Summary report

Technical workshop

Validation of the prototype for the new hazardous events and disaster losses and damages tracking system

3 – 4 May 2023, UN Campus, Bonn, Germany
Abstract
This report summarizes key results from the Technical Workshop on validating the prototype for the new hazardous events and disaster losses and damages tracking system, co-organized by the United Nations Office for Disaster Risk Reduction (UNDRR), United Nations Development Programme (UNDP) and World Meteorological Organization (WMO) on 3rd and 4th May 2023. The report outlines key elements from presentations, panel discussions, and breakout groups among governments, practitioners, experts and other losses and damages’ data stakeholders convened with the objective to gather feedback on the draft prototype of the new tracking system.
Summary report
Technical workshop – Validation of the prototype
for the new hazardous events and disaster losses and damages tracking system

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Acknowledgments

The Technical Workshop on validating the prototype for the new hazardous events and disaster losses and damages tracking system was organized in Bonn from 3rd and 4th May 2023.

The workshop was primarily an in-person event with technical presentations and group work dynamics to elicit concrete feedback through participatory experience. Participants could also join virtually.

The workshop is one of several engagement activities to co-design the new tracking system, organized by the United Nations Office for Disaster Risk Reduction (UNDRR) during the past two years. It was co-organized with the United Nations Development Program (UNDP) and the World Meteorological Organization (WMO).

The forum covered a diverse participation with around 100 participants, both in-person and virtual, represented over 30 governments and 20 international organizations over two days.

All resources from the workshop are available in the link www.undrr.org/quick/76830. Broadcasting and recordings are available in the YouTube Channel by UNDRR https://www.youtube.com/watch?v=vr5HT7XdVOM (day 1 – 3rd May 2023), and https://www.youtube.com/watch?v=K9AxEI-9yUk (day 2 – 4th May 2023).

The organizers would like to acknowledge the financial support of the donors that made possible this technical gathering, especially the German Government.

We acknowledge the technical contributions from all member states, UN agencies, funds and programs, and other academic and technical partners and private sector organizations that share their experiences and learning during the two-day workshop.
# Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>ABAC</td>
<td>Attribute-Based Access Control model</td>
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<td>AI</td>
<td>Artificial Intelligence</td>
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<td>APIs</td>
<td>Application programming interfaces</td>
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<td>HIPs</td>
<td>Hazard Information Profiles</td>
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<td>IDs</td>
<td>Identification numbers</td>
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<td>NMHSs</td>
<td>National Meteorological and Hydrological Services</td>
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<td>NSO</td>
<td>National Statistical Office</td>
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<td>ODK</td>
<td>Open Data Kit</td>
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<td>PDNA</td>
<td>Post disaster needs assessments</td>
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<td>Q&amp;A</td>
<td>Questions and answers</td>
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<td>SDGs</td>
<td>Sustainable Development Goals</td>
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<td>UNDP</td>
<td>United Nations Development Programme</td>
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<td>UNDRR</td>
<td>United Nations Office for Disaster Risk Reduction</td>
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<td>WMO</td>
<td>World Meteorological Organization</td>
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<tr>
<td>WMO CHE</td>
<td>WMO Cataloguing of hazardous event</td>
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Executive summary

This report summarizes key elements and discussions from governments and partners during the ‘Technical workshop: validation of the prototype for the new losses and damages tracking system’. The key objective of the workshop was to gather feedback from practitioners, experts and other losses and damages’ data stakeholders on the draft prototype of the new tracking system. The workshop also provided the opportunity to confirm the next steps in the process to support the rollout of the new system.

The workshop is one of many activities to co-design the new tracking system with governments, development partners and users. The system targets strengthening the understanding of losses and damages, related cascading hazards and events, and the analysis and use of data for policy and decision-making. Understanding the extent and magnitude of disaster impact is the foundation of understanding disaster risk.

UNDRR, UNDP and partner organisations have been supporting governments in establishing losses and damages databases (www.DesInventar.net) since 1994 that record events and their impacts at national and subnational levels. While 110 Member States have benefited from such databases, which also contribute to the monitoring of the Sendai Framework and SDGs, both producers and users of such information have recognized limitations of these databases in meeting the present-day challenges. This also assumes significance in context of the growing need for disaster impact data to inform the Loss and Damage discussions under UNFCCC mechanisms.

WMO has been leading the ‘Cataloging of Hazardous Weather, Climate, Water and Space Weather Events’ (WMO-CHE) which supports recording the physical parameters of hazardous events.

UNDRR, in close partnership with UNDP and WMO, is in the process of developing the co-designed prototype of the new system. The new system builds on the progress made to date, addresses new needs, and is flexible enough to adapt to future needs. The integration of globally agreed standards and adaptation of frameworks, methodologies and processes to national contexts is key for data value chains that support multiple relevant use cases for losses and damages data and at the national and local level while enabling global and regional comparability. Old and new use cases include:

- Strengthening the evidence on impacts of climate change
- Benchmarking of success (or failure) of resilience building measures
- Building, informing, and calibrating vulnerability and risk models
- Better disaster risk reduction financing and informed insurance products
- Informed early warning systems including impact-based forecasting, early action, and preparedness for response and recovery
- Informed resilient recovery including post disaster needs assessments (PDNA)
- Better understanding of disparate impact on human sustainable development.

Key characteristics of the new system include government ownership, localised data, multidimensional disaggregation, interoperability, scalability, standards supporting comparability, easier customisation, and built-in primary data collection. The data users and producers include national, sub-national, and local governments, development partners, regional organisations, humanitarian actors, the financing and insurance sectors, science and technology networks, and the UN system.

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1 https://www.undrr.org/event/technical-workshop-validation-prototype-new-losses-and-damages-tracking-system
Recommendations and way forward

Rich discussions during the two workshop days provided a good balance between evolving technology and innovation as well as data governance with attention to standards, methodologies, and capacities. The exchanges included aspects of the enabling environment such as people with capacities and professional development, processes with automation, and other improvements. Relevant feedback themes included analytics, interoperability, customization, cascading events, and user-friendly approaches. All efforts will be made to ensure a phased roll out of the new tracking system, including smooth migration process from DesInventar, in collaboration with partners.

The three partners, UNDRR, UNDP and WMO, will continue refining frameworks, guidance, and tools for supporting countries. This includes addressing governance, technical capacity, and methodological challenges faced by countries when assessing losses and damages, institutionalizing data architecture and enhancing the value chain on losses and damages data. In collaboration with other regional organizations and specialized agencies, UNDRR, UNDP and WMO are committed to a new approach for the new generation of losses and damages tracking systems. This aims to ensure that data is used to generate insights for comprehensive disaster and climate risk management and risk-informed sustainable development policy making, programming and investment decisions.

Roadmap to the new system

The next steps for implementing the proposed roadmap to build the new system cover:

1. Document all feedback.
2. Finalize the prototype.
3. Pilot the prototype (focus on developing countries with higher vulnerabilities to disasters and climate change, countries at different levels of digital maturity)
4. Start building the new system.
   • Modular approach – from minimum core capability to advance.
   • Flexibility to customize – suited to the country context and interoperable.
   • Scope scalability – horizontal, vertical, thematic and application.
   • Change management – Data migration and implementation / integration support.
5. Continued dialogue with the governments.
6. Continue engaging with the partners to serve the governments.
7. Iterative process of capacity development (guidance for users; orientation and training materials and technical assistance).

Other considerations contain:

1. Governance
   • Institutional mechanisms to ensure two ways data exchange with a range of external data suppliers and users – Synergy in international frameworks and national regulatory frameworks.
   • User/group profiles for data input as well as viewing data and creating reports.
2. Data standards and methods
   • Documentation of standards and methods; Continue developing or revising the methodological frameworks for assessment.
   • Strengthen collaboration with the statistical community and specialized agencies.
   • Quality assurance tools – record duplication, missing data, open records, etc.
3. Capacity development
   • Promote peer-to-peer learning.
   • Good practices on data governance and analysis.
   • Regional learning.
4. Document and share use cases and user experiences.
1. Introduction

This report captures key elements and summarizes discussions of the ‘Technical workshop: validation of the prototype for the new losses and damages tracking system’. It consolidates presentations and feedback from governments and other workshop participants. The report does not cover all details from the workshop and presentations as well other materials are available online2.

The key objective of the workshop was to gather feedback from practitioners, experts and other losses and damages’ data stakeholders on the draft prototype of the new tracking system. The workshop also provided the opportunity to confirm the next steps in the process to support the rollout of the new system.

The workshop is one of many activities to co-design the new tracking system with governments, development partners and users. The system targets strengthening the understanding of losses and damages, related cascading hazards and events, and the analysis and use of data for policy and decision-making.

1.1. Background

Understanding the extent and magnitude of disaster impact is the foundation of understanding disaster risk. UNDRR, UNDP and partner organisations have been supporting governments in establishing losses and damages databases (www.DesInventar.net) since 1994 that record events and their impacts at national and subnational levels. While 110 Member States have benefited from such databases, which also contribute to the monitoring of the Sendai Framework and SDGs, both producers and users of such information have recognized limitations of these databases in meeting the present-day challenges. This also assumes significance in context of the growing need for disaster impact data to inform the Loss and Damage discussions under UNFCCC mechanisms.

WMO has been leading the ‘Cataloging of Hazardous Weather, Climate, Water and Space Weather Events’. This provides the basis for National Meteorological and Hydrological Services (NMHSs) through their existing observation and monitoring capabilities to record the physical parameters of hazardous events.

There is, hence, a need to develop a system that builds on the progress made to date, addresses new needs, and is flexible enough to adapt to future needs. The integration of globally agreed standards and adaptation of frameworks, methodologies and processes to national contexts is key for data value chains that support multiple relevant use cases for losses and damages data and at the national and local level while enabling global and regional comparability.

After initial phases of user needs discovery, data and digital maturity assessments3, consultation and discussion with Member states and other stakeholders that produce or use losses and damages data, UNDRR, in close partnership with UNDP and WMO, is in the process of developing a prototype of the new system. User interviews have been conducted in the first quarter of 2023 to validate and confirm the existing and emerging needs previously identified by data producers and users across the losses and damages data value chain.

Multiple technical meetings with subject-matter experts, regional and global partners and stakeholders have been organized including the November 2022 “Technical Forum on Tracking of hazardous events and disaster losses and damages”4. These meetings and consultations are part of the

co-creation process to consolidate a framework for tracking losses and damages as well as to develop a new system building on the needs and requirements by current as well prospective users.

1.2. Target audience

Considering the technical nature of this workshop, the targeted participants include those

a) who have been previously involved in the co-design process for the new system,

b) who have familiarity with losses and damages data management and use as per their functions in Governments, and

c) partners and stakeholders collaborating with governments on assessments, enhancing data governance, improving data collection, management, analysis, and application.

The workshop was primarily an in-person event with technical presentations and group work dynamics to elicit concrete feedback. Participants could also join virtually. Ona Systems Inc, the international software company engaged for the prototype design and user testing phase, co-facilitated the feedback gathering through group discussions and other interactive methods.

2. Scene setting

Starting point

The DesInventar system is used by 110 countries since 1994, and it contains more than 750,000 records of disaster events. The sub-nationally disaggregated disaster losses and damages databases provide a comprehensive picture of human, economic, housing and infrastructural losses. The mostly nationally managed systems contain data that is defined, collected, and validated within the country, with no thresholds. The methodology targets homogeneous disaster data at all scales (small, medium, and large) while customisation is possible through extension variables. Since 2018 the DesInventar Sendai enables closer alignment with the targets A to D of the Sendai Framework. This enables streamlined reporting including the Sustainable Development Goals (SDGs).

Rationale for a new approach and new system

Keeping track of hazardous events, disaster losses and damages is an essential element of our understanding of risk and the basis for decision-support for disaster risk management. Old and new use cases include:

- Strengthening the evidence on impacts of climate change
- Benchmarking of success (or failure) of resilience building measures
- Building, informing, and calibrating vulnerability and risk models
- Better disaster risk reduction financing and informed insurance products
- Informed early warning systems including impact-based forecasting, early action, and preparedness for response and recovery
- Informed resilient recovery including post disaster needs assessments (PDNA)
- Better understanding of disaster impact on human sustainable development.

Key characteristics of the new system include government ownership, localised data, multidimensional disaggregation, interoperability, scalability, standards supporting comparability, easier customisation, and built-in primary data collection.

The data users and producers include national, sub-national, and local governments, development partners, regional organisations, humanitarian actors, the financing and insurance sectors, science and technology networks, and the UN system.
**Persisting, new and emerging needs are to be addressed**

Losses and damages tracking processes and needs have changed significantly over the last 25 years since the DesInventar inception. Recurring and emerging challenges are complex and originate from different factors such as technical and governance issues, limited institutionalization, capacities for disaggregated data collection, horizontal and vertical coordination, costing damage, loss estimation, data management and analytics. Strong needs include better understanding the triggering factors, underlying risk factors and causes of each recorded event, as well as linking event impacts with weather-related and other hazardous events and multidimensional vulnerabilities. It also includes the tracking and understanding of cascading events and impacts across sectors and geographies in interconnected economies, ecosystems, and societies.

New challenges include the development and application of data standards, and data integration for disaster impact analysis and use cases. Key elements of the DALA/PDNA (damages and losses assessments, and post disaster need assessments) frameworks can enrich the data model of the new tracking system and impacts analysis. The integration of data from multiple sources and different assessment processes is desired. Finally, scalable solutions and tools are required to track not only “events” but potentially also slow onset processes.

**Interoperability with hazardous event catalogues (CHE-WMO)**

The CHE-WMO supports strengthening the data value chain of hazardous events, causal factors, and impacts. The methodology links climate-related variables with losses and damages, and disaster events through systematically recording the physical parameters of hazardous events. It was approved by the WMO Congress in 2019 and is supported by a rollout plan since March 2023. It ensures that events are recorded uniquely with a standardized event name, beginning and end times, spatial area of impact, and linking the cascading events to larger-scale phenomena. Unique universal identifiers can be used to link observation records with impact records, as well as to connect larger phenomena with cascading hazardous events of all types (e.g., Tropical cyclone and strong winds, storm surge, heavy rain and flood).

3. **Session 1: New system storyboard, purpose, functionalities, and modules**

**Milestones of the new system development and rollout**

A discovery and needs analysis covered 112 respondents from 31 countries (governments and stakeholders). The vision and roadmap recommended a DesInventar transformation, advancing information governance, connecting and innovating loss and risk data, within a system-wide approach. The data and digital maturity analysis highlighted that system development and technical assistance need to be contextualised to the digital maturity level of a country. Finally, the new system design is built through consultations consolidating user needs, good practices, requirements for different use cases, landscape assessments, system architecture and data model development, and a prototype with user needs validation.

**Recommendations of the technical forum**

Key recommendations covering inputs from 175 participants representing 40 governments and 50 international organisations include:

- Document the use cases of losses and damages data and derived applications and products to serve as reference and inspiration for more investments in losses and damages data.
- Develop a forward-looking policy paper and guidance on suggested steps to take forward this tracking model at the country level based on their data and digital maturity levels.
• Onboard pilot countries interested and available to test and rollout the new tracking system, consolidated toolkit on guidance and methodologies and to provide feedback.
• Strengthen losses and damages toolkit including glossary, metadata standards, guidance, training materials for economic valuation of losses and damages and disaggregated data collection and analysis building on existing methods, sectoral good practices and expertise.

The storyboard of the new system – purposes, functions, modules

Different purposes of the new system include:

• Tracking effects and impacts of disasters events in a systematic and disaggregated manner.
• Supporting attribution analysis of impacts to causal / triggering hazards and enhancing the understanding of exposure and vulnerability dimensions of the impacts observed.
• Supporting tracking of cascading effects of disasters, including socio-economic ones.
• Facilitate quantification, accounting, economic valuation or costing of damages.
• Enhance analysis of disaster effects to support applications and use cases of historic data.
• Facilitate primary data collection and recording (multiple device feeds, online / offline, etc.).
• Enable recording data collection with core standard variables and built-in disaggregation.
• Facilitate disaggregation / aggregation and unit-based costing of damages and losses.
• Enhance data management including processes / workflows and interoperability.
• Optimize data analysis, visualization, sharing, reusing - e.g., pre-built dashboards, graphs, etc.

The storyboard of the new system illustrates key aspects of the data entry, data storage and management, and data analysis as shown in Figure 1. Respective modules are a) data entry and management, b) administration, and c) analysis.

Figure 1: Storyboard

Overview of the conceptual and methodological frameworks, standards, taxonomies – key concepts

The new system builds on the conceptual DesInventar model which covers time, space, institutions / sources, events with hazards and causes, and effects. It also includes other established methodological frameworks such as the Sendai requirements for Target A to D, and the PDNA with damage and loss specifications as illustrated in Figure 2.
**Hazard classification review & Hazard information profile**

Hazard information is relevant for all aspects of DRM while the lack of coherent hazard information limits DRR efforts. The [Hazard Definition and Classification Review Technical Report](https://www.undrr.org/publication/hazard-definition-and-classification-review-technical-report) (July 2020)\(^5\) identified 302 hazards in eight clusters relevant to the Sendai Framework. The clusters cover meteorological and hydrological, extraterrestrial, geohazards, environmental, chemical, biological, technological, and societal hazards. The [Hazard Information Profiles (HIPs)](https://www.undrr.org/publication/hazard-information-profiles-hips) (October 2021)\(^6\) supplement the review. The profiles describe each hazard with name, definition, references, annotations, and coordinating agencies. The HIPs can be used to actively engage policymakers and scientists in evidence-based risk assessments, and other DRR or DRM actions. Regular reviews and updates of the hazard list and profiles are recommended.

**Governance model of the new system**

The new tracking system targets government ownership including sub-national administrative levels for countries / Member States. For example, administrators can configure access levels for data producers and reviewers and other criteria. Core variables and the recording of events and effects allow customisation and comparability including sectors, asset categories and more. Countries can decide whether they host the open-source software on premise or benefit from global hosting options. Global and regional dashboards enable data exchange, synchronisation, and sharing. Finally, technical support, assistance, methodology guidance, manuals, training, and more are provided by UNDRR, UNDP, WMO and other partners to strengthen information governance – beyond only technological solutions.

3.1. **Feedback from breakout group discussion 1**

The guiding questions were:

- What are the overall views and feedback on the proposed conceptual model? How far does it address current challenges?
- What are the core elements that you expect to have in such a tracking system?
• What functionalities / features / capabilities would you want to see in the new system?
• Is the way information on records, hazardous and disaster events, human impacts and sector damages and losses is proposed to be organized understandable?
• Which baseline (pre-disaster), metadata and context information are relevant to include?

The consolidated group feedback highlighted key themes comprising methodology including standards, interoperability and reuse of existing data, analytics, capacities, disaggregation, cascading events and validation. Examples are clustered in Table 1.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Feedback – key aspects: Storyboard, purpose, functionalities, and modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strengths and Popular Features</td>
<td>Interoperability (different databases / structures, population data, etc.); Co-design and engagement; Disaggregation; Standardization including hazard profiles and WMO-CHE; Methodology including non-economic losses</td>
</tr>
<tr>
<td>To Revise, Correct, or Add</td>
<td>Methodology including cascading events and multi-temporal dimensions (impacts evolving over time, displacement, recording etc.); Disaggregation; Media storage including documents and photos; User-friendly system; Validation</td>
</tr>
<tr>
<td>Main Questions or concerns</td>
<td>Methodology (terminology, purpose and data collection reference, comparability, timeframes); Capacities and enabling environment; Legal implications; Climate change needs and climate finance access; New risks</td>
</tr>
<tr>
<td>Other Suggestions</td>
<td>Methodology (encoding approximate numbers, post-event mortality, non-economic losses, etc.); Interoperability and reuse including DesInventar, SFM, FAIR data, open-source maps; Analytics including recurring and transnational events; Capacities and maturity context; Small events recording</td>
</tr>
</tbody>
</table>

Table 1: Feedback from breakout group discussion 1

4. Session 2: User journeys for data analysis and visualization

Thematic and geospatial mapping and analysis functions

The available data for analysis comprises:

a) Core data from losses and damages data collection process (events per national definitions and effects including human effects, damages, disruption and losses)

b) Ingested data to enable analysis of impact of disasters (baseline pre-disaster information and contextual data, e.g. GDP per sector, population density, etc.)

Three types of analytics are available in the new system: 1) built-in analytics, 2) self-service analytics, and 3) external analytics with data exports.

Built-in / pre-configured analytics dashboards

The built-in pre-configured analytics comprise four dashboards to view data:

• Effects browser to view effects filtered by combinations of events, hazard type, sector, etc.
• Post disaster event analysis overview of impacts (according to PDNA principles).
• Sector impact to view impacts by sector for multiple hazard events.
• Hazard impact to view sector impacts by specific hazard types.

○ The global instance will support sector impact and hazard impact dashboards.

Self-service – on demand / custom analytics
The self-service analytics support on demand or customised queries with maps, statistics, calculations of indicators (including the Sendai Framework and SDGs). Visualisations include stacked bar charts, pie charts, time series, small multiples, metrics, cards, summary tables, maps, and more.

Export options to preferred data analysis and visualization tool

The new tracking system enables using business intelligence and data visualisation tools such as Power BI, R, and others. Data can be exported into CSV / Excel, and application programming interfaces (APIs) for data sharing.

4.1. Feedback from breakout group discussion 2

The guiding questions were:

- What analytical elements would you want to see in the new system?
- How far does the proposed model cover them? What features or capabilities in the prototype were difficult for you to see?
- What are specific/unique analysis views you would like that would meet your needs?
- Which baseline and context information are most relevant to include/ connect with to enhance analysis (e.g., calculating ratios, visualizing relationships)?
- What customized / self-service analytics are you likely to need/use?

The consolidated group feedback highlighted key themes of diverse analytics aspects including visualization and baseline information, while other topics include interoperability, navigation, transparency and more. Examples are clustered in Table 2.

Table 2: Feedback from breakout group discussion 2

<table>
<thead>
<tr>
<th>Questions</th>
<th>Feedback – key aspects: User journeys for data analysis and visualization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strengths and Popular Features</td>
<td>Analytics with event viewer, output creation for different audiences, multi-hazard and cross border analysis; Interoperability including external tools and sources and geo data / GeoJSON (open standard format representing geographical features and attributes); division of data into public and private.</td>
</tr>
<tr>
<td>To Revise, Correct, or Add</td>
<td>Visualizing analytics should include non-economic losses, losses in relation to new risks; user friendly navigation including maps; Context information such as poverty, employment, population pyramids; Indicators on rescue services.</td>
</tr>
<tr>
<td>Main Questions or concerns</td>
<td>Analytics export, customization, and IT infrastructure; Visualization with data collection requirements and transparency; Capacity development; Currency conversion; Disaggregation; Sustainability; Translation into local languages; Use cases especially politically / legally sensitive aspects and GIS systems.</td>
</tr>
<tr>
<td>Other Suggestions</td>
<td>Analytics covering historical trends and statistics for decision support, macro-economic impact, multi-risk, open text encoding; Baseline including vulnerability, different formats, and authoritative sources; Self-service including API’s and widgets, Artificial Intelligence (AI) for risk information; Automation including hazard return periods and impacts.</td>
</tr>
</tbody>
</table>

5. Panel discussion: Use cases for disaster losses and damages data

General examples of use cases for disaster losses and damages data include:
• Tracking the effects and impacts of disasters events over time in a systematic and disaggregated manner (covering geographic levels, hazards, social groups, sectors etc.).
• Supporting attribution analysis of impacts to causal / triggering hazards and enhancing the ability to understand exposure and vulnerability dimensions of the impacts observed.
• Supporting tracking of cascading effects of disasters, including socio-economic ones.
• Facilitate quantification and accounting (economic valuation or costing) of damages (e.g., infrastructure assets like roads).
• Enhance analysis possibilities of the disaster effects to support specific applications of historic data like impact-based forecasting, calibration of risk assessments, preparedness and contingency planning, recovery planning, cost-benefit analysis to make the case for investments in DRR, benchmarking on progress on adaptation, DRR and resilience building, etc.

Specific use cases include:

1. UNFCCC: Loss and damage data needs for climate action (averting, minimizing, and addressing and financing for Loss and Damage)

The new tracking system will be critical to support countries managing decentralised granular data to identify new risks and emerging impacts specific to communities and locations for accessing loss and damage finance.

2. IFRC: Early warning & Early action (forecasting-based financing & anticipatory action)

Four IFRC specific use cases of loss data comprise a) annual resource allocation based on evidence, b) understanding hazards and priorities in countries when developing early action plans and protocols based on historical evidence, c) developing triggers for early action during frequent events based on the realised risk, and d) validating, ground truthing, and calibrating impact forecast models, risk models and hazard models.

3. FAO: Anticipatory action

FAO uses historical data to calibrate anticipatory action triggers to reduce agricultural production loss and impacts on people’s livelihoods. Families were able to save up to 7 $ of disaster impact for each 1 $ invested through acting ahead of hazards to prevent or reduce humanitarian impacts before they fully unfold.

4. WMO / UK Meteo: Impact-based forecasting

Use cases for impact-based forecasting include a) innovative approaches with machine learning to unpack the complex issue of cascading hazards through science and research, b) contextualised advice for better action on the ground based on impact scenarios and mitigation, and c) measuring costs and benefits of early warning systems such as protected critical infrastructure and other avoided losses in comparison to the costs and losses with identified gaps and investment needs for better protection.

5. Costa Rica: Resilient recovery and DRR financing

Use cases include loss and damage data as a bridge between probabilistic and deterministic data models including calibration.

6. OSSO corporation: Research / DRR economics

Use cases and research include a) risk estimation and equations comprising historical losses, event frequency, and exposure; b) risk index for floods; c) forecasting hydro-meteorological events based on historical data, weather stations, and statistical data. Examples of applied research with DesInventar data include validation of hazard, vulnerability, and risk models; risk management prioritization; national and urban planning; financing including international banks; sectorial public resources
allocation; infrastructure works reorientation; ethnic and land conflicts; Andean Atlas of the Andean Community of Nations and others.

6. Session 3: Data entry – data acquisition and ingestion module

The new tracking system targets addressing data entry challenges such as granularity at sub-national levels, complexity of fields and requirements, speed of single entries, contexts for user interface design, languages including different character sets or right-to-left languages and more. Solutions include standard variables and taxonomies with customization, time stamps and metadata on records (recorder of information / log on updates, revisions, approvals, etc.), integration of media: images, audio, GIS maps, and more.

Structure of disaster event records

One or many records are a logical wrapper around multiple effects that contain damage, loss, disruptions, and human effects as illustrated in Figure 3.

Events can be associated with different identification numbers (IDs such as **GLIDE**7, national IDs, etc.), and contain contextual disaster information.

Data entry and import

Functionalities include automatic data ingestion through field data collection tools, APIs, and manual record entry.

6.1. Feedback from breakout group discussion 3

The guiding questions were:

- Which taxonomies should be fixed/standard, and which should allow the addition of items at the country level? How helpful and how difficult would it be to map national classifications to global ones to allow comparisons and aggregation?
- Do you see a way in which the proposed data model could be used to track cascading relationships between events, e.g., where a cyclone causes landslides? What are the challenges and suggestions to track such cascading events?
- Which primary data collections tools are being used and will need to integrate with the disaster losses and damages tracking system? Which ones will be needed to build-in?
- What type of review, update, and validation institutional workflow will you need the platform to support in your context/country?
- Does the data model incorporate all core elements that you expect to have on a disaster losses and damages tracking system?

The consolidated group feedback highlighted key themes of different methodology questions, interoperability, user friendly approaches and hazard standardization. Examples are clustered in Table 3.

![Figure 3: Data entry - core entities](https://via.placeholder.com/150)

**Table 3: Feedback from breakout group discussion 3**

| Questions | Feedback – key aspects: Data entry – data acquisition and ingestion module |

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7 [https://www.glidenumber.net](https://www.glidenumber.net)
Strengths and Popular Features

Rich data with detailed information, effects linked to events and cascading hazards, use cases to promote uptake and inform situation awareness, rich data including different formats, HIPs, translation and contextualisation.

To Revise, Correct, or Add

User friendly interface with clear guidance, interoperability with diverse import and export options including Excel, KOBO, Open Data Kit (ODK), privacy, terminology / glossary, customization, process status definitions.

Main Questions or concerns

Country specific data collection and terminologies / taxonomies; customization and interoperability; the understanding of hazards in different countries and contexts.

Other Suggestions

Standardization of taxonomies, geography and other aspects; cascading events with aggregation, cause and effect relationship, time scales especially for long-term events; Classification overview and recording of multiple effects; interoperability including offline data collection with KOBO templates, local community data, and geo-coded NSO data with baseline information for vulnerability profiles; processes and use cases.

7. Session 4: Administration module and governance of the tracking system

Beyond the standard core fields, the system will include customization options for effects, events, assets, regions, and more. The system will support different languages and countries can contribute translations supported through the open-source software. The prototype will only be available in English. User permissions will be based on Attribute-Based Access Control model (ABAC) which supports specific data, specific actions, locations or regions and other aspects. The system will support manual and automatic data transfer from country instances to the global instance. UNDRR and partners will provide options to countries for hosting the system including security updates and upgrades on their behalf. Alternatively, countries can self-host the system.

7.1. Feedback from breakout group discussion 4

The guiding questions were:

- Are the customization and hosting options presented addressing your expectations and needs? Any suggestions?
- Do the administration functions (granting access to data entry, review, update, delete or validation per variables/administrative levels, revisions/approvals of data) support well your institutional workflows and processes for data collection, validation, and management?
- Which type of support will governments require for hosting, updating versions, migrating historic data, building connections to pull in/pull out data, configuring administrative boundaries and granting access rights, etc.?

The consolidated group feedback highlighted key themes of maintenance, hosting including security, capacities including training, customization, and other aspects. Examples are clustered in Table 4.

Table 4: Feedback from breakout group discussion 4

<table>
<thead>
<tr>
<th>Questions</th>
<th>Feedback – key aspects: Administration module and governance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strengths and Popular Features</td>
<td>Customization including local data and visualization, user accounts and permissions management, system architecture including replicas and backups.</td>
</tr>
</tbody>
</table>
To Revise, Correct, or Add | Digitizing paper records; installation, migration, and ongoing updates; permissions aligned with hazards; data sovereignty; query and diagnostic logs; local census data integration.
---|---
Main Questions or concerns | Awareness among focal points; error / bug reporting and tracking; monitoring and evaluation; security and cloud storage.
Other Suggestions | Hosting including on premise requires clear instructions, training, and support while certificates could be considered; methodology including direct loss and subnational levels are important features; import and data migration will require support; training including manuals, videos, and other online options.

8. Recommendations and way forward

Rich discussions during the two workshop days provided a good balance between evolving technology and innovation as well as data governance with attention to standards, methodologies, and capacities. The exchanges included aspects of the enabling environment such as people with capacities and professional development, processes with automation, and other improvements. Other feedback themes included analytics, interoperability, customization, cascading events, and user-friendly approaches. The co-designed modular development approach of the new tracking system for hazardous events and losses and damages strengthens government ownership and uses cases or purposes such as policy support and risk information beyond reporting. All efforts will be made to ensure smooth migration process from DesInventar to the new system in collaboration with partners.

The three partners, UNDRR, UNDP and WMO, will continue refining frameworks, guidance, and tools for supporting countries. This includes addressing governance, technical capacity, and methodological challenges faced by countries when assessing losses and damages, institutionalizing data architecture and enhancing the value chain on losses and damages data. In collaboration with other regional organizations and specialized agencies, UNDRR, UNDP and WMO are committed to a new approach for the new generation of losses and damages tracking systems. This aims to ensure that data is used to generate insights for comprehensive disaster and climate risk management and risk-informed sustainable development policy making, programming and investment decisions.

8.1. Roadmap to the new system

The next steps for implementing the proposed roadmap to build the new system cover:

1. Document all feedback.
2. Finalize the prototype.
3. Pilot the prototype (focus on developing countries with higher vulnerabilities to disasters and climate change, countries at different levels of digital maturity)
4. Start building the new system.
   - Modular approach – from minimum core capability to advance.
   - Flexibility to customize – suited to the country context and interoperable.
   - Scope scalability – horizontal, vertical, thematic and application.
   - Change management – Data migration and implementation / integration support.
5. Continued dialogue with the governments.
6. Continue engaging with the partners to serve the governments.
7. Iterative process of capacity development (guidance for users; orientation and training materials and technical assistance).
8.2. Other considerations

Other considerations contain:

1. Governance
   - Institutional mechanisms to ensure two ways data exchange with a range of external data suppliers and users – Synergy in international frameworks and national regulatory frameworks
   - User/group profiles for data input as well as viewing data and creating reports

2. Data standards and methods
   - Documentation of standards and methods; Continue developing or revising the methodological frameworks for assessment
   - Strengthen collaboration with the statistical community and specialized agencies
   - Quality assurance tools – record duplication, missing data, open records, etc.

3. Capacity development
   - Promote peer-to-peer learning
   - Good practices on data governance and analysis
   - Regional learning

4. Document and share use cases and user experiences
# Appendix: Final programme

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00 - 09:00</td>
<td>Arrival of participants &amp; registration</td>
</tr>
<tr>
<td>09:00 - 09:15</td>
<td>Welcome Remarks &lt;br&gt; Background and objectives</td>
</tr>
<tr>
<td>9:15 - 10:15</td>
<td><strong>Scene-setting &amp; Technical Session 1: New system storyboard, purpose, functionalities and modules</strong>&lt;br&gt; <strong>Scene Setting</strong>&lt;br&gt; - Current status/ departure point&lt;br&gt; - Rationale for a new approach and new system&lt;br&gt; - Persisting, new and emerging needs are to be addressed&lt;br&gt; - Interoperability with hazardous event catalogues (CHE-WMO)&lt;br&gt; - The starting point – a quick DesInventar demo&lt;br&gt; <strong>Technical Session 1</strong>&lt;br&gt; - Milestones of the new system development and rollout&lt;br&gt; - Recommendations of the technical forum&lt;br&gt; - The storyboard of the new system – purposes, functions, modules&lt;br&gt; - Overall system structure/architecture&lt;br&gt; - Overview of the conceptual and methodological frameworks, standards, taxonomies – key concepts&lt;br&gt; - Governance model of the new system&lt;br&gt; - Hazard classification review &amp; Hazard information profile&lt;br&gt; - Discussion / Questions and Answers (Q &amp; A)</td>
</tr>
<tr>
<td>10:15 - 10:40</td>
<td>Tea / Coffee</td>
</tr>
<tr>
<td>10:40 - 12:30</td>
<td><strong>Breakout Group discussion 1: Feedback on the new system storyboard, purpose, functionalities and modules</strong>&lt;br&gt; <strong>Guiding questions</strong>&lt;br&gt; - What are the overall views and feedback on the proposed conceptual model? How far does it address current challenges?&lt;br&gt; - What are the core elements that you expect to have in such a tracking system?&lt;br&gt; - What functionalities/ features/ capabilities would you want to see in the new system?</td>
</tr>
<tr>
<td>12:30 - 13:30</td>
<td>Lunch</td>
</tr>
<tr>
<td>13:30 - 14:00</td>
<td><strong>Plenary - Report back from Group work 1</strong>&lt;br&gt; - Presentations from breakout group rapporteurs&lt;br&gt; - Discussion</td>
</tr>
<tr>
<td>14:00 - 15:00</td>
<td><strong>Technical Session 2: User journeys for data analysis and visualization</strong>&lt;br&gt; - Thematic and geospatial mapping and analysis functions&lt;br&gt; - Built-in/ Pre-configured analytics - Dashboards – preconfigured and customization options – records browser, per event, per sector, per hazard</td>
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</tbody>
</table>
• On demand/ custom analytics: Queries, maps, statistics, calculations of indicators/indices (including Sendai Framework / SDG indicators)
• Export options to preferred data analysis and visualization tool

<table>
<thead>
<tr>
<th>Time</th>
<th>Session/Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:00 - 15:15</td>
<td>Tea / Coffee</td>
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</table>
| 15:15 - 17:00| Breakout Group discussion 2 : Feedback on user journeys for data analysis and visualization

Guiding questions
• What analytical elements would you want to see in the new system?
• How far does the proposed model cover them? What features or capabilities in the prototype were difficult for you to see?
• What are specific/unique analysis views you would like that would meet your needs?
• Which baseline and context information are most relevant to include/ connect with to enhance analysis (e.g., calculating ratios, visualizing relationships)?
• What customized/ self-service analytics are you likely to need/use?
• What is the most authoritative, accurate and complete source for each type of baseline ( pre-disaster)/context/statistics and metadata data? What challenges do you anticipate in data integration?

<table>
<thead>
<tr>
<th>Time</th>
<th>Session/Activity</th>
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</thead>
</table>
| 17.00 - 17:30| Plenary - Report back on the group work 2

• Presentations from breakout group rapporteurs
• Discussion

Day 2: 4th May 2023

<table>
<thead>
<tr>
<th>Time</th>
<th>Session/Activity</th>
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</thead>
<tbody>
<tr>
<td>8:00</td>
<td>Arrival of participants</td>
</tr>
<tr>
<td>8:30 - 8:45</td>
<td>Recap Day 1 – Key feedback gathered and initial responses</td>
</tr>
<tr>
<td>8:45 – 9:45</td>
<td>Panel discussion – Use cases for disaster losses and damages data</td>
</tr>
<tr>
<td>1. UNFCCC: Loss and damage data needs for climate action (averting, minimizing, and addressing and financing for Loss and Damage)</td>
<td></td>
</tr>
<tr>
<td>2. IFRC: Early warning &amp; Early action (forecasting-based financing &amp; anticipatory action)</td>
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<tr>
<td>3. WMO / UK Meteo: Impact-based forecasting</td>
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<td>4. Costa Rica: Resilient recovery and DRR financing</td>
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<tr>
<td>5. Trinidad &amp; Tobago: Preparedness for response</td>
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<tr>
<td>6. OSSO corporation: Research/DRR economics</td>
<td></td>
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<tr>
<td>9:45 – 10:00</td>
<td>Tea/Coffee</td>
</tr>
<tr>
<td>10:00 - 11:15</td>
<td>Technical Session 3: Data entry: Data acquisition and ingestion module</td>
</tr>
<tr>
<td>- Standard variables and customizable extensions</td>
<td></td>
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<tr>
<td>- Structure of the module – disaster event record, impact records (human dimensions, structural losses and damages, and disruption); operational/programmes/responses</td>
<td></td>
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<tr>
<td>- Data import functionalities, automatic data ingestion, field data collection tools and manual record entry</td>
<td></td>
</tr>
<tr>
<td>- Taxonomies (hazards, assets, regions): standards and customizations</td>
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<tr>
<td>- Time stamps and metadata on records (recorder of information/log on updates, revisions, approvals, etc.)</td>
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<tr>
<td>- Integration of media: images, audio, GIS maps, etc.</td>
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<tr>
<td>Time</td>
<td>Session/Activity</td>
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<tr>
<td>11:15 - 13:00</td>
<td>Breakout Group discussion 3: Data entry: feedback on data acquisition and ingestion module&lt;br&gt;&lt;br&gt;<strong>Guiding questions:</strong>&lt;br&gt;• Which taxonomies should be fixed/standard, and which should allow the addition of items at the country level? How helpful and how difficult would it be to map national classifications to global ones to allow comparisons and aggregation?&lt;br&gt;• Do you see a way in which the proposed data model could be used to track cascading relationships between events, e.g., where a cyclone causes landslides? What are the challenges and suggestions to track such cascading events?&lt;br&gt;• Which primary data collections tools are being used and will need to integrate with the disaster losses and damages tracking system)? Which ones will be needed to build-in?&lt;br&gt;• What type of review, update, and validation institutional workflow you will need the platform to support in your context/country?&lt;br&gt;• Does the data model incorporate all core elements that you expect to have on a disaster losses and damages tracking system?</td>
</tr>
<tr>
<td>13:00 - 14:00</td>
<td>Lunch&lt;br&gt;&lt;br&gt;14:00 - 14:30 Report back from breakout discussions 3</td>
</tr>
<tr>
<td>14:30 – 15:15</td>
<td>Technical Session 4: Administration module and governance of the tracking system&lt;br&gt;• System governance - country and global instances; synchronisation, data sharing; etc.&lt;br&gt;• User permissions and workflows&lt;br&gt;• Installation and use options/ Hosting options&lt;br&gt;• Context information and metadata configuration&lt;br&gt;• Language, hazard list, assets classification and geographic levels/boundaries/maps configurations&lt;br&gt;• Global instance: Cross country comparison&lt;br&gt;• Discussion</td>
</tr>
<tr>
<td>15:15 - 16:15</td>
<td>Breakout Group discussion 4: Feedback on administration module and governance of the tracking system&lt;br&gt;&lt;br&gt;<strong>Guiding questions</strong>&lt;br&gt;• Are the customization and hosting options presented addressing your expectations and needs? Any suggestions?&lt;br&gt;• Do the administration functions (granting access to data entry, review, update, delete or validation per variables/administrative levels, revisions/approvals of data) support well your institutional workflows and processes for data collection, validation, and management?&lt;br&gt;• Which type of support will governments require for hosting, updating versions, migrating historic data, building connections to pull in/pull out data, configuring administrative boundaries and granting access rights, etc.?</td>
</tr>
<tr>
<td>16:15 – 16:30</td>
<td>Tea/coffee</td>
</tr>
<tr>
<td>16:30 - 17:15</td>
<td>Plenary: Wrapping up&lt;br&gt;&lt;br&gt;• Consolidation of feedback and responses&lt;br&gt;• Governance</td>
</tr>
<tr>
<td>17:15 - 17:30</td>
<td>Way Forward and recommendations</td>
</tr>
</tbody>
</table>