UNESCO-CODATA Data Policy for Times of Crisis facilitated by Open Science

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International Data Policy Committee (IDPC)
Committee on Data (CODATA) of the International Science Council (ISC)

Addressing Crises Through Data Policy and Open Science

UNESCO-CODATA Guidance for Times of Crisis Facilitated by Open Science

- The **Factsheet, Guidance, and Checklist** form the **foundation of the UNESCO-CODATA Data Policy for Times of Crisis initiative**.
- These documents are designed to **tackle urgent and emerging crises with data policies aligned to Open Science principles.**
- They guide how to **manage and mobilize data ethically, inclusively, and efficiently across scientific, humanitarian, and policy sectors**.
- Relevance to **global emergencies such as pandemics, climate related disasters, and armed conflicts.**

Developed as part of the UNESCO Open Science Toolkit, these resources aim to assist in the implementation of the 2021 UNESCO Recommendation on Open Science by providing a general framework and practical guidance for developing data policies for times of crisis facilitated by open science.

Read now

Factsheet

Guidance

Checklist

Symposium

Explored the existing and most recent cooperative scientific, digital, and ethics frameworks for advancing the implementation of the UNESCO Recommendation across its Areas of Action.

29 Mar 2023

Consultative meeting

Discussed how the principles of open science could guide efficient and effective policies for data sharing in times of crises taking into account existing international policies and action frameworks.

5 Jul 2024

Consultation launch

Interested stakeholders were invited to review and provide feedback on three documents.

Oct 2024

Deadline for feedback

6 Jan 2025

Webinar

Presenting the results of UNESCO's global consultation on developing data policies for crisis situations facilitated by open science.

16 Jan 2025

Soft launch

During the Global Science Ministerial Dialogue on Science Diplomacy at UNESCO

25 Mar 2025

Launch

Jun 2025

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DATA POLICIES FOR TIMES OF CRISIS FACILITATED BY OPEN SCIENCE

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While this factsheet provides a general framework for developing data policies for times of crisis facilitated by open science, it recognises that data policies should be responsive and adaptable to the unique needs of each crisis and the local context, ensuring relevance, effectiveness, and reliability in crisis response efforts.

Why science in times of crisis?

Natural and human-made crises, health emergencies, geopolitical conflicts, and humanitarian disasters have consistently highlighted the need for scientific research, technological innovation and evidence-informed preparedness, response, and recovery measures at local, national, regional, and global levels.

Crises are situations that significantly disrupt the lives and livelihoods of many people. Often involving an urgent need for humanitarian support, crises raise protection concerns, including the safety, dignity, and rights of individuals and communities. They also threaten political and security stability and disrupt social and economic systems.

Populations are increasingly confronted with multiple, cascading, and/or complex hazards and crises. Each crisis requires a coordinated multisector response adapted to the unique local context and grounded in the best available information and scientific evidence.

Science plays a key role in the development of forecasting models, early warning systems, and innovative crisis monitoring, preparedness, and response technologies. It is also fundamental for the provision and collection of data on which evidence-based decision making relies throughout the crisis management cycle (Figure 1).

Figure 1. The role of science across the crisis management cycle

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UNESCO OPEN SCIENCE · TOOLKIT FACTSHEET

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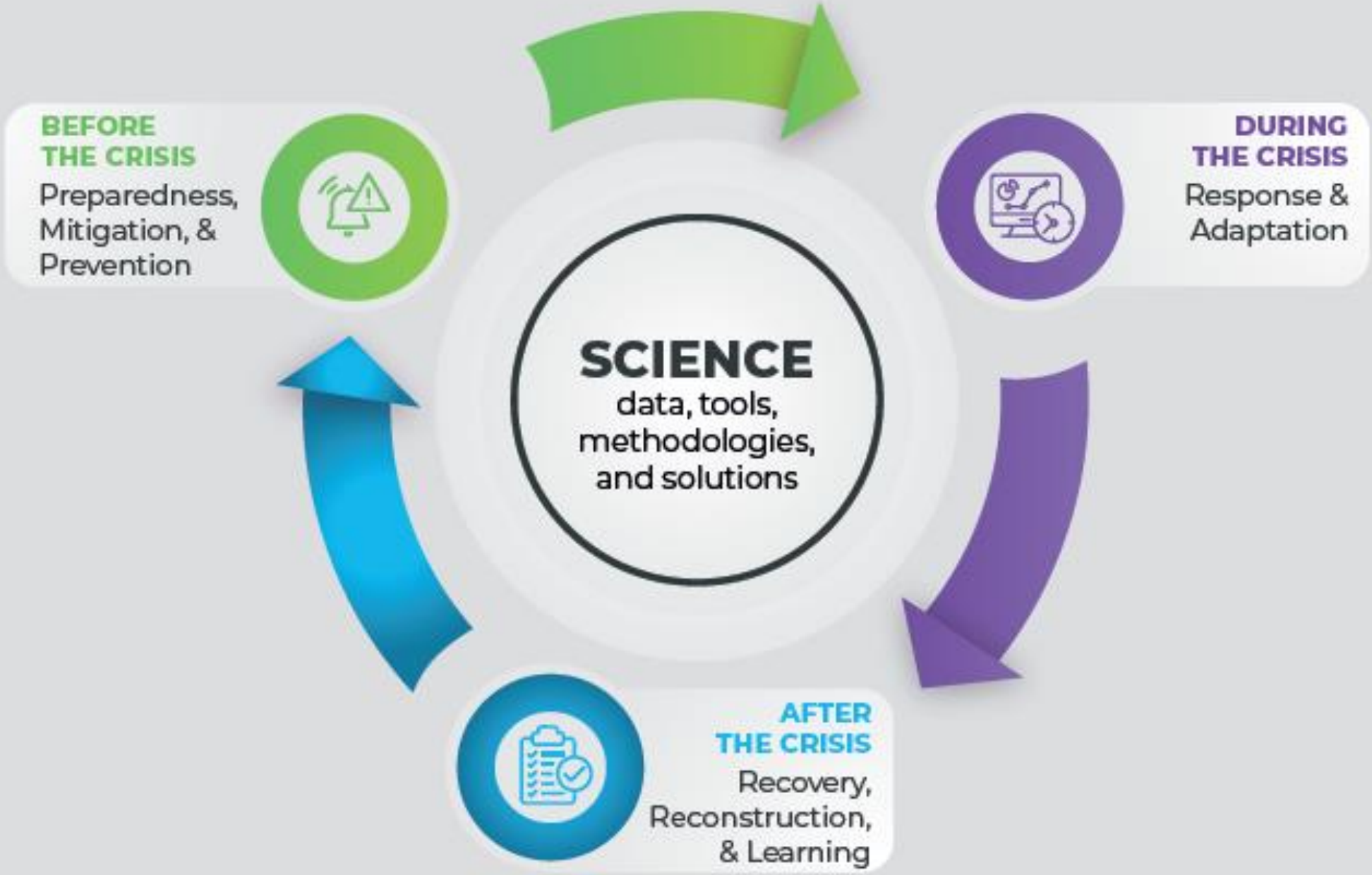

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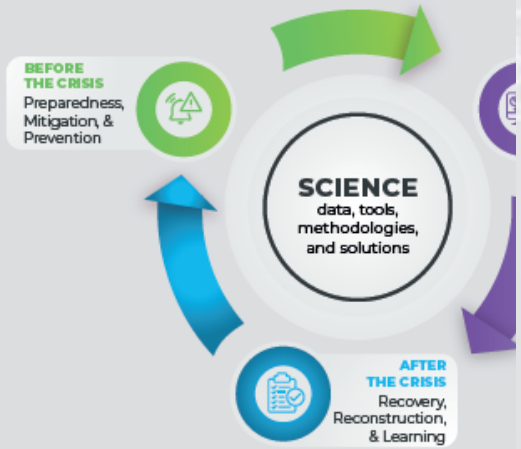

Figure 2. Open science as a driver of inclusive and effective evidence-based crisis response

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Figure 3: Values and principles of open science as referenced in the UNESCO Recommendation on Open Science

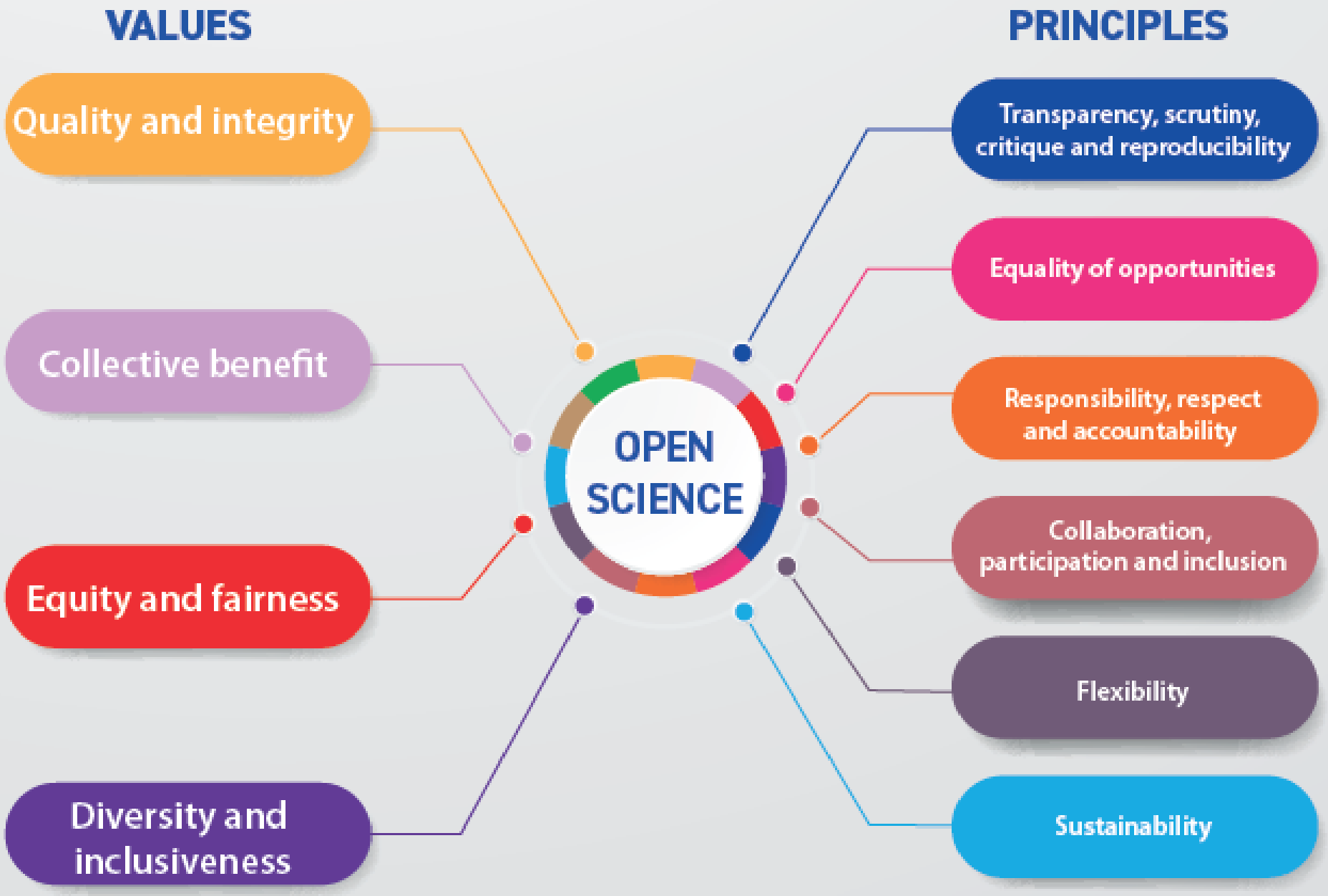

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Figure 1. The role of science across the crisis management cycle

- Government agencies
- Emergency management authorities
- Public health institutions
- Statistical agencies
- Ethics committees
- Legal experts
- Research institutions (including those in academia, government, NGOs, and industry)
- Scientific editors and publishers
- Funding bodies
- Charities
- Non-governmental and civil society organisations
- Communities, journalists, and the digital and mass media
- The private sector (including technology, health, financial, and insurance companies)

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While this document provides general guidance for developing data policies in times of crisis facilitated by open science, it recognises that such policies should be responsive and adaptable to the unique needs of each crisis and the local context, ensuring relevance, effectiveness, and reliability in crisis response efforts.

The role of data policies in supporting crisis preparedness, response, and recovery

Crises necessitate rapid, transparent, and collaborative data sharing to ensure evidence-informed decision making and intervention. Without reliable and safe access to trustworthy data, even a well-coordinated response is insufficient and may prove inadequate. In times of crisis, policymakers rely on different stakeholders within and outside the scientific community to collect, process, and analyse reliable data in a timely and transparent manner, ensuring appropriate policy and operational response.

As highlighted in the UNESCO Open Science Toolkit's *Factsheet on Data Policies for Times of Crisis facilitated by Open Science*, by providing an overarching set of rules, principles, and guidance on data collection, use, sharing, analysis, protection, and dissemination, data policies for times of crisis facilitated by open science set standards that foster the quality, reliability, and accessibility of essential data for crises management.

To achieve maximum impact, data policies for times of crisis must address not only immediate response needs but also preparedness and long-term recovery. They need to:

- Establish clear objectives, roles, and responsibilities.
- Ensure availability of and access to adequate resources.
- Uphold ethical standards and protect human rights.
- Develop data governance and management protocols in open science frameworks.
- Facilitate open data collection and accessibility.
- Strengthen open data infrastructure for data sharing and storage.
- Promote interdisciplinary, multistakeholder, and international collaboration.
- Strengthen public engagement and communication.
- Establish mechanisms for documentation, monitoring, and evaluation.
- Plan for long-term preparedness and resilience.

Data policies for addressing the challenges of crisis situations

In times of crisis, data policies need to be grounded in open science values and principles to promote accessibility, transparency, collaboration, and interoperability. These policies can enable stakeholders to respond more efficiently and in coordination while also ensuring ethical standards, human rights, and regulatory requirements are maintained. To this end, data policies for times of crisis facilitated by open science need to address the challenges that typically occur in crisis situations and affect the efficiency of crisis response, preparedness, and recovery. These challenges are as follows and are summarised in Table 1 below.

Data needs for specific kinds of crises or specific crisis situations

Data policies in times of crisis should be thoughtfully tailored to address the different types of crisis situations, including natural or human-made crises, health emergencies, geopolitical conflicts, or humanitarian disasters. By developing and implementing distinct policies or case-specific protocols, stakeholders can more effectively align data policies with the unique demands of each crisis. For instance, health crises may focus more on real-time health surveillance and patient data privacy; natural disasters might emphasise geospatial data sharing and rapid coordination; while in geopolitical or

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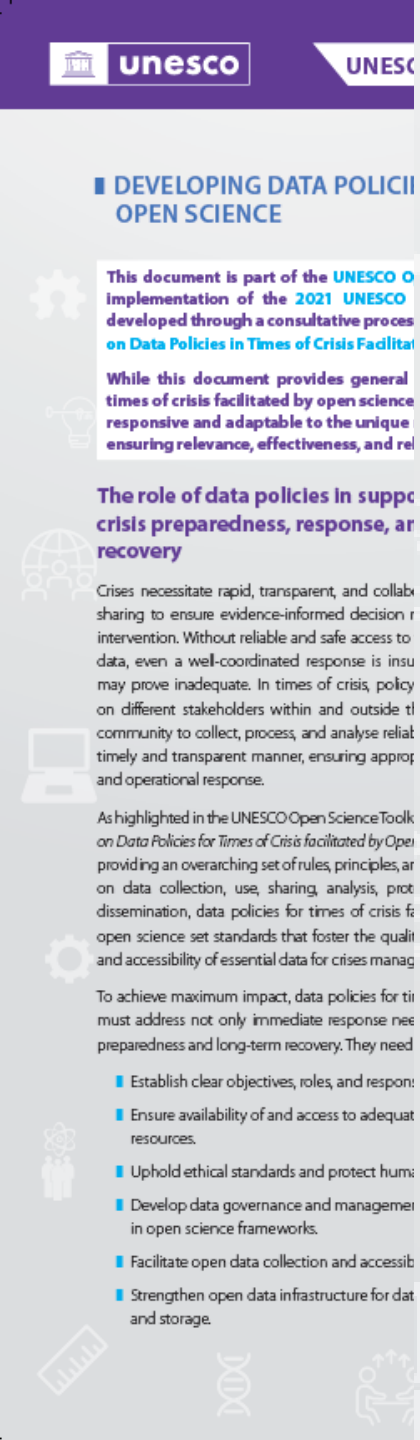
Table 1. Summarises how data policies in times of crisis facilitated by open science can address these challenges across the preparedness, response, and recovery phases.

The challenges	Data policy requirements	The role of data policy		
		Preparedness	Response	Recovery
Data needs	Setting clear objectives to guide data identification, quality, and quantity.	Identify, define, and ensure the quality and quantity of data needed, leveraging open science for broad data access and inclusion.	Verify and assess data quality, provenance, reliability, and adequacy.	Review the data standards implemented during the crisis for their reliability and effectiveness.
Data sovereignty, stewardship, and ownership	Identification, as appropriate, of data ownership and responsibilities.	Establish clear data ownership and responsibilities of different stakeholders as well as pathways for open collaboration and data sharing.	Enforce the defined ownership roles and respect one another's responsibilities.	Reassess ownership roles and responsibilities. Evaluate their success and potential need for revision.
Data quality, bias, and documentation	Fit for purpose data quality, bias mitigation, and robust documentation.	Develop data quality standards, identify potential data biases, and establish documentation expectations and instruments.	Implement quality standards, review for bias, and maintain documentation standards.	Review and improve data quality standards, bias mitigation mechanisms, and update documentation standards.
Real-time data sharing	Definition of data access and sharing protocols.	Develop, as appropriate, open access (or other) mechanisms to facilitate data sharing and ensure data systems and tools	Implement access and sharing to efficiently utilise resources efficiently during the crisis.	Review and evaluate data access and sharing mechanisms through a post-crisis evaluation.



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		Preparedness	Response	Recovery
Public communication and transparency	Development of a proactive, reliable, and trustworthy information communication strategy.	Create a crisis data and information communication plan detailing guidelines and procedures, including channels to templates to document, and protocols to follow. Test the plan with the media and other communication.	Implement the crisis data and information communication plan, including new releases and talking points. Allow for mitigation strategies, when necessary.	Evaluate the crisis data and information communication plan for effectiveness and impact.
Resources and data overload	Identification of data resource needs and development of a resource allocation plan.	Identify strategies for obtaining resources. Develop a comprehensive resource sourcing and allocation plan with a long-term vision.	Utilise and document data resource management, including those used for personnel and infrastructure during the crisis.	Review the comprehensiveness, reliability, and effectiveness of the resource sourcing and allocation plan during the crisis.
Monitoring and evaluation	Establishment of clear procedures for monitoring and evaluating the effectiveness and reliability of the data policy.	Implement standard procedures to regularly review and update data policies in advance of and during a crisis, incorporating open science practices.	Apply the data policy and document any errors or deviations in its implementation.	Review the data policies for their impact and effectiveness during the crisis. *For all above: revise the data policy based on the lessons identified.*

DEVELOPING DATA POLICIES FOR TIMES OF CRISIS FACILITATED BY OPEN SCIENCE

Table 2. Alignment between data policies and data management plans in crises.

Area of alignment	Role of data policies
Ethical standards, legal requirements, and regulatory frameworks	Data policies need to assist DMPs in adhering to ethical standards, legal requirements, and regulatory frameworks. This includes compliance with privacy laws, data protection regulations, and the ethical handling of sensitive information.
Consistency across stakeholders	Data policies can help align DMPs across the different stakeholder organisations to ensure high-quality data collection and management.
Long-term stewardship, data sharing, and access	Data policies provide high-level guidance on data stewardship, sharing, and access while DMPs operationalise these principles, defining how data will be securely collected, stored, shared, and preserved with relevant parties engaged in crisis management.
Flexibility and adaptability	Data policies and DMPs for crises need to be flexible and adaptable to the evolving nature of crises. This allows for adjustments in data collection, management, and sharing protocols as new information becomes available or as the crisis management requirements change. Ensuring adaptability in data policies and DMPs enables more effective responses and fosters a data management approach that remains relevant and efficient under dynamic crisis conditions.

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In times of crisis, the ability to manage and utilise data effectively is crucial for rapid, evidence-informed decision making and coordinated responses. Developing data policies that adhere to open science principles ensures that data is findable, accessible, interoperable, and reusable, while also promoting collaboration across disciplines and sectors. Open science fosters accessibility, transparency, inclusivity, and ethical consideration, making it a powerful framework for guiding data policies needed to address crises. These policies must not only address the immediate needs of crisis management but also provide long-term resilience and preparedness for future emergencies.

As a complement to the Factsheet and Guidance on *Data Policies for Times of Crisis facilitated by Open Science*, this checklist serves as a practical tool to guide the creation of data policies in crisis situations underpinned by the values and principles of open science.

By embedding the values of integrity, collaboration, equity, and inclusiveness, these policies promote the integration of data from multiple stakeholders, assist the ethical use of sensitive information, and ensure that data is used to its fullest potential to support the needs of preparedness, response, and recovery. This framework helps stakeholders from various sectors, organisations, and regions to collaborate effectively, ensuring a cohesive, data-driven approach to crisis management.

Establish clear objectives, roles, and responsibilities

- ☑ Define specific, measurable, and actionable objectives aligned with open science principles to guide data use, build trust, and ensure readiness during crises.
- ☑ Identify critical data needs for crisis preparation, response, and recovery, prioritising collection and analysis.
- ☑ Identify responsibilities *vis-à-vis* data sovereignty, ownership, and stewardship.
- ☑ Map all the relevant stakeholders.
- ☑ Assign clear roles and responsibilities to stakeholders, ensuring coordination across sectors while addressing the needs of scientists, policymakers, responders, and affected communities.
- ☑ Provide clear definitions of key data management terms to avoid ambiguity and ensure consistency.

Ensure availability of and access to adequate resources

- ☑ Secure adequate financial, technological, and human resources for the development and implementation of data policies in times of crisis.
- ☑ Develop contingency funds and mobilise additional resources as needed to address evolving data policy needs.
- ☑ Ensure the resources needed to support open access and data sharing in open science environments.
- ☑ Incorporate periodic resource evaluations to identify gaps and adapt data policies and resulting data management systems as crises evolve.

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- Assign clear roles and responsibilities to stakeholders, ensuring coordination across sectors while addressing the needs of scientists, policymakers, responders, and affected communities.
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UNESCO OPEN SCIENCE · TOOLKIT CHECKLIST

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Establish clear objectives, roles, and responsibilities

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Uphold ethical standards and protect human rights

- Embed ethical considerations (including privacy, transparency, and equity) in all data management processes.
- Ensure compliance with the existing legal and regulatory frameworks, safeguarding the dignity and rights of individuals and communities.
- Apply the CARE Principles (Collective Benefit, Authority to Control, Responsibility, Ethics) to promote the protection of marginalised populations and the sovereignty of indigenous data.
- Define measures to prevent and handle breaches and misuse.

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Develop data governance and management protocols in open science frameworks

- Define the requirements for data quality, bias mitigation, and robust documentation within a fit-for-purpose framework.
- Define roles and responsibilities regarding the control of data in the context of open science and crisis management, ensuring secure data sharing practices that protect sensitive data and uphold ethical standards.
- Establish clear protocols for data collection, storage, sharing, and reuse, aligning with open science principles and tailored to specific disciplines and data types.
- Disaggregate data by gender, age, disability status, urban/rural area, and crisis-exacerbated vulnerabilities to assess the crisis' impact on vulnerable groups, as appropriate.
- Follow the TRUST Principles for Digital Repositories (Transparency, Responsibility, User Focus, Sustainability, Technology) to create trusted and sustainable data infrastructures.

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Facilitate open data collection and accessibility

- Implement standardised data formats and protocols to enable seamless data access and sharing, as appropriate.
- Develop mechanisms to securely collect and share data across regions, organisations, and sectors for addressing crises.
- Integrate the FAIR Data Principles (Findable, Accessible, Interoperable, Reusable) into data management practices to advance broad accessibility and usability.
- Prioritise compliance with relevant data privacy laws while enabling appropriate access to essential data.

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Strengthen open data infrastructure for data sharing and storage

- Build or enhance interoperable data infrastructures that facilitate real-time and context-specific data sharing and analysis for managing crises.
- Promote the use of open-source technologies to enhance real-time data exchange and processing.
- Ensure that digital infrastructure is resilient, scalable, and capable of adapting to the demands of crisis management.
- Encourage further research and innovation on advanced digital technologies, including artificial intelligence (AI) and machine learning tools for data validation and predictive analysis, addressing ethical concerns such as data bias, privacy risks, and reliability. AI should not be actively implemented without rigorous evaluation and clear safeguards.

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Promote interdisciplinary, multistakeholder, and international collaboration

- Identify and engage key stakeholders from diverse disciplines, regions, and sectors, including non-traditional data stakeholders.
- Foster international and cross-sector collaboration to ensure coordinated and comprehensive crisis responses.
- Use secure and accessible platforms to facilitate real time strategic alignment, data sharing, and communication between stakeholders.

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Strengthen public engagement and communication

- Establish clear and transparent communication protocols with the public and key stakeholders.
- Encourage public participation in data collection and crisis management through open and accessible platforms.
- Ensure timely and accurate communication, aligned with open science principles to build trust and foster cooperation.

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Establish mechanisms for documentation, monitoring, and evaluation

- Maintain detailed documentation of data management activities to support accountability and continual improvement.
- Develop clear, measurable indicators to assess and evaluate the effectiveness of data policies in times of crisis, including accuracy and timeliness of data collection and reporting; and effectiveness of data-sharing mechanisms in enabling real-time, evidence-informed decision making.
- Apply lessons learned from each crisis to refine and update data policies for future preparedness.

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Plan for long-term preparedness and resilience

- Include provisions for building sustainable data systems that can be mobilised during future crises.
- Prioritise long-term data governance, including policies for repurposing crisis data for future research and resilience building.
- Ensure crisis-related data remains accessible postcrisis for research, impact assessments, and preparedness planning.
- Provide training and capacity building programmes to ensure stakeholders are equipped to manage crisis data effectively.
- Use data policies as one of the tools to promote ongoing awareness and preparedness, including crisis simulations and drills to maintain operational readiness that strengthen resilience in data management practices.

Developed as part of the UNESCO Open Science Toolkit, these resources aim to assist in the implementation of the 2021 UNESCO Recommendation on Open Science by providing a general framework and practical guidance for developing data policies for times of crisis facilitated by open science.

Read now

Factsheet

Guidance

Checklist

Data for Decision-Makers in the Digital Age

From Guidance to Action
Delivering Data Where It's Needed Most

- The guidance prioritizes **real-time, reliable, and accessible data** to support science-based decision-making.
- Supports **first responders, scientists, and policymakers** working in time-critical and resource-limited environments.
- Encourages **cross-border and interdisciplinary collaboration** using **Open Science tools and standards**.

Builds capacity for responding to **today's emergencies** and preparing for **tomorrow's crises**.

Thank you!

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