

DIOXIN MANAGEMENT STRATEGIES AND RISK VIEWS: THEORETICAL FRAMEWORKS, DOCUMENT ANALYSES AND OPINION SURVEY APPROACHES

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Introduction

Despite the long-time attention directed to dioxins and associated risks, little studies have been made of risk management strategies, e.g. as viewed by key groups. No surveys of the opinions of experts on dioxins were found in scientific literature. Expert opinions on dioxins have been utilised in important contexts such as in WHO, EU and USEPA, based e.g. on scientific committees and assessment panels, but focussed on risks, not management. Risk management has most often dealt with specific technologies instead of broader strategic questions.

Considering the developments of dioxin risk management e.g. with the recent EU strategy¹ and the global POPs convention, the complexity and extent of the task, and the great interests, uncertainties and controversies still surrounding it, theoretical and empirical studies of strategic questions in dioxin risk management seem an important and urgent task.

Based on previous work on local and regional dioxin risks^{2,3}, and in connection with analyses of risk management strategies of dioxins in Baltic Sea fish, a controversial contemporary issue, we examine the foundations, characteristics and implications of dioxin management strategies. The material includes opinion surveys among experts in Baltic Sea, EU and other countries.

We present theoretical frameworks, initial analyses of documents and methodological issues in elucidating dioxin risk management strategies, focussing on how they reflect overall views of risks and management principles. We specifically describe ongoing expert opinion surveys, linking with the symposium. This is a first attempt to improve the knowledge of what experts on dioxins and people dealing with strategy-level decisions on them think of related issues.

The characteristics and correlates of expert opinions are important for 1) practical development (incl. refinement and extension) and implementation of dioxin-related management strategies, 2) general understanding of more general key dimensions of risk views and related societal phenomena between science and policy; 3) developing evaluation of management strategies.

Methods

Theoretical studies

Views of and responses to dioxin risks are influenced not only by science but also by values, policies, norms, resources, and a host of other socio-psychological and contextual factors. The scope and level of strategies and their goals, means, obstacles and functions vary accordingly. In theoretical studies, emphasis is put here on the following themes; additional topics will be defined on the basis of the exploratory empirical studies:

– relationships between science and policy/action, specifically the tensions between proactiveness (e.g. based on precautionary principle) and requests for detailed scientific evidence and advance assessment, including the role of information and time factors

– comparisons of risks and management approaches across sectors, and the related issues of the appropriate scopes for strategies and of the commensurability of risks and benefits

RISK ASSESSMENT

– geographical scales of management strategies, and the integration of global (POPs, regional (EU and marine conventions) and national strategies and the resolution of conflicting interests.

Strategy document analysis

The analysis was based on the following main sources and information retrieval methods:

- searches of scientific literature (eg. dioxin* risk* manag* strateg*) in key databases
- general Internet searches by search engines
- organisation-based searches (e.g. for EU, USEPA and UNEP materials)
- review documents previously obtained.

Expert surveys and other means of soliciting opinions

For structured compilation of expert opinions, a 3-p. fill-in (tick and rank) questionnaire on dioxin risk characterisation, evaluation and management strategies was designed after in-house trial runs. The form was initially e-mailed to 150 experts world-wide, selected on the basis of documented experience and activities in assessment and management of dioxins or other agents. The experts include scientists with publications on the above topics; dioxin symposia committee members and chairs; competent authorities on chemicals; other experts in e.g. health, environmental and food administrations and international organisations; analysts from other areas. They do not form a random sample; the analysis will thus not produce quantitative estimates of distributions of views of specific classes of experts, or other representative characterisations. Instead it will provide general and exploratory information on different expert views, to be followed up by studies testing the concepts and hypotheses identified.

Basic information was given of the background, aims and conduct of the study in an attached letter. All answers were promised to be treated confidentially. The questionnaire was personal, and the experts were asked to reflect on their own opinion, not that officially held e.g. by their employer. To increase response rate, non-respondents were reminded of the questionnaire.

Views of dioxin risks and management strategies are also explored in other connections, formally (on the basis of the questionnaire) and informally in interviews with experts. They offer a participatory approach to elucidating dioxin risks and management. In particular, the ongoing survey will be complemented with opinions in networks within a Nordic Council of Ministers project analysing risks and risk management strategies for Baltic Sea fish.

Results and discussion

Theoretical analyses

General types of responses to risks and management styles were initially identified in the form of dichotomies, as a framework to be tested by empirical results on official strategies and expressed opinions. Hypotheses were also produced of underlying phenomena (Table 1). The dichotomies reflect the extremes of responses. In reality, intermediates and combinations arise; the dichotomies should thus be seen as ways explore tendencies, not as absolute classifications. Based on refined typologies and their relationships, strategy characterisations can be produced accounting for the multi-dimensionality of risk and management views.

Analysis of documented authoritative strategies

On the basis of official documents, strategies addressing dioxin risks vary greatly in scope (e.g. substances, media and measures), relation to other strategies, organisational/geographical level, normative basis and status (e.g. mandate, sanctions), clarity of principles and assumptions, contents and detail (e.g. specification of means), goals (also quantitative) and time scale, participation and openness, implementation stage, and monitoring of success. Information on such traits is used to explore and to assess particularly the following existing or draft strategies:

Table 1. Typologies of dioxin risk views and management responses, and associated factors.

Types (dichotomies) of views or management styles	Possible generalization or underlying phenomenon	Qualifications, modifiers and explanations
- science-based - action-based - quantifying - qualitative - focusing -multifrontier efforts - sectorialist - integrationist - health - environmental - expert-driven - participatory - transparent - opaque	reflective - proactive rationalist - emotionalist symmetry - asymmetry incrementalism - holism anthropocentric - ecocentric elitist - egalitarian/democratic openness - restrictiveness	can be excessive/restrain each other broad rationalism regards qualities view of risk commensurability sectorial holism may also exist may have overlap/synergy many intermediates & dimensions openness can be excessive/cosmetic

- EU: dioxin strategy, endocrine disrupter strategy, PBT substance strategy, and Existing Substances Regulations based strategies for individual (even precursor) compounds
- UNEP: global and national strategies for POPs based on the Stockholm Convention
- IPCS: PCBs stockpile strategy; strategic approach for international chemicals management
- OSPAR and HELCOM: strategies for hazardous substances (and strategy for Baltic Sea fish)
- US EPA multimedia dioxin strategy

- Japanese basic guidelines for ... measures against dioxins (waste incineration-oriented)

- possibly other national dioxin strategies (e.g. Australian, under development)

Expert opinion surveys - methodological problems, future needs and suggestions

At this writing, replies to the questionnaire are still received and processed, allowing feedback and additional contributions from respondents. Results can thus not yet be presented. Instead, the contents of the questionnaire are outlined, indicating some methodological issues (Table 2). This initial description is linked with the treatise and refinement of conceptual frameworks for strategic studies and with the analysis of other information sources such as official strategies.

These studies will be used to evaluate dioxin management strategies, generally and specifically e.g. in Baltic Sea protection. For this, more information will be needed on existing strategies. However, already the present identification of concepts and relationships in a theoretical framework, analysis of documents and exploration of the general traits and variations in expert views will contribute to evaluations of value in strategy development and implementation.

Future needs and suggested avenues and work include the following:

- quantitative and qualitative (mainly aggregated and anonymous case) analysis of responses, with the purpose of identifying main clusters of views on risk management
- in-depth analyses of strategic issues with willing respondents (e.g. modified Delphi)
- additional questionnaire-based surveys among experts e.g. at meetings and in networks
- other means of soliciting opinions among experts and other groups, e.g. by theme interviews.

Acknowledgements

This work has been supported by SYKE. The views expressed are those of the authors alone.

References

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RISK ASSESSMENT

Table 2. Outline of the contents of the expert opinion survey questionnaire, and associated methodological issues.

1. Types and characteristics of **dioxin risks** (AhR mediated substance-attributable) considered important
 - substances: PCDD/Fs, Copl-PCBs, PCNs, PCTs, PBDD/Fs, Copl-PBBs, etc.
 - sources: (haz./munic.) waste inciner, domestic burn, other fuels, metal industry, biocides, traffic, other
 - exposure routes and media: air, water, diet
 - receptor organisms: human, domestic animals, wild mammals, fish, birds, other
 - receptor groups: fetuses, infants, juveniles, reproducing adults
 - effects: tumours (which), reprod, develop, neurol, immunol, hormonal, hepat, other
 - other important risk attributes (e.g. areal, temporal and social)
 2. **Comparative assessment** of dioxin risks
 - general comparisons: the criteria and limits for comparisons vary, and make a key task in surveys
 - specific comparisons: with risks of non-copl-PCBs, PAHs, PBDEs, toxaphenes, DDTs, CPs, phthalates
 3. **Goals** of risk management (particularly quantitative) considered necessary and sufficient
 - types: for emissions, environmental levels, fluxes, food/feed levels, intakes, body burdens, risks
 - scope: ‘dioxins’, WHO-ITEQ compounds, PCDD/Fs, other
 - specifications: for effects/adversity, targets/groups, other
 - basis: N(L)OAEs, benchmark doses, dose-responses, epidemiological data, other
 - uncertainty treatment: safety factors, statistically (by confidence levels/distributions), other
 - overall risk level (10, 50, 100, 200, or X % of present)
 - realistic time-scale (5, 20, 50, or X yrs)
 4. **Characteristics of risk management strategies** ranked (on scale 1-5):
 - general: effectiveness, coverage, ease, certainty, speed, prevent., flexibility, concreteness, compatibility, monitor
 - societal: costs, norm basis, fairness, involvement, acceptance, transparency; innovation
 5. **Strategic approaches** to risk management by ranking (on scale 1-5) the following contrasting pairs:
 - dedicated dioxin strategies - utilizing strategies for other compounds
 - stressing research, analysis and monitoring - prompt action even on uncertain risks;
 - emphasizing regulatory measures - voluntary and market-driven approaches;
 - incremental, step-wise approaches - focusing on long-term planning and management
 - strongly focused activities - multi-frontier action approaches
 - strict polluter pays principle - extensive burden-sharing including public sectors
 - focusing on greatest risks - focusing on greatest risk reduction opportunities
 - internationally coordinated - subsidiarity-based
 - separate sectorial - integrated
 6. Risk management **means** considered most important
 - general: in terms of spending (X times present), and synergy/competition with other efforts
 - specific (ranking on scale 1-5): prevent, control sources, remedy sites, alter feed production/processing, limit intake, occupational, therapy, maximize benefits/compensate; classify, inform, supervise or monitor
 7. **Obstacles** to appropriate risk management to be ranked (on scale 1-5):
 - knowledge, tech, organization, statutes, enforce., funds, attitudes, communication, conflicts
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