The Use of Risk Governance Principles in Practice: Lessons from a Dutch Public Institute for Risk Research and Assessment

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I. Introduction: risk governance principles

The technical, natural science-based approach, with a focus on the likelihood of possible consequences and damage potential, has been adapted to deal with risks, such as genetically modified organisms, or newly synthesised materials, which cannot be managed merely by existing technocratic procedures. For a number of years already, professional risk assessment and management communities have advocated for a change, claiming that major controversies, crises and scandals around food, environmental health and technological innovations have necessitated a reshaping of traditional risk regulation towards a more integrative risk governance.[1] In this approach risk experts, policy-makers, stakeholders and civil society organisations (CSOs) are working together towards identifying risks, generating and evaluating options, and coming to a strategy. This is reflected, for example, in the analytic-deliberative approach embodied in the modified IRGC *Risk Governance Framework*[2] that includes concern assessment in parallel with the more conventional risk assessment. Decision-makers need to understand the nature and strengths of societal concerns and consider them alongside more technical recommendations for action. The ideas by the IRGC have a social science basis, but more or less at the same time in the natural science oriented risk assessment community comparable ideas and concepts have been developed. From the 1990s onwards, the US-based National Research Council (NRC) published several reports on how risk assessments should remain credible and authoritative in times of

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[1] A Klinke and O Renn, "Adaptive and integrative governance on risk and uncertainty" (2012) 15(3) Journal of Risk Research 273; M van Asselt and O Renn, "Risk Governance" (2011) 14(4) Journal of Risk Research 431.

[2] International Risk Governance Council, *An Introduction to the IRGC Risk Governance Framework*, Report (Geneva: International Risk Governance 2008).

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scientific uncertainty and strong competing interests.[3] In 2005, the "European" International Risk Governance Council published their white paper, which addressed similar challenges. In this article we focus on the IRGC risk governance framework.[4]

Despite the popularity of risk governance frameworks amongst scholars and policy-makers, there has been little research done that shows how major institutes for risk research and assessment try to implement the underlying risk governance principles. This is surprising, since such institutes are necessary actors in this process. New technologies show opportunities, but also raise a number of risk-related social, economic and political issues. The governance of these risks is a challenge: the stakeholders and public involved hold vested positions; values are at stake; and the science is complex, uncertain or even incomplete. Yet, the expectations of policy-makers that institutes for risk research and assessment can adequately deal with these risks are often high. On the one hand, it is acknowledged that these risks can be complex, uncertain or ambiguous and need approaches in line with risk governance principles; on the other hand these institutes are also expected to deliver clear and unambiguous answers.[5] Operating within this precarious field of tension, the Dutch National Institute for Public Health and the Environment (RIVM) has become an important actor in the implementation of risk governance principles in the Netherlands. The institute has an open attitude towards risk governance principles and new approaches, and has been at the forefront in supporting the Dutch government in developing its national risk governance strategy.[6] Moreover, RIVM has its own strategic research budget, from which projects can be funded in which risk researchers and staff members can experiment in ways to translate risk governance principles into practice.

In this article, we want to shed more light on the process of applying risk governance principles in an institutional setting like the RIVM. The importance of the institutional context has already been addressed by Renn and Walker,[7] but only in conceptual terms. Boholm, Corvellec, and Karlsson[8] have given a more descriptive perspective on day-to-day risk governance in institutional settings. In a similar way, we investigate actual dealings with risk issues as they unfold in the RIVM context.

[3] National Research Council, *Understanding Risk: Informing Decisions in a Democratic Society* (Washington, DC: National Academy Press 1996); National Research Council, *Science and Decisions: Advancing Risk Assessment* (Washington, DC: National Academy Press 2009).

[4] International Risk Governance Council, *Risk Governance. Towards an Integrative Approach*, White Paper (Geneva: International Risk Governance Council 2005); *An Introduction to the IRGC Risk Governance Framework*, supra, note 2.

[5] M van Asselt and Ellen Vos, "The precautionary principle and the uncertainty paradox" (2006) 9(4) Journal of Risk Research 313.

[6] Ministry of Infrastructure and Environment, *Bewust Omgaan met Veiligheid: Rode Draden. Een Proeve van een IenM Breed Afwegingskader Veiligheid* [*Consciously Dealing with Safety: Common Thread. A Proof of an IenM Broad Assessment Framework for Safety*], Report (The Hague: Ministry of Infrastructure and Environment 2014).

[7] O Renn and K Walker, "Lessons learned: a re-assessment of the IRGC framework on risk governance" in O Renn and K Walker (eds) *Global Risk Governance. Concept and Practice using the IRGC Risk Governance Framework* (Geneva: International Risk Governance Council 2008).

[8] Å Boholm, H Corvellec and M Karlsson, "The Practice of Risk Governance: Lessons from the Field" (2012) 15(1) Journal of Risk Research 1.

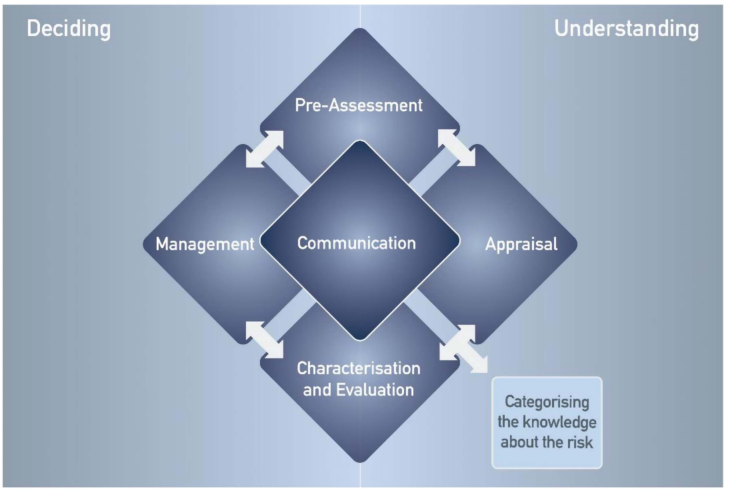

Figure 1. (Colour online) The IRGC Risk Governance Framework (used with permission of the IRGC)

II. Putting a risk governance framework into practice

Risk governance includes and extends beyond the three conventional recognised elements of risk analysis: risk assessment, risk management and risk communication, and includes matters of institutional design and role, organisational capacity, stakeholder involvement, and collaborative decision-making. The IRGC framework[9] proposes a comprehensive sequence of pre-assessment, appraisal, characterisation, evaluation, management and communication, see Figure 1. The IRGC framework is challenging in two ways: the inclusion of the societal context and a new categorisation of risk-related knowledge. The IRGC framework stresses that the social, economic, political, and institutional contexts are equally as important as the scientific risk assessment. This "inclusive governance" stands for a risk decision making process in which the four major actors in this process, ie political, business, scientific and civil society, work together to frame the problem, produce and evaluate possibilities, and jointly decide on actions.[10]

The IRGC framework is intended to give direction: risk practitioners can go through all the steps in order to ensure the best possible decision. Often, this is only done with hindsight to analyse the governance arrangement of particular cases.[11] In the face of political debate, time-pressure and societal concerns, the application of the framework becomes much more daunting, especially when multiple actors need to be involved. Risk research scholars have therefore criticised the IRGC framework for being too theoretical and paying too little attention to the societally-situated nature of risk.[12]

[9] *Risk Governance. Towards an Integrative Approach*, supra, note 4; *An Introduction to the IRGC Risk Governance Framework*, supra, note 2.

[10] O Renn, *Risk Governance. Coping with Uncertainty in a Complex World* (London: Earthscan 2008).

[11] See eg Renn and Walker, supra, note 7. See also J Roodenrijs et al, "Risk Governance for Infectious Diseases: Exploring the Feasibility and Added Value of the IRGC-Framework for Dutch Infectious Disease Control" (2014) 17(9) Journal of Risk Research 1161.

[12] Health Council, *Meewegen van Gezondheid in Omgevingsbeleid. Evenwichtig en Rechtvaardig Omgaan met Risico's en Kansen* [*Taking Health into Account in Environmental Policies. Balancing and Fair Dealing with Risks and*

As mentioned above, Boholm, Corvellec, and Karlsson[13] criticise the IRGC's decontextualising approach to risk governance, an approach that stays at a methodological and theoretical distance from the institutional settings in which risk understanding gets born and risk decisions are made. Their study is one of the few that offers a more practical perspective on day-to-day risk governance in institutional settings. Embedded in all kinds of organisational routines, the governance of risks does not stand out as an activity in itself. It appears to be interwoven with the full scope of activities from budgeting to managing, from strategising to framing, from individual to organisational learning. The authors point in this respect to the "micro-contexts" in which different actors with divergent roles, aims, and understanding of their responsibilities deal with and act upon risks. Instead of the decontextualising approach to risk governance on a macro-level, they advocate situating risk governance in the contexts in which it takes place.[14] We want to refer to this phenomenon as *situated contexts*, also to emphasise the element of *situated learning*. As Lave and Wenger[15] have argued, learning should not be viewed as simply the transmission of abstract and decontextualised knowledge from one individual to another, but as a social and cultural process whereby knowledge is co-constructed.

1. Research questions

"To situate risk governance in the contexts in which it takes place" is the starting point for our research. From this viewpoint we formulated two related research questions: (i) What is the effect of situated contexts on roles for the institute? (ii) What is the effect of limited and/or conflicting scientific knowledge in these situated contexts? In our research we focus on the collection and analysis of experiences with new risk governance approaches within RIVM, lessons learned, and draft them together in a working model for practical use and guidance.

III. Method

From studying different cases we want to draw more general lessons regarding the use of risk governance principles in an institutional setting. Therefore we analysed four cases of new or emerging technologies in which RIVM has played a broader role, other than purely traditional risk research and assessment: (i) nanosilica; (ii) shale gas; (iii) electromagnetic fields (EMF); and (iv) synthetic biology. We explored the different ways risk cases were set on the RIVM agenda, how they were managed, and how risk practitioners took up the use of risk governance principles therein. The risks in all of the four cases in our study can be characterised as complex, uncertain and

(F'note continued)
Opportunities], Report (The Hague: Health Council of the Netherlands 2016); R Löfstedt and M Van Asselt, "A framework for risk governance revisited" in Renn and Walker, *Global Risk Governance*, supra, note 7; Roodenrijs et al, supra, note 11.

[13] Boholm, Corvellec and Karlsson, supra, note 8.

[14] ibid.

[15] J Lave and E Wenger, *Situated Learning. Legitimate Peripheral Participation* (Cambridge: Cambridge University Press 1991).

ambiguous: there is a lack of knowledge of possible effects, the available knowledge is still under discussion, and there are disputes about the interpretation of this (incomplete) knowledge by stakeholders involved.

1. Data collection

To stay as close as possible to risk governance practice, these case studies have been designed around interviews and document analysis, but also make use of interactive techniques. For data collection, a case study protocol was developed. The first step was a semi-structured interview on the basis of a questionnaire with open questions. Project leaders and their team members of the projects on shale gas, nanosilica, EMF and synthetic biology were interviewed. The questions were categorised by "dossier information" (budget, knowledge base, internal cooperation, mandate, etc), "governance information" (type of risk, risk perceptions, approach, role(s), etc) and "innovation information" (place in the R&D process, societal needs, intellectual property rights, valorisation, etc). After the interview, the interviewee was allowed to comment and correct the answers. In order to get a better view on day-to-day risk governance practices, the respondents were asked to present their cases for our research team and a selected RIVM audience. This provided the opportunity to improve and enrich the data. An advantage of this approach was that it resulted in reflection, intervision and capacity building on risk governance approaches within RIVM. A useful add-on to the already available information was the provision of a timeline of relevant events in each risk dossier. The data collection process took place from April to December 2014.

IV. Actual use of risk governance principles at the RIVM

In this section we describe our findings in applying risk governance principles on the basis of our research questions: (i) What is the effect of situated contexts on roles for the institute? (ii) What is the effect of limited and/or conflicting scientific knowledge in these situated contexts? We end with some general observations.

1. Effect of situated contexts on roles for the institute

RIVM has a tradition in research on EMF health risks, especially to support the development of the national policy for living near overhead power lines.[16] With the introduction of wireless communication technology, public and political interest in the health risks of the technology increased.[17] Despite several studies, scientific uncertainties remain.[18] Civil Society Organisations (CSOs) and interest groups contested

[16] H van Dijk et al, "The Role of Scientific Advisory Bodies in Precaution-Based Risk Governance Illustrated with the Issue of Uncertain Health Effects of Electromagnetic Fields" (2011) 14(4) Journal of Risk Research 451.

[17] J Bolte et al, *Vooronderzoek naar Bezorgdheid over Basisstations voor Mobiele Telefonie* [*People's Concern about Base Stations for Mobile Telecommunication: An exploratory study*], Report (Bilthoven: RIVM 2005); M Hermans, *Engaging with Risks. Citizens, Science and Policy in Mobile Phone Mast Siting Controversies,* PhD thesis (Maastricht: Maastricht University 2015).

[18] G Kelfkens and M Pruppers, *Verkenning Jaargemiddelde Belasting van Bovengrondse Hoogspanningslijnen in 2011 en 2013* [*Exploration Annual Average Load on Above-ground Power Lines in 2011 and 2013*], Report (Bilthoven: RIVM 2015); R Stam, M Pruppers and J Bolte, *Bronnen van Elektromagnetische Velden en Blootstelling van Burgers* [*Sources of Electromagnetic Fields and Exposure of Citizens*], Report (Bilthoven: RIVM 2014).

the scientific knowledge base and referred to uncertainties in their calls for precautionary measures. Due to the societal sensitivity of EMF, the Dutch government established in 2007 the independent Knowledge Platform on Electromagnetic Fields and Health, where stakeholders meet and discuss EMF-related health risks. RIVM is one of the members of this platform, others are electricity grid operators, telecommunication providers, CSOs and interest groups who plead for safer use of the technology. The stakeholder engagement exercise was mostly focused on the weight of scientific evidence for the harmfulness of EMF, which was contested. RIVM not only had to deal with disputed scientific evidence, but also had to juggle between its role as research institute that provided a number of the EMF studies commissioned by the government, and its role as an independent member of the Knowledge Platform. Moreover, this platform was never designed to influence policy making. The absence of this link with policy-making ultimately meant that the platform members that represented electro-hypersensitivity and concern about EMF became frustrated at the lack of impact of their contributions.

The shale gas case is another example to illustrate the struggle by the RIVM with situated context conditions. Shale gas was perceived as a controversial dossier because in the public and political debate opinions of proponents and opponents strengthened. Moreover, there were economic, environmental and public health issues. Shale gas was not part of the regular assignment of RIVM. This lack of funding, together with the political context, led to a deliberate wait-and-see attitude by the institute. In the meantime, the Dutch public debate intensified and polarised.[19] This case shows that despite RIVM's public responsibility, situated context variables caused the institute in the beginning to play a limited role in contributing to the scientific knowledge base and to the societal debate on shale gas.

2. Effect of limited and/or conflicting scientific knowledge in these situated contexts

RIVM, in cooperation with other Dutch research institutes, conducted commissioned research by the Dutch government on specific nanomaterials – nanosilica – in food products. A first study[20] concluded that nanosilica is present in certain food products, but that the risks for humans are unknown because of lack of data. The communication of this study triggered media attention and parliamentary questions. This led to follow-up research,[21] which again concluded that, despite more data being available, the risks of nanosilica in foodstuffs cannot be excluded.[22] The outcome of the risk assessment, ie that "there are still a lot of unknowns", was a difficult message to communicate, not only to the responsible ministries, but also to other stakeholders and the public. This in turn led to hesitations about how, when and to whom to communicate inconclusive

[19] M Blankesteijn, G Munnichs and L van Drooge, *Contested Science. Public Controversies about Science and Policy*, Report (The Hague: Rathenau Instituut 2014).

[20] S Dekkers et al, "Presence and Risks of Nanosilica in Food Products" (2011) 5(3) Nanotoxicology 393.

[21] S Dekkers et al, "Knowledge Gaps in Risk Assessment of Nanosilica in Food: Evaluation of the Dissolution and Toxicity of Different Forms of Silica" (2013) 7(4) Nanotoxicology 367.

[22] P van Kesteren et al, "Novel insights into the risk assessment of the nanomaterial synthetic amorphous silica, additive E551, in food" (2015) 9(4) Nanotoxicology 442.

evidence, whom to involve in the risk governance process, and what kind of role and position to take as an institute.

In the case of synthetic biology, the RIVM initially took a cautious approach because of uncertainty about risks from synthetic biology, and the political and societal sensitivity with GMOs. Because of its novelty, there is a relatively limited – but growing – amount of scientific research. RIVM itself did small-scale research on synthetic biology funded by its strategic research programme. RIVM was asked by one of its governmental commissioners to initiate and participate in a national information and reference point on synthetic biology for safety and governance-oriented questions. The institute gave substance to this request in becoming an expert knowledge centre by way of its involvement in national and international research and regulatory projects. Even though RIVM also envisioned becoming a trusted intermediary for stakeholders, it has been hesitant about opening up the broader societal discussion in this early stage of technology development. RIVM regularly issues a public newsletter on the topic, in which new developments are signalled.

3. Some general observations

The use of risk governance principles at the RIVM is mostly a bottom-up process that is pushed forward by committed RIVM researchers and staff members. They are experimenting with ways to apply risk governance principles, such as setting up focus groups, engaging new stakeholders, doing concern assessments, and broadening the risk-knowledge base. Such initiatives are encouraged, stimulated and partly funded by RIVM's strategic research programme; learning about best practices is only partly present. The work of RIVM is mostly demand-driven. It reacts to the knowledge needs of (most governmental) commissioners. Consequently, the institute must align the knowledge needs of its funding ministries with its own ideas on integrated risk assessment and risk governance.[23]

We noticed some unease in taking up the new role of *knowledge broker*, in bringing together existing knowledge, both risk facts and perceptions, and contributing to the risk discourse. And also in adopting a *signalling function*, in gathering knowledge and expertise about scientific research and regulation, advising a broader range of stakeholders, and identifying new possible risks for society. Often this means that RIVM researchers and staff members have to take account of several situated context variables at the same time, like policy mandates, budgets, stakeholder concerns, or political preferences in the set-up and aim of their projects. The case studies show also that commissioners are willing to give the RIVM a broader, supportive role in risk governance and policy-making processes, for example in the case of synthetic biology and EMF. As a result, RIVM needs to experiment and innovate to combine these new roles, which is not always an easy process.

[23] National Institute for Public Health and the Environment (RIVM), *Maatwerk in Risicobeoordeling* [*Customisation in Risk Assessment*], Report (Bilthoven: RIVM 2014).

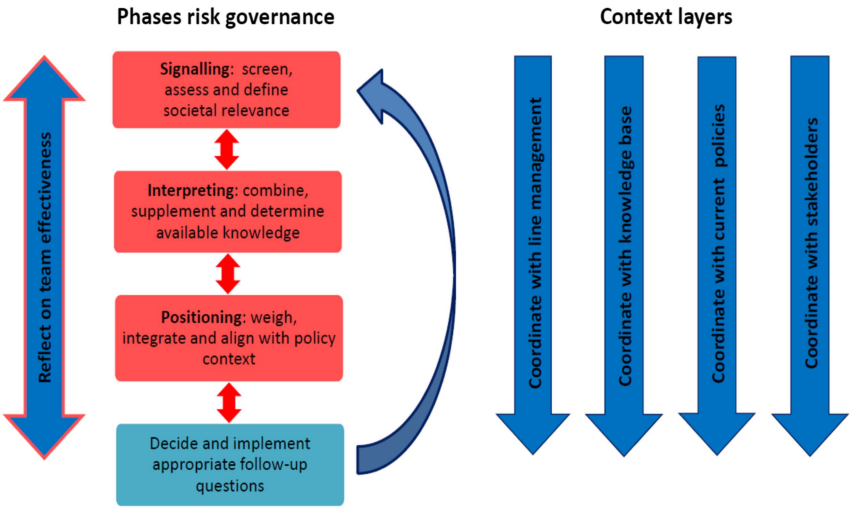

Figure 2. (Colour online) Working model for applying risk governance principles at the RIVM

V. Towards a working model

The use of risk governance principles in these four cases has shown that RIVM takes different roles, ranging from a more traditional advisory role to government, towards a knowledge broker and signalling role, and even a facilitating role in bringing together policy, industry, CSOs and other interest groups. From our observations we draft a working model that represents risk governance at the institute in a contextual frame, see right side of Figure 2, with four context layers. Risk governance at the RIVM is also a continuous process, see left side of Figure 2, with three main phases: *signalling*, *interpreting* and *positioning*. Phase 4 is not performed at RIVM. These phases can overlap or interact. They are similar to the understanding sphere: pre-assessment, appraisal, characterisation and evaluation in the IRGC Risk Governance Framework as presented in Figure 1.

The IRGC Framework already calls for the inclusion of the social, economic, political, and institutional context of risks.[24] Last year the IRGC issued a revised version of its Risk Governance Framework.[25] Feedback from practical applications of the IRGC Framework placed the focus on the sources of governance deficits and showed new approaches for more "inclusive risk assessment and management". Our analysis of risk governance at RIVM clearly showed again how crucial this dimension of contexts is, as Boholm and co-authors have already pointed out.[26] The internal layers include, among others, the coordination with the RIVM management, and the coordination with RIVM's knowledge-base. A challenge here is that RIVM researchers and staff members should – and do – hold different roles, depending on the type of risk at hand, the situated context,

[24] *An Introduction to the IRGC Risk Governance Framework*, supra, note 2; Renn, supra, note 10.

[25] International Risk Governance Council, *Introduction to the IRGC Risk Governance Framework*, revised version (Lausanne: EPFL International Risk Governance Center 2017).

[26] Boholm, Corvellec and Karlsson, supra, note 8.

but also on the type of knowledge and values that these risk practitioners have themselves.[27] The external layers include, among others, the coordination with actual policies, and the coordination with stakeholders and wider interest groups. A challenge here is to find ways to accommodate and align both the needs of commissioning policy-makers, and the appliance of risk governance principles.[28] The four context layers each in their own way shape the *situated context* for which an appropriate expert role and governance approach in a specific risk dossier has to be chosen.

VI. Concluding remarks

We observed and identified a number of important characteristics in the use of risk governance principles at RIVM. Firstly, applying these principles is primarily an experimental bottom-up process, initiated by committed RIVM researchers and staff members. Secondly, both knowledge production and roles for the institute are strongly dependent from variables in the situated context.

RIVM's efforts to use risk governance principles, in addition to the regular risk research and assessment approaches that have a longer history, have given a stimulus for the development of specific guidance in dealing with complex, uncertain and ambiguous risks. This lack of specific guidance can be viewed as problematic, but it also created a situation in which RIVM's risk researchers and staff members could experiment with ways to translate risk governance principles in their day-to-day practice. The opportunities for learning were significant, and we encouraged these learning processes by organising workshops and discussion rounds in which practitioners discussed their experiences with their peers at the institute. In this way the governance of risks becomes embedded in all kinds of organisational activities and gives rise to the implementation of new routines in risk research and assessment. We believe that it is crucial that RIVM further capitalises on these experiences in order to build capacity in a more inclusive and integrative risk governance. It also needs to look beyond its own borders and initiate learning processes with other institutes for risk research and assessment, with traditional and new stakeholders, and with the policy-makers that commission the institute.

In a concluding meeting with RIVM management, it was noted that new guidance would be welcomed by the management to help and guide project leaders and their teams to act more proactively towards commissioners and stakeholders, and to be aware of possibilities and limitations of RIVM roles within specific situated contexts. By bringing together our findings, we drafted a working model that provides initial guidance for risk governance approaches at the institute. Recently, RIVM has started a Community of Practice for its risk practitioners, also accessible to policy-makers and risk governance scholars, applying risk governance principles in different situated contexts. With the institution of this Community of Practice, our research findings will be continued and supplemented in a tangible way within the RIVM.

[27] P Spruijt et al, "Roles of scientists as policy advisers on complex issues: A literature review" (2014) 40 Environmental Science and Policy 16.

[28] National Institute for Public Health and the Environment, supra, note 23.