

Can we meet people requirements on food safety after contamination?

Franca Carini

Institute of Agricultural and Environmental Chemistry, Faculty of Agricultural Sciences, Università Cattolica del Sacro Cuore, Via Emilia Parmense 84, I-29100 Piacenza, Italy

INTRODUCTION

Emergencies of various kind, both on a local or a large scale, like nuclear, industrial and technological accidents, war events and acts of terrorism, have a common denominator: substances dangerous for the humans and the environment are widely dispersed, which can result in deaths of people and animals and in the contamination of the environment. Once introduced into terrestrial or aquatic food chains, pollutants give cause for concern for the consequent risk of toxicity to human beings or animals from ingestion of contaminated food.

People living in the affected or presumed affected regions need immediate information on consumption of food both from the local market and vegetable gardens, in order to reduce or prevent the risk of a health damage. It is known in fact that intervention with protective actions to avert the exposure occurring, like sheltering, control of the food chain, and, if necessary, evacuation, is likely to reduce the number of health effects by up to several orders of magnitude (e.g. by factors of approximately 10-1000) and is a much more effective protective measure than the provision of medical treatment after exposure has occurred. (e.g. by a factor of approximately 2-3) (Mettler, 2005).

BACKGROUND

The IAEA General Conference, in its Resolution adopted on 24 September 2004, encourages Member States to improve their own preparedness and response capabilities for nuclear and radiological incidents and accidents, as well as for responding to acts involving the malicious use of nuclear or radioactive material (IAEA, 2004). The ICRP (International Commission on Radiological Protection) has developed advice on how to intervene in radiological emergencies (ICRP 63, 1991) and under radiological attacks (ICRP 96, 2005) devising actions aimed to protect the health of members of the public.

Directives and regulations have been produced at national and international level during the years to define roles and procedures to cope with the emergency. However they are addressed to the competent authorities who need support from analyses and model calculations before supplying appropriate information on contingent food restrictions. Furthermore practice shows that the adoption of relevant decisions is hampered because of the required change in routines and procedures. Carter and French (2005) in a review of approaches to decision making in Europe, note that the most urgent decisions may be taken before most representatives arrive at the decision making center, so the initial advice is based on the assessment from a smaller set of tools. Serious accidents and events arise in part because they are unanticipated, and their management requires teams to think through alternative strategies almost *ab initio*.

Crick *et al.* (2004), in a review on the management of emergency response in the early phase at a nuclear installation, underline as the management approach is today at the basis of the recent international community's agreement (IAEA, 2002). This approach involves the establishment of goals, that are themselves based on experience gained from past emergencies. The authors discuss the considerable uncertainty and difficulty to make accurate predictions of the off-site

consequences and urge the development of products that meet user requirements and more practical tools.

It is recognised that the response to radiological attacks or emergencies should be planned beforehand and that optimised measures should be prepared in advance. Communication and coordination of the information are key aspects of the process. Furthermore information required at different levels needs to be displayed to different granularities, i.e. different degrees of detail (Carter and French, 2005).

THE INVOLVMENT OF STAKEHOLDERS

Various valuable EC projects have introduced the involvement of stakeholders in planning emergencies after a radioactive release. The FARMING project has engaged a considerable number of stakeholders on countermeasures applicable after an accident and has provided a forum where the suitability of a wide range of management options has been debated (Nisbet, 2005). As underlined by the results of the FARMING project, a considerable divergence of opinion between national panels was apparent for many of the options considered. This can be attributed to differences in soil type, climate, land management, infrastructure, consumer confidence, socio-political context and culture. Where consensus was reached between stakeholders it was generally for those countermeasures that provide public reassurance, sustain farming practices and minimise environmental impact (Nisbet *et al.*, 2005a, 2005b).

A decision framework that aims to a sustainable management of contaminated areas has been produced under the STRATEGY Project, where the ethical aspects of restoration strategies and practical means to take them into account have been considered (Howard and Beresford, 2003). The authors state that the promotion of self-help strategies is an important ethical factor in evaluation of individual countermeasures. Within STRATEGY there has been an emphasis that the social aspects of countermeasure implementation need to be given due weight. In a short term scenario there is no time to make participatory decisions, but a general framework can be prepared in advance by involving local and wider community of stakeholders within participatory decision making.

Following the contamination of rural areas, farmers urgently need information and advice on how to start and apply the early protective actions on farms. The information strategy employed may ensure the success of an intervention or be the reason for its failure. It is seen as especially important to give advice to consumers and households, especially young families, on how to cope with a radiation situation (Ratavaara *et al.*, 2005). Other investigations were carried out to ensure preparedness for crisis involving radioactivity to catering operations and private households in Finland (Enqvist, 2005). "Kotivara" a crisis food preparation booklet for households is described. The Author underlines the importance of information and communication flow. Only through the right information, at the right time can the population be prepared and equipped to act correctly. An accurate picture of the problems to be faced in the field of food supply has been given by Orre (2005) following a training exercise organized by the National Emergency Supply Agency in Finland. The Author comments on that it is unlikely that there would be enough resources available to help people at the local level. The capacity to carry out radiation monitoring would be limited. Well prepared instructions and appropriate training sessions would be necessary. Previous experience in Finland during the BSE crisis highlighted the importance of having instructions and information in times of crisis.

A QUESTION STILL OPEN

Notwithstanding the numerous studies and efforts, there remains a chasm, in various countries, between the principles and the actual implementation of appropriate measures in the event of an emergency resulting in or potentially resulting in great concern among the population. People are concerned by the quality of life which they relate also to health and food. The society relies on scientific research to find solutions to big problems such as health threats or global warming, but it also considers that science and technologies may have negative effects and carry risks which should be better assessed and controlled. Owing to the actual or perceived radiological hazard, in the absence of information and advice over very short times, people will experience trouble, alarm, distrust or anger feelings.

The involvement of stakeholders carried out under various projects and in different countries is a very good starting point. Among the different stakeholders engaged in food supply - farmers and growers, manufacturer, processors, distributors, food handlers and consumers-, farmers and growers, as well as the owners of vegetable gardens are at the same time growers and consumers. In order to avert exposures to pollutants and to minimise general disruption it is suggested to assume that radiological or chemical agents are spread in the environment, until proven otherwise.

It is recognised that it is impossible to characterise all the possible scenarios in a nuclear or radiological emergency of actual, potential or perceived radiological significance: differences in the time of application and choice of protective actions will depend upon the nature of the emergency, its duration in time and the area affected. Specific advice can be expected to show site, context, national differences, as well as socio-economic and psychological aspects. Interdisciplinary research is required, considering an integration of natural sciences on the one hand and human sciences on the other hand. Real focus is needed on practical experience and arrangements. Gender differences may exist and are to be addressed, considering that specific protection measures have already been recommended for female workers who may be pregnant or are nursing an infant. Serviceable tools can be developed for people, taking also into account the possibility to develop new educational methods for young people.

ACKNOWLEDGEMENT

This work is supported by MIUR (Ministero dell'Istruzione, dell'Università e della Ricerca, Italy), under the project 2005083454_005 and by the UCSC (Università Cattolica del Sacro Cuore, Italy).

REFERENCES

- Carter, E. and S. French, 2005. Nuclear Emergency Management in Europe: a Review of Approaches to Decision Making: 247-259. In: B. Van de Walle and B. Carlé (Eds.): Proceedings of the 2nd International ISCRAM Conference, Brussels, Belgium, April 2005.
- Crick, M., T. McKenna, E. Buglova, G. Winkler and R. Martincic, 2004. Emergency management in the early phase. Radiation Protection Dosimetry, 109(1-2): 7-17.
- Howard, B.J. and N.A. Beresford, 2003. Final Report of the Strategy Project. Contract No: FIKR-CT-2000-00018. IAEA General Conference, 2004. Measures to Strengthen International Cooperation in Nuclear, Radiation and Transport Safety and Waste Management, Vienna, 24 September 2004.
- IAEA, 2002. Preparedness and Response for a Nuclear or Radiological Emergency. Safety Standard Series No. GS-R-2, Vienna, 2002.
- ICRP Publication 96, 2005. Protecting People against Radiation Exposure in the Event of a Radiological Attack. J. Valentin (Ed.). Annals of the ICRP, Vol. 35 No. 1. Elsevier Ltd, United Kingdom.
- Mettler, F.A.Jr., 2005. Guest editorial. ICRP Publication 96. Annals of the ICRP, Vol. 35 No. 1. Elsevier Ltd, United Kingdom.

- Nisbet, A.F., 2005. FARMING: Final Scientific Report of the FARMING Project. Nov 2000-Oct 2004. A.F. Nisbet (Ed.). February 2005.
- Nisbet, A.F., J.A. Mercer, A. Rantavaara, R. Hanninen , C. Vandecasteele, F. Hardeman, K.G. Ioannides, C. Tzialla, H. Ollagnon, V. Pupin and T. Jullien, 2005a. Variation in stakeholder opinion on countermeasures across Europe. *J. Environ. Radioactivity*, 83: 371-381.
- Nisbet, A.F., J.A. Mercer, A. Rantavaara, R. Hanninen , C. Vandecasteele, B. Carlé, F. Hardeman, K.G. Ioannides, C. Papachristodoulou, C. Tzialla, H. Ollagnon, T. Jullien and V. Pupin, 2005b. Achievements, difficulties and future challenges for the FARMING network. *J. Environ. Radioactivity*, 83: 263-274.
- Orre, K., 2005. The logistics of food supply following radioactive fallout. *J. Environ. Radioactivity*, 83: 429-432.
- Rantavaara A., H. Wallin, K. Hasunen, K. Härmälä, H. Kulmala, E. Latvio, K. Liskola, I. Mustonen, I. Nieminen, R. Tainio, 2005. Finnish stakeholder engagement in the restoration of a radioactively contaminated food supply chain. *J. Environ. Radioactivity*, 83: 305-317.