

Decision aiding handbooks for managing contaminated food production systems and inhabited areas in Europe

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Abstract. Information on options for managing contaminated food production systems and inhabited areas has been systematically recorded in a datasheet format and published as compendia of countermeasures. As only subsets of these management options are likely to be required in the event of a radiological incident, generic handbooks to aid decision makers in the selection and combining of options have been developed for use in Europe, in close collaboration with stakeholders. The handbooks contain relevant scientific and technical information, details of the factors influencing implementation of management options, compendia of datasheets and a decision aiding framework comprising for example, of look-up tables, flow charts, decision trees and colour-coded selection tables. Guidance is also provided on customisation of the handbooks and how to engage with stakeholders. Demonstration of the handbooks in emergency centres confirmed their value for both contingency planning and incident management. The demonstrations also provided valuable feedback on aspects which could be further improved. A Handbook Users Group (HUG) was established for managing feedback on the generic handbooks and to provide a forum for information exchange on customised versions in the future.

1. INTRODUCTION

The accident at the Chernobyl Nuclear Power Plant prompted a number of initiatives to document and evaluate options for managing the effects of this type of radiological emergency. Since 2000, information on these management options has been recorded in a systematic way using a datasheet format. Compendia of datasheets for the management of contaminated food production systems and inhabited areas that cover all phases of accident response have been published for use in Europe [1, 2]. However, only subsets of these options are likely to be applicable according to the timing, scale and types of radionuclides released. Consequently, a need was identified to develop handbooks to aid decision making, not just from scientific or technical points of view but also taking into account stakeholder opinion. In 2005, the first version of the UK Recovery Handbook for Radiation Incidents was published [3], the food production section of which was produced in close collaboration with stakeholders: the Agriculture and Food Countermeasures Working Group [4, 5]. This paper describes how work in this area has been further enhanced by:

- developing generic handbooks for managing contaminated food production systems and inhabited areas in Europe, in close collaboration with stakeholders;
- demonstrating that these generic handbooks are fit for purpose and that stakeholder engagement enhances their usefulness;
- developing a mechanism for maintaining the handbooks state-of-the-art.

2. METHODS

The European Commission, through the EURANOS project [6], provided financial support to develop two complementary generic handbooks, one that would be applicable to food production systems, the other to inhabited areas. The approaches used to develop these handbooks are described briefly below.

2.1 Food production systems

There were three components that provided the building blocks for the generic handbook for food production systems: the UK Recovery Handbook for Radiation Incidents [3]; the European compendium of datasheets of options for managing food production systems [1]; and the European FARMING stakeholder network established in the UK, Finland, Belgium, France and Greece in 2000 [7]. Figure 1, below, illustrates the approach taken over a two year period to produce the first version of the handbook. National panels belonging to the FARMING network were reconvened during 2005 to provide feedback on whether a handbook similar to the one published for use in the UK could be developed in a more generic way for application at the European level. Stakeholder opinion was unanimously in favour of the development of such a document. The stakeholders provided a wealth of constructive criticism and comment on how the structure, format and content of the UK Recovery Handbook for Radiation Incidents could be improved and made more generic for application elsewhere in Europe. National co-ordinators took responsibility for the drafting of the new handbook, which was subsequently discussed with the FARMING stakeholder panels. Further amendments were made before publication of the first version of the handbook for food production systems in 2006 [8].

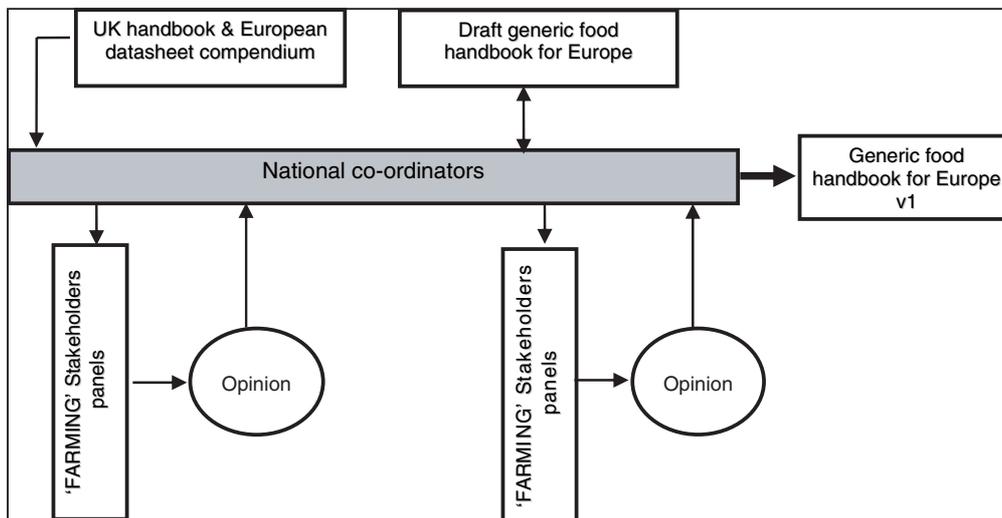


Figure 1. Approach used in the development of the generic handbook for food production systems.

2.2 Inhabited areas

The generic handbook for inhabited areas was developed using a similar approach to that for food production systems but with a few notable differences. Firstly, there was additional reference material available in the form of a Swedish handbook [9] to complement the UK Recovery Handbook for Radiation Incidents [3] and the European compendium of datasheets of options for managing inhabited areas [2]. Secondly, there was no pre-existing stakeholder network to consult. Consequently, the national co-ordinators took responsibility for setting up bespoke stakeholder panels in Germany, Finland, Slovak Republic and France. The national co-ordinators also took the lead on producing a preliminary version of the generic handbook. This document was discussed with stakeholders and amended by the national co-ordinators. The draft handbook was then circulated to the stakeholder panels again for a final opportunity to provide feedback. Further amendments were made before publication of the first version of the handbook for inhabited areas in 2007 [10].

2.3 Demonstration

Emergency centres in member states not involved in the development of the handbooks were invited to take part in demonstration activities to establish whether the handbooks were useful for the purposes of contingency planning and accident management. Emergency exercises or similar events based on scenarios involving contamination of the foodchain or inhabited areas were used. Participants were asked to provide reports that gave feedback on the installation, format, navigation, scope and content of the handbooks as well as on the tables, figures, flow charts and decision trees that were included to aid decision making. Six demonstrations were carried out using the handbook for food production systems; five demonstrations took place with the handbook for inhabited areas. In addition a further demonstration took place in Denmark to investigate the appropriateness applicability of a stakeholder participatory process when applying the food handbook in the management of contaminated food production systems.

2.4 The Handbooks Users' Group

Due to the generic nature of the handbooks it is likely that they will be customised for use at national, regional and local levels. The customisation process will inevitably identify gaps in the information provided or lead to improvements in the way it is presented. Therefore, it was considered important to establish a forum for capturing feedback on the handbooks and for providing a mechanism to maintain the handbooks as state of the art. To help initiate this process, a Handbooks Users Group (HUG) was established in 2007, comprising a steering group of national co-ordinators who had been involved in the original development of the handbooks.

3. RESULTS AND DISCUSSION

3.1 The handbooks

Version 1 of the handbooks are available free of charge as interactive CD ROMs from the EURANOS website (<http://www.euranos.fzk.de>). They are aimed at national and local authorities, emergency services, radiation protection experts, agriculture and food production sectors, the water industry and others who may be affected depending on the situation. The handbooks are designed to be of a generic nature and, to be applicable at national, regional or local levels, will require some form of customisation. They include management of the pre-release, emergency and longer term phases of the incident. The sources of contamination considered are principally from a nuclear site or weapons' transport accident; although many of the management options described will also be relevant to other types of radiation incident e.g. radiological dispersion devices. Some 26 radionuclides are included including alpha and beta particles and gamma ray emitting radionuclides. The types of land use considered range from agricultural and domestic food production systems, drinking water, buildings (residential, non-residential and industrial) and paved areas, parks and open spaces, countryside, woodland and forest. The handbooks are divided into several independent sections comprising:

- supporting scientific and technical information;
- an analysis of the factors influencing the implementation of management options;
- compendia of comprehensive and state-of-the-art datasheets for more than 100 management options;
- a decision-aiding framework comprising look-up tables, flow charts, decision trees, mind maps, and colour coded selection tables;
- guidance on customisation of the handbooks and the engagement of stakeholders;
- worked examples for training purposes.

The handbooks can be used as a preparatory tool, under non-crisis conditions to involve stakeholders and to develop local, regional and national handbooks and plans. The customised handbooks can also be used following an incident as part of the decision-aiding process to develop a recovery strategy.

However, to realise their full potential, the handbooks should be used as part of a participatory process involving a broad range of stakeholders.

3.2 Feedback from the demonstrations

Demonstration activities based on the application of both handbooks in emergency centres concluded that the handbooks were useful for the purposes of contingency planning and accident management but to realise their full potential they should be customised at national, regional and local levels. Feedback on the content of the handbooks was positive with constructive criticism given on how to improve their navigation, structure and format. A need for glossaries was identified. For the handbook on food production systems, there were also requests for the inclusion of a worked example, checklists for planning in advance of an incident and the provision of more information on monitoring and measurement strategies. Feedback from the demonstrations also recommended that the drinking water section of the inhabited areas handbook be made into a stand-alone document.

The additional demonstration that took place in Denmark to investigate the appropriateness/applicability of a stakeholder participatory process when applying the food handbook was also successful. Stakeholder engagement is currently not used as part of the decision-making process in Denmark. Nevertheless, ten stakeholders, including three from non-government organisations took part in a participatory process using the handbook as a tool for dialogue and debate. They expressed their willingness to discuss the issues at stake from contamination of the foodchain and gave a clear commitment to continue the process.

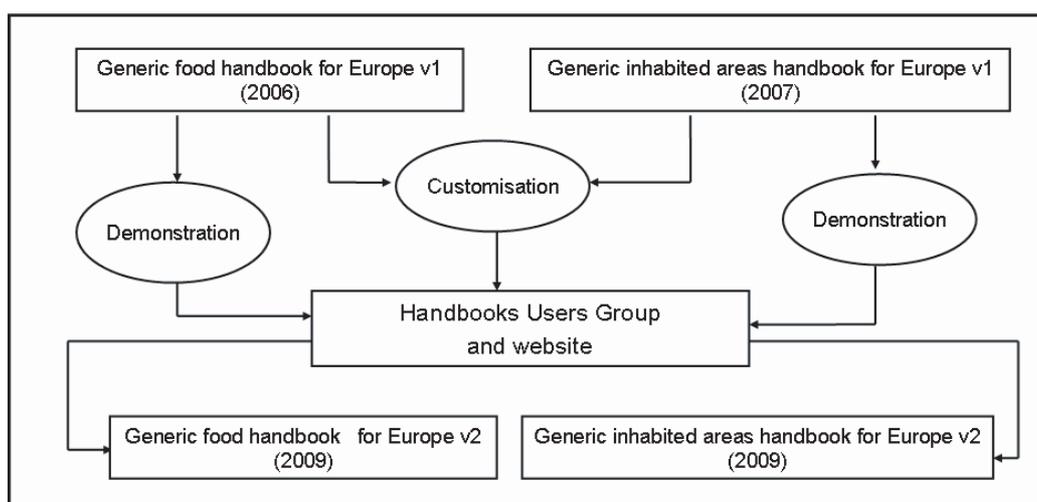


Figure 2. Approach used in the future development of the generic handbooks.

3.3 Future development of the handbooks through the Handbooks Users Group

Feedback from the demonstrations was considered by the Handbook Users Group (HUG) and a work programme taking into account the most important changes was established. Updated versions of the handbooks are expected to be published in 2009 as European Commission EUR reports. The handbooks are living documents that will be developed in future through the HUG. This will build a network of users for both the generic handbooks and any subsequently customised versions. A website has been set up (www.eu-neris.net) to provide a platform to facilitate information exchange between members of

the HUG on both the generic handbooks and customised versions. The inter-relationship between the handbooks, demonstration and customisation activities and the HUG is shown in Figure 2.

4. CONCLUSIONS

With support from the European Commission it has been possible to develop, in close collaboration with a wide range of stakeholders, two generic handbooks for assisting in the management of contaminated food production systems and inhabited areas in Europe. Subsequent demonstration activities based on the application of both handbooks in emergency centres concluded that the handbooks were useful for the purposes of contingency planning and accident management but to realise their full potential they should be customised at national, regional and local levels. The demonstrations also provided a wealth of constructive feedback on how the handbooks could be further improved. A Handbooks Users Group and website were established to provide a forum/platform for managing feedback on the handbooks and the release of subsequent updates. The HUG has initiated a work programme for the production of version 2 of the handbooks in 2009. The associated website provides a valuable resource for the exchange of information on the generic handbooks as well as customised versions, which may well extend beyond the timescales of the EURANOS project.

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