Management of Contaminated Food after a Nuclear Accident

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Following the Fukushima Daiichi nuclear power plant accident in March 2011, significant public concern arose regarding the management of food in and from Japan. These concerns were reflected in Japan and in surrounding countries. Unfortunately, it was quickly realized that the current frameworks for decision-making with regard to food safety were inadequate to the challenges presented by this unprecedented event.

The areas affected by the nuclear accident are heavily agricultural, producing products such as apples, peaches, persimmons, and rice. In addition, the area is an important fisheries region in Japan. The food products from Fukushima are of a quality which had been well-regarded in Japan and abroad. The population in affected areas were thus concerned with not only their own health, in terms of eating potentially contaminated food, but also for their future livelihood.

In the aftermath of the accident, many Japanese living outside the directly affected areas were concerned about eating potentially contaminated food. In Tokyo, well south of the accident, some shops ceased entirely to carry certain food items, simply because the best examples were commonly from the Fukushima region. Similar reactions were observed with many of Japan’s trading partners, which were concerned about importing potentially contaminated food.

These concerns posed a complex, triple-problem with local, national and international implications, for which there were no broad, internationally-agreed approaches. This stands as an important lesson to be absorbed from the Fukushima Daiichi accident, and it highlights the need for international focus.

In the event of a large radiological contamination event, a prime concern with regard to food will be at the local level. It will be necessary to manage exposure from contaminated food, which will involve the establishment of criteria to allow food produced in the affected areas to be consumed, and mechanisms for potentially contaminated food to be measured. While internationally agreed criteria exist for the level of contamination permissible on a material or good such that it need not be subject to radiological regulatory control (criteria as known as “exemption or clearance levels”), this guidance does not apply to food which would be consumed by people, or to animal feed. Similarly, the Codex Alimentarius Commission, jointly run by the Food and Agriculture Organisation and by the World Health Organisation, has established radiological criteria below which the imposition of national import restrictions is not judged to be justifiable for health reasons, but again, these do not address the safety aspects of local consumption of locally produced food.

In the example of the Fukushima Daiichi accident, the lack of clear standards for consumption of food products exacerbated a situation already burdened with considerable fear and uncertainty. As such, a key post-accident challenge is the development of radioactivity standards for the food produced in affected areas. Doing so requires that public safety needs are balanced against the sociological impacts of food production restrictions in agricultural and fishing regions. Associated challenges include the need to extensively measure radiological deposition and its effects on crops, fish and farm animals, and to establish processes and procedures for making measurements of internal contamination levels in what can be large numbers of affected individuals, particularly children.

1 OECD Nuclear Energy Agency: The Nuclear Energy Agency is an agency of the OECD that serves as the principal forum for civilian nuclear technology cooperation among the world’s highly developed countries. Founded in 1958, it has 31 member countries and addresses issues such as technology development, nuclear safety, radiation protection, science, nuclear waste, and nuclear law.
3 Joint FAO/WHO Food Standards Programme, Codex Alimentarius Commission, Codex General Standard for Contaminants and Toxins in Foods, Schedule 1 mSv Radionuclides, CODEX STAN 193-1995, CAC, Rome (2006). Codex establishes internationally agreed allowable levels of harmful substances in food below which it is not justifiable, for public health reasons, that countries block food-product importation. Among the substances listed in Codex are radionuclides, for which internationally-agreed Codex criteria are designed to result in less than 1 mSv of exposure in a year from imported foods.
Protection aspects at the national level can also pose challenges. It is essential to develop criteria regarding food entering national markets, while considering radiological exposure, consumer confidence, and again the social implications that restrictions can have on food production agricultural activities in affected areas. Here again, while some international post-accident radiological standards exist, there are currently none that apply to food management in non-affected areas. Associated challenges include the need to establish protocols, installations and training of personnel in order to facilitate the evaluation of food products before allowing them to enter national markets.

Finally, the international aspects of food management are equally challenging. Countries affected by a radiological contamination situation and that also export food need to establish export criteria. Here again, no internationally agreed approach or guidance exists. Countries importing food from countries affected by a radiological contamination situation will need to establish import criteria. As mentioned previously, the Codex Alimentarius Commission has established radionuclide-specific criteria defining a level below which the restriction of imports, using the World Trade Organisation’s Sanitary and Phytosanitary (SPS) trade related measures at borders, is deemed to be unjustified from a public health standpoint. Yet the development of export criteria and of import criteria are both within the purview of national governments, and there is no broad international guidance to address these issues in an overall framework of public health (e.g. radiological and accident-stress related illnesses), social impact (e.g. loss of jobs and social networks), and cultural protection (e.g. loss of cultural landmarks and impact on traditional celebrations and networks).

Although these local, national and international challenges are not necessarily common attributes of all large radiological releases, they do suggest that thinking with regard to emergency and recovery planning and management must evolve. In this context, the OECD Nuclear Energy Agency has begun to explore solutions to these issues, noting that large-scale accidents are rare, and assuming that a limited number of export food products would come from any affected area. Taking into account that internal and export criteria are a matter of national choice, the NEA has proposed a framework for establishing a single set of criteria for the local, national and international management of food from post-accident affected areas.

The NEA Post-Accident Food Management Framework assumes that, in the case of a declared emergency, food produced in an affected area will be, quite rapidly, banned from being sent to market or at least substantively restricted. The distribution and trade of food products will be resumed only after the accident is under control, affected areas have been characterised radiologically, and a measurement and certification process has been established. The time period during which the accident is being brought under control and contamination levels are being characterised, local and national food-management criteria can be selected. Initially, these criteria will be based on pre-determined risk assessments, but these will then be refined to address actual prevailing circumstances, and will primarily address protection of the most exposed group who those living in the affected area.

In addition to criteria for local protection, criteria will be needed for allowing food to enter national markets, and for the export of food products. In this context, it is expected that it will be socially, politically and perhaps ethically difficult for a country to use different criteria for those in the affected area and for putting food on the national market, to be eaten by those not in affected areas. Equally, it is likely that the criteria applied nationally will be used make decisions related to exports, again for social, political and ethical reasons. Criteria may change over time as the prevailing circumstances evolve, but only one set of accident-specific criteria will be used locally, nationally and internationally. In view of the internationally-agreed import criteria established by Codex, it is suggested that the criteria selected for local, national market and export be no higher than the Codex values.

The NEA Framework thus proposes the selection of a single set of criteria addressing radionuclide concentrations in local, national and exported foods. This is broadly based on observations and reflections of events following the Fukushima accident, but also draws from national and international reactions to the Chernobyl accident. The NEA Framework is being considered by the International Commission on Radiological Protection (ICRP) for future recommendations, and by the International Atomic Energy Agency (IAEA) for future global standards. In addition, a preliminary NEA study of post-Fukushima trade from Japan suggests that the Japanese government’s use of a common set of criteria locally, nationally and internationally may have had a positive effect on some aspects of food exports from Japan.

Further international and domestic study is needed to substantiate any conclusions, but it is clear from the trade confusion atrose following the Fukushima accident that there is a need for international guidance for post-accident management of contaminated food. The international community has committed itself to learn from the Fukushima accident and improve nuclear safety; the NEA believes that it is essential that improved criteria for food consumption and distribution be part of this effort and is working with our member countries and other international bodies to assure that this occurs.

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