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IFRC Roadmap

TECHNOLOGICAL & BIOLOGICAL HAZARD PREPAREDNESS

Towards 2030:
'An enhanced multi-hazard approach'

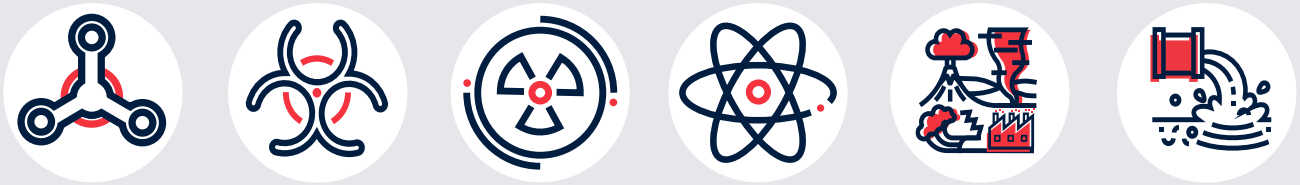
Draft for consultation*
October 2020

IFRC

INTERNAL USE

**** This draft Roadmap is intended for internal use within the IFRC. It is accompanied by a Background Information document which provides supplementary details on the issues.***

TECHNOLOGICAL AND BIOLOGICAL (CBRN) HAZARD PREPAREDNESS PROGRAMME



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Key Messages

I. The risk of technological and biological (CBRN) disasters is increasing due to greater population density, urbanization and industrialization, ageing infrastructure, and the wider use of technological and other hazardous materials.

II. The frequency of such events, their range, and their impact on both human life and on the natural environment is testing the IFRC's capacity to respond.

III. The IFRC recognizes the importance of including technological and biological (CBRN) hazards within its multi-hazard approach to disaster risk management.

IV. The current programme, established in 2013, is limited in scope. Crucial gaps include: a lack of institutional buy-in; insufficient mainstreaming in policies, programmes and operations; disconnect between capacities and legal responsibility; and inadequate resources for ensuring proper duty of care.

V. IFRC aims to have the necessary knowledge and expertise to respond to any kind of emergency - no matter how new, large, unexpected, or technologically complicated. For this reason, technological and biological (CBRN) hazards must be fully incorporated into IFRC's multi-hazard approach to disasters, at all levels of the organization, and across all sectors.

VI. We recommend developing a cost-effective and resource-light five-year plan of action, which focuses on:
   I. Increasing knowledge-sharing within the IFRC.
   II. Developing mechanisms to enhance coordination and foster greater expertise.
   III. Integrating technological and biological (CBRN) hazard response into policies, programmes and day-to-day operations within National Societies and the IFRC Secretariat.

"The changes of the 21st century are complex and inter-related. (...) Strategy 2030 (...) aims to ensure that the Red Cross and Red Crescent remains a dynamic global network of organisations that are fit for purpose and always there to accompany people and communities."

Strategy 2030 (p. 5), IFRC - 2018

I. Introduction

© Mauritius Oil Spill. Mauritius Red Cross, 2020

By their very nature, disasters caused by technological and biological (CBRN) [1] hazards differ in some key respects from the range of disasters to which the IFRC and National Societies are accustomed to responding. Bhopal, Fukushima, Beirut, to name but a few examples – each of these disasters is seared in our collective memory, because each was **unexpected, unprecedented and outside the scope of traditional RCRC response.** Crucially, each involved toxic or other substances which created an **additional level of danger**, potentially lethal, not only for the victims, but also for those responding.

Of course, most disasters are unexpected. We cannot predict exactly when or where they will strike, and with what intensity. We have, however, learned to prepare for those most likely to occur in our areas: we know that there will be hurricanes and typhoons each year in certain regions; we know and understand the likelihood of floods or drought; we better understand the risks of earthquakes, and have even developed early warning mechanisms for potential tsunamis. When such disasters occur, we basically know what to expect in terms of impact, and what is expected of us, in terms of response.

1. *Throughout the document and unless otherwise stated, this term is understood to include checmical, , biological, radiological and nuclear hazards, generally referred to as CBRN.*

"I felt a lot of pressure and worry about not knowing enough about radiation and radiation exposure. We had had no training in how to operate after a nuclear accident and it was frightening to deal with that kind of invisible threat."

Shoichi Kishinami, Director of Operations, Japanese Red Cross Society, Fukushima Chapter, who had been with JRCS for 38 years.

Source: RCRC Magazine, Issue 1, 04/2016

This is not generally the case with technological and biological hazards. Although a number of hazards and associated risks can be identified ahead of time, as a Movement we have yet to do this in a consistent and systematic manner. As a result, most such disasters occur 'out of the blue', with often catastrophic consequences. Moreover, whether large-scale or small, they are usually unlike anything we have seen or dealt with before – events for which we, and other disaster response agencies, have little previous experience to fall back on. Such disasters **stretch our capacities and challenge our capabilities**. Worse, they usually carry **additional danger**, also unprecedented and generally life-threatening (e.g.: toxic gases, nuclear fall-out, asbestos, etc.). This adds another challenge in responding to what is already a complex, sometimes compound, disaster.

Unfortunately, we can expect technological and biological disasters to become more frequent. Increased population density, greater urbanization and industrialization, ageing infrastructure, wider use of hazardous materials (often poorly monitored) - all mean that the risk of such disasters is increasing.

This 'Roadmap on Technological and Biological (CBRN) Hazards' addresses these issues and how we, as an organization, can adapt. Based on both external and internal policies, such as the UN's Sendai Framework and IFRC's Strategy 2030 amongst others [2], its **aim is to agree a way forward, leading to a five-year plan of action**, with a view to fully incorporating technological and biological disaster risk management into the IFRC's multi-hazard approach - in all areas (i.e. policies, programmes and operations) throughout the whole disaster risk management cycle, and at all levels, involving both the IFRC Secretariat and National Societies.

2. *Sendai Framework for Disaster Risk Reduction 2015-2030. Other relevant policies include the UN's Sustainable Development Goals and the IFRC's Recovery Framework (2020) and its Disaster Risk Management Policy, as well as a number of programmes – newly-developed or currently under consideration - such as the Green Response, the Movement's 'Ambitions to address the Climate Crisis', the National Society Development Plan, and the draft IFRC Strategic Plan: An Agenda for Renewal.*

II. Background on Red Cross Red Crescent Response to Technological & Biological (CBRN) Hazards

© Bhopal Gas Tragedy. Indian Red Cross, 1984

1. Overview

Emergencies linked to technological and biological hazards have been **part of the humanitarian remit** for a long time, and the Red Cross Red Crescent has been responding to such disasters since its inception - as part of its traditional disaster response mandate, as well as in its role as an auxiliary to national authorities. What has been changing, however, is the frequency with which such events are occurring, their range, and their impact on both human life and on the natural environment – testing the IFRC's capacity to respond.

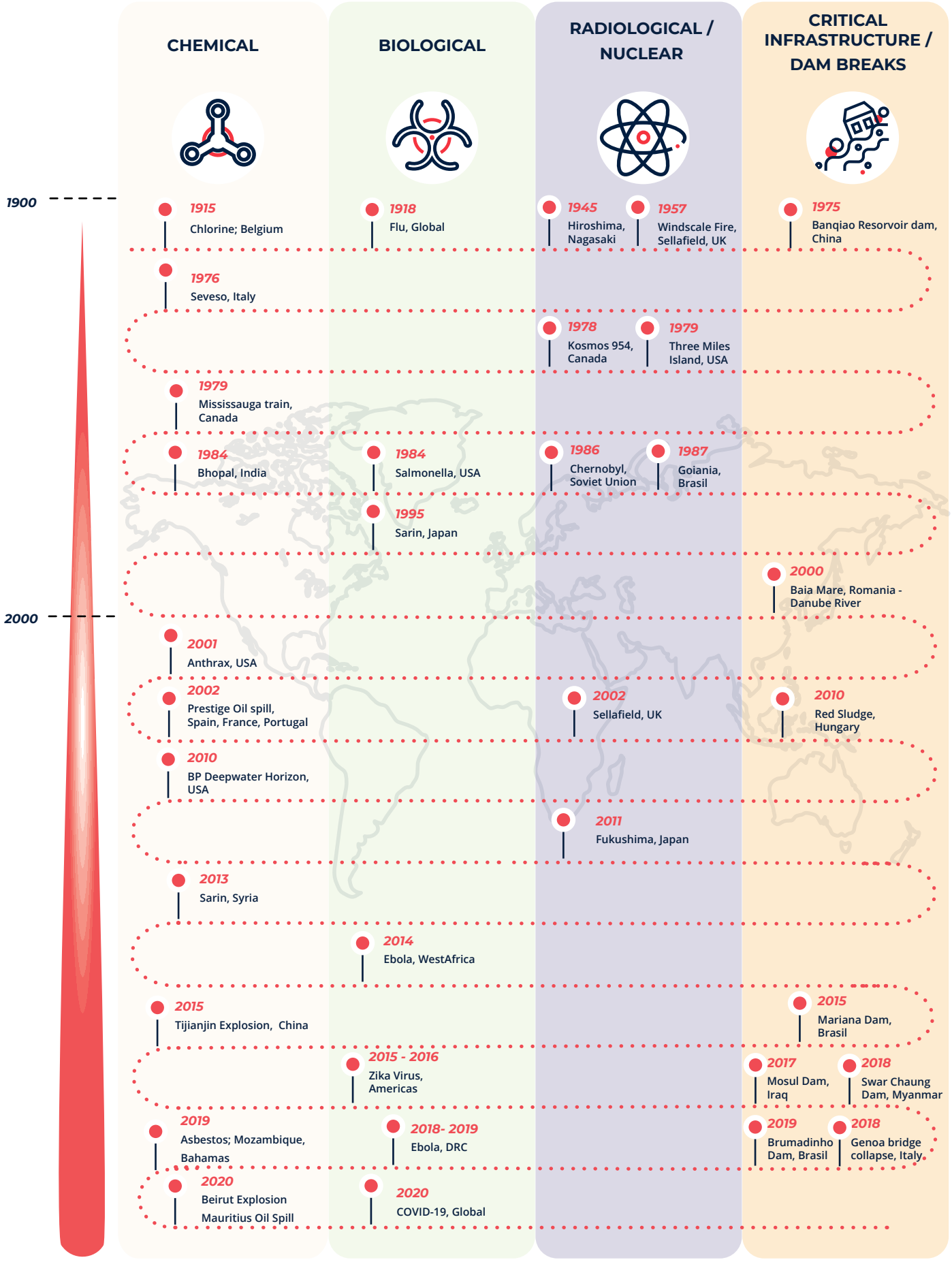
With the advent of the nuclear age, as well as greater use of a wide range of chemicals in both industry and agriculture, emergencies involving ionizing radiation and hazardous chemicals have occurred with increasing frequency since the middle of the last century: the chemical release in Bhopal, India (1984) where over 500,000 people were exposed to hazardous substances; the nuclear power plant accidents at Three Mile Island, USA (1979), Chernobyl, former USSR (1986), and Fukushima, Japan (2011), which had long-lasting

consequences not only for those living in the vicinity, but also for the environment and livelihoods of neighbouring regions and countries; and most recently, the catastrophic chemical explosion in the port of Beirut, Lebanon (2020). In addition, smaller-scale disasters are occurring more regularly, involving toxic sludge releases, asbestos poisoning, oil spills, infrastructure collapse, and similar man-made hazards.

National Societies, and the Movement as a whole, have been called upon to respond to such disasters as a matter of course, and have done so to the best of their capabilities, using the knowledge and equipment available to them as part of their normal response mechanisms. However, there has been a growing recognition in recent years of the need to focus more specifically on the particular risks and needs associated with technological and biological hazards (including CBRN hazards), with a view to better integrating this area into overall RCRC disaster risk management, and enhancing our prevention, preparedness, response and recovery strategies across sectors.

© Spanish Flu. American Red Cross, 1915

Historical Snapshot - Technological/CBRN disasters involving RCRC



2. Movement Response

Since 1986, technological hazards have regularly been addressed by the Movement's statutory meetings. Main Red Cross Red Crescent commitments in relation to technological hazards include:

- In **1986**, adoption of Resolution XXI on disaster relief in case of technical and other disasters by the 25th International Conference of the Red Cross;

- In **1995**, adoption of Resolution 4 during the 26th International Conference, on "Principles and Actions in International **Humanitarian Assistance and Protection"**, with an extensive Annex describing the "Role of the Red Cross and Red Crescent Societies in response to technological disasters";

- In **2011**, agreement by the General Assembly on **Joint Decision 11/ 46** - "Preparedness to respond to the **Humanitarian consequences to nuclear accidents".**

- These decisions have also built on commitments arising from the *Seville Agreement*, under which the IFRC has a responsibility to assume leadership or coordination roles in situations of "...natural or **man-made / technological disasters** and other emergency and disaster situations in peacetime which require resources exceeding those of the Operating National Society".

Following on these resolutions, a decision was taken to 'strengthen our efforts and expertise regarding technological hazards' during an IFRC Partnership Meeting held in Tokyo, Japan (2012). This led to the establishment of the Global Technological & Biological Hazards / CBRN Preparedness Programme in 2013, with support from the Japanese Red Cross Society (JRCS) and several other National Societies. This has enabled some progress, but the topic has yet to be fully integrated into IFRC's strategic and operational planning.

Looking ahead, there is a clear need – and mandate - to better address the IFRC's disaster risk management capacities in relation to technological and biological (CBRN) hazards. Indeed, as part of its recently adopted Strategy 2030, the IFRC states:

"The ability of populations to cope will be affected by disasters that are predicted to become more common, more costly, more complex, and more concentrated. (...) Beyond traditional drivers of disaster and crises, **our increasing dependence on technology brings new risks and vulnerabilities,** including potentially unforeseen cyber and digital threats. (...) In addition to all the above, increasing population density in urban and particularly informal settings is likely to result in significant deprivation and more hazard exposure." (Global Challenge 2, p.13-14).

"Such disasters pose particular challenges and risks for first responders, while preparing for them requires a significant investment of time and resources due to the specialized knowledge needed for an effective and safe response. Such investment is essential (…). With ageing infrastructure in many parts of the world, technological hazards unfortunately are expected to increase. (…) Urbanization and industrialization compound the vulnerabilities to such disasters while climate-related events can bring additional threats to technological infrastructure".

Simon Eccleshall, former IFRC Head of Disaster and Crisis Management (referring to the nuclear disaster at Fukushima and the subsequent 2011 General Assembly Resolution)

Source: RCRC Magazine, Issue 1, 04/2016

Strategy 2030 goes on to say that: "The greatest vulnerabilities and threats to health resilience over the next decade are going to be as a result of multiplier effects from population movements, **epidemics**, conflicts, non-communicable diseases, **natural and technological disasters**, and climate change." (Global Challenge 3, p. 14).

Furthermore, the recently adopted IFRC Disaster Risk Management Policy (2019) recognizes the variety of contexts within which disasters occur and specifies the need to support individuals' and communities' own capacity to reduce risks, respond to disasters and recover. Moreover, it states: "Our work in recovery also presents an opportunity to address future risks and vulnerabilities, such as promoting improved preparedness, climate change adaptation, safer infrastructure, strengthened societal systems, revitalized livelihoods, and protection of the environment" (p. 1).

Overall, the IFRC has recognized that the increasingly complex and inter-related changes brought by the 21st century underline the importance of a well-integrated and properly resourced multi-hazard approach to disaster risk reduction, response, and recovery – and one which encompasses technological and biological (CBRN) hazards as a matter of course [3].

3. *This is consistent with the IFRC Recovery Framework (2019) which states: "Risk reduction, climate action, and nature-based solutions are integrated into recovery programmes, to contribute to community resilience in an environmentally sustainable way. This aligns with both the Green Response and Build Back Better concepts" (p. 16) – although a clearer reference to technological and biological (CBRN) hazards would be useful.*

III. IFRC action on Technological and Biological (CBRN) Hazards - Why Now?

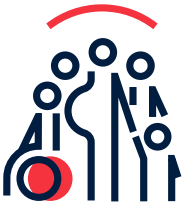
© Chernobyl Nuclear accident. Soviet Union, 1986

1. Relevant in the current environment

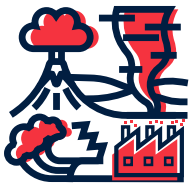
We are not in the realm of science fiction or doomsday scenarios when we speak of technological and biological disasters. At this very moment, people everywhere are walking around in facemasks, and much of the world has been shut down due to the COVID-19 pandemic; the city of Beirut has been shattered by a wholly preventable explosion; and yet another coastline, in Mauritius this time, has been destroyed by yet another oil spill, affecting human and natural habitats.

Looking ahead, we can safely predict that technological and biological disasters will:

Increase in scope and frequency.
We have already had several wake-up calls, alerting us to the particular challenges posed by disasters which are either directly caused by, or indirectly linked to, technological and biological (CBRN) hazards. The explosion in Beirut and the COVID-19 pandemic are but the most recent events in an increasingly long and varied list. Further technological advances, coupled with the unremitting development of critical infrastructure aimed at increasing productivity and enhancing access to resources, will inevitably add to this tragic list.



Affect more people.
Although we are, as societies, increasingly reliant on technology and its hazardous by-products, we are not necessarily getting better at managing the related risks. In many countries, inadequate safety and security measures, coupled with a lack of understanding of the full consequences of technological / CBRN accidents means that more people are being put at risk. In addition, growing populations and increased urbanization (in particular the establishment of 'informal settlements') are adding to the potential for disasters to impact the lives and livelihoods of greater numbers of people overall – and particularly the most vulnerable, who tend to live and work in areas highly susceptible to technological and biological (CBRN) hazards.



Compound the effects of nature-based disasters.
It is a proven fact that compound (natural and technological) emergencies are on the rise [4]. There is even a term to describe such events: 'NATECH'. The increasing frequency of compound emergencies is no doubt linked to our increasing reliance on technology, as already stated. But the impact of climate change adds an additional layer of risk. As nature-based disasters increase in frequency and severity, so too does the risk that they will provoke a series of 'cascading' disasters, as happened in Fukushima in the aftermath of the earthquake and tsunami of 2011. Moreover, we have come to recognize "the importance of extending the fundamental humanitarian principle of 'do no harm' to the environment and ecosystems which the people we seek to assist are reliant on, recognizing that sustainability is generated through environmentally sound actions" (Green Response Snapshot, 2018).

The conclusion from the Chernobyl review [5] in 2016 neatly sums up IFRC's responsibility: "With continued technological developments and the involvement of many states in nuclear and radiological activities, as well as an inevitable risk of technological accidents and disasters (...), there is a pressing need to review and strengthen the International Red Cross and Red Crescent Movement's preparedness and response to nuclear and radiological accidents and other technological disasters."

"Climate change is (...): Increasing the frequency and severity of several hazards. Increasing people's vulnerability and exposure to regularly experienced shocks and stresses. Increasing uncertainty and unexpected events (...)".

IFRC - Plan of Action, Climate Change 2013-2016 (p. 18)

4. *Sendai DRR Framework, records from several global disaster loss databases (Centre for Research on the Epidemiology of Disasters: EM-DAT, MunichRe: NatCatSERVICE, and SwissRe: Sigma).*
5. *Review: Chernobyl Humanitarian Assistance and Rehabilitation Programme (CHARP) 1990-2012, IFRC (2016).*

2. A clear opportunity for IFRC

It is increasingly clear that technological and biological (CBRN) emergencies are an integral part of the overall disaster response landscape. The IFRC must therefore be better prepared for such emergencies, as a **fully integrated part of its multi-hazard approach** to disaster risk management.

This is expected of us by others:

- The **general public.** Instant access to information has increased the general public's high expectations of the Red Cross Red Crescent in disasters. National Societies' ability to fulfil their humanitarian mandate and the effectiveness of their response to a range of emergencies - including those due to technological and biological (CBRN) hazards - will impact on their overall credibility (e.g. with the public and donors), as well as on that of the Movement as a whole.

- **National authorities.** Governments at all levels are also realizing that technological and biological (CBRN) hazards require attention and resources. Increasingly, they are turning to National Societies to agree on and/or clarify the NS's role as an auxiliary to public authorities and civil protection agencies in such emergencies.

- **International organizations.** In discussions with other CBRN actors and international organisations through the Inter Agency Committee Framework, it is apparent that the RCRC is perceived as being prepared for all hazards, with well-trained teams and equipment available to address the humanitarian consequences of any kind of hazard, at any time, and anywhere. We are commended for our global network with its strong resources and immediate availability. We are also seen as an organisation which has embraced a multi-hazard approach, and as one of the few humanitarian actors pro-actively dealing with emerging risks, including technological and biological (CBRN) hazards.

We need to be able to live up to these expectations, not only to safeguard our reputation, but also because it is our mandate.

We expect if of ourselves

Indeed, an internal survey undertaken in 2018 reveals that a number of National Societies have identified 'preparedness for multi-hazard events' as a priority. In this context, they have requested stronger coordination and collaboration from the IFRC Secretariat, as well as additional regional and global support, in order to provide **the 'added value' of the RCRC in the preparedness and response to technological & biological (CBRN) hazards.**

© Asbestos risk exposure after Lombok Earthquake, Indonesia 2018

Furthermore, discussions within the Movement underline the opportunities afforded by engaging in preparedness activities for these types of hazards, such as collaborating with new international and national partners (from response organisations, academia and the private sector), as well attracting new volunteers with specific technical and other relevant backgrounds.

Finally, Strategy 2030 and the IFRC Secretariat's Agenda for Renewal put forward a vision of a global network that brings people together for the good of humanity and is fit for this purpose. It clearly recognizes technological and biological hazards as integral to the global challenges that we face [6]. In particular, Strategy 2030 states:

- Global Challenge 2 (p.13-14): Evolving crises in disasters. (...) "Beyond traditional drivers of disaster and crises, **our increasing dependence on technology brings new risks and vulnerabilities.** (...). Increasing population density in urban and particularly informal settings is likely to result in significant deprivation and **more hazard exposure**".
- Global Challenge 3 (p.14): Growing gaps in health and well-being – "Greatest vulnerabilities and threats to health resilience over the next decade are going to be as a result of **multiplier effects** from population movement, **epidemics**, conflicts, non-communicable diseases, **natural and technological disasters** and climate change".

Therefore, the question facing us is not if, but how best to do this.

6. *Surprisingly, the subsequent draft Agenda for Renewal (2020) fails to address technological and biological (CBRN) hazards directly.*

IV. IFRC - Current State of Play

1. What has been achieved?

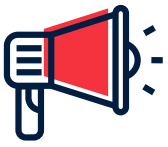
The establishment of a global IFRC programme on nuclear emergency preparedness in 2013 was driven by General Assembly Decision 11/46, following the 2011 nuclear accident in Fukushima. Its primary aim has been to capture existing expertise within the Movement and establish basic guidance for the IFRC Secretariat and National Societies on nuclear and radiological emergencies.

This was broadened into the Technological and Biological (CBRN) Hazards Preparedness Programme, coordinated by a Senior Officer acting as the programme's Global Focal Point within the IFRC's Disaster and Crises Department. The programme is supported by a Technical Working Group (TWG), made up of a network of National Society experts, who provide technical expertise with a view to:

a. Sharing experiences
b. Aligning operational approaches
c. Assisting in developing training sessions, workshops, and relevant tools.

In addition, the Japanese Red Cross Society (JRCS) has established the Nuclear Disaster Resource Centre (NDRC) as part of its emergency preparedness operations, providing access to a growing network of nuclear emergency medical advisors. The NDRC also operates a global Digital Archive / Knowledge Base to collect evidence and tools for nuclear emergency preparedness and response.

The IFRC's technological and biological (CBRN) programme has evolved since its inception, and currently focuses on the following areas:



Rasing awareness
Raising awareness through communications and mainstreaming in RCRC policies, programmes, and operations.

Operational capacity
Strengthening operational capacity and enhancing RCRC expertise, as part of a multi-hazard approach.

Specialized technical preparedness
Promoting specialized technical preparedness through advocacy, public awareness, and partnerships.

SPECIAL NOTE ON BIOLOGICAL HAZARDS

© COVID-19 Response Operations. Colombian Red Cross, 2020

The IFRC has been working for many years to help communities prepare for and respond to health emergencies and biological hazards – be it through specialized health programmes focusing on HIV or malaria, or through support to targeted vaccination campaigns (e.g. influenza, mumps, measles). IFRC preparedness and response programmes to most naturally-occurring biological hazards (such as local epidemics of ebola, Zika virus, SARS, and the current COVID-19 pandemic), are already fully-integrated into the Emergency Health Department at IFRC Secretariat level, and dealt with by National Societies as part of their established emergency health response activities [7].

A core group of National Societies is actively engaged in preparedness and response to technological and biological (CBRN) hazards – due to their previous experience of such disasters, potential risks which have been identified, or based on specific national expertise.

In general, NS awareness of and preparedness for technological and biological (CBRN) hazards has grown, primarily through knowledge-sharing, workshops, and training, as well as the work of IFRC's technological and biological (CBRN) hazards TWG. Furthermore, NSs from all regions are engaging (to varying degrees) with national authorities to better frame their role in preparedness and response to technological and biological emergencies within their respective national and regional contexts.

However, it is also apparent that more needs to be done - at both Secretariat and NS levels - and with greater consistency, if we are to meet our commitments as set out in Strategy 2030.

7. *Since 2017, funding from the U.S. Agency for International Development), has also enabled the IFRC's Community Epidemic and Pandemic Preparedness Program (CP3) to scale-up its activities. The programme strengthens the ability of communities, National Societies, and other partners in eight target countries to prevent, detect and respond to diseases and to play a significant role in preparing for future risks.*

2. What are the gaps?

While activities carried out by the programme to date have served to establish a baseline of knowledge and raise basic awareness of technological and biological (CBRN) hazard preparedness, a number of critical gaps remain to be filled. The Technical Working Group (TWG) has underlined the need for a more coherent, sustainable and integrated approach in order to build on existing capacities within the IFRC, and provide consistent, harmonized advice and assistance to NSs engaged (or becoming engaged) in this area.

The key gaps can be summarized as follows:

a. Buy-in

In many instances, both within the Secretariat and National Societies, IFRC's involvement in technological and CBRN emergencies is considered to be 'something we already do as part of our existing DRR activities' and therefore not requiring any special attention or action. If considered at all, it is more likely seen as 'yet another box to tick', and generally takes a back seat to more current and 'popular' topics, such as climate change and urbanization [8].

b. Mainstreaming

As a consequence of the lack of buy-in, technological and biological (CBRN) hazard preparedness and response is too often ignored by IFRC departments and NSs alike. This may sound like a contradiction: on the one hand, it is already part of what we do, so therefore we don't need to do anything more; on the other hand, it is perceived as being a highly-specialized area that will require a lot of extra resources and work if it is to be properly addressed. The truth is somewhere in between: this is not a new area, but one with additional elements that need to be addressed if we are to be effective - an opportunity to 'add-on', at relatively little cost in terms of time and budgets.

c. Capacity versus legal responsibility

In fact, this is not merely an opportunity, but a necessity. A mapping exercise carried out in 2015 with forty-one National Societies with regard to their legal role and level of preparedness in responding to technological / CBRN hazards concluded that a number do have a dedicated role, as established in their national emergency plans. However, only a few of them possess the necessary capacities, and there is a general lack of understanding of the specific risks involved.

8. *The programme's lengthy and complicated name may be a factor. This may seem like a frivolous observation, however it may be worth considering the use of a simpler term, such as 'technological and man-made hazards', in line with international terminology (Ref. Sendai Framework).*

© Red Sludge. Hungarian Red Cross, 2010

d. **Duty of care**

Finally, one key aspect of technological and biological (CBRN) hazards which does require special attention is that of our duty of care to staff and volunteers, given the toxic nature of such emergencies. There is a general lack of awareness and understanding of the specific risks (and the terminology) involved, and a lack of consistently available resources - both in terms of technical competencies and, crucially, personal protective equipment (PPE).

Considering all of the above, the most effective way of addressing technological and biological hazards is to integrate this topic into our existing policies, programmes and operations, exactly as we're doing for climate change, for example.

> *"The focus will be on reducing the current and future humanitarian impacts of climate and environmental crises (...). This means climate adaptation and mitigation are high on our collective agenda, integrating climate risk management across all programmes, operations and advocacy".*
>
> *IFRC Secretariat Strategic Plan: Agenda for Renewal – Draft June 2020*

V. Next steps

1. Overall aim

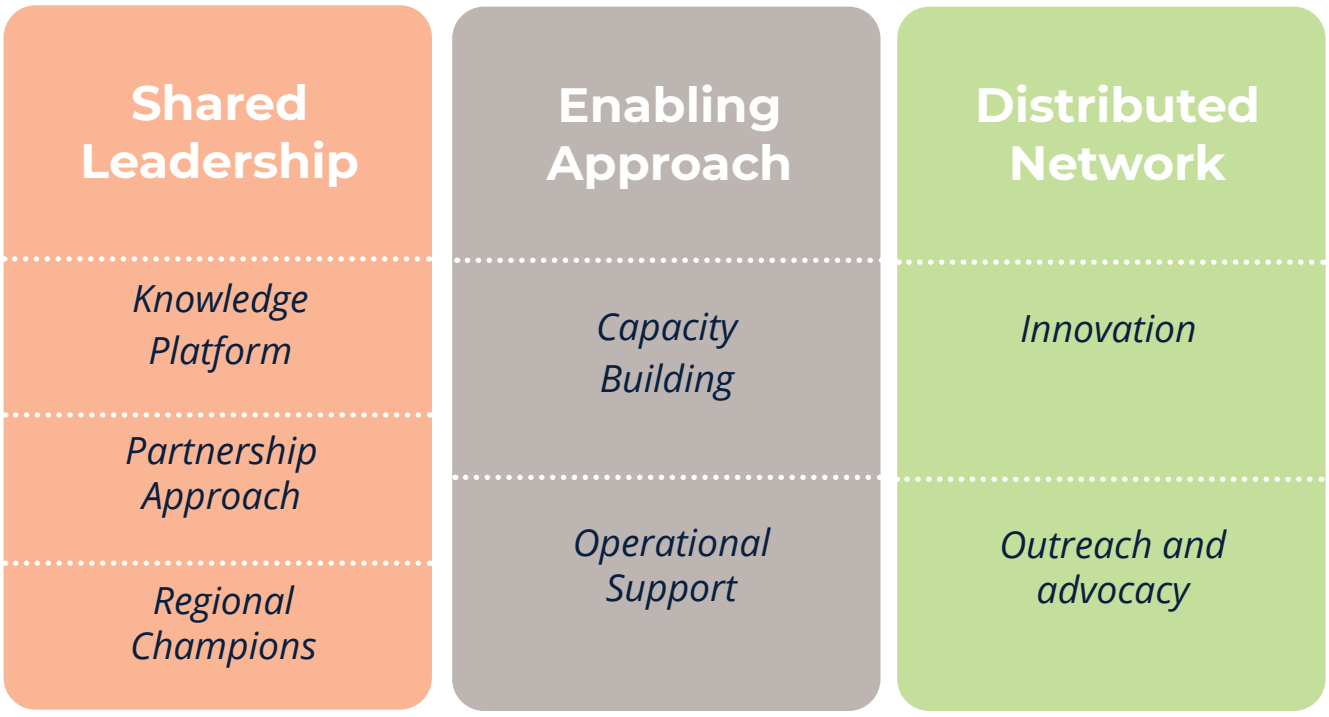
As an organization, we must ensure that we have the necessary knowledge and expertise to respond to any kind of emergency - no matter how new, large, unexpected, or technologically complicated. For this reason, technological and biological (CBRN) hazards must be fully incorporated into IFRC's multi-hazard approach to disaster risk reduction, response and recovery, at all levels and across sectors.

To achieve this, we recommend developing a five-year plan of action, which focuses on:

- Increasing knowledge-sharing within the IFRC;
- Developing mechanisms to enhance coordination and foster greater expertise;
- Integrating technological and biological (CBRN) hazard response into policies, programmes and day-to-day operations within NS and at IFRC Secretariat level.

The proposed Plan of Action on Technological & Biological (CBRN) Hazard preparedness will be linked to the sector-specific benchmarks already developed within our **Preparedness for an Effective Response (PER) approach** [9], but will also look at novel and cost-effective ways to better mainstream our activities through the whole disaster cycle.

2. Specific Recommendations



9. *More details about the benchmarks and related components can be found in the PER promotional pack.*

A. Shared Leadership

- **Knowledge Platform**

In order to build on existing resources and structures within the IFRC, a comprehensive technological and CBRN knowledge platform (potentially hosted and operated by one of the existing IFRC Reference Centres) would provide the RCRC network with guidance documents and tools, as well as other relevant material such as videos and training packages – including on-line. Existing digital archives (e.g. NDRC) could be merged into a broader IFRC Technological and Biological (CBRN) Hazards compendium.

- **Partnership Approach**

In addition to the Knowledge Platform, a mechanism for sharing technical and/or operational expertise should be institutionalized, with roles and responsibilities clearly defined. Currently, we rely on an ad-hoc system, identifying expertise as needs arise, or using whatever local capacities are available. By instituting a more formal 'Partnership Approach', and working together as a 'distributed network', specific National Societies (or individuals within the Movement), could be mandated to contribute their expertise in specific areas, as well as represent the IFRC in technical and/or international fora, as part of the organization's advocacy role.

- **Regional Champions**

Taking the partnership approach a step further, regional collaboration should be enhanced through a network of 'regional champions', acting as either technical leads or in coordinating roles in support of their peers, and as regional resources. This peer-to-peer approach would encourage closer collaboration between National Societies within a region, while taking into account regional specificities (types of hazards, regulations, cultural considerations, etc.), as well as address potential cross-border risks and add to regional response capacities. As a first step, we recommend undertaking a pilot project, to establish such a collaboration mechanism, based on existing capacities within a specific region.

B. Enabling Approach

- **Capacity Building**

Our capacity to prevent, prepare for and respond to technological and biological (CBRN) disasters needs to be better integrated into existing DRR activities, and enhanced as necessary. This includes (but is not limited to) the following:

a. Assess local capacity to respond to technological and biological (CBRN) events as part of the overall Preparedness for Effective Response (PER) process.
b. Nominate focal points within the Secretariat across all sectors and regions, in order to fully integrate technological and biological (CBRN) hazards into IFRC policies, programmes and activities.
c. Provide information, training and tools to enhance National Society and IFRC capacities, as part of on-going training (e.g.: open up specialized NS training to participants from other NSs; integrate CBRN scenarios into FACT/CAP/HEOPS/ERU training and exercises).

- **Operational Support**

We should ensure that existing expertise (within NSs, the IFRC Secretariat, as well as in close coordination with technical teams from ICRC) is available and in a position to provide support and guidance to operations on a regional and global level. For this, we need to:

a. Review the Rapid Response mechanism, to include specific technological and CBRN expertise, based on agreed competencies and role profiles, consistent with the response system.
b. Review availability of suitable PPE and related kit (e.g. radiology dosimeters), as well as establish an effective system of procurement and stockpiling to ensure operational readiness, in line with envisioned hazards and related NS role.

C. Distributed Network

- **Innovation**

With its unique expertise as a community-based response organisation, RCRC can contribute to research programmes, as well as in the development of innovative processes to better address technological and biological (CBRN) hazards. This could include closer collaboration with the academic sector, research agencies and the private sector on improving and enhancing tools and guidance, as well as participating in specific fora (e.g. WHO programme on psycho-social support during nuclear events).

- **Outreach and advocacy**

Our extensive experience enables us to reach out and play an important role in evidence-based advocacy. This would involve regular exchanges with technical partner organisations, as well as pro-active contributions to regional and global policy development and guidelines.

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3. Expected outcomes

The expected outcomes of a five-year plan of action can be summarized as follows:

4. Process

This Roadmap[10] forms the basis for discussions as part of a virtual consultation process with National Societies to be completed by the end of 2020. The aim is to agree on the key elements of a five-year Plan of Action, to be fully implemented by the end of 2025.

For this to happen, we will need a clear commitment from Senior Management, National Societies and other key stakeholders within IFRC, to provide the necessary time and resources to achieve the proposed plan, and ultimately strengthen our collective contribution in addressing this technical area as part of IFRC's Strategy 2030.

10. *A Background Information document accompanies this Roadmap, providing additional information.*

VI. Conclusion

Technological and biological (CBRN) disasters are part of the 'new normal' and challenge us in new ways. Although much of what we currently do can be adapted, it is clear that our ability to respond to such incidents also requires unique planning, key partnerships, effective tools and resources, and responsive leadership.

This means using existing resources more effectively, and with greater flexibility, across all geographical AND thematic areas. It also means clearly identifying those areas in which we need to invest more specifically, to better meet these challenges.

The unthinkable keeps happening with greater frequency and with increasing impact. A sole focus on the present leaves us ill-prepared for the future. **In order to be in the right place, with the right capacity and the right skills, now is the right time to fully incorporate technological and biological (CBRN) hazards into our multi-hazard approach to disaster risk management.**

Once this is achieved, we will be well-positioned and fit for purpose to meet our responsibilities to the victims of such hazards, and to those, like Ms Watanabe, who work so hard to help them.

"We were not at all aware of the possible damage at the nuclear power plant, and we started the treatment of tsunami survivors. But, soon after our arrival, we heard the news of the explosion, so that we had to pack up and change the location of our medical relief activities.* "You are going to leave us!"** ***survivors said to us reproachfully. My heart was close to breaking with a mixture of guilt and fear that I wanted to evacuate from the radiation danger."

Ms. A. Watanabe; JRCS Emergency nurse, Fukushima RC Hospital.

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Annex 1: Terminology

MULTI-HAZARD APPROACH

Technological and biological (CBRN) hazards are addressed through a multi-hazard approach which refers to:

- Different hazardous events threatening the same exposed elements (with or without temporal coincidence).
- Hazardous events occurring at the same time or shortly following each other (cascade effects) like NATECH events.
- The totality of relevant hazards in a defined geographical area and their interrelations.

The approach determines overall risk based on multiple hazards (including natural, technological, health, economic, ecological, social, etc.), and taking into account possible hazard and vulnerability interactions.

TECHNOLOGICAL HAZARDS

Briefly, man-made hazards are defined as those "induced entirely or predominantly by human activities and choices" [11]. **Technological Hazards** are a subset of man-made hazards, and include events such industrial spills, transport accidents, or factory explosions. Technological hazards may also arise directly from the impacts of a natural event.

NATECH EVENTS

A technological accident caused by a natural hazard is known as a NATECH event.

Industrial facilities and critical infrastructure are vulnerable to the impact of natural and climate-related hazards which can trigger so-called NATECH (Natural Hazard Triggering Technological Disasters) accidents and the release of toxic substances, fires, and explosions, potentially affecting health, and resulting in environmental pollution and economic losses.

CBRN HAZARDS

The acronym CBRN refers broadly to chemical, biological, radiological, and nuclear hazards.

11. *UN Office for Disaster Risk Reduction (UNISDR). The term is quite broad, and includes conventional industrial accidents such as oil spills, dam ruptures, fires etc. Although technological hazards can be used in conflict situations and for adverse purposes, the term relates primarily to non-deliberate provocations, as other terminology exists to describe deliberate acts.*

TECHNOLOGICAL AND BIOLOGICAL (CBRN) HAZARD CLASSIFICATION

The classification schemes for hazards vary across different research institutions and governments. For the purposes of this document, and as defined by UNSIDR (2017) [12] :

Environmental hazards

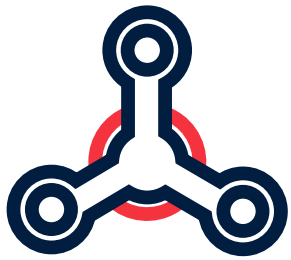
Environmental hazards may include chemical, natural and biological hazards. They can be created by environmental degradation or physical or chemical pollution in the air, water and soil. However, many of the processes and phenomena that fall into this category may be termed drivers of hazard and risk rather than hazards in themselves, such as soil degradation, deforestation, loss of biodiversity, salinization and sea-level rise.

Technological hazards

Technological hazards originate from technological or industrial conditions, dangerous procedures, infrastructure failure, or specific human activities. Examples include industrial pollution, nuclear radiation, toxic waste, dam failures, transport accidents, factory explosions, fires and chemical spills. Technological hazards may also arise as a result of a natural hazard event (**NATECH events** – see above).

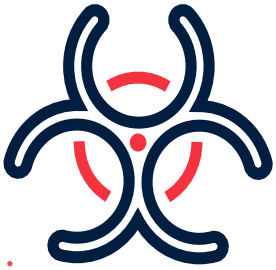
12. *Other types of hazards defined by UNISDR include geological or geophysical hazards, and hydrometeorological hazards.*

CBRN Hazards: This broad classification refers specifically to hazards caused by chemical, biological, radiological and nuclear agents. These have been defined by the ICRC [13] as follows:



Chemical Agents

Naturally occurring or man-made toxic substances used in everyday life, industry and medicine, or for law-enforcement/military purposes.



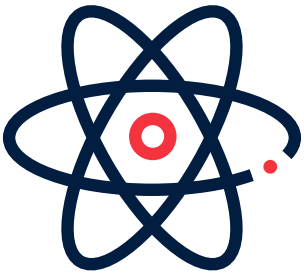
Biological Agents

Naturally occurring or genetically altered micro-organisms [viruses, fungi and bacteria] and toxins [poisonous chemicals produced by biological organisms).

CBRN Hazards

Radiological Agents

Radioactive materials occurring naturally, as the by-products in industrial processes or manufactured for use in industry or medical therapy.



Nuclear Agents

Radioactive materials generated by nuclear fission, such as those associated with an operating nuclear plant or with the explosion of a nuclear weapon.

13. *Chemical, Biological, Radiological and Nuclear Events: In Brief' (ICRC).*

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