefit in this situation.

In a second stream of research, statistical risk modelling both fed into each of the case study workshops and also made significant progress on specific technical aspects of modelling. A probabilistic model was developed and applied to exposure of children to the pesticide carbendazim in apples, apple juice and processed apple foods. A key feature was the development of new approaches, using Bayesian techniques, to model various sources of uncertainty and variability, including measurement uncertainty and calibration errors affecting chemical concentrations, and variability of pesticide residues between and within batches of produce. It was shown that measurement uncertainty can have a significant impact on results, with unquantified uncertainties making the quantitative estimates conservative. Further developments have modelled between and within individual variability in consumption and extended the approach to model consumption of more than a single food type. A simplified model was implemented as a web-based calculation tool for the public to compute their probability of exceeding recommended limits according to their age and diet.

We have also explored a modular formulation of food safety objectives (FSO), including uncertainty. We have built statistical models associated with campylobacter and chicken that quantify beliefs concerning the risks from two distinct hazard pathways: undercooking and cross-contamination. These distributions have been incorporated into a belief network representation of the hazard that contrasts, quantitatively, the options for hazard control either on the farm (affecting dominantly rural stakeholders) or on improved domestic hygiene.

In a third stream of research we examined, in a series of studies, the impact of risk information derived from the case studies on consumer behaviour, perceived risk and trust. Presenting risk as frequencies reduced consumption to a greater degree than when presenting this as percentages but information on the size of the population removed this difference. FSOs were found to be effective for communicating relative risks along the food chain for campylobacter in chickens. Risk information had a greater impact on perceived risk if attributed to the Food Standards Agency (FSA) rather than to the food industry, showing the FSA to be a more trusted source. Attributing information to a group comprising FSA experts plus stakeholders, rather than an FSA group alone, led to information being rated as more factual but the FSA were seen as less expert and to have less responsibility.

A fourth stream of research investigated how stakeholders thought about the food chains for chicken and apples and the implications this has for communicating the risks involved. Difficulties in getting stakeholders to represent their thoughts were overcome using an innovatory methodology (“fuzzy felt”) that involved constructing a picture of the chain, indicating where the risks were and how they should be mitigated. A web-based version of this method has also been developed.

Stakeholder focus groups conceptualised the food chain in strikingly different ways. For example: food campaigners and members of the public tended to divide food production into two food chains, mainstream and ‘alternative’ (e.g. organic) production, whereas scientists, farmers and food industry representatives saw a unified system; while ‘experts’ discussed risk in terms of factors that cause harm when ingesting a foodstuff, other stakeholders included risk issues relevant to their own interests and values; for the expert group risk mitigation was based on good management, regulation, inspection and assurance schemes but these were hardly mentioned by the other groups.

Overall the research showed that changing the current models of risk assessment and management to accommodate wider stakeholder participation is a major challenge. Our experience of running participatory processes has identified some problems: recruiting stakeholders can be extremely difficult; variability within stakeholder groups makes it difficult to ensure their views are adequately represented by those who participate; they take more time than conventional risk assessments, have to be conducted with less technical language, and may dwell on aspects of the problem that technical specialists (rightly or wrongly) consider unimportant; open styles of participation are good at airing diverse opinions but can be less effective in arriving at well-defined questions for scientific risk assessment.

The project resulted in eight refereed papers, with a further two submitted and several in preparation, five MSc theses and 15 presentations at conferences. The research has led to two further projects funded by NERC and DEFRA and a bid for European Union

funding.

The CS3 workshops involved close working with the FSA which provided nine staff for the exercise. There have been several presentations to those involved in practical risk management, for example, three presentations to the FSA Consumer Exposure Research Team and a planned presentation to the FSA Probabilistic Modelling Working Group.