

Communicating and Comprehending Chemical Hazards and Risks:

Challenges and Opportunities in Low- and Middle-Income Countries

Factsheet



Elements of Chemicals & Waste Control System



Legal Framework



Sustainable Financing



Data & Information



Hazard & Risk Assessment



Risk Reduction



Enforcement & Compliance



Risk Communication

Adapted from an illustration by Maja Modén

Executive summary

Communicating health and environmental hazards and risks associated with chemicals is crucial in achieving the sound management of chemicals and waste (SMCW), protecting human health and the environment, and promoting risk prevention and reduction. A common statement is “we need to improve awareness-raising” to prevent negative health and environmental impacts from chemical exposures. However, regular and consistent chemical risk communication is rarely planned for or sustainably financed. Government agencies in low- and middle-income countries (LMICs) face several challenges in chemical risk communication. These include the absence of dedicated financial resources, a lack of capacity and skills, and the staff needed for risk communication, as well as difficulty closing the knowledge gap between experts and the public. This factsheet guides regulators and decision-makers in LMICs on implementing and financing various communication strategies. The focus is on communication that prevents emergencies, manages crises, and reduces accidents and poisonings that result in death or chronic health effects, while also promoting transparency and regular communication with at-risk populations.



What is hazard versus risk communication?

To **communicate a risk**, there must be a hazard, a potential threat to health and the environment. Risk is the function of hazard and exposure— **$R = f(H \times E)$** . **Figure 1** illustrates the difference between a hazard and a risk. This factsheet focuses on chemical risks and hazards.

Therefore, **hazard communication** is linked to a chemical's inherent toxicity. Once the hazard has been classified, different communication vehicles are used, predominantly on the chemical label (e.g., hazard/precautionary statements, signal words, pictograms), to convey information about the hazard to the regulator or end-user. The World Health Organization (WHO) classifies the acute toxicity of pesticides in the WHO Recommended Classification of Pesticides by Hazard and guidelines to classification, 2019 (<https://www.who.int/publications/i/item/9789240005662>).

Figure 1: Difference Between Hazard and Risk

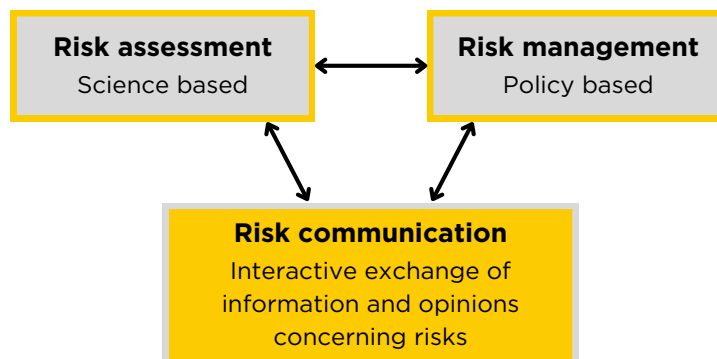


Source: UCT, Division of Environmental Health, Factsheet 2022 <https://bit.ly/3VksuXG>

Many countries classify a chemical's acute and chronic toxicity under the Globally Harmonized System of the Classification and Labelling of Chemicals (GHS; <https://unece.org/about-ghs>). Countries are encouraged to move from using the WHO classification system for pesticides to the GHS for global consistency and to include chronic toxicity.

Chemical **risk communication (RC)** is an interactive and real-time exchange of information and opinions about a chemical/s hazard throughout the risk analysis process (see **Figure 2**). Traditionally, RC was about disseminating information from scientists/experts to the public/layperson. However, there has been a shift away from this top-down approach to communication toward a more **participatory approach**. This involves understanding **risk perceptions** of exposed populations. Risk perceptions are people's beliefs, attitudes and judgements about a hazard's potential risk and severity.

Figure 2: Risk Communication as an integral component of risk analysis



Source: Adapted from WHO, 2021
https://www.researchgate.net/figure/Risk-analysis-framework-of-the-World-Health-Organization_fig5_280310349

The purpose (*why are you communicating the risk?*) of RC can vary depending on the goal and objectives (*what do you hope to gain by it?*). Before developing an RC strategy, it is key to identify the **goal** (see **Box 1**) and **target audience/s** (see **Box 2**). Factors that influence the purpose of the strategy include the funds available, legislation impacting the RC process, organisational mandates and policies, the target audience's needs and requirements, and the chemical risk itself (i.e., *what are the risks and for whom*).

Box 1: Purpose and Objectives of RC

Goals of chemical RC can include:

- **Promote an understanding of risks**, risk assessments, threats, and hazards.
- **Provide skills** on how to prevent chemical exposures, emphasising that personal protective equipment is often the least effective approach.
- **Provide reassurance**, taking into account the dominant risk perceptions of the public or target audience.
- **Encourage** people to adopt risk-reduction behaviours and reduce or eliminate the risk to their lives.
- **Promote credibility** in institutions that deal with risks.
- **Involve the public in risk management decision-making, planning, and enable a two-way dialogue** and understanding between stakeholders.

Source: Adapted from WHO, 2021

Chemical RC should be integral to chemical risk management strategies, legislation and chemical registration. That is, it should feature throughout a **chemical's life cycle**. Policymakers and regulators, for example, should require the chemical industry to submit RC plans when submitting a registration application or when hazardous chemicals are placed on the market. These should include how risks will be communicated to low-literate populations, how the public can understand the label elements, how to prevent exposures during phase-out periods and disposal.



Target audiences

Determining who will be the target of your RC plan or strategy is vital. You may have the same message, but if there are different target audiences, your strategies will vary (see **Box 2**).

Box 2: Example of Communication Methods for Decision-Makers vs Public/End-users



Decision-Makers

- Policy briefs (researchers, NGOs)
- Risk assessment data (industry, researchers)
- Journal articles (researchers)
- Media (researchers, NGOs)
- Web-based (researchers, industry, government)
- Forums to discuss findings (conferences, meetings)



Public/End-Users

- Print formats and media posters, pamphlets, factsheets, videos, radio programmes, TV (researchers, government, NGOs)
- Pesticide labels (government and industry)
- Face-to-face: e.g. training, education programme, explaining findings (researchers, clinicians)
- Interactive communication platforms: e.g., WhatsApp, social media (researchers, government, NGOs)

Key: () = Responsible communicator

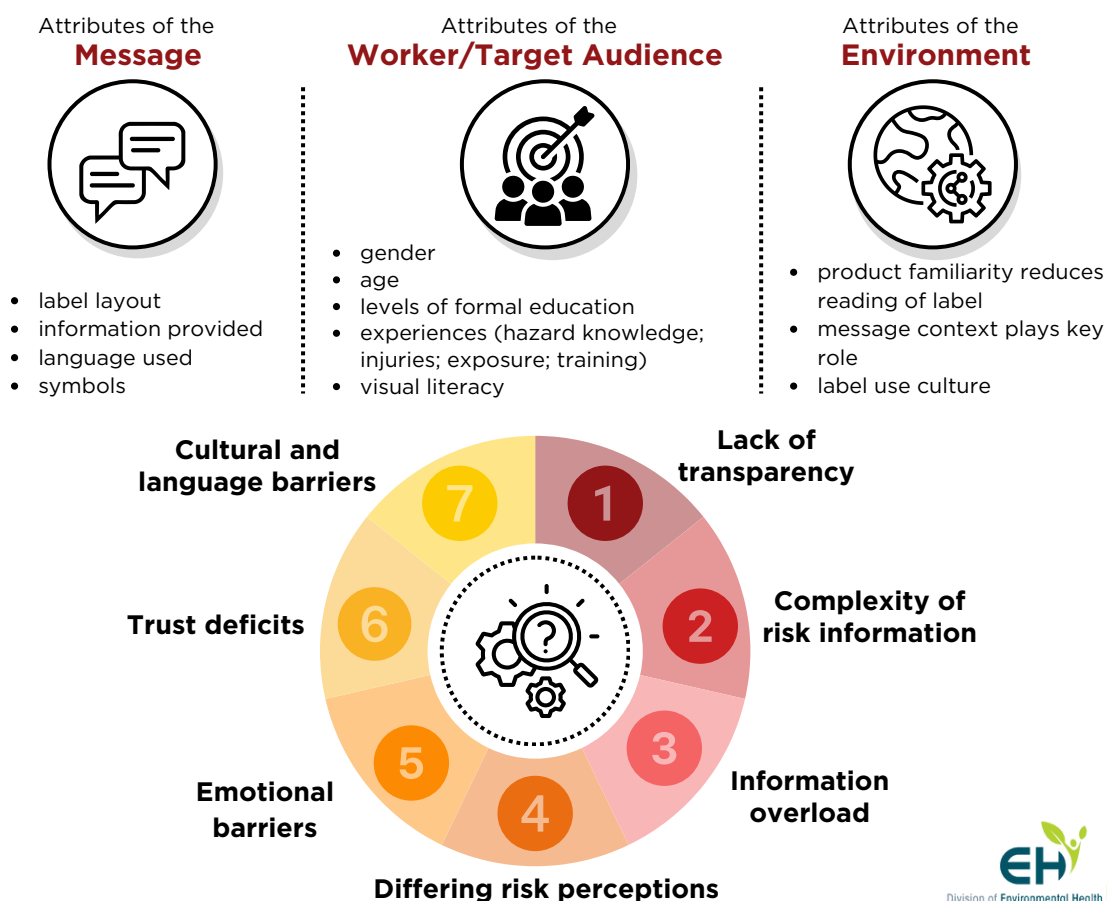
Source: Adapted from Rother 2014



Chemical risk communication barriers, constraints and recommendations

For RC to be an effective **two-way communication process**, it must be accepted by the public/target audience. This requires risk communicators to identify and then adequately address the various attributes and barriers of RC plans and strategies (see **Figure 3**).

Figure 3: Barriers to Comprehension of Risk Communication Tools






Source: Adapted from Risk Communication Faster Capital
<https://fastercapital.com/startup-topic/Risk-Communication.html>

Table 1 highlights some key elements that have impacted the RC process in LMICs, along with recommendations for addressing them.

Table 1: Identifying and Addressing Risk Communication Constraints

Key Area	Government Constraints	Recommendations
Public Trust	<ul style="list-style-type: none"> • Rely on the chemical industry to do RC • Do not explain the risk and how to prevent it adequately 	<ul style="list-style-type: none"> ✓ Avoid a top-down approach ✓ Assess the target audience's risk perceptions and address these
Community Engagement	<ul style="list-style-type: none"> • Lack of effort to include communities in decision-making and RC planning • Once-off attempt that covers limited populations 	<ul style="list-style-type: none"> ✓ Work with institutions/faith-based organisations respected in communities ✓ Work with environmental health practitioners ✓ Run public forums
Uncertainty	<ul style="list-style-type: none"> • Not sharing information that a chemical may cause an adverse effect • Results in harmful exposures 	<ul style="list-style-type: none"> ✓ Communicate complexity and uncertainty in a way the target audience can understand

Funding	<ul style="list-style-type: none"> Not prioritising chemical RC (i.e., awareness raising), so funds are not available 	 Effective RC is costly and must be budgeted for annually
Access to RC information	<ul style="list-style-type: none"> Information is not provided to end-users Regulators are uninformed about up-to-date risk information 	 Regularly provide information and add to the school curriculum  Engage with/have a platform for scientists/researchers to share published research and explain the implications








Label as an Risk Communication Tool

The **pesticide and chemical label** is seen as the main risk communication vehicle. However, most end-users are unable to use it as intended. The public cannot understand the label's components, especially pictograms, colour codes and signal words. Governments should use popular media, as well as the school curriculum, to help people understand and apply this information.



Risk Communication Plans and Strategies

There are **five key components** to developing and implementing an effective risk communication plan or strategy. These include:

-  **Understanding how communities perceive the chemical risk** - chemical risks are understood differently;
-  **Building trust and credibility** - trust is key for effective risk communication, built through transparency and continuing engagement;
-  **Releasing information effectively** - do not delay in providing information; as soon as exposures are going to happen, information should be released;
-  **Engaging/interacting with target audiences** before developing an RC strategy - involving stakeholders early (e.g. use public forums); and
-  **Explain risks and management strategies** - although this can be complicated, explaining risks and prevention strategies in a language and means understood by the target audience is key.

Source: Adapted from ITRC



The Right-to-Comprehend Risks

Access to information is not enough to promote protective behaviour changes. The *right-to-know*, typically provided through Safety Data Sheets (SDS) or chemical labels, is not sufficient for effective chemical RC. Instead, mechanisms are needed to aid and promote understanding of hazard and risk information - that is, *the right-to-comprehend*. However, few legislated measures exist to uphold this right (e.g., training, label cards) through culturally relevant means. Concepts of "misuse" and "ignorance" are used to explain why pesticide poisoning occurs, disregarding workers' and the public's *right-to-comprehend*.



Financing Risk Communication Activities

RC campaigns and material development require substantial funding, content experts and communication specialists. Communicating chemical risks and prevention measures must be prioritised to ensure adequate funding and regular occurrence. Funding could come from earmarked national budgets or fees and taxes on the chemical industry.



Recommendations

As the body of knowledge in the field of RC continues to grow, so do the risks to health and the channels through which risks are communicated, which are also evolving. It is, therefore, important for a risk communicator to

- Align the principles of this field when developing an RC tool or campaign (see **Figure 4**)
- Keep up to date with the growing body of knowledge in this field and
- Adapt new technologies, research findings and communication tools to its target audience

RC comes in many forms and requires different elements and tactics to deliver the message. **Figure 4** highlights key practices for achieving effective risk communication.

Figure 4: Good Risk Communication practices



Source: Adapted from WHO, 2021



Checklist

- ☒ Establish and write down the purpose and objectives of the RC plan or strategy.
- ☒ Identify the target audience.
- ☒ Engage with the target audience to develop the most appropriate messages and strategies.
- ☒ Ensure adequate human and financial resources are available (use non-industry trainers).
- ☒ Run the RC strategies regularly to reach a broader part of the target audience.
- ☒ Update the RC strategy at least annually to keep up with new findings.



Resources:

ITRC Risk Communication Toolkit Website. Interstate-Technology-Regulatory-Council. Washington, DC. <http://rct-1.itrcweb.org>.


Lundgren, R. E., & MacMakin, A. H. (2018). Risk communication - a handbook for communicating environmental safety and health risks, sixth edition. New Jersey, United States of America: John Wiley & Sons, Inc., Hoboken. <https://ieeexplore.ieee.org/book/8434159>

Rother Hanna-Andrea (2018) Pesticide labels: Protecting liability or health? – Unpacking “misuse” of pesticides. Current opinion in Environmental Science & Health, 4:10-15.

Rother H-A (2014) Communicating pesticide neurotoxicity research findings and risks to decision-makers and the public. NeuroToxicology 45: 327- 337. <http://dx.doi.org/10.1016/j.neuro.2014.03.001>

WHO. (2021). Effective Risk Communication for Environment and Health: A strategic report on recent trends, Copenhagen: WHO Regional Office for Europe.
<https://iris.who.int/handle/10665/349338?&locale-attribute=de>

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