United Nations | Department of Economic and Social Affairs

CURRICULUM ON GOVERNANCE FOR THE SUSTAINABLE DEVELOPMENT GOALS

Toolkit on

Risk-informed Governance and Innovative Technology for Disaster Risk Reduction and Resilience

Facilitator's Guidance Manual

(DRAFT)

Division for Public Institutions and Digital Government (DPIDG)

United Nations Department of Economic and Social Affairs (UNDESA)

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Introduction

The Curriculum on Governance for the Sustainable Development Goals was prepared by the UN Department of Economic and Social Affairs (UN DESA), Division for Public Institutions and Digital Government's (DPIDG). UN DESA/DPIDG's mission is to support governments in strengthening their capacities to translate the Sustainable Development Goals (SDGs) and other internationally agreed goals into institutional arrangements, strategies and programmes for effective service delivery and participatory, accountable and inclusive decision-making processes. The division's capacity development efforts are geared towards supporting developing countries, with a focus on Least Developed Countries (LDCs), Landlocked Developing Countries (LLDCs) and Small Island Developing States (SIDS). UNPOG, as an integral part of DPIDG, is mandated to strengthen the public governance capacities of developing Member States in Asia and the Pacific and beyond to achieve the 2030 Agenda for Sustainable Development. Under the general guidance of DPIDG, UNPOG has developed three training toolkits as part of the Curriculum on Governance, which include *Effective National to Local Public Governance for SDG Implementation, Government Innovation for Social Inclusion of Vulnerable Groups, and Risk-informed Governance and Innovative Technology for DRR and Resilience*.

Turning sustainable development from concept into practice presents countries with new governance and institutional challenges. One of the 11 principles of Effective Governance for Sustainable Development, developed by the UN Committee of Experts on Public Administration and endorsed by the Economic and Social Council in 2018, is **competence**. A competent and effective public service with well-motivated and professional public servants is at the center of success in implementing government policies and programs related to the 2030 Agenda and the SDGs, including in delivering services to the furthest left behind. Without a dedicated effort to help governments mobilize and build the capacities of public servants at all levels, progress on the SDGs may be undermined by ineffective bureaucracies.

In light of the above, the UN Department of Economic and Social Affairs works closely with schools of public administration and governments to help countries around the world meet their economic, social and environmental goals in a balanced way. The ***UN DESA's Global Initiative on Equipping Public Servants with the Capacities to Implement the SDGs*** aims at developing the capacities of governments and public servants (in terms of knowledge, skills, attitude, leadership competencies and mindsets) to support the implementation of the SDGs, provide data and information about development of capacities in the regions; and support institutional capacity development for improved public service delivery as well as North-South and South-South exchange of effective governance practices to ensure cross-fertilization and mutual learning.

The work carried out by UN DESA/DPIDG with governments and schools of public administration is based on four building blocks:

- ✓ Systems thinking
- ✓ Co-creation
- ✓ Driving transformational change
- ✓ Focusing on impact

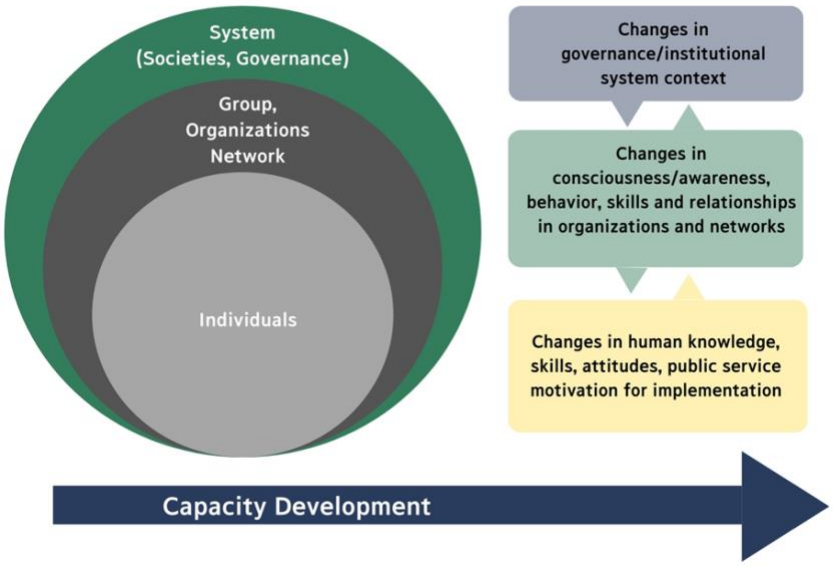
The initiative engages schools of public administration in developing and updating their curricula to reflect the SDGs and the key principles and objectives of the 2030 Agenda and to develop the relevant competencies that public sector leaders and public servants need to effectively support the implementation of Agenda 2030.

Curriculum on Governance for the SDGs

Four years after the adoption of the 2030 Agenda for sustainable development, it is clear that there is a strong commitment and momentum for implementation. But it is also clear that implementing the Sustainable Development Goals (SDGs) presents major challenges for public institutions that need new capacities and knowledge to provide integrated support to SDG implementation and to "leave no one behind".

A Curriculum on Governance for the SDGs was developed in collaboration with schools of public administration and other partners to respond to the need to equip public servants with the capacities to realize the 2030 Agenda.

The Curriculum is composed of a number of training tool-kits which provide a holistic roadmap in terms of key governance elements needed to implement the SDGs. Each training tool-kit is inter-related and complementary to the other ones. New national and local capacities are needed to design and implement holistic, integrated, coherent and informed political and institutional frameworks that support these new aspirations and goals. Effective governance strategies, knowledge, new skills, and attitudes are essential to build public servants' capacities for SDG implementation and drive individual, institutional and societal changes. In designing the training tool-kits, a multi-disciplinary approach is being adopted since this is critical to addressing sustainability issues.



For more information on the Curriculum, please see the Curriculum Guide.

Purpose of the Facilitator Guide

The purpose of this Guide is to provide advice and tips on how to facilitate the training course on "**Risk-informed Governance and Innovative Technology for Disaster Risk Reduction and Resilience"** by using the toolkit material.

Purpose of the Training Course

The training course is intended to provide methodologies and approaches that can support countries in building capacities at the **individual, organizational and institutional/societal levels**.

It provides methodologies and guidance tools that can assist schools of public administration and governments to drive the transformational change needed to advance the implementation of the 2030 Agenda. These elements include:

- understanding key challenges within the selected area of each training toolkit
- creating a vision for change
- involving a wide range of stakeholders
- identifying enabling factors
- understanding the inter-linkages among the SDGs
- establishing links between vision, goals, objectives and which activities lead to desired outcomes
- developing a roadmap for implementation
- elaborating concrete action plans for follow-up and indicators of achievement

Focusing on impact: The training toolkits are aimed at providing concrete outcomes and lasting impact. For this reason, they are co-created with schools of public administration and other key stakeholders. The training tool-kits will be continuosly updated and expanded based on the feedback received from schools of public administration and governments. They will become "living documents" that can be customized to the needs of specific countries. To ensure that the training toolkits are relvant and have an impact, they will be pilot tested, on a voluntary basis. Follow-up to the training can also be strengthened through targeted advisory services and peer-to-peer learning workshops. Engaging with schools of public administration will ensure a multiplying effect since national schools will utilize the Curriculum to train public servants.

Beneficiaries: The Curriculum and its training toolkits will be used through different avenues. It is intended in the first place for use by governments and civil servants through the schools of public administration. The training toolkits will be made available online and schools of public administration will be encouraged to utilise the material in any way they see relevant. Moreover, DPIDG advisors will use the training package for specific capacity development delivery, based on requests by governments or by regional commissions. Finally, this training course can also be useful for resident coordinators who have been approached directly by respective government partners that they partner with. The training toolkits will be tailored to the appropriate level, depending on the specific requests.

Exchange Platform: **UNPAN** was revamped and will be used as an interactive platform for this Curriculum. Schools of public administration will be able to make changes and provide feedback by becoming partners of UNPAN and sharing their own comments as well as their own curricula, case studies, etc.

Capacity Development Training : Training courses and material are provided free of charge. All materials will be made available online. While the training courses are intended as training for trainers, short online trainings/courses will be developed in a second phase.

Training Scenario for Toolkit Delivery

The following is a checklist to implement face to face capacity development activities where facilitators and training organizers can follow a standardized process. The checklist ensures minimum criteria in key areas of instructional design applicable to learning and training, including analysis, design, development, implementation and evaluation (ADDIE).

- **Analysis**

Step 1: Conduct a Needs Assessment Exercise through various modalities. These could include feedback during workshops or a short online survey to better define participant or learner expectations, training objectives, contents

Step 2: Gather information about the target audience (e.g. level of skills, knowledge, and preferred role in public institution, specific countries, etc.)

Step 3: Identify the purpose, goals and learning objectives of the training (e.g. competency gaps, problem to solve, Sustainable Development Goal targets it seeks to impact, etc.)

- **Design**

Step 1: Create a draft structure for the training bearing in mind the logical flow of the training and skeleton structure focused on i) introduction of concepts and policy frameworks, ii) examining application to national context, iii) new expert knowledge on key topics, iv) training output preparation, and v) evaluation.

Step 2: Circulate the draft structure and agenda for peer review and potential partnerships with schools of public administration and expert institutions. Define the number of days for the training – ideally between four to five days of duration, bearing in mind budget limitations. Ensure that the training is flexible enough so that schools of public administration may use components of the training or adapt the training to their own needs.

Step 3: Develop learning objectives per module and draft learning content. Link learning objectives and the content of training in a sequenced and logical manner, bearing in mind the limitations of the target audience.

- **Development**

Step 1: Based on the work prepared during the previous phases, create and develop the content and activities of the training course.

Step 2: Identify experts and resource persons to contribute to sessions

Step 3: Use exercises per module and ask participants to read the suggested readings the day before of each session of the course. Prepare exercises and facilitation tools in line with the target audience's capabilities and limitations in mind. Note that exercise outputs such as action plans can serve as evidence for later evaluation of the training's effectiveness.

- **Implementation**

Step 1: Circulate the call for training participants and define the final list of participants, including their background (e.g. through short bios collected into a booklet), the background information of resources persons and all relevant personnel which will be active in the training delivery. This information can be presented as part of a training booklet or guide to be used during the training.

Step 2: Prepare, collect and test the training materials including presentations, exercises, research and additional reading materials, and equipment to ensure they are operational and efficient in order to meet the objectives of the training. Ensure that the training materials are organized and readable for all participants in the target audience, bearing in mind their needs.

Step 3: Deliver the training in a timely and efficient format. Ensure there is a timekeeper, rapporteur, note taker, facilitator and local personnel to guide through each training module and session.

Step 4: Prepare social media updates and photos that are collected throughout the training, including quotes and cases from the countries and participants. Circulate these to the communications focal point for publishing.

- **Evaluation**

Step 1: Using one of the evaluation templates provided here in annex III, evaluate the training results by distributing the forms to participants to ensure that the goals and objectives have been achieved via both formative and summative evaluations:

a. Formative evaluation is carried out throughout the different stages of the training (e.g. daily or per module).

b. Summative evaluation is done at the end of the program.

Step 2: Collect the evaluation results and analyze them, organizing them into a short summary document.

Step 3: Prepare a report of the training, including summary points per session, presentations and training materials, key outcome messages, evaluation results and circulate for peer review. After peer review, publish the report and circulate among participants. Ensure it is a concise and readable publication.

Step 4: Conduct a short evaluation about 6-8 months (as per the annex) following the activity to assess true impact especially on the participant's institution using a short survey assessing knowledge retained and follow up activities conducted.

General Facilitation Guidelines[1]

An important role of the facilitator is to ensure that s/he creates the best possible learning climate. For this to happen, seven important characteristics have to exist.

- Participants must want to learn.
- The content and process must be relevant and in context for the learner.
- Practice of the material or ideas must be an integral part of the training.
- Participants must translate ideas into their own words, allowing ownership of the learning.
- There must be a sense of creative tension formed in which people find a variety of ways to develop their learning.
- Participants must have an expectation that the learning will make their work more effective.
- Participants must have an expectation that the learning experience will be fun and positive.

The facilitator is responsible for creating a physical and psychological environment in which the participants can work and learn. As a rule of thumb facilitators must remember that country participants may come from varying economic, geographic backgrounds and from various administrative disciplines. Background knowledge on concepts may be divers, which adds to the richness of discussion. In addition, English is often a second language. The training may often be in English, but fluency in English language may be varied among participants – thus it is fundamental to test understanding during each opportunity possible.

For there to be a good training climate, the following factors must be present:

- Good physical conditions;
- Respect, acceptance, and trust;
- Encouragement of self-discovery;
- An atmosphere that encourages openness and participation;
- A consideration that differences are good and desirable;
- An understanding that individuals have a right to make mistakes;
- A recognition of the variety of ways that people learn;

[1] Source: UNHCR Facilitators Toolkit. Retrieved from: https://www.unhcr.org/4371d7c92.pdf

- An understanding of how individuals will use the learning. As the combination of factors varies from group to group, the facilitator must also consider the characteristics of the group being trained. This includes the preferred learning style of the participants (some learn through video, others through text and others more so through discussion).
- Accessibility for people with disabilities;

Guidelines for Effective Training Facilitation*

At the Start of Training ...

Set up the room to facilitate learning and group member interaction

Help group members feel welcome and comfortable -- with the environment, each other and the trainer

Build interest in the training topic

- Discuss why the training is important to participants
- Ask for and respond to participants' needs and interests
- Set realistic expectations together

Build participants' interest in each other as group members and learning resources

- Ask participants to briefly discuss their experience and the resources they can contribute
- Reinforce the ideas of valuing individual differences and recognizing each other as resources

Establish self as learning facilitator vs expert teacher

- Set norms for active participation
- Find ways to reinforce the initial contributions of other group members
- Encourage dialogue among group members vs only with trainer

Throughout the Training Remember these Rules of Thumb...

- ✓ Use a variety of instructional methods to keep interest high and the pace moving appropriately for participants
- ✓ Encourage questions and comments to help participants understand and "digest" key points
- ✓ Take the time to ensure that the majority of participants understand/have learned the topic at hand
- ✓ If training is in English - English is a second language for many UN country representatives
- ✓ Establish time for those who have further needs to discuss them with the trainer or other participants during breaks or after the session
- ✓ Ensure that the trainer's non-verbal behaviors encourage participant involvement and interactions with each other
- ✓ Move forward to ask questions
- ✓ Make open-handed gestures to signal a desire for comments, questions
- ✓ Show interest non-verbally in what participants have to say (relaxed listening posture, appropriate head nodding, eye contact)
- ✓ Shift eye contact from speakers to others, so that speakers will do the same
- ✓ Ensure that the trainer's verbal behaviors encourage participant learning and interactions with each other
- ✓ Ask direct questions of specific individuals
- ✓ Ask indirect questions of entire group
- ✓ Use different types of questions and reflections
- ✓ Ask if others can respond to a participant's question directed to the trainer
- ✓ Ask the questioner what s/he thinks before soliciting responses from others or giving a response
- ✓ Keep the group on task
- ✓ Manage time and group interactions effectively to accomplish objectives
- ✓ Make sure that "air time" is shared equitably
- ✓ Observe individual reactions and group interactions carefully; adjusting interactive style, questioning methods and/or instructional activities to respond to sensed needs or concerns
- ✓ Model effective active listening and self-disclosure skills
- ✓ Be willing and able to confront individual defensiveness or interpersonal conflict situations sensitively and skillfully
- ✓ Demonstrate care and respect for each participant's dignity and wellbeing as a human being and country representative
- ✓ Model recognition of, and appreciation for, diversity in line with UN core values
- ✓ Maintain a balance between intensity and lightness of effort and mood
- ✓ Encourage humor
- ✓ Support appropriate personal sharing or brief digressions
- ✓ Take opportunities to relax together
- ✓ Be sensitive and flexible enough to adjust planned activities as the need arises

Facilitation Guidelines for the Training Course on "Risk-informed Governance and Innovative Technology for Disaster Risk Reduction and Resilience"

This toolkit is a set of comprehensive training materials that aims to facilitate and strengthen capacities of government officials, academics, UN Country Teams to run training workshops on Risk-informed Governance and Innovative Technology for Disaster Risk Reduction and Resilience.

The training course consists mainly of 3 Modules subdivided into 11 sub-modules. The course is designed to cover a five-day training period. The materials and activities presented explores mechanisms for access, adoption, uptake, finance, and maintenance of emerging technology and seeks to advance public sector capacities for risk-informed policymaking and governance. The course consists of combination of the in-class lectures, seminars and course assignments. The feedback on the assignments will be given in-class, following groups' reporting. Full attendance and participation in the assignments is required to fulfill requirements of the course.

The training programme addresses the key issues on risk-informed governance and innovative technology for Disaster Risk Reduction and Resilience along three main dimensions/themes. Module 1 focuses on Science, Technology, and Innovation in Public Governance for DRR and Resilience for Risk-informed Governance. This Module is composed of three sub-modules and preceded by an introductory and concepts-driven introduction presentation for the first training day.

Module 2 on Practical and Planned Application of Emerging Technology and Innovation for DRR and Resilience is composed of five sub-modules covering the second day, all through the third day till the afternoon of the fourth day. This Module as well has a Site visit on the second day and Big Data Analysis Training on the fourth day.

Module 3 on Implementation of Emerging Technologies and Innovation for DRR and Resilience is composed of three sub-modules for the fifth day of the training program. The training program ends on the fifth day with a wrap-up session composed of an action plan preparation session and program evaluation. A supplementary Module on Strengthening Risk-informed Governance and Innovative Technology for Public Health Emergencies is also added to address current happening on COVID-19.,

Upon successful completion of this training course, participants will be able to:

- Apply concepts on how to establish public governance frameworks and close technology gaps for disaster risk reduction and sustainable development in vulnerable states;
- Be equipped with knowledge of how digital government solutions can be implemented to promote public service innovation for resilience;
- Define a strategy and roadmap on how to promote risk-informed governance, government innovation and expand the adoption of frontier technologies for disaster risk reduction and resilience;
- Mobilize the means of implementation to leverage innovations in technology through public programmes and finance and technology transfer; and
- Set up plans to measure progress on disaster risk reduction and resilience through innovative technologies.

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Day 1: Course Introduction and Science, Technology, and Government Innovation in Public Governance for DRR and Resilience

Time	Activity	Notes/ Learning outcome	Resources
09:00 - 10:00 (60 mins)	Welcomes, introduction, icebreaker	Facilitators introduce themselves and any guest speakers and provide programme overview and the purpose and objectives for the week. In this opening session, participants and facilitating team introductions are undertaken. The facilitating team explains to participants how the course will be administered, which includes an overview of program policies and facility emergency procedures. The facilitator will also explain the course structure, format, and evaluation methods, and provide a summary of the topics and activities that will be included in the five days of facilitation that follow. Icebreaker: Part of the introduction is that participants share some key issues from their self-assessment. What has brought you here? What is a main challenge you or your organization/country face in relation to adopting risk-informed governance and innovative technology for DRR and resilience? What would you like to learn from this workshop and what are your main expectations? *(Note: The course material contains detail document on this activity)*	Slides Day 1 Flip charts, Post-its, markers and sharpies
10:00 - 10:30 (30 mins)	Presentation: Module 1.1 Risk-Informed Governance for DRR and Resilience	This module introduces, defines, and explains at both the theoretical and technical levels emergency and disaster risk management and resilience building efforts. Participants are to reflect on what and where data informs risk planning and how risks are integrated into current planning and decision-making. The module explains and facilitate the understanding of the requirement of effective institutions for the achievement of the 2030 Agenda. Participants will be introduced an approach to supporting and strengthening institutions as well as the 'Principles of Effective Governance for Sustainable Development' developed by the Committee of Experts on Public Administration (CEPA). Participants are also to share and learn about their specific country risk profiles according to PreventionWeb country data. Risk-informed governance and decision-making are addressed Learning outcomes: Ability to explain how risk-informed governance and innovative technologies improve the disaster management planning process, and how official and citizen disaster preparedness efforts might be improved as a result of new technology applications. Understanding of the range and diversity of functions of government that support disaster risk management and how technologies can streamline risk information across government.	Slides Day 1 and slide by slide description

10:30 - 11:00 (30 mins)	Activity: Visioning Exercise on risk-informed governance	The facilitators lead a discussion on: What does risk-governance for DRR look like in their own country? What would it take in terms of the key building blocks of risk governance (People, Processes and Mechanism) to ensure resilience? *(Note: The course material contains detail document on this activity)*	Flip charts, Post-its, markers and sharpies
11:00 - 11:10	Break		
11:10 - 11:40 (30 mins)	Presentation: Module 1.1 Risk-Informed Governance for DRR and Resilience	Module 1.1 Continued	Slides Day 1 and slide by slide description
11:40 - 12:00 (20 mins)	Activity: Event Versus Disaster	Module 1.1 Continued What is the defining threshold for a disaster in your country? Is this threshold easily defined? What are the characteristic differences between an event that is adequately managed, and one that the public or the media would deem to be disastrous? *(Note: The course material contains detail document on this activity)*	Flip charts, Post-its, markers and sharpies
12:00 - 13:00	LUNCH		
13:00 - 13:45 (45 mins)	Presentation: Module 1.2: Science, Technology, and Government Innovation for Risk-Informed Governance	This This session provides a foundational context for the application of technology in emergency and disaster management, and for the enhancement of resilience. Instructional materials allow participants to better conceptualize the purpose and nature of technological innovation as it applies in a theoretical sense and as it supports the achievement of societal and public sector goals including sustainable development. A conceptual basis of data and information, both of which play important roles in the furtherance of science and the adoption of new technologies and innovations, is provided. The importance of new technologies in collecting data and informing decision-making in public governance and planning in disaster prevention phases and risk mitigation is discussed. Learning outcomes: Ability to define science and technology, and innovation, and to understand what qualifies a system or solution as being "emerging" or "disruptive". Ability to explain what resilience is, and how it applies to individuals, communities, organizations, and societies with increased understanding of the ways science and technology may be used to support society and governance, including the pursuit of	Slides Day 1 and slide by slide description

		sustainable development goals.	
13:45 - 14:30 (45 mins)	Activity: Importance of ICTs in modern governance and society	Why are ICTs so critical in modern governance and society? Consider that: More than half of the world's population is now online. Mobile access to basic telecommunication services is becoming ever more predominant. Broadband access continues to demonstrate sustained growth. Almost the whole world population now lives within range of a mobile-cellular network signal. Internet access at home is gaining traction. *(Note: The course material contains detail document on this activity)*	Flip charts, Post-its, markers and sharpies
14:30 - 14:40	BREAK		
14:40 - 15:10 (30 mins)	Presentation: Module 1.2: Science, Technology, and Government Innovation for Risk-Informed Governance	Module 1.2 Continued	Slides Day 1 and slide by slide description
15:10 - 15:30 (20 mins)	Activity: Link between E-Government, Smart Cities, and Emerging Technologies Adoption	Divide participants into smaller groups of 4-6 people. Each group should sit around a table with a flipchart paper sheet and marker pens placed on it. Give the participants 20 minutes to answers the questions. Is the existence of or progress towards E-Government or Smart City a requirement for the successful adoption of new technologies for DRR and resilience? What kinds of changes are occurring in the DRM sector because of technology disruption? *(Note: The course material contains detail document on this activity)*	Flip charts, Post-its, markers and sharpies
15:30 - 15:40	BREAK		
15:40 - 16:30 (50 mins)	Presentation: Module 1.3: Global, Regional, and National Efforts to Advance Innovative Technologies Use in DRR and Resilience	This module highlights that improving technological innovation in support of disaster risk reduction and sustainable development, and expanding access to the products of innovation, are complementary efforts that play a central role in the Sendai Framework and the 2030 Agenda for Sustainable Development. Participants will learn how these and other efforts support the expanded use of technology in support of evidence-based policy making and risk-informed governance for resilience and regional level. The practice of developing science and technology national strategies and how these are integrated into national development strategies is included. Learning outcomes: Ability to describe how the 2030 Agenda for Sustainable	Slides Day 1 and slide by slide description

		Development and the Sendai Framework address the need for scientific and technological innovation. Enhanced capacity to promote or support creation and/or advancement of national science and technology strategies.	
16:30 - 17:00 (30 mins)	Activity: Focus of S&T in the Sendai Framework	Divide the participants into small groups or pairs. The focus of the Roadmap is very much on data and information. The Facilitator can initiate a discussion about whether these expected outcomes fully capture the range of capabilities offered from ongoing scientific research, discovery, and innovation. The Facilitator may note that the focus of the roadmap expected outcomes is on data and information. Participants may wish to refer to the lessons from Module 1, Session 1 in this discussion. Is data and information the sole focus? Does that adequately capture all desired capabilities? If not, what is missing?. *(Note: The course material contains detail document on this activity)*	Flip charts, Post-its, markers and sharpies
17:00 - 17:15	Wrap-up & Reflection	Discuss takeaways, questions, thoughts and concerns	

Day 2: Practical and Planned Application of Emerging Technology and Government Innovation for DRR and Resilience

Time	Activity	Notes/ Learning outcomes	Resources
9:00 - 9:05 (05 mins)	EQ Check in	Remind participants of the day's agenda and objectives	
9:05 - 9: 45 (40 mins)	Presentation: Module 1.4: Risk-informed Governance and Innovative Technology for Public Health Emergencies	Public health is constantly threatened by a wide range of hazards and disasters. Despite measures to prevent them, emergencies of varying types, scales and consequences still occur. Emergency preparedness is a continuous process in which action, funding, partnerships, and political commitment at all levels must be sustained. The overall responsibility for safeguarding, maintaining, and restoring the health and wellbeing of communities lies with national governments. Strengthening governance capacities and leveraging innovative technologies is critical for public health emergencies. This session presentation and discussions will focus on the role of risk-informed governance and innovative technology for public health emergencies including COVID-19 pandemic. Learning outcome: Increased understanding on the role of Risk-Informed Governance and Innovative Technologies for Public Health Emergencies; Understand the contribution of Science, Technology and Innovation to DRR in the context of COVID-19; Strengthened capacity on the entire process of preparedness, prevention, response and post-recovery to respond to public health emergencies including COVID-19 pandemic.	Slides Day 2 and slide by slide description
9:45 - 10: 00 (15 mins)	Activity: Focus on Public Health Emergencies	The Facilitator leads a discussion on the role of innovative technologies in promoting DRR and resilience including public health emergencies such as COVID-19 pandemic.	Flip charts, Post-its, markers and sharpies
10:00 - 10:40 (40 mins)	Presentation: Module 2.1: Extending Our Reach and Expanding Our Capabilities	Participants study a range of new technologies and innovations that are enabling public sector organizations to expand their sensing, planning, and operational capabilities. Unmanned vehicles, whether designed for aerial, terrestrial, or aquatic movement, are finding new application in almost every aspect of disaster risk management with examples including the remote study of land, water, and man-made features and facilities; the identification and monitoring of threatening hazards and conditions; the assessment of disaster damages and impacts; the expansion of information and communications technology (ICT) systems' reach; and the conduct of operational response and recovery tasks such as relief delivery. Learning outcome: Strengthened capacity to request and utilize imagery produced using in-situ and remote sensing systems in order to better reduce the risk of, plan for, respond to, and recover from disasters. Capacity to recognize pre- and post-disaster scenarios	Slides Day 2 and slide by slide description

		where unmanned vehicle technologies, robotics, or in-situ and remotely-sensed imagery can provide informational or operational support.	
10:40 - 11:00 (30 mins)	Activity: Using Unmanned Vehicles to Do Our Work	Divide participants into smaller groups of 4-6 people. Each group should sit around a table with a flipchart paper sheet and marker pens placed on it. Why would an emergency management stakeholder choose to use a UAV to deliver relief supplies instead of delivering the supplies in person? What conditions would make UAV delivery of relief supplies impractical? *(Note: The course material contains detail document on this activity)*	Flip charts, Post-its, markers and sharpies
11:00 - 11:10	Break		
11:10 - 11:40 (30 mins)	Presentation: Module 2.1 : Extending Our Reach and Expanding Our Capabilities	Module 2.1 Continued	Slides Day 2 and slide by slide description
11:40 - 12:00 (20 minutes)	Activity: Benefits of Using Unmanned Vehicles for Hazard Mapping, Monitoring, and Detection	Module 2.1 Continued What advantages do unmanned vehicles have over traditional methods when it comes to these three functions? Participants may have additional thoughts to offer? **Advantages of Using Unmanned Vehicles for Disaster Assessments** What advantages do drones offer disaster management stakeholders in terms of supporting situational awareness or collecting damage assessment data? How have unmanned vehicles supported disaster assessment in your country? *(Note: The course material contains detail document on this activity)*	Flip charts, Post-its, markers and sharpies
12:00 - 13:00	LUNCH		
13:00 - 17:00 (30 mins)	Site Visit: Innovative Technologies for DRR and Resilience in Practice	Participants will visit a facility that utilizes one or more of the innovative technologies detailed in Module 4 (Innovative Technologies Overview). Learning outcome: Enhanced knowledge on innovative technologies for DRR and resilience in practice.	Slides Day 2 and slide by slide description
17:00- 17:15	Wrap-up & Reflection	Discuss takeaways, questions, thoughts and concerns	

Day 3: Practical and Planned Application of Emerging Technology and Innovation for DRR and Resilience

Time	Activity	Notes/ Learning objective/ Take away/ Link to worksheet	Resources
9:00 - 9:10 (10 mins)	EQ Check-in	Remind participants of the day's agenda and objectives	
9:10 - 9: 50 (40 mins)	Presentation: Module 2.2: Changing How We Make and Acquire Things	In this session, participants explore how new technological advancements and innovations in manufacturing and construction are improving our abilities to prevent disasters from happening and recovering successfully from them when they do. Learning outcome: Ability to identify where access to 3-D printing technology will support planning and/or operations. Enhanced knowledge about new construction materials and methods, including when and where they are appropriate, and the benefits gained through their application.	Slides Day 3 and slide by slide description
9:50 - 10:50 (60 mins)	Activity 1: Use of Manufactured Goods in the Disaster Context	For each of the disaster management phases (preparedness, Mitigation, Response, and Recovery), identify one product that typifies that function. Identify the manufacturing process that is used to created it. Identify any challenges that might exist with respect to procurement of that product using these traditional methods. For example: Child-sized surgical tools are often unavailable in disaster clinics. These are produced through a variety of manufacturing methods, including machining, injection moulding, joining, and forming. In the early days of disasters, it can be difficult to transport these needed implements into the disaster area if transportation routes are blocked, or if communications systems are nonfunctional. *(Note: The course material contains detail document on this activity)*	Flip charts, Post-its, markers and sharpies
10:50 - 11:00	Break		
11:00 - 11:40 (30 mins)	Presentation: Module 2.3: Connecting People, Things, and Technology	The interconnectedness of people to people, people to things, and things to things, coupled with improved capacity to transfer information electronically, is changing how risks and disasters are managed. New communications technologies, namely fifth generation (5G) cellular network data transmission, are allowing devices to collect and transmit information on a previously-unimaginable scale. Expansion of existing technologies for new uses, as is occurring with SMS texting, is further improving crisis, emergency, and risk communication, including between citizen responders and their governments. Mesh networks are expanding the reach of existing infrastructure and helping to manage in situations where infrastructure doesn't exist or has been impacted by disasters. The nature	Slides Day 3 and slide by slide description

		of information collected is also expanding on account of the transmission capacity. . New infrastructure systems and linkages are expanding access even in situations where traditional networks are nonexistent, damaged, or otherwise nonfunctional. Distributed ledger ('blockchain') technology, is also helping in this regard, namely through the improvement of availability and fidelity of disaster-related information, and in the process is solving many longstanding problems related to transparency and equitable relief and recovery as well as supporting more effective planning and disaster financing. Learning outcomes: Ability to explain how 5G and IoT are improving hazard monitoring, alert, and warning. Increased understanding of the information management and sharing capabilities afforded by new and emerging technologies and the ability to incorporate distributed ledger technology into relief and recovery plans and policies.	
11:40 – 12:00 (20 mins)	Activity: The Computer in Your Pocket	Divide participants into smaller groups of 4-6 people. Each group should sit around a table with a flipchart paper sheet and marker pens placed on it. As communications technologies have continued to evolve, the prevalence and capacity of mobile phones are perhaps the most obvious examples of how ICT has changed our lives. These devices have put almost all the standard computing capabilities of traditional laptop and desktop computers within reach of people in all countries. With this powerful resource on our person at almost all times, our ability to utilize ICT for disaster risk management has expanded considerably. The Facilitator can lead a discussion with participants about the different activities that they can do, or that they can do better or more efficiently, whether before, during, or after a disaster. What is the specific technology that is contained in the mobile phone that gives people these capabilities?. *(Note: The course material contains detail document on this activity)*	Flip charts, Post-its, markers and sharpies
12:00 - 13:00	LUNCH		
13:00 - 13:50 (50 mins)	Presentation: Module 2.3: Connecting People, Things, and Technology	Module 2.3 Continued	Slides Day 3 and slide by slide description
13:50 - 14:40 (50 mins)	Activity 1: How Can Cloud Computing Enhance Disaster Risk Management	The Facilitator can divide the participants into groups of 4 or 5 participants per group. Each group should develop a list of four ways that cloud computing contributes to disaster risk management, providing one example for each disaster management phase (mitigation, preparedness, response, and recovery). Participants should explain if this capability is currently being applied in their country and relate any challenges that were encountered (or	Flip charts, Post-its, markers and sharpies

		that are preventing the technology use altogether). **IoT-based Training Needs** As a distinct domain, IoT requires a significant amount of training for different sectors and people. No specific agency or office oversees IoT, because it is not a thing that is installed or maintained. Rather, like the internet, it is just there. Its utility is almost universal, and many staff will need to understand how it works and how it impacts their own job functions. The facilitator can lead a discussion on the different aspects of training that will need to be addressed to ensure that IoT is effectively harnessed for DRM and community resilience. Who needs to be trained? What are the different topics of training? What are the training and education priorities? Who is best positioned to conduct training and education for IoT? *(Note: The course material contains detail document on this activity)*	
14:40 – 15:00	Break		
15:00 – 15:50 (50 mins)	Presentation: Module 2.4: Improving Data Analysis and the Presentation of Information	Data and information are collected through myriad channels and means in advance of, during, and in the aftermath of a disaster, and new and innovative technologies are significantly expanding the pool of options. Once collected, data remains of little value without the capacity to assess, analyze, and report it in a manner that supports effective decision-making. In this session, participants look at how advanced computing capacity and software options are being used to analyze massive quantities of data collected on grand scales ('big data') to support decision makers, and how those same systems are enabling wider access to visualization of data and information usable even by practitioners with little to no training in geographic information systems use. Learning outcome: Ability to incorporate existing big data analysis systems into planning and response. Understanding of the range of big data that is being collected by different stakeholders, and the importance of data standards and open data policies to support its use in disaster risk management. Ability to understand how virtual and augmented reality are increasing cognition and improving resilience.	Slides Day 3 and slide by slide description
15:50 – 17:00 (70 mins)	Activity 2: Big Data in Government	Anyone using a smartphone or computer is already using big data. Mapping applications, for instance, draw information from thousands or perhaps millions of users to identify the fastest and most efficient routing in real time. The phone itself is not processing the Big Data – rather it has been enabled to display the product of Big Data Analysis, which is occurring elsewhere (typically using cloudbased systems). The Facilitator can ask Participants to identify one way that their own government is using Big Data, whether for disaster risk reduction, development, or some other aspect of resilience.	Handout

		What is the purpose of this use? How was this action or effort conducted previously? What benefits have been gained as a result of access to Big Data technologies? What are the requirements of using Big Data in this manner (e.g., hardware, software, training, knowledge, authorities, other). *(Note: The course material contains detail document on this activity)*	
17:00 - 17:15	Wrap-up & Reflection	Discuss takeaways, questions, thoughts and concerns	

Day 4: Practical and Planned Application of Emerging Technology and Innovation for DRR and Resilience

Time	Activity	Notes/ Learning objective/ Take away/	Resources
9:00 - 9:10 (10 mins)	EQ Check-in	Remind participants of the day's agenda and objectives	
9:10 - 9:30 (20 mins)	Presentation: Module 2.4: Improving Data Analysis and the Presentation of Information	Module 2.4 Continued	Slides Day 4 and slide by slide description
9:30 -10:00 (30 mins)	Activity: Data Sources and Stakeholders	Divide participants into smaller groups of 4-6 people. Each group should sit around a table with a flipchart paper sheet and marker pens placed on it. There are differences in each country with regards to who generates data and who owns or controls that data. The Facilitator can divide Participants into groups of 1 to 4 Participants. The facilitator should provide for the participants the following list of data types (the Facilitator can add additional data types to this list). Each group should select five of these data types to consider in their own country (or countries). Questions to answer include: What public, private, and/or nongovernmental sector organizations generate this type of data? Who maintains this data? Is access to this data limited or otherwise impacted by any laws? *(Note: The course material contains detail document on this activity)*	Flip charts, Post-its, markers and sharpies
10:00 - 10:50 (50 mins)	Presentation: Module 2.5: Humans as a Resource	Citizens are assuming an increasingly critical role in the informational aspects of society, and social activities themselves, through the many mechanisms for interconnectedness and communication that have been developed. Social media and the prevalence of communications technologies including mobile phones is enabling individuals to support pre- and post-disaster response and recovery operations, both of official responders and the actions of other citizens and organizations. Through participation in research and other studies, citizens are contributing to the generation and improvement of information and are helping to support different aspects of disaster risk management including monitoring, notification, assessment, crisis communication, and other functions. Citizens are also contributing indirectly through the prevalence of social media, which response organizations can utilize to improve situational awareness. Social media organizations are likewise tapping into their unique access to support emergency operations and situational awareness by communicating with their	Slides Day 4 and slide by slide description

		members and subscribers. Learning outcome: Capacity to utilize social media for expanded situational awareness in disasters, and to conduct two-way information sharing with the public. Ability to understand how crowdsourcing and citizen science supports risk-informed decision-making.	
10:50 -12:00 (70 mins)	Activity: Engagement for Resilience	Divide participants into smaller groups of 4-6 people. Each group should sit around a table with a flipchart paper sheet and marker pens placed on it. Give the participants70 minutes to answers the questions shown in Slide 8, 9, and 16. *(Note: The course material contains detail document on this activity)*	Flip charts, Post-its, markers and sharpies
12:00 - 13:00	LUNCH		
13:00 - 17:00 (30 mins)	Big Data Analysis Training	Participants will receive a 4-hour training in GIS Analytics and Big Data Analysis. Participants will receive a practitioner account that enables them to use the platform for disaster risk management purposes on completion of the course.	
17:00 - 17:15	Wrap-up & Reflection	Discuss takeaways, questions, thoughts and concerns	

Day 5: Implementation of Emerging Technologies and Government Innovation for DRR and Resilience

Time	Activity	Notes/ Learning objective/ Take away/	Resources
09:00 - 09:20 (20 mins)	Check-in	Remind participants of the day's agenda and objectives. Reflect on what has been studied during the week	
09:20 – 10:10 (50 mins)	Presentation: Module 3.1: Implementing and Financing Technology Solutions	In this session, participants explore the mechanisms by which community and national government planners identify, access, and implement technology solutions and innovations. Instructional materials will cover the various stakeholders involved in the implementation process, and the requirements and mechanisms for expanding access to technologies as beneficiary or user. Materials will focus on many of the key requirements for adopting emerging technologies, such as data preparedness, public education and staff training, and systemization and standardization, among others. Participants will also explore the mechanisms through which countries and communities may finance emerging technologies adoption and maintenance. Explored options will include technology funds, partnership with the private sector, official development assistance, and others. Development partnerships, agreements, and knowledge transfer platforms that support innovative technologies uptake and adoption will also be covered in this session. Learning outcome: Enhanced ability to recognize and understand the roles that different stakeholders play in the adoption and use of emerging technologies. Increased knowledge of the requirements countries and communities face before a technology is adopted, during its use, and for long-term maintenance of the capacity. Strengthened capacity to recognize and assess risks associated with the adoption of emerging technologies. Increased capacity to assess, prioritize, and pursue financing options to address emerging technology needs. Increased awareness of regional and global partnerships and efforts aimed at expanding access to and uptake of emerging technologies, including South-South and triangular cooperation.	Slides Day 5 and slide by slide description
10:10 – 10:50 (40 mins)	Activity: Capacity Domains in the Context of Emerging Technology	The Facilitator can initiate a discussion on the importance of addressing each of the capacity domains for any emerging technology. For instance, fostering increased use of robotics technologies requires more than simply supporting acquisition of off-the-shelf robotic systems, or tasking the country's laboratories. This discussion can either take place as a discussion with all Participants discussing a single technology at length, or dividing the participants into four groups, each with a single technology to discuss and report to the audience. For a group discussion, drone technology may provide the best illustration of how capacity must be developed in all four domains. Participants are requested to complete the matrix by answering the questions that is provided in the separate handout.	Flip charts, Post-its, markers and handout

		Participants present back main gaps and recommendations. *(Note: The course material contains detail document on this activity)*	
10:50 – 11:00	Break		
11:00 – 11:30 (30 mins)	Presentation: Module 3.1: Implementing and Financing Technology Solutions	Module 3.1 Continued	Slides Day 5 and slide by slide description
11:30 – 12:00 (30 mins)	Activity: Capacity Domains in the Context of Emerging Technology	The Facilitator can initiate a discussion on the importance of addressing each of the capacity domains for any emerging technology. For instance, fostering increased use of robotics technologies requires more than simply supporting acquisition of off-the-shelf robotic systems, or tasking the country's laboratories. This discussion can either take place as a discussion with all Participants discussing a single technology at length, or dividing the participants into four groups, each with a single technology to discuss and report to the audience. For a group discussion, drone technology may provide the best illustration of how capacity must be developed in all four domains. *(Note: The course material contains detail document on this activity)*	Flip charts, Post-its, markers and handout
12:00 - 13:00	LUNCH		
13:00 – 13:40 (50 mins)	Presentation Module 3.2: Technology Gaps and Challenges to Implementation of Government Innovation for DRR and Resilience	In Session 2, participants will explore the problems associated with emerging technologies that are largely to blame for disparities in their use between different regions and countries. Materials will look deeper into the roots of the 'digital divide' consider how such gaps can work in a country's favor in terms of 'leapfrogging' existing capacity. Institutional barriers to access, uptake, and utilization will be examined, from the public institutions that support them to the ability of the emergency management community to reach the 'last-mile' of delivery. In this session, participants also explore the impacts of technology use, understanding that implementation and/or access rarely comes without some cost. Learning outcome: Increased understanding of the primary barriers to access, adoption, and utilization of emerging technologies, including the strength of public institutions, institutional knowledge and brain-drain, political challenges and policy restrictions, public investment problems, donor rigidity, infrastructure dependencies, and more. Increased appreciation for the requirements for maintaining adopted technologies, including financial costs, staff training, and cascading dependencies.	Slides Day 5 and slide by slide description

13:40 – 14:50 (70 mins)	Activity: Bridging the Digital Divide	Many developing countries have limited resources, weak ICT infrastructure and insufficient skills capacity contributing to digital divide. For this activity, the Facilitator can group students into teams of 3 or 4 Participants each to help address these questions: What are they key factors in your country that could help to bridge the digital divide? What is needed at the national and local levels to help bridge this gap? *(Note: The course material contains detail document on this activity)*	Flip charts, Post-its, markers and handout
14:50 – 15:00	Break		
15:00 – 15:30 (30 mins)	Presentation: Module 3.3: Measuring Progress: Monitoring and Evaluation of Implementation Efforts	The scale and scope of the 2030 Agenda for Sustainable Development, which has 231 indicators, present a challenge for governments to effectively monitor and evaluate progress. There is a need to ensure that efforts are informed by evidence and that necessary data are available to track progress and promote accountability, particularly for communities at risk of being left behind. The SDGs will be monitored and assessed through a system of 231 indicators. Many of these indicators can be localized by gathering data at the territorial level. This module focuses on monitoring and evaluation at the national to the local level. Key messages: Monitoring and evaluating progress within the SDGs poses several challenges for local and subnational governments, as there are many possible differences between cities, including geographical, socioeconomical and governmental, which make it difficult to select globally applicable and meaningful indicators. In addition, because the SDGs will largely be implemented at the local level, specific city-level indicators will be necessary. A ”data revolution” – which must be accompanied by a much needed data ”presentation revolution” – is critical for achieving the vision of the 2030 Agenda: at all levels of government, well-presented, intuitive and communicable data can strengthen decision-making, progress measurement, and the transparency and accountability of the entire SDG framework. Learning outcome: Provide support to local and national governments and to motivate monitoring and evaluation that embodies the principles of 2030 Agenda: integration, equity, resilience, environmental sustainability, universality, mutual accountability, and leaving no one behind	Slides Day 5 and slide by slide description
15:30– 16:00 (30 mins)	Activity: Completion and presentation of Action Plan on Change Project	The Action Plan preparation on the Change Project is an exercise which aims to apply the knowledge and the concept learned during the training workshop to real life challenges in the participant’s own organization and context. It aims to identify, brainstorm, apply concepts and tools from the lessons, and draw realistic action plans to address the challenge in localizing the SDGs. Prior to beginning of the training workshop, the participants are asked to select a project that s/he would like to implement upon a completion of the training. The Change Project can be focused either on the specific development challenge or on creating	Handout

		institutional/organizational changes towards implementation of SDGs. The individual project will be shared by each participant on the first day of the workshop. Throughout the workshop, the Change Project will be gradually developed with reference to each day's learning. *(Note: The course material contains detail document on this activity)*	
16:30 - 17:00	Wrap-up & Reflection	Course Evaluation by Participants & Closing Session	

Evaluation Background

Kirkpatrick's Four-Levels of Training Evaluation Model

The Kirkpatrick Four-Level Training Evaluation Model is designed to objectively measure the effectiveness of training. By analyzing each level, one is able to gain an understanding of how effective a training initiative was, and how to improve it in the future. Any time a training exercise is delivered to a team, there is the need to know how effective it's been. Thus, are people putting their learning into practice? Is it positively impacting their role and the wider organization? Each successive level of the model represents a more precise measure of the effectiveness of a training program[2].

Kirkpatrick's Four-Levels of Training Evaluation Model[3],[4]

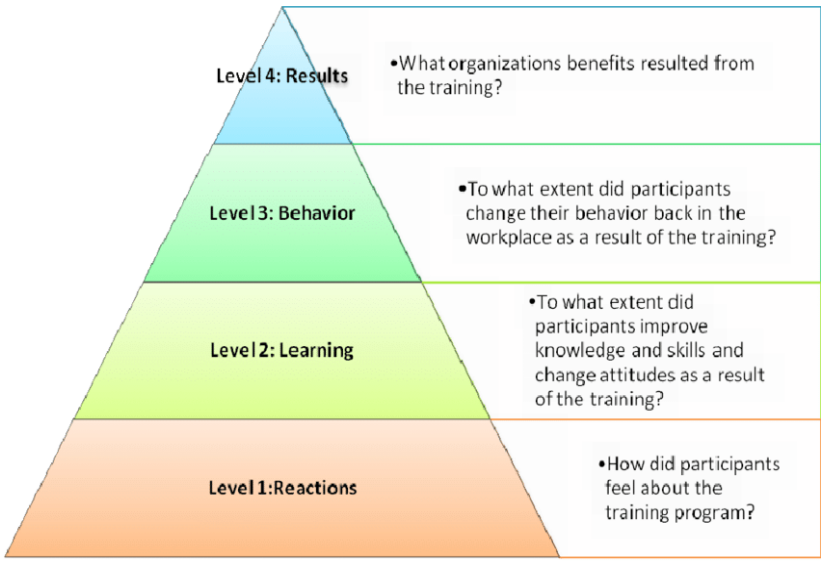
EVALUATION TYPE	EVALUATION DESCRIPTION AND CHARACTERISTICS	EXAMPLES OF EVALUATION TOOLS AND METHODS	RELEVANCE AND PRACTICABILITY
LEVEL 1 REACTION	▪ **Reaction evaluation** is **how the delegates felt**, and their **personal reactions to the training or learning experience**, for example: ▪ Did the trainees like and enjoy the training? ▪ Did they consider the training relevant? ▪ Was it a good use of their time? ▪ Did they like the venue, the style, timing, domestics, etc.? ▪ Level of participation. ▪ Ease and comfort of experience. ▪ Level of effort required to make the most of the learning. ▪ Perceived practicability and potential for applying the learning.	▪ Typically, 'happy sheets'. ▪ Feedback forms based on subjective personal reaction to the training experience. ▪ Verbal reaction which can be noted and analyzed. ▪ Post-training surveys or questionnaires. ▪ Online evaluation or grading by delegates. ▪ Subsequent verbal or written reports given by delegates to managers back at their jobs.	▪ Can be done immediately the training ends. ▪ Very easy to obtain reaction feedback ▪ Feedback is not expensive to gather or to analyze for groups. ▪ Important to know that people were not upset or disappointed. ▪ Important that people give a positive impression when relating their experience to others who might be deciding whether to experience same.

[2] https://www.ag.ndsu.edu/evaluation/documents/kirkpatricks-four-levels-of-training-evaluation-in-detail
[3] http://www.ct.gov/ctdn/lib/ctdn/ttt_14_m5_handouts2.pdf
[4] https://www.kirkpatrickpartners.com/Our-Philosophy/The-Kirkpatrick-Model

LEVEL 2 LEARNING	▪ **Learning evaluation** is the measurement of the **increase in knowledge or intellectual capability** from before to after the learning experience: ▪ Did the trainees learn what was intended to be taught? ▪ Did the trainee experience what was intended for them to experience? ▪ What is the extent of advancement or change in the trainees after the training, in the direction or area that was intended?	▪ Typically, assessments or tests before and after the training. ▪ Interview or observation can be used before and after although this is time-consuming and can be inconsistent. ▪ Methods of assessment need to be closely related to the aims of the learning. ▪ Measurement and analysis is possible and easy on a group scale. ▪ Reliable, clear scoring and measurements need to be established, so as to limit the risk of inconsistent assessment. ▪ Hard-copy, electronic, online or interview style assessments are all possible.	▪ Relatively simple to set up, but more investment and thought required than reaction evaluation. ▪ Highly relevant and clear-cut for certain training such as quantifiable or technical skills. ▪ Less easy for more complex learning such as attitudinal development, which is difficult to assess. ▪ Cost escalates if systems are poorly designed, which increases work required to measure and analyze.
LEVEL 3 BEHAVIOR	▪ **Behavior evaluation** is the extent to which the trainees **applied the learning** and **changed their behavior**, and this can be immediately and several months after the training, depending on the situation: ▪ Did the trainees put their learning into effect when back on the job? ▪ Were the relevant skills and knowledge used ▪ Was there noticeable and measurable change in the activity and performance of the trainees when back in their roles?	▪ Observation and interview over time are required to assess change, relevance of change, and sustainability of change. ▪ Arbitrary snapshot assessments are not reliable because people change in different ways at different times. ▪ Assessments need to be subtle and ongoing, and then transferred to a suitable analysis tool. ▪ Assessments need to be designed to reduce subjective judgment of the observer or interviewer, which is a variable factor that can affect reliability and	▪ Measurement of behavior change is less easy to quantify and interpret than reaction and learning evaluation. ▪ Simple quick response systems unlikely to be adequate. ▪ Cooperation and skill of observers, typically line-managers, are important factors, and difficult to control. ▪ Management and analysis of ongoing subtle assessments are difficult, and

	▪ Was the change in behavior and new level of knowledge sustained? ▪ Would the trainee be able to transfer their learning to another person? ▪ Is the trainee aware of their change in behavior, knowledge, skill level?	consistency of measurements. ▪ The opinion of the trainee, which is a relevant indicator, is also subjective and unreliable, and so needs to be measured in a consistent defined way. ▪ 360-degree feedback is useful method and need not be used before training, because respondents can make a judgment as to change after training, and this can be analyzed for groups of respondents and trainees. ▪ Assessments can be designed around relevant performance scenarios, and specific key performance indicators or criteria. ▪ Online and electronic assessments are more difficult to incorporate - assessments tend to be more successful when integrated within existing management and coaching protocols. ▪ Self-assessment can be useful, using carefully designed criteria and measurements.	virtually impossible without a well-designed system from the beginning. ▪ Evaluation of implementation and application is an extremely important assessment - there is little point in a good reaction and good increase in capability if nothing changes back in the job, therefore evaluation in this area is vital, albeit challenging. ▪ Behavior change evaluation is possible given good support and involvement from line managers or trainees, so it is helpful to involve them from the start, and to identify benefits for them, which links to the level 4 evaluation below.
LEVEL 4 RESULTS	▪ **Results evaluation** is the **effect on the business or environment** resulting from the improved performance of the trainee - it is the acid test. ▪ Measures would typically be business or organizational key performance indicators, such as: ▪ Volumes, values, percentages, timescales, return on	▪ It is possible that many of these measures are already in place via normal management systems and reporting. ▪ The challenge is to identify which and how relate to the trainee's input and influence. ▪ Therefore, it is important to identify and agree accountability and relevance with the trainee at the start of the training, so they	▪ Individually, results evaluation is not particularly difficult; across an entire organization it becomes very much more challenging, not least because of the reliance on line-management, and the frequency and scale of changing structures, responsibilities and roles, which

	investment, and other quantifiable aspects of organizational performance, for instance; numbers of complaints, staff turnover, attrition, failures, wastage, non-compliance, quality ratings, achievement of standards and accreditations, growth, retention, etc.	understand what is to be measured. ▪ This process overlays normal good management practice - it simply needs linking to the training input. ▪ Failure to link to training input type and timing will greatly reduce the ease by which results can be attributed to the training. ▪ For senior people particularly, annual appraisals and ongoing agreement of key business objectives are integral to measuring business results derived from training.	complicates the process of attributing clear accountability. ▪ Also, external factors greatly affect organizational and business performance, which cloud the true cause of good or poor results.



Four Levels of Evaluating Training – Kirkpatrick Method[5]

[5] https://www.researchgate.net/figure/Kirkpatricks-four-levels-of-evaluation-model_fig1_265425958

Learning Network on Capacity Development (LenCD)[6]

The LenCD Learning Package provides an overview of the core concepts and principles of capacity development, practical 'how-to' guides, and a trainer/facilitator's guide and materials. To measure capacity outcomes and results for different levels and contexts, it is necessary to set up a capacity measurement system which involves these action steps:

- **Decide who needs to be involved and how.** All capacity development processes have many stakeholders, some who are involved from start to finish; others who only participate in part of the process. There will be a constantly changing group whose needs have to be accommodated. It is important to guard against approaches that only answer the needs of only one type of stakeholder. Measurements need to be meaningful to all actors identified as relevant to the process.
- **Decide what needs to be measured and the criteria for measurement.** There is no single, universally agreed set of capacity development dimensions to use in a measurement system. Measurement dimensions need to be specific to the context and cover all levels – individual, organizational, sectoral and institutional, types of capacity – hard and soft, and the themes for application in any capacity development framework being used.
- **Create a measurement framework to fit the context.** Creating a specific framework can ensure that the measurement process and tools fit the capacity development process. The dimensions and criteria discussed above can be used to identify a starting point, which could be: inputs and outputs, outcomes, or impact. Using an iterative approach i.e. deciding where to start and doing the details one step at a time (rather than trying to map out the whole thing at the start) allows for effective response to what is emerging and any changes in the environment.
- **Test the framework.** The framework needs to be first tested, and later reviewed regularly, for relevance and practicality before it is put to extensive use.
- **Select tools.** When tools are being selected it should be remembered that: all tools should be adapted to local context and needs; all tools have advantages and disadvantages according to context, and this should be taken into account when using them; and, a mix is needed to cover all the different measurement requirements i.e. different tools will be needed at different stages in the process. Some tools to consider are: outcome mapping; stories of change; most significant change; case studies; random sampling; tracer studies; ladder of change; theory-based evaluation; rapid appraisal methods; cost-benefit and cost-effectiveness analysis; Logical Framework; and public expenditure tracking surveys.

[6] http://lencd.org/group/effective-institutions

Annex I – Agenda at a Glance and Day by Day

Risk-informed Governance and Innovative Technology for Disaster Risk Reduction and Resilience					
Time	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**
Modules	**Science, Technology, and Government Innovation in Public Governance for DRR and Resilience**	**Practical and Planned Application of Emerging Technology and Government Innovation for DRR and Resilience**	**Practical and Planned Application of Emerging Technology and Innovation for DRR and Resilience**	**Practical and Planned Application of Emerging Technology and Innovation for DRR and Resilience**	**Implementation of Emerging Technologies and Government Innovation for DRR and Resilience**
Morning Session	**Welcome & Course Introduction** *Introduction of Speakers and Participants; Programme Overview; Icebreaker Activity* (9:00-10:00)	**Module 1.4: Risk-informed Governance and Innovative Technology for Public Health Emergencies** *Presentation (9:00-9:45)* *Group Work (9:45-10:00)*	**Module 2.2: Changing How We Make and Acquire Things** *Presentation* (9:00-10:00) *Group Work* (10:00-11:00)	**Module 2.4** (Continued) *Presentation* (9:00-9:30) *Group Work* (9:30-10:00)	**Module 3.1: Implementing and Financing Technology Solutions** *Presentation* (9:00-11:00) *Group Work* (11:00-12:00)
	Module 1.1: Risk-Informed Governance for DRR and Resilience *Presentation* (10:00-11:00) *Group Work* (11:00-12:00)	**Module 2.1: Extending Our Reach and Expanding Our Capabilities** *Presentation (10:00-11:00)* *Group Work (11:00-12:00)*	**Module 2.3: Connecting People, Things, and Technology** *Presentation* (11:00-11:30) *Group Work* (11:30-12:00)	**Module 2.5: Humans as a Resource** *Presentation* (10:00-11:00) *Group Work* (11:00-12:00)	
Lunch Break					
Afternoon Session	**Module 1.2: Science, Technology, and Government Innovation for Risk-Informed Governance** *Presentation* (13:00-14:30) *Group Work* (14:30-15:30)	**Site Visit** **Innovative Technologies for DRR and Resilience in Practice** (13:00-17:00)	**Module 2.3** (Continued) *Presentation* (13:00-14:00) *Group Work* (14:00-15:00)	**Big Data Analysis Training** (13:00-17:00)	**Module 3.2: Technology Gaps and Challenges to Implementation of Government Innovation for DRR and Resilience** *Presentation* (13:00-14:00) *Group Work* (14:00-15:00)
	Module 1.3: Global, Regional, and National Efforts to Advance Innovative Technologies Use in DRR and Resilience *Presentation* (15:30-16:30) *Group Work* (16:30-17:00)		**Module 2.4: Improving Data Analysis and the Presentation of Information** *Presentation* (15:00-16:00) *Group Work* (16:00-17:00)		**Module 3.3: Measuring Progress: Monitoring and Evaluation of Implementation Efforts** (15:00-16:00)
	Wrap-up & Reflection (17:00-17:15)	***Wrap-up & Reflection*** (17:00-17:15)	***Wrap-up & Reflection*** (17:00-17:15)	***Wrap-up & Reflection*** (17:00-17:15)	***Course Evaluation by Participants & Closing Session*** (16:00 -17:00)

Risk-informed Governance and Innovative Technology for Disaster Risk Reduction and Resilience	
Day 1: Science, Technology, and Government Innovation in Public Governance for DRR and Resilience	
9:00-10:00	**Welcome and Course Introduction**
	In this opening session, participants and facilitating team introductions are undertaken. The facilitating team explains to participants how the course will be administered, which includes an overview of program policies and facility emergency procedures. The facilitator will also explain the course structure, format, and evaluation methods, and provide a summary of the topics and activities that will be included in the five days of facilitation that follow. • Introduction of Speakers and Participants; Programme Overview; Icebreaker Activity
10:00-12:00	**Module 1.1: Risk-Informed Governance for DRR and Resilience**
Content	Session 1 introduces, defines, and explains at both the theoretical and technical levels emergency and disaster risk management and resilience building efforts. Participants are to reflect on what and where data informs risk planning and how risks are integrated into current planning and decision-making. Participants also reflect on the entities in government that are informed about resilience and risk, and how these government entities coordinate with central planning and decision-making, as well as SDGs institutional coordination for resilience. Participants consider how public sector entities identify hazards, assess, and manage risk, and respond to and recover from disasters. Public alert and warning are also covered in recognition of the significant contributions to these functions that have emerged on account of new technologies and innovations. The lessons contained in this session serve to establish a baseline understanding of the various foci of technology and innovation applications, whether that be identification and monitoring of risk, detection, notification, and assessment of emergency and disaster situations, and response and recovery support during and in the aftermath of actualized events. In this session, participants are also to share and learn about their specific country risk profiles according to PreventionWeb country data. Risk-informed governance and decision-making are addressed. **Discussion Topics:** • Natural, Technological, and Intentional Hazards • Measuring and Mapping Exposure • Event Scale and Size • Economic Vulnerability • Sources of Data • Hazard Monitoring Methods • Motivation for Adopting New Technologies

Learning Outcomes	• Ability to explain how an adverse event progresses from emergency to catastrophe. • Ability to list and define the major components of comprehensive disaster management • Understanding of the range and diversity of functions of government that support disaster risk management and how technologies can streamline risk information across government. • Ability to explain how innovative technologies improve the disaster management planning process, and how official and citizen disaster preparedness efforts might be improved as a result of new technology applications.
Key Readings	• Izumi, T., Shaw, R., Ishiwatari, M., Djalante, R., Komino, T. 2019. 30 Innovations for Disaster Risk Reduction. IRIDeS, Keio University, the University of Tokyo, UNU-IAS, and CWS Japan, Japan, http://bit.ly/2OkCMWg. • Center for Sustainable Community Design. n/d. Types of Mitigation Actions. Beyond the Basics. http://bit.ly/2H7LGSn. • International Telecommunications Union (ITU). 2019. Disruptive Technologies and Their Use in Disaster Risk Reduction and Management. ITUGET 2019 Background Document. http://bit.ly/2Lu3j2G • Inform. 2019. Inform Global Risk Index: Results 2019. http://bit.ly/38IztQn. • Eastern Kentucky University. n/d. When Disaster Strikes: Technology's Role in Disaster Aid Relief. Blog. http://bit.ly/2OSoGgy. Offline Document: http://bit.ly/32ACmjb
Schedule	10:00-11:00: Presentation 11:00-12:00: Work Group
12:00-13:00	Lunch Break
13:00-15:30	**Module 1.2: Science, Technology, and Government Innovation for Risk-informed Governance**

Content	This session provides a foundational context for the application of technology in emergency and disaster management, and for the enhancement of resilience. Instructional materials allow participants to better conceptualize the purpose and nature of technological innovation as it applies in a theoretical sense and as it supports the achievement of societal and public sector goals including sustainable development. A conceptual basis of data and information, both of which play important roles in the furtherance of science and the adoption of new technologies and innovations, is provided. The importance of new technologies in collecting data and informing decision-making in public governance and planning in disaster prevention phases and risk mitigation is discussed. Participants are given a first look at the limitations of technology use and technological innovation, the challenges encountered, and risks faced or created. **Discussion Topics:** • The availability and application of technologies used in participants' own work, and how this has changed over their career. • The benefits that participants have gained and the costs that have been incurred as technologies are introduced and adopted in their professions. • Information and Communications Technologies (ICTs). • Links between e-Government, Smart Cities, and emerging technologies adoption. • e-Government implementation considerations. • The impact of new technologies, and the readiness of governments to implement them. • Macro-level changes that are occurring in the disaster risk management field as a result of technological innovation. • Different types of knowledge. • Different types of data and information used in participants' work. • The limitations, challenges, and risks that are key to understanding and planning for new and emerging technologies. • Differences in access to technology. • Technology and innovation risks.
Learning Outcomes	• Ability to define science and technology, and innovation, and to understand what qualifies a system or solution as being "emerging" or "disruptive". • Ability to explain what resilience is, and how it applies to individuals, communities, organizations, and societies. • Increased understanding of the ways science and technology may be used to support society and governance, including the pursuit of sustainable development goals. • Knowledge of the technological solutions available to support digital government and public service innovation for DRR • Ability to explain what resilience is, and how it applies to individuals, communities, organizations, and societies.
Key Readings	• United Nations. 2019. The Role of Science, Technology, and Innovation in Building Resilient communities, Including Through the Contribution

	of Citizen Science. Economic and Social Commission. Commission on Science and Technology for Development. May 13-17. Geneva. http://bit.ly/2MlB46z • United Nations. 2018. E-Government Survey 2018: Gearing E-Government to Support Transformation Towards Sustainable and Resilient Societies. Department of Economic and Social Affairs. New York. http://bit.ly/2SsKvl4 [Chapter 1]
Schedule	13:00-14:30: Presentation 14:30-15:30: Work Group
15:30-17:00	**Module 1.3: Global, Regional, and National Efforts to Advance Innovative Technologies Use in DRR and Resilience**
Content	Improving technological innovation in support of disaster risk reduction and sustainable development, and expanding access to the products of innovation, are complementary efforts that play a central role in the Sendai Framework and the 2030 Agenda for Sustainable Development. In this session, participants learn how these and other efforts support the expanded use of technology in support of evidence-based policy making and risk-informed governance for resilience. Some of the leading challenges that exist (notably with regards to the Small Island Developing States (SIDS), the Landlocked Developing Countries (LLDCs), and the Least Developed Countries (LDCs)) are introduced. The practice of developing science and technology national strategies and how these are integrated into national development strategies is included. **Discussion Topics:** • Scientific and Technical Advisory Group (STAG) Report Recommendations • Focus of S&T in the Sendai Framework • Linking Development and Disaster Resilience • Information Sharing Experience • Recommendations of the UN Commission on Science and Technology for Development (CSTD) • Universality of the Strategy for STI in Africa (STISA-2024) Pillars • Good Practices for Advancing STI National and Local Strategies
Learning Outcomes	• Ability to describe how the 2030 Agenda for Sustainable Development and the Sendai Framework address the need for scientific and technological innovation. • Enhanced capacity to promote or support creation and/or advancement of national science and technology strategies.
Key Readings	• UNDRR. 2019. The Science and Technology Roadmap to Support Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2013. http://bit.ly/2mkomcW. • Shaw, R., L. Lu and F. Lian. 2017. Science Technology Plan for Disaster Risk Reduction: Asian and Pacific Perspectives. ICSU and IRDR. Beijing, China. http://bit.ly/2YLqhIL • Asian Science and Technology Conference for DRR. 2018. Science-Policy Dialogue for Implementation of the Sendai Framework. UNISDR. April. http://bit.ly/2Zzp98f.

	• United Nations. 2015. Strengthening the Role of Science and Technology for Disaster Risk Reduction in the Arab Region. United Nations Office for Disaster Risk Reduction. Geneva. http://bit.ly/2YjFBNi
Schedule	15:30-16:30: Presentation 16:30-17:00: Work Group
17:00-17:15	**Day 1 Wrap-up and Reflection**
Day 2: Practical and Planned Application of Emerging Technology and Government Innovation for DRR and Resilience	
9:00-10:00	**Module 1.4: Risk-informed Governance and Innovative Technology for Public Health Emergencies**
Content	Public health is constantly threatened by a wide range of hazards and disasters. Despite measures to prevent them, emergencies of varying types, scales and consequences still occur. Emergency preparedness is a continuous process in which action, funding, partnerships, and political commitment at all levels must be sustained. The overall responsibility for safeguarding, maintaining, and restoring the health and wellbeing of communities lies with national governments. Strengthening governance capacities and leveraging innovative technologies is critical for public health emergencies. This session presentation and discussions will focus on the role of risk-informed governance and innovative technology for public health emergencies including COVID-19 pandemic. **Discussion Topics:** • Public Governance Innovation for Public Health Emergencies • Principles for Public Health Emergency Preparedness • Strengthening Governance Capacity for Public Health Emergencies • Data-driven Decision Making for Public Health Emergencies • Digital Government for Public Health Emergencies • Innovative Practices in Governance Innovation for COVID-19 Response • Managing Public Health Emergencies
Learning Outcomes	• Increased understanding on the role of Risk-Informed Governance and Innovative Technologies for Public Health Emergencies. • Understand the contribution of Science, Technology and Innovation to DRR in the context of COVID-19. • Strengthened capacity on the entire process of preparedness, prevention, response and post-recovery to respond to public health emergencies including COVID-19 pandemic
Key Readings	• Tomorrow, A. H. OECD Reviews of Public Health: Korea. https://www.oecd-ilibrary.org/social-issues-migration-health/oecd-reviews-of-public-health-korea_be2b7063-en

	• The Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda (https://www.post2020hlp.org/wp-content/uploads/docs/UN-Report.pdf) • United Nations. 2020. COVID-19 Response. 5 ways the UN is fighting 'infodemic' of misinformation. https://www.un.org/en/un-coronavirus-communications-team/five-ways-united-nations-fighting-%E2%80%98infodemic%E2%80%99-misinformation • United Nations Secretary-General's (IEAG), A Word That Counts: Mobilizing The Data Revolution for Sustainable Development, November 6, 2014 (www.undatarevolution.org/report/) • OECD Policy Responses to Coronavirus (COVID-19). The territorial impact of COVID-19: Managing the crisis across levels of government. http://www.oecd.org/coronavirus/policy-responses/the-territorial-impact-of-covid-19-managing-the-crisis-across-levels-of-government-d3e314e1// • United Nations Global Pulse (2013). Big Data for Development: A primer. https://beta.unglobalpulse.org/wp-content/uploads/2013/06/Primer-2013_FINAL-FOR-PRINT.pdf • UN/DESA Policy Brief #61: COVID-19: Embracing digital government during the pandemic and beyond. https://www.un.org/development/desa/dpad/publication/un-desa-policy-brief-61-covid-19-embracing-digital-government-during-the-pandemic-and-beyond/ • UN Women (2020). COVID-19: How to include marginalized and vulnerable people in risk communication and community engagement. https://reliefweb.int/sites/reliefweb.int/files/resources/COVID-19_CommunityEngagement_130320.pdf • Whitelaw, S., Mamas, M. A., Topol, E., & Van Spall, H. G. (2020). Applications of digital technology in COVID-19 pandemic planning and response. The Lancet Digital Health. https://www.thelancet.com/action/showPdf?pii=S2589-7500%2820%2930142-4 • WHO (2020). Strengthening Preparedness for COVID-19 in Cities and Urban Settings. https://www.who.int/publications/i/item/strengthening-preparedness-for-covid-19-in-cities-and-urban-settings • World Health Organization. (2019). Health emergency and disaster risk management framework. https://www.who.int/hac/techguidance/preparedness/health-emergency-and-disaster-risk-management-framework-eng.pdf?ua=1 • World Health Organization. (2017). A strategic framework for emergency preparedness. https://extranet.who.int/sph/sites/default/files/document-library/document/Preparedness-9789241511827-eng.pdf
Schedule	9:00-9:45: Presentation 9:45-10:00: Work Group

10:00-12:00	Module 2.1: Extending Our Reach and Expanding Our Capabilities
Content	In this session, participants study a range of new technologies and innovations that are enabling public sector organizations to expand their sensing, planning, and operational capabilities. Unmanned vehicles, whether designed for aerial, terrestrial, or aquatic movement, are finding new application in almost every aspect of disaster risk management with examples including the remote study of land, water, and man-made features and facilities; the identification and monitoring of threatening hazards and conditions; the assessment of disaster damages and impacts; the expansion of information and communications technology (ICT) systems' reach; and the conduct of operational response and recovery tasks such as relief delivery. This relatively inexpensive and highly accessible technology has shown incredible potential across each of these areas, especially when coupled with advanced imaging (e.g., LiDAR) capabilities. Robotics, a grouping within which unmanned vehicles are often placed, includes a broad range of general and specialized operational capabilities that are helping to enhance disaster risk management capacities. Examples include search and rescue and access into environmentally hostile situations, environmental assessment, weather monitoring, and more. And through the use of increasingly sophisticated remote and in-situ imagery and sensing capabilities, planning and forecasting capabilities in support of DRR and resilience are moving at-risk and disaster-impacted communities towards more resilient futures. **Discussion Topics:** • The benefits that may be gained through incorporation of unmanned vehicle technology in each emergency management phase (multiple discussions). • Features and attributes of robots that are particularly useful in the disaster setting. • Value of LiDAR Program Data • Benefits that may be gained through access to data collected using in-situ and remote sensing technologies, and the limits of such resources and systems.
Learning Outcomes	• Strengthened capacity to request and utilize imagery produced using in-situ and remote sensing systems in order to better reduce the risk of, plan for, respond to, and recover from disasters. • Ability to understand the current and planned capacity of robots and drones. • Capacity to recognize pre- and post-disaster scenarios where unmanned vehicle technologies, robotics, or in-situ and remotely-sensed imagery can provide informational or operational support.
Key Readings	• American Red Cross, et. Al. 2015. Drones for Disaster Response and Relief Operations. April. http://bit.ly/2VcAmdE. • Paganini, Marc, and Ivan Petiteville. 2018. Satellite Earth Observation in Support of the SDGs. European Space Agency. http://bit.ly/35Dim0X

Schedule	9:00-10:30: Presentation 10:30-12:00: Work Group
12:00-13:00	Lunch Break
13:00-17:00	**Site Visit** **Innovative Technologies for DRR and Resilience in Practice**
Content	Participants will visit a facility that utilizes one or more of the innovative technologies detailed in Module 4 (Innovative Technologies Overview).
Learning Outcomes	• Enhanced knowledge on innovative technologies for DRR and resilience in practice.
Schedule	13:00-17:00: Site visit
17:00-17:15	**Day 2 Wrap-up and Reflection**
Day 3: Practical and Planned Application of Emerging Technology and Innovation for DRR and Resilience	
9:00-11:00	**Module 2.2: Changing How We Make and Acquire Things**

Content	In this session, participants explore how new technological advancements and innovations in manufacturing and construction are improving our abilities to prevent disasters from happening and recovering successfully from them when they do. Additive manufacturing, more commonly known as 3-D printing, offers an astounding range of support options for disaster risk management and resilience building efforts. The cost to 3-D printing technology has fallen to a point that enables access by almost any organization. With additive manufacturing capabilities, response organizations are finding there is less need to stockpile unique or as-needed items given these can be manufactured on site and can even be customized. An expanding range of raw materials that may be used for this form of manufacturing further expands the possible uses, including foods, medicines, and medical supplies. The scale of utility has likewise expanded as larger printers have been developed, with capabilities for the printing of vehicles and even homes now within the realm of possibility. Science, technology, and innovation have also improved the materials of construction themselves. Self-healing buildings, materials that alleviate natural forces, materials that produce energy, and others are improving mitigation options and increasing the prospects for community resilience. Utilization of new construction materials and techniques is helping to ensure that replacement and new buildings are better able to withstand future events, and robotics, 3-D printing, and other mechanisms are making the rebuilding process faster and more cost efficient. **Discussion Topics:** • Use of manufactured goods in the disaster context. • Country-specific advantages and disadvantages related to additive manufacturing. • The suitability of 3D printed homes. • Innovative materials champions. • Use of semi-permanent quick-setup shelters. • Promoting research and development of new materials.
Learning Outcomes	• Ability to identify where access to 3-D printing technology will support planning and/or operations • Enhanced knowledge about new construction materials and methods, including when and where they are appropriate, and the benefits gained through their application.
Key Readings	• OCHA. 2015. Shrinking the Supply Chain: Hyperlocal Manufacturing and 3D Printing in Humanitarian Response. http://bit.ly/2Y9cJUI. • Kuckelhaus, Markus. 2016. 3D Printing and the Future of Supply Chains. DHL Trend Research. http://bit.ly/2PgrGAb. • World Economic Forum. 2016. Shaping the Future of Construction: A Breakthrough in Mindset and Technology. Reference 220416. http://bit.ly/32ZLHAs.
Schedule	9:00-10:00: Presentation 10:00-11:00: Work Group

11:00-12:00	Module 2.3: Connecting People, Things, and Technology
Content	The interconnectedness of people to people, people to things, and things to things, coupled with improved capacity to transfer information electronically, is changing how risks and disasters are managed. New communications technologies, namely fifth generation (5G) cellular network data transmission, are allowing devices to collect and transmit information on a previously-unimaginable scale. Expansion of existing technologies for new uses, as is occurring with SMS texting, is further improving crisis, emergency, and risk communication, including between citizen responders and their governments. Mesh networks are expanding the reach of existing infrastructure and helping to manage in situations where infrastructure doesn't exist or has been impacted by disasters. The nature of information collected is also expanding on account of the transmission capacity. New infrastructure systems and linkages are expanding access even in situations where traditional networks are nonexistent, damaged, or otherwise nonfunctional. Distributed ledger ('blockchain') technology, is also helping in this regard, namely through the improvement of availability and fidelity of disaster-related information, and in the process is solving many longstanding problems related to transparency and equitable relief and recovery as well as supporting more effective planning and disaster financing. **Discussion Topics:** • The computer in your pocket. • Cloud computing versus e-Government. • How can cloud computing enhance disaster risk management? • What can and should be connected to the internet of things? • IoT-based training needs. • Disaster risk management uses of distributed ledger technology.
Learning Outcomes	• Ability to explain how 5G and IoT are improving hazard monitoring, alert, and warning. • Increased understanding of the information management and sharing capabilities afforded by new and emerging technologies. • Ability to incorporate distributed ledger technology into relief and recovery plans and policies.
Key Readings	• GSMA. 2017. Blockchain for Development: Emerging Opportunities for Mobile, Identity, and Aid. GSM Association. http://bit.ly/2LJJOlO. • World Economic Forum. 2019. Realizing the Internet of Things: A Framework for Collective Action. WEF White Paper. http://bit.ly/2oMrVto. • Eze, Kelechi G., Matthew N. O. Sadiku, and Sarhan M. Musa. 2018. 5G Wireless Technology: A Primer. Roy G. Perry College of Engineering, Texas A&M University. http://bit.ly/2ZboTNt • Ray, Partha Pratim, Mithun Mukherjee, and Lei Shu. 2017. Internet of Things for Disaster Management: State of the Art and Prospects. IEEE Access. October 12. http://bit.ly/2N3Oi74.

Schedule	11:00-11:30: Presentation 11:30-12:00: Work Group
12:00-13:00	Lunch Break
13:00-15:00	**Module 2.3: Connecting People, Things, and Technology (Continued)**
Schedule	13:00-14:00: Presentation 14:00-15:00: Work Group
15:00-17:00	**Module 2.4: Improving Data Analysis and the Presentation of Information**
Content	Data and information are collected through myriad channels and means in advance of, during, and in the aftermath of a disaster, and new and innovative technologies are significantly expanding the pool of options. Once collected, data remains of little value without the capacity to assess, analyze, and report it in a manner that supports effective decision-making. In this session, participants look at how advanced computing capacity and software options are being used to analyze massive quantities of data collected on grand scales ('big data') to support decisionmakers, and how those same systems are enabling wider access to visualization of data and information usable even by practitioners with little to no training in geographic information systems use. Through artificial intelligence and machine learning, computers are expanding their utility in this regard. Advanced imaging in the form of virtual and augmented reality, is allowing information to be communicated and learning to occur in ways that improve cognition while reducing unnecessary risks to trainees and practitioners. These new technologies are increasing the conceptual capacity and forecasting abilities of planners and responders alike. **Discussion Topics:** • Big Data in government. • Data sources and stakeholders. • Mobile phone data. • Local data partners. • New data for disaster risk management analysis. • The limits of artificial intelligence. • Risk acceptability for AI solutions. • Using predictive analysis to support resilience. • Why use virtual reality?
Learning Outcomes	• Ability to incorporate existing big data analysis systems into planning and response. • Understanding of the range of big data that is being collected by different stakeholders, and the importance of data standards and open data policies to support its use in disaster risk management. • Comprehension of artificial intelligence and machine learning, including what these related technologies are doing to improve the capabilities of disaster risk reduction practitioners. • Ability to understand how virtual and augmented reality are increasing cognition and improving resilience.

Key Readings	• Global Facility for Disaster Risk and Reduction. 2018. Machine Learning for Disaster Risk Management. World Bank. Guidance Note. http://bit.ly/2oLonaW. • West, Darrell M. 2018. What is Artificial Intelligence? Brookings Institution. October 4. http://bit.ly/2AGL9Dm. • Yu, Manzhu, Chaowei Yang, and Yun Li. 2018. Big Data in Natural Disaster Management: A Review. Geosciences. George Mason University. http://bit.ly/2pBfUav. • Botha, Marc. 2019. The Limits of Artificial Intelligence. Medium. Towards Data Science. February 11. http://bit.ly/3aqfYwN.
Schedule	15:00-16:00: Presentation 16:00-17:00: Work Group
17:00-17:15	**Day 3 Wrap-up and Reflection**
Day 4: Practical and Planned Application of Emerging Technology and Innovation for DRR and Resilience	
9:00-10:00	**Module 2.4: Improving Data Analysis and the Presentation of Information (Continued)**
Schedule	9:00-9:30: Presentation 9:30-10:00: Work Group
10:00-12:00	**Module 2.5: Humans as a Resource**
Content	Citizens are assuming an increasingly critical role in the informational aspects of society, and social activities themselves, through the many mechanisms for interconnectedness and communication that have been developed. Social media and the prevalence of communications technologies including mobile phones is enabling individuals to support pre- and post-disaster response and recovery operations, both of official responders and the actions of other citizens and organizations. Through participation in research and other studies, citizens are contributing to the generation and improvement of information and are helping to support different aspects of disaster risk management including monitoring, notification, assessment, crisis communication, and other functions. Citizens are also contributing indirectly through the prevalence of social media, which response organizations can utilize to improve situational awareness. Social media organizations are likewise tapping into their unique access to support emergency operations and situational awareness by communicating with their members and subscribers. **Discussion Topics:** • Engagement for resilience. • What can you crowdsource? • When VGI makes sense. • Using VGI for exposure and vulnerability mapping. • Incentives for citizen science.

	• Promoting citizen science for community resilience.
Learning Outcomes	• Capacity to utilize social media for expanded situational awareness in disasters, and to conduct two-way information sharing with the public. • Ability to understand how crowdsourcing and citizen science supports risk-informed decision-making.
Key Readings	• Studies on Participatory Early Warning Systems (P-EWS): Pathways to Support Citizen Science Initiatives. Frontiers in Earth Science. November 6. http://bit.ly/2JOkfPn. • UN Asian and Pacific Training Centre for Information and Communication Technology for Development and the Asian Disaster Preparedness Center. 2018. Reference Document on Social Media for Disaster Risk Management. http://bit.ly/2v07nRn.
Schedule	10:00-11:00: Presentation 11:00-12:00: Work Group
12:00-13:00	Lunch Break
13:00-17:00	**Big Data Analysis Training**
Description	Participants will receive a 4-hour training in GIS Analytics and Big Data Analysis. Participants will receive a practitioner account that enables them to use the platform for disaster risk management purposes on completion of the course.
Schedule	13:00-17:00: Training
17:00-17:15	**Day 4 Wrap-up and Reflection**
Day 5: Implementation of Emerging Technologies and Government Innovation for DRR and Resilience	
9:00-12:00	**Module 3.1: Implementing and Financing Technology Solutions**
Content	In this session, participants explore the mechanisms by which community and national government planners identify, access, and implement technology solutions and innovations. Instructional materials will cover the various stakeholders involved in the implementation process, and the requirements and mechanisms for expanding access to technologies as beneficiary or user. Materials will focus on many of the key requirements for adopting emerging technologies, such as data preparedness, public education and staff training, and systemization and standardization, among others. Participants will also explore the mechanisms through which countries and communities may finance emerging technologies adoption and maintenance. Explored options will include technology funds, partnership with the private sector, official development assistance, and others. Development partnerships, agreements,

	and knowledge transfer platforms that support innovative technologies uptake and adoption will also be covered in this session. **Discussion Topics:** • Capacity domains in the context of emerging technology (multiple discussions on this topic). • Stakeholder roles and responsibilities. • Why do countries need STI policy?
Learning Outcomes	• Enhanced ability to recognize and understand the roles that different stakeholders play in the adoption and use of emerging technologies. • Increased knowledge of the requirements countries and communities face before a technology is adopted, during its use, and for long-term maintenance of the capacity. • Strengthened capacity to recognize and assess risks associated with the adoption of emerging technologies. • Increased capacity to assess, prioritize, and pursue financing options to address emerging technology needs. • Increased awareness of regional and global partnerships and efforts aimed at expanding access to and uptake of emerging technologies, including South-South and triangular cooperation.
Key Readings	• Raymond, Nathaniel and Ziad Al Alchkar. 2016. Data Preparedness: connecting data, decision-making and humanitarian response. Harvard Humanitarian Initiative. http://bit.ly/30CoWBf • Woodward, Aylin. 2018. When It Comes to Natural Disasters, Technology Has an Unavoidable Dark Side. Futurism. February 1. http://bit.ly/2YZX1Ln • Sawahel, Wagdy. 2018. Technology Transfer Boost for LDCs. University World News. June 12. http://bit.ly/2N32dLe • United Nations. 2016. Knowledge Sharing for DRR Science for the Implementation of the Sendai Framework: The Role of Knowledge Hubs. UN Office for Disaster Risk Reduction. • Gray, Vanessa. 2019. Key Recommendations for Using Disruptive Technologies to Manage Disasters. ITC4SDG. http://bit.ly/2KxIMZe.
Schedule	9:00-11:00: Presentation 11:00-12:00: Work Group
12:00-13:00	Lunch Break
13:00-15:00	**Module 3.2: Technology Gaps and Challenges to Implementation of Government Innovation for DRR and Resilience**
Content	In Session 2, participants will explore the problems associated with emerging technologies that are largely to blame for disparities in their use between different regions and countries. Materials will look deeper into the roots of the 'digital divide' consider how such gaps can work in a country's favor in terms of 'leapfrogging' existing capacity. Institutional barriers to access, uptake, and utilization will be examined, from the public institutions that support them to the ability of the emergency management community to reach the 'last-mile' of delivery. In this session, participants also explore the

	impacts of technology use, understanding that implementation and/or access rarely comes without some cost. **Discussion Topics:** • Regulations and policies guiding drone use. • Implementation risks. • Cybersecurity.
Learning Outcomes	• Increased understanding of the primary barriers to access, adoption, and utilization of emerging technologies, including the strength of public institutions, institutional knowledge and brain-drain, political challenges and policy restrictions, public investment problems, donor rigidity, infrastructure dependencies, and more. • Increased appreciation for the requirements for maintaining adopted technologies, including financial costs, staff training, and cascading dependencies.
Key Readings	• Aid and International Development Forum. 2018. The Digital Divide is Closing: Worlds Least Developed Countries on Track for Universal Internet. http://bit.ly/2MfZVZP • Almarzooqi, Ahmed. 2017. Infusing Technology Into Third World Countries. International Center for Global Leadership. http://bit.ly/2XWwi0J. • Kellen, Vince. 2019. Difficulties and Challenges of Data Democratization. Cutter Business Technology Journal. January 2. http://bit.ly/2OVCOFW • Pew Research Center. 2015. Internet Seen as Positive Influence on Education but Negative Influence on Morality in Emerging and Developing Nations. http://bit.ly/303DoT1. • Saez, Catherine. 2018. 4 of 5 People in LDCs Can Access Mobile Networks, But Are Not Using Internet. Intellectual Property Watch. January 24. http://bit.ly/32xKcKk
Schedule	13:00-14:00: Presentation 14:00-15:00: Work Group
15:00-16:00	**Module 3.3: Measuring Progress: Monitoring and Evaluation of Implementation Efforts**
Content	In this final module, participants will consider what monitoring and evaluation requirements exist in terms of emerging technologies access, adoption, and use, and how those requirements may be addressed. Materials will apply the goals and priorities of the Sendai Framework and the Sustainable Development Goals as international standards against which evaluation may be measured, but also provide alternate measures and methods. **Discussion Topics:** • Value of global goals and indicators. • Data collection methods. • Evaluation of emerging technologies.
Learning Outcomes	• Increased understanding of monitoring and evaluation methods that are relevant to the adoption and use of emerging technologies.

	• Developed capacity to more effectively identify and plan for monitoring and evaluation needs when planning for emerging technologies use.
Key Readings	• Kusek, Jody Zall and Ray C. Rist. 2004. Ten Steps to a Results-Base Monitoring and Evaluation System. A Handbook for Development Practitioners. The World Bank. http://bit.ly/37Je1Jb • UNDRR. 2016. The Science and Technology Roadmap to Support Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030. 29 February. http://bit.ly/2V9bsxy. • UNDESA, 2019. SDG Indicators – UN STATS. http://bit.ly/2OOqDbA • UNDP. 2009. Handbook on Planning, Monitoring, and Evaluation for Development Results. http://bit.ly/2PfDBiF. • Wagner, Lynn. 2018. Getting to 2030: Tracking SDG Indicators for Evidence of Implementation Progress. March 29. http://bit.ly/2N11ZUO.
Schedule	15:00-16:00: Presentation and Wrap-up
16:00-17:00	**Course Evaluation by Participants & Closing Session**

Annex II - Ex-ante and Post-ante Assessment

Risk-informed Governance and Innovative Technology for Disaster Risk Reduction and Resilience

Ex-ante and Poste-ante Assessment

Module 1.1: Risk-Informed Governance for Disaster Risk Reduction and Resilience

1. Which of the following is a global framework developed to promote disaster risk reduction activities by UN Member Countries for the period from 2015 to 2030?

Before the workshop	After the workshop
a. The 2030 Agenda b. The Hyogo Framework c. The Sendai Framework* d. The Paris Accord	a. The 2030 Agenda b. The Hyogo Framework c. The Sendai Framework* d. The Paris Accord

2. Which of the following is a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation?

Before the workshop	After the workshop
a. Vulnerability b. Exposure c. Disaster d. Hazard*	a. Vulnerability b. Exposure c. Disaster d. Hazard*

3. Which of the following is likely to be the reason that two identical hazard events result in a minor issue in one country and a major disaster in another?

Before the workshop	After the workshop
a. Exposure b. Vulnerability* c. Likelihood d. Probability	a. Exposure b. Vulnerability* c. Likelihood d. Probability

4. Which of the following is a typical source of vulnerability in the Small Island Developing States (SIDS)?

Before the workshop	After the workshop
a. Diversified economies b. Extensive infrastructure	a. Diversified economies b. Extensive infrastructure

c. Low debt burden d. Limited exports*	c. Low debt burden d. Limited exports*

5. Which of the following is defined in published United Nations Terminology to be: *"The application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses."*

Before the workshop	**After the workshop**
a. Humanitarian Assistance b. Disaster Risk Management* c. Disaster Mitigation d. Sustainable Development	a. Humanitarian Assistance b. Disaster Risk Management* c. Disaster Mitigation d. Sustainable Development

6. Which of the following is a nonstructural mitigation measure?

Before the workshop	**After the workshop**
a. Resistant Construction b. Detection Systems c. Relocation d. Risk Modeling and Measurement*	a. Resistant Construction b. Detection Systems c. Relocation d. Risk Modeling and Measurement*

7. What of the following forms of decision-making is most directly supportive of reduction in future disasters and increases in community and country resilience?

Before the workshop	**After the workshop**
a. Disaster-smart decision-making b. Risk-informed decision-making* c. Hazard-aware decision-making d. Development-driven decision-making	a. Disaster-smart decision-making b. Risk-informed decision-making* c. Hazard-aware decision-making d. Development-driven decision-making

Module 1.2: Science, Technology, and Innovation

1. Which of the following is defined to be: ""the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence"?

Before the workshop	**After the workshop**

a. Technology b. Innovation c. Learning d. Science*	a. Technology b. Innovation c. Learning d. Science*

2. Every technology is based on at least one of which of the following:

Before the workshop	**After the workshop**
a. Scientific law/principle* b. Social norm/ideal c. Economic theory/model d. Mathematical theoreum/hypothesis	a. Scientific law/principle* b. Social norm/ideal c. Economic theory/model d. Mathematical theoreum/hypothesis

3. Which of the following is the pursuit of finding ways to do things better or more effectively, whether through more effective processes, products, services, technologies, or models.

Before the workshop	**After the workshop**
a. Discovery b. Development c. Innovation* d. Research	a. Discovery b. Development c. Innovation* d. Research

4. There are four determinants of science and technology 'acceptability'. Which of the following is not one of these four 'S&T Acceptability Filters"?

Before the workshop	**After the workshop**
a. Ethics b. Economics c. Feasibility* d. Market Forces	a. Ethics b. Economics c. Feasibility* d. Market Forces

5. ICT stands for which of the following:

Before the workshop	**After the workshop**
a. Information and Communications Technology* b. International Coordination Template c. Incident Coordination Theme d. Incident Communications Table	a. Information and Communications Technology* b. International Coordination Template c. Incident Coordination Theme d. Incident Communications Table

6. Which of the following is one of the four 'Pillars' of e-Government?

Before the workshop	After the workshop
a. Leadership b. Coordination c. Infrastructure d. Technology*	a. Leadership b. Coordination c. Infrastructure d. Technology*

7. Which of the following is an urban area that uses different types of internet-connected devices and systems (often referred to as the 'internet of things' or IoT) to collect data and manage assets and resources?

Before the workshop	After the workshop
a. e-Governance b. Smart City* c. Techno-City d. e-Government	a. e-Governance b. Smart City* c. Techno-City d. e-Government

8. We are currently in which of the following industrial revolutions?

Before the workshop	After the workshop
a. 2nd Industrial Revolution b. 3rd Industrial Revolution c. 4th Industrial Revolution* d. 5th Industrial Revolution	a. 2nd Industrial Revolution b. 3rd Industrial Revolution c. 4th Industrial Revolution* d. 5th Industrial Revolution

9. New technologies are called which of the following when they 'change how things are done'?

Before the workshop	After the workshop
a. Destructive technologies b. Frontier technologies c. Emerging technologies d. Disruptive technologies*	a. Destructive technologies b. Frontier technologies c. Emerging technologies d. Disruptive technologies*

10. Which of the following can be defined as "*a representation of a message that is processed into something of value in order to be applied in practice*"?

Before the workshop	After the workshop
a. Ledger b. Information* c. Knowledge d. Data	a. Ledger b. Information* c. Knowledge d. Data

11. Which type of knowledge is gained through personal experience, and which cannot be written down?

Before the workshop	After the workshop
a. Implicit Knowledge b. Explicit Knowledge c. Tacit Knowledge* d. Professional Knowledge	a. Implicit Knowledge b. Explicit Knowledge c. Tacit Knowledge* d. Professional Knowledge

12. Which of the following is a descriptor of 'open' data?

Before the workshop	After the workshop
a. Discriminatory b. Proprietary c. Machine processable* d. Licensable	a. Discriminatory b. Proprietary c. Machine processable* d. Licensable

13. Which of the following is not one of the three 'Vs' of Big Data?

Before the workshop	After the workshop
a. Veracity* b. Volume c. Velocity d. Variety	a. Veracity* b. Volume c. Velocity d. Variety

Module 1.3: Global, Regional, and National Efforts to Advance Innovative Technologies Use in DRR and Resilience

1. Which of the following is a term to describe what is used by public sector organizations and other stakeholders to develop solutions and create opportunities to address societal challenges in a manner that is both effective and efficient?

Before the workshop	After the workshop
a. Government b. Governance* c. Innovation d. Research and Development	a. Government b. Governance* c. Innovation d. Research and Development

2. Which of the following is one of the three styles of Governance?

Before the workshop	After the workshop

a. Network* b. Pyramid c. Organizational d. Unstructured	a. Network* b. Pyramid c. Organizational d. Unstructured

3. Which of the following governance innovations focuses on the improvement of quality of public service delivery?

Before the workshop	**After the workshop**
a. Institutional innovation b. Organizational innovation c. Process innovation* d. Conceptual innovation	a. Institutional innovation b. Organizational innovation c. Process innovation* d. Conceptual innovation

4. Which of the following is not one of the three pillars of people-centered public sector reform?

Before the workshop	**After the workshop**
a. Effective public services b. Inclusive public services c. Coordinated public services* d. Accountable public services	a. Effective public services b. Inclusive public services c. Coordinated public services* d. Accountable public services

5. Priority 1 of the Sendai Framework for Disaster Risk Reduction is:

Before the workshop	**After the workshop**
a. Mitigating Disaster Risk b. Supporting Risk Financing c. Preparing for Disasters d. Understanding Disaster Risk*	a. Mitigating Disaster Risk b. Supporting Risk Financing c. Preparing for Disasters d. Understanding Disaster Risk*

6. Which of the following was created to guide the use of science and technology in support of Sendai Framework implementation?

Before the workshop	**After the workshop**
a. 2020 Science and Technology Global Strategy b. Science and Technology Roadmap* c. Global Innovation and Exploration Platform d. Sendai Technology Action Plan	a. 2020 Science and Technology Global Strategy b. Science and Technology Roadmap* c. Global Innovation and Exploration Platform d. Sendai Technology Action Plan

7. There are how many Sustainable Development Goals?

Before the workshop	After the workshop
a. 4 b. 17* c. 30 d. 169	a. 4 b. 17* c. 30 d. 169

8. UNDRR promotes regional science, technology, and innovation efforts through which of the following?

Before the workshop	After the workshop
a. Science and Technology Advisory Groups (STAGs)* b. Technology and Innovation Platforms (TIPs) c. Regional Technology Incubators (RTIs) d. The Technology Bank	a. Science and Technology Advisory Groups (STAGs)* b. Technology and Innovation Platforms (TIPs) c. Regional Technology Incubators (RTIs) d. The Technology Bank

Module 2.1: Extending Our Reach, Expanding Our Capabilities

1. Unmanned vehicles operate using which of the following:

Before the workshop	After the workshop
a. A human operator b. Autonomous operation c. Neither a nor b d. Either a or b*	a. A human operator b. Autonomous operation c. Neither a nor b d. Either a or b*

2. In a unmanned vehicle system, transmitters are a component of which of the following?

Before the workshop	After the workshop
a. The operator b. The control center c. The control link* d. The payload	a. The operator b. The control center c. The control link* d. The payload

3. A USV operates in which domain?

Before the workshop	After the workshop

a. Air b. Ground c. Water* d. Space	a. Air b. Ground c. Water* d. Space

4. Which of the following unmanned vehicle system power options are characterized as being able to operating in almost any condition where oxygen is present, but which are not often suitable for applications that require precision throttle changes?

Before the workshop	**After the workshop**
a. Internal combustion engine* b. Photovoltaic solar cells c. Energy accumulator d. Lighter-than-air gasses	a. Internal combustion engine* b. Photovoltaic solar cells c. Energy accumulator d. Lighter-than-air gasses

5. Which of the following categories of unmanned vehicle system operation is described as follows: "*The vehicle will take commands from the operator and use its own onboard sensors and other information to act on that information*"?

Before the workshop	**After the workshop**
a. Piloted Operation b. Direct Automation* c. Flight Path d. Autonomous Operation	a. Piloted Operation b. Direct Automation* c. Flight Path d. Autonomous Operation

6. Which of the following is a viable disaster application for drone technology?

Before the workshop	**After the workshop**
a. Search and rescue b. Firefighting c. Disaster assessment d. All of the above	a. Search and rescue b. Firefighting c. Disaster assessment d. All of the above

7. Which of the following is not a descriptor of a true robot?

Before the workshop	**After the workshop**
a. Can sense its environment* b. Is guided by human control c. Cannot achieve goals d. All of the above	a. Can sense its environment* b. Is guided by human control c. Cannot achieve goals d. All of the above

8. Which of the following is a potential disadvantage of robots?

Before the workshop	After the workshop
a. Robots require a salary b. Robots tire c. Robots do not gain experience* d. Robots are less accurate than humans	a. Robots require a salary b. Robots tire c. Robots do not gain experience* d. Robots are less accurate than humans

9. Which of the following is defined as, "*Sensing technologies that gather data in situations where the distance between the sensor and the subject is greater than any linear dimension of the sensor, but which would generally be within close range*"?

Before the workshop	After the workshop
a. In-Situ b. Remote c. Local d. Proximal*	a. In-Situ b. Remote c. Local d. Proximal*

10. Which sensors record natural energy that is reflected or emitted from the earth's surface?

Before the workshop	After the workshop
a. Passive sensors* b. Active sensors c. Refractive sensors d. Inductive sensors	a. Passive sensors* b. Active sensors c. Refractive sensors d. Inductive sensors

11. A scatterometer is a form of which kind of sensor?

Before the workshop	After the workshop
a. Passive sensor b. Active sensor* c. Refractive sensor d. Inductive sensor	a. Passive sensor b. Active sensor* c. Refractive sensor d. Inductive sensor

12. Earth observation takes place from which of the following:

Before the workshop	After the workshop
a. Space b. Within the atmosphere c. Neither of the above d. Both of the above*	a. Space b. Within the atmosphere c. Neither of the above d. Both of the above*

13. Stripmap and Spotlight are modes of which of the following?

Before the workshop	After the workshop
a. Synthetic Aperature Radar (SAR)* b. Global Positioning System (GPS) c. Light Detection and Ranging (LiDAR) d. None of the above	a. Synthetic Aperature Radar (SAR)* b. Global Positioning System (GPS) c. Light Detection and Ranging (LiDAR) d. None of the above

Module 2.2: Changing How We Make and Acquire Things

1. Injection moulding is a form of which of the following?

Before the workshop	After the workshop
e. Traditional manufacturing* f. Additive manufacturing g. 3D printing h. All of the above	i. Traditional manufacturing* j. Additive manufacturing k. 3D printing l. All of the above

2. Most traditional "3D Printers" use which of the following?

Before the workshop	After the workshop
a. Laser Sintering b. Stereolithography c. Material Jetting d. Fused Filament Fabrication*	a. Laser Sintering b. Stereolithography c. Material Jetting d. Fused Filament Fabrication*

3. Which form of additive manufacturing uses a liquid polymer contained in a vat?

Before the workshop	After the workshop
a. Laser Sintering b. Stereolithography* c. Material Jetting d. Fused Filament Fabrication	a. Laser Sintering b. Stereolithography* c. Material Jetting d. Fused Filament Fabrication

4. The surface on which an object manufactured in a 3D printer or other additive manufacturing device is built is called which of the following?

Before the workshop	After the workshop
a. Foundation b. Build plate* c. Manufacturing surface d. Sinter	a. Foundation b. Build plate* c. Manufacturing surface d. Sinter

5. CAD stands for which of the following?

Before the workshop	After the workshop
a. Complex Additive Drafting b. Coordinate Angular Drill c. Concept Application Delivery d. Computer Aided Design*	a. Complex Additive Drafting b. Coordinate Angular Drill c. Concept Application Delivery d. Computer Aided Design*

6. Which of the following is an advantage of additive technology?

Before the workshop	After the workshop
a. Cost savings in large print runs b. Energy requirements c. No need for post-manufacturing finishing d. Transportability*	a. Cost savings in large print runs b. Energy requirements c. No need for post-manufacturing finishing d. Transportability*

7. Self-healing concrete is an example of which of the following?

Before the workshop	After the workshop
a. Innovative materials* b. New materials c. Sintering materials d. All of the above	a. Innovative materials* b. New materials c. Sintering materials d. All of the above

Module 2.3: Connecting People, Things, and Information

1. Which of the following is not a characteristic of cloud computing?

Before the workshop	After the workshop
a. Ubiquetous network access b. Resource pooling c. Cybersecurity* d. Rapid elasticity	a. Ubiquetous network access b. Resource pooling c. Cybersecurity* d. Rapid elasticity

2. Which of the following is a reason that organizations turn to cloud computing?

Before the workshop	After the workshop
a. Cost b. Productivity c. Reliability d. All of the above*	a. Cost b. Productivity c. Reliability d. All of the above*

3. Which of the following is not one of the three ways that cloud services are deployed?

Before the workshop	After the workshop
a. Public cloud b. Private cloud c. Transfer cloud* d. Hybrid cloud	a. Public cloud b. Private cloud c. Transfer cloud* d. Hybrid cloud

4. Which of the following is not one of the four cloud service types?

Before the workshop	After the workshop
a. Infrastructure as a Service (IaaS) b. Platform as a Service (PaaS) c. Serverless Computing d. Storage as a Service (SaaS)*	a. Infrastructure as a Service (IaaS) b. Platform as a Service (PaaS) c. Serverless Computing d. Storage as a Service (SaaS)*

5. Which of the following is a weakness of 5G technology?

Before the workshop	After the workshop
a. Short range of transmission* b. Intermittent transmission reliability c. High cost of transmission d. Encrypted encoding of transmitted data	a. Short range of transmission* b. Intermittent transmission reliability c. High cost of transmission d. Encrypted encoding of transmitted data

6. Which of the following is an internet infrastructure that relies on connected devices to act as both user and transceiver of data?

Before the workshop	After the workshop
a. Tranferrence network b. Mesh network* c. Distributed network d. Paired network	a. Tranferrence network b. Mesh network* c. Distributed network d. Paired network

7. Which of the following is an application that is run on a mobile phone operating system?

Before the workshop	After the workshop
a. OTT b. MMS c. SMS d. RCS	a. OTT b. MMS c. SMS d. RCS

8. SMS texts are limited to how many characters?

Before the workshop	After the workshop
a. 124 b. 160 c. 164 d. 200	a. 124 b. 160 c. 164 d. 200

9. IoT objects require internet connections for which of the following reasons?

Before the workshop	After the workshop
a. Sension b. Actuation c. Neither a nor b d. Both a and b*	a. Sension b. Actuation c. Neither a nor b d. Both a and b*

10. Which is not one of the three IoT layers?

Before the workshop	After the workshop
a. Physical b. Network c. Application d. Infrastructure*	a. Physical b. Network c. Application d. Infrastructure*

11. Which of the following is not one of the three essential components of a distributed ledger technology system?

Before the workshop	After the workshop
a. Applications b. Protocol and network c. Infrastructure d. Digital currency*	a. Applications b. Protocol and network c. Infrastructure d. Digital currency*

12. Which of the following DLT arrangements has publicly accessible data, but transactions can only be conducted by or approved by specific individuals?

Before the workshop	After the workshop
a. Permissioned public* b. Permissionless private c. Permissionless public d. Permissioned private	a. Permissioned public* b. Permissionless private c. Permissionless public d. Permissioned private

13. Distributed ledgers are not good in situations where:

Before the workshop	After the workshop
a. There exists an environment of incomplete trust b. Transactions are conducted in a marketplace where individuals struggle to operate without undue error c. There already exists a requisite level of digital infrastructure d. None of the above*	a. There exists an environment of incomplete trust b. Transactions are conducted in a marketplace where individuals struggle to operate without undue error c. There already exists a requisite level of digital infrastructure d. None of the above*

Module 2.3: Improving Data Analysis and the Presentation of Information

1. The 'Big' in 'Big Data' refers to the data itself and which of the following?

Before the workshop	After the workshop
a. Data openness b. The span of servers connected c. The ability of anyone to use the data d. The need for advanced computing technologies*	a. Data openness b. The span of servers connected c. The ability of anyone to use the data d. The need for advanced computing technologies*

2. Which of the following is not one of the five "Vs" of Big Data?

Before the workshop	After the workshop
a. Versioning* b. Velocity c. Variety d. Variability	a. Versioning* b. Velocity c. Variety d. Variability

3. Which of the following is a term used to denote the systematic study of data for the purpose of extracting knowledge?

Before the workshop	After the workshop
a. Data science* b. Data analysis c. Data Mining d. Big Data	a. Data science* b. Data analysis c. Data Mining d. Big Data

4. Which of the following aims to find patterns and relationships in data?

Before the workshop	After the workshop
a. Repetitive Data Analytics b. Detective Data Analytics c. Exploratory Data Analytics* d. Confirmatory Data Analytics	a. Repetitive Data Analytics b. Detective Data Analytics c. Exploratory Data Analytics* d. Confirmatory Data Analytics

5. Which of the following presents Big Data analysis products in a map format?

Before the workshop	After the workshop
a. Cartographic Big Data b. GIS-Based Big Data Analytics* c. GPS Data Analysis d. Big Data Mapping	a. Cartographic Big Data b. GIS-Based Big Data Analytics* c. GPS Data Analysis d. Big Data Mapping

6. Which of the following is not a defining characteristic of AI?

Before the workshop	After the workshop
a. Intentionality b. Intelligence c. Adaptability d. Independence*	a. Intentionality b. Intelligence c. Adaptability d. Independence*

7. Which of the following was defined by Google to be “using data to answer questions”, and involves the elimination of unrelated data?

Before the workshop	After the workshop
a. Machine Learning* b. Artificial Intelligence c. Big Data d. GIS Analytics	a. Machine Learning* b. Artificial Intelligence c. Big Data d. GIS Analytics

8. Image recognition is a form of which of the following?

Before the workshop	After the workshop
a. Big Data b. Machine Learning* c. Artificial Intelligence d. Predictive Analytics	a. Big Data b. Machine Learning* c. Artificial Intelligence d. Predictive Analytics

9. Which of the following combines real-world stimuli with virtual enhancements?

Before the workshop	After the workshop

a. Virtual Reality b. Augmented Reality* c. 3D Gaming d. None of the above	a. Virtual Reality b. Augmented Reality* c. 3D Gaming d. None of the above

Module 2.5: Humans as a Resource

1. Social media is a tool through which of the following engagement forms occurs?

Before the workshop	After the workshop
a. Passive engagement b. Active engagement c. Neither a nor b d. Both a and b*	a. Passive engagement b. Active engagement c. Neither a nor b d. Both a and b*

2. Which of the following is an online journal that provides a platform for individuals and organizations to write and share content?

Before the workshop	After the workshop
a. Social network b. Blog* c. Podcast d. Forum	a. Social network b. Blog* c. Podcast d. Forum

3. Twitter is which of the following?

Before the workshop	After the workshop
a. Microblog* b. Forum c. Photosharing Site d. Podcast	a. Microblog* b. Forum c. Photosharing Site d. Podcast

4. The act of drawing information from large amounts of social media data (in the form of posts and interactions) in order to discover patterns or trends in order to inform some other effort or to answer a particular question is called which of the following?

Before the workshop	After the workshop
a. Social media social research b. Demographic social data retrieval c. Social media data mining* d. All of the above	a. Social media social research b. Demographic social data retrieval c. Social media data mining* d. All of the above

5. A form of crowdsourcing where money is raised through the help of the public is called which of the following?

Before the workshop	After the workshop
a. Crowdfunding* b. Crowdraising c. Crowdmoney d. Crowdfinance	a. Crowdfunding* b. Crowdraising c. Crowdmoney d. Crowdfinance

6. Crowdsourcing that involves individuals providing map-based information is also called which of the following?

Before the workshop	After the workshop
a. Volunteered Geographic Information* b. CrowdGIS c. Public Map Building d. All of the above	a. Volunteered Geographic Information* b. CrowdGIS c. Public Map Building d. All of the above

7. Which of the following is a citizen scientist never involved in?

Before the workshop	After the workshop
a. Data collection b. Data reporting c. Project design d. None of the above*	a. Data collection b. Data reporting c. Project design d. None of the above*

8. Which of the following is defined to be an "elevated level of engagement wherein the cognitive ability of participants is required to complete the task at hand"?

Before the workshop	After the workshop
a. Distributed Intelligence* b. Crowdsourced Scientific Data c. Participatory Science d. Extreme Citizen Science	a. Distributed Intelligence* b. Crowdsourced Scientific Data c. Participatory Science d. Extreme Citizen Science

9. A subset of citizen science initiatives that brings the practice within reach of almost every global citizen is called which of the following?

Before the workshop	After the workshop

a. Global Crowdsourcing (GC) b. Cloud Science (CS) c. Online Citizen Science (OCS)* d. None of the above	a. Global Crowdsourcing (GC) b. Cloud Science (CS) c. Online Citizen Science (OCS)* d. None of the above

Module 3.1: Implementing and Financing Technology Solutions

1. The policies, systems, and processes that are established or exist to organize and manage implementation objectives are considered to be which of the four capacity domains?

Before the workshop	After the workshop
a. Institutional Strengthening / Development* b. Leadership c. Knowledge d. Accountability	a. Institutional Strengthening / Development* b. Leadership c. Knowledge d. Accountability

2. The capacity to assess a situation and define a vision and mandate is which of the following capacity types?

Before the workshop	After the workshop
a. Functional capacity* b. Technical capacity c. Both a and b d. Neither a nor b	a. Functional capacity* b. Technical capacity c. Both a and b d. Neither a nor b

3. Which of the following are difficult to conceptualize?

Before the workshop	After the workshop
a. Hard capacities b. Soft capacities* c. Both a and b d. Neither a nor b	a. Hard capacities b. Soft capacities* c. Both a and b d. Neither a nor b

4. In terms of capacity development, which is the "broad social system within which people and organizations function, [and includes] all the rules, laws, policies, power relations and social norms that govern civic engagement"?

Before the workshop	After the workshop
a. The enabling environment* b. The individual level c. The organizational level	a. The enabling environment* b. The individual level c. The organizational level

d. The administrative environment	d. The administrative environment

5. Which of the following is "a method that explains how a given intervention, or set of interventions, is expected to lead to specific development change, drawing on a causal analysis based on available evidence"?

Before the workshop	**After the workshop**
a. Implementation Strategic Plan b. Integration Methodology c. Logical Framework d. Theory of Change*	a. Implementation Strategic Plan b. Integration Methodology c. Logical Framework d. Theory of Change*

6. Which of the following is the process by which the capacity of a group, organization, or society is reviewed against desired goals, where existing capacities are identified for maintenance or strengthening and capacity gaps are identified for further action?

Before the workshop	**After the workshop**
a. Suitability Audit b. Visioning Exercise c. Capacity Needs Assessment* d. All of the above	a. Suitability Audit b. Visioning Exercise c. Capacity Needs Assessment* d. All of the above

7. Which of the following is a tool that planners can use to structure interventions within a defined strategic framework?

Before the workshop	**After the workshop**
a. Implementation Canvas b. Results Framework c. Both a and b* d. Neither a nor b	a. Implementation Canvas b. Results Framework c. Both a and b* d. Neither a nor b

8. The UN Technology Bank provides assistance to which of the following?

Before the workshop	**After the workshop**
a. All countries b. The LDCs c. Technology incubators d. None of the above	a. All countries b. The LDCs c. Technology incubators d. None of the above

Module 3.2: Technology Gaps and Challenges to Implementation of Innovative Technologies for DRR and Resilience

1. Which of the following is a term that is used to describe the gap that exists between different groups of people, different countries, or different world regions, in the access that each has to modern information and communications technology?

Before the workshop	After the workshop
a. ICT Development Challenge b. Digital Divide* c. Technological Inequality d. Technology Gap	a. ICT Development Challenge b. Digital Divide* c. Technological Inequality d. Technology Gap

2. The belief that "everyone has the right to access the technologies they need in order to live the life they value without harming others now or in the future" is called what?

Before the workshop	After the workshop
a. Inherent Technology Human Rights b. Development Technology Equality c. Standard Technology Baseline d. Technology Justice*	a. Inherent Technology Human Rights b. Development Technology Equality c. Standard Technology Baseline d. Technology Justice*

3. Which of the following is a challenge marked by the loss of a talented workforce to other countries?

Before the workshop	After the workshop
a. Brain Drain b. Expertise Poaching c. Tech Flight d. None of the above	a. Brain Drain b. Expertise Poaching c. Tech Flight d. None of the above

4. Intellectual property rights often act as which of the following?

Before the workshop	After the workshop
a. An incentive to technology adoption b. A disincentive to technology adoption c. Both a and b* d. Neither a nor b	a. An incentive to technology adoption b. A disincentive to technology adoption c. Both a and b* d. Neither a nor b

5. Which of the following is a common dependency of emerging technologies?

Before the workshop	After the workshop
a. Mobile communications* b. Water c. Both a and b d. Neither a nor b	a. Mobile communications* b. Water c. Both a and b d. Neither a nor b

6. The situation that happens in many countries, communities, and organizations, however, data becomes compartmentalized, or siloed, by these structures, policies, and cultural arrangements such that data is captured by different actors and processed and stored in different locations under separate control is called which of the following?

Before the workshop	After the workshop
a. Data fragmentation* b. Data deluge c. Data overload d. Data bias	a. Data fragmentation* b. Data deluge c. Data overload d. Data bias

7. Which of the following is a concept that everyone should have access to data, and that there are no gatekeepers to create bottlenecks that result in inefficiencies of data analysis and use?

Before the workshop	After the workshop
a. Open Data b. Data Democritization* c. Data Universality d. Data Quality Assurance	a. Open Data b. Data Democritization* c. Data Universality d. Data Quality Assurance

Module 3.3: Measuring Progress – Monitoring and Evaluation of Implementation Efforts

1. Which of the following is not a focus of assessment?

Before the workshop	After the workshop
a. Output b. Outcome c. Impact d. Objective*	a. Output b. Outcome c. Impact d. Objective*

2. Which of the following is defined to be the "ongoing and systematic process of collecting, analyzing, and using information to track a program's progress toward reaching its objectives and to guide management decisions"?

Before the workshop	After the workshop
a. Tracking b. Assessment c. Monitoring* d. Program Baselining	a. Tracking b. Assessment c. Monitoring* d. Program Baselining

3. Which of the following is defined to be the "process by which the relevance, efficiency and effect of an activity in terms of its objectives are determined systematically and objectively, and which includes the analysis of the implementation and administrative management of such activities"?

Before the workshop	After the workshop
a. Tracking b. Assessment* c. Monitoring d. Program Baselining	a. Tracking b. Assessment* c. Monitoring d. Program Baselining

4. The benefits of the particular goods or services to the target population(s) are called which of the following?

Before the workshop	After the workshop
a. Outputs b. Outcomes* c. Impacts d. Objectives	a. Outputs b. Outcomes* c. Impacts d. Objectives

Annex III – Action Plan for Change Project Template

What is Change Project?

The Change Project is an exercise which aims to apply the knowledge and the concept learned during the training workshop to real life challenges in the participant's own organization and context. It aims to identify, brainstorm, apply concepts and tools from the lessons, and draw realistic action plans to address the challenge in localizing the SDGs.

How does it work?

Prior to beginning of the training workshop, the participants are asked to select a project that s/he would like to implement upon a completion of the training. The Change Project can be focused either on the specific development challenge or on creating institutional/organizational changes towards implementation of SDGs. The individual project will be shared by each participant on the first day of the workshop. Throughout the workshop, the Change Project will be gradually developed with reference to each day's learning.

In a course of the week, participants will have a chance to connect the Change Project to the SDG targets, revisit objectives and actions for implementation as well as further strategies for engaging stakeholders, think about funding, monitoring and communication.

The template is for developing the Change Project and to guide the thought process. The template is a suggestion with minimum components and can be modified to suit each participant's Change Project.

Change Project Plan Template

Project Title:

1. Context & Objectives

Please explain the general context for developing this Project and the overall objectives set by this Change Project.

2. Implementing Agency

Please specify the agency(s) designated/mandated to implement the Change Project.

3. Problem/Situation Analysis

Please provide a summary analysis about the major policy issues to be addressed by developing and implementing the Change Project. This may include the analysis on the underlying causes of varied problems and the challenges in addressing such problems.

Please list the specific goal(s) to be achieved by developing and implementing this Change Project.

4. Goal(s)

5. Specific Actions/Activities

Please specify concrete actions/activities to achieve the goals.

A)
B)
C)
D)
E)

6. Engagement of Other Stakeholders (If applicable)

Please indicate relevant stakeholders (e.g. academia, civil society organizations, IT businesses and etc.) to be engaged in implementing the Change Project. Please also elaborate on specific mechanism/policy initiatives to engage other stakeholders (if such mechanism or initiatives are currently in place)

7. Partnership with other Member States (If applicable)

Please kindly indicate whether you are interested in partnering with other countries to implement the Change Project.

8. Expected support from UN DESA (If applicable)

Please indicate whether you would expect any capacity development support from UN DESA to implement the Change Project.

9. Duration & Time Plan

Please indicate the duration of implementing the Change Project.

Please indicate specific time plan (Monthly, Quarterly, etc.) for implementing each action/activity of the Change Project.

10. Resources (e.g. financial, technical and human resources)

Please indicate the current resources available for implementing the Change Project and the expected resource gap.

11. Expected Achievements/Outcomes

Please elaborate expected achievement or outcomes from implementing the Change Project in different stages, in alignment with broad national objectives of economic development, environment protection and social progress.

12. Monitoring & Evaluation

Please kindly indicate/elaborate the mechanism and approach to monitoring and evaluating the progress of implementing the Change Project, which may be supported by specific measurable indicators which could be produced on a regular basis at different stages.

13. Challenges & Solutions

Please elaborate on challenges envisioned in implementing the Project and solutions to be planned to address such challenges.

Action Plan Summary for the Project

Goal:						
Action Steps	**Timeline (Duration)**	**Implementing Agencies**	**Outputs**	**Impact**	**Resources**	**Monitoring/ Evaluation**
1)						
2)						
3)						
4)						
5)						

Contact Details

Name: ……..…..

Position/Job Title: ……..

Email: ……..…..

Department/Organization: …….....

Country: ……..……..

Evaluation Questionnaire

Training Toolkit on "Risk-informed Governance and Innovative Technology for Disaster Risk Reduction and Resilience"

As a follow-up assessment on the training workshop just organized, UN DESA/ DPIDG/UNPOG would like to solicit your feedback on how to ensure measurable and sustainable impact of the course on your country/organization/institution and your personal learning objectives. Your suggestions and comments will help better develop the training course to meet your capacity development needs. It would be greatly appreciated if you could kindly send your feedback and comments.

Module 1: Science, Technology, and Innovation in Public Governance for DRR and Resilience

Module 1.1: Risk-informed Governance and Innovative Technology for DRR and Resilience	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Importance & relevance of the theme					
Clarity of the objectives of the Session					
Session structure and the working method					
Quality of presentations and case studies					
Quality of discussion / interaction					
Quality of materials					
Generally helped increase understanding on Risk-Informed Governance for DRR and Resilience					

Module 1.2: Science, Technology, and Innovation for Risk-informed Governance	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Importance & relevance of the theme					
Clarity of the objectives of the Session					
Session structure and the working method					
Quality of presentations and case studies					
Quality of discussion / interaction					
Quality of materials					
Generally helped increase understanding on Science, Technology, and Innovation for Risk-informed Governance					

Module 1.3: Global, Regional, and National Efforts to Advance Innovative Technologies Use in DRR and Resilience	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Importance & relevance of the theme					
Clarity of the objectives of the Session					
Session structure and the working method					
Quality of presentations and case studies					
Quality of discussion / interaction					
Quality of materials					
Generally helped increase understanding on Global, Regional, and National Efforts to Advance Innovative Technologies Use in DRR and Resilience					

Module 1.4: Risk-informed Governance and Innovative Technology for Public Health Emergencies	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Importance & relevance of the theme					
Clarity of the objectives of the Session					
Session structure and the working method					
Quality of presentations and case studies					
Quality of discussion / interaction					
Quality of materials					
Generally helped increase understanding on Global, Regional, and National Efforts to Advance Innovative Technologies Use in DRR and Resilience					

Module 2: Practical and Planned Application of Emerging Technology and Innovation for DRR and Resilience

Module 2.1: Extending Our Reach and Expanding Our Capabilities	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Importance & relevance of the theme					
Clarity of the objectives of the Session					
Session structure and the working method					
Quality of presentations and case studies					
Quality of discussion / interaction					

Module 2.1: Extending Our Reach and Expanding Our Capabilities	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Quality of materials					
Generally helped increase understanding on Extending Our Reach and Expanding Our Capabilities					

Site Visit: How do you evaluate the organization and usefulness of the Site Visit?	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Innovative Technologies for DRR and Resilience in Practice					
Any suggestions on how to improve the Site Visit?					

Module 2.2: Changing How We Make and Acquire Things	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Importance & relevance of the theme					
Clarity of the objectives of the Session					
Session structure and the working method					
Quality of presentations and case studies					
Quality of discussion / interaction					
Quality of materials					
Generally helped increase understanding on Changing How We Make and Acquire Things					

Module 2.3: Connecting People, Things, and Technology	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Importance & relevance of the theme					
Clarity of the objectives of the Session					
Session structure and the working method					
Quality of presentations and case studies					
Quality of discussion / interaction					
Quality of materials					

Module 2.3: Connecting People, Things, and Technology	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Generally helped increase understanding on Connecting People, Things, and Technology					

Module 2.4: Improving Data Analysis and the Presentation of Information	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Importance & relevance of the theme					
Clarity of the objectives of the Session					
Session structure and the working method					
Quality of presentations and case studies					
Quality of discussion / interaction					
Quality of materials					
Generally helped increase understanding on Improving Data Analysis and the Presentation of Information					

Module 2.5: Humans as a Resource	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Importance & relevance of the theme					
Clarity of the objectives of the Session					
Session structure and the working method					
Quality of presentations and case studies					
Quality of discussion / interaction					
Quality of materials					
Generally helped increase understanding on Humans as a Resource					

Big Data Analysis Training	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Importance of GIS Analytics and Big Data Analysis					
Clarity of the objectives of the training Session					
Generally helped increase understanding on GIS Analytics and Big Data Analysis					

Module 3: Implementation of Emerging Technologies and Innovation for DRR and Resilience

Module 3.1: Implementing and Financing Technology Solutions	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Importance & relevance of the theme					
Clarity of the objectives of the Session					
Session structure and the working method					
Quality of presentations and case studies					
Quality of discussion / interaction					
Quality of materials					
Generally helped increase understanding on Implementing and Financing Technology Solutions					

Module 3.2: Technology Gaps and Challenges to Implementation of Innovative Technologies for DRR and Resilience	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Importance & relevance of the theme					
Clarity of the objectives of the Session					
Session structure and the working method					
Quality of presentations and case studies					
Quality of discussion / interaction					
Quality of materials					
Generally helped increase understanding on Technology Gaps and Challenges to Implementation of Innovative Technologies for DRR and Resilience					

Module 3.3: Measuring Progress: Monitoring and Evaluation of Implementation Efforts	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Importance & relevance of the theme					
Clarity of the objectives of the Session					
Session structure and the working method					
Quality of presentations					
Quality of discussion / interaction					
Quality of materials					

Module 3.3: Measuring Progress: Monitoring and Evaluation of Implementation Efforts	Rating				
	1 Poor	2 Fair	3 Good	4 Very Good	5 Excellent
Generally helped increase understanding on Measuring Progress: Monitoring and Evaluation of Implementation Efforts					

1. Please provide any specific suggestion(s) for improving similar trainings on this toolkit and other capacity development workshops or conferences in the future?

2. What type of capacity building activities would you like to see more from UN DESA and other partner Agencies in the future?

3. Please indicate your willingness/ commitment to integrate the principles, strategies and methodologies you have learned about in this event in your policies, programmes and legislative or institutional frameworks. If yes, please specify.

4. What actions will you take as a result of having taken part in this event/session once you return to your organization/country? Please elaborate.

5. What follow up capacity development support/ advisory services from the UN would you be interested in? Please elaborate.

6. Please give us any other comments or suggestions:

CONTACT INFORMATION	
Full Name:	
Title:	
Country:	
Organization:	
Email:	
Phone:	

Thank you very much for your kind response.

Annex IV – Evaluation Form Template Type 2

Evaluation Questionnaire

As a follow-up assessment on the training workshop just organized, UNDESA/ DPIDG/UNPOG would like to solicit your feedback on how to ensure measurable and sustainable impact of the course on your country/organization/institution and your personal learning objectives. Your suggestions and comments will help better develop the training course to meet your capacity development needs. It would be greatly appreciated if you could kindly send your feedback and comments.

1.General Evaluation

Please answer by ticking accordingly:

Session	Strongly agree	Agree	No impact	Disagree	Strongly disagree
The training helped me establish increased knowledge of risk-informed governance and innovative technology for DRR and resilience that is relevant to my national context					
I gained new ideas on approaches and experiences of other countries on better integration of the SDGs and Disaster Risk Reduction for Resilience at national level.					

I gained new ideas on approaches and experiences of other countries on promoting the adoption of digital government solutions and pursuing public service innovation for resilience.					
I gained new ideas and increased my knowledge on practical methods and good practice in planning and implementing sustainable development policies and programs.					
I had an opportunity to take different positions with regards to sustainable development principles and practices including Sendai Framework priority areas.					
I learned about the core importance of enabling and promoting risk-informed governance and innovative technologies to implement the SDGs and Sendai Framework.					
I increased my knowledge on expanding the uptake of frontier technologies for DRR and resilience.					
I increased my knowledge and understanding on Global, Regional, and National Efforts to Advance Innovative Technologies use in DRR and Resilience					
I learned about effective measuring progress on resilience for strengthened institutions through frontier technologies.					

2. Learning Objectives

Please rate the learning objectives according "degree of success to which the objective was met in the training".

Training objective	**Criteria**	**Rating**				
	Degree of success to which objective was met in event	**Fully Successful**	**Mostly successful**	**More or less successful**	**Partially successful**	**Not successful**
Participants will increase their knowledge on applying the concepts on how to establish risk-informed public governance frameworks and close technology gaps for disaster risk reduction and sustainable	**Comments**					

development in vulnerable states;						
Participants will increase their awareness and become equipped with knowledge of how digital government solutions can be implemented to promote public service innovation for resilience	**Comments**					
Participants will strengthen their skills to define a strategy and roadmap on how to promote risk-informed governance, government innovation and expand the adoption of frontier technologies for disaster risk reduction and resilience;	**Comments**					
Participants will be able to mobilize the means of implementation to leverage innovations in technology through public programmes and finance and technology transfer	**Comments**					
Participants will be able to examine key dimensions of disaster risk reduction (DRR) with enhanced awareness of proven good practices to strengthen resilience including through information and communication technology (ICT) innovations	**Comments**					

3. Value/benefits of the content of the Training

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

Information presented in this Training was new to me.					
The content of the Training is relevant to my job					
It is likely that I will use the information acquired in this Training					
Overall, the Training was very useful.					
What topics were of most interest to you?	1. 2. 3.				
What topics were not of most interest to you?	1. 2. 3.				
Comments					

4. Methodology

The methodology used in this Training was the following: Expert presentations, country cases, applied interactive exercises and discussions for peer-to-peer learning and comparative exchange.

Please rate the effectiveness and appropriateness of the methodology used.

Methodology	**Rating**				
	Extremely	Mostly	Not sure	Partially	Not
Effectiveness of methodology					
Appropriateness of methodology					

What parts of the methodology were most beneficial for you?

☐ 1. Self-Assessment

☐ 2. knowledge sharing on challenges, achievements, and success cases

☐ 3. Country commitments

☐ 4. Change Project

☐ 5. Others: Please specify:

Comments	

5. Delivery (Presenters/facilitators)

How effective was (were) the facilitator(s) in terms of presenting information and in terms of responding to participants?

Did the facilitators and other staff meet your expectations in:

Delivery of presentations/facilitation	**Rating**				
	Extremely	Mostly	Neutral	Partially	Not
Effectively communicating and presenting information					
Effectively responding to participant questions and learning needs					
Summarizing discussions / presentations					
Promoting participation of all learners and stimulating their involvement					
Please note up to three of the preferred presenters or resource persons that were most notable or relevant to you and your job functions?					
Comments					

Did support staff at the training meet your needs and expectations in:

Support in Training	**Rating**				
	Extremely	Mostly	Not sure	Partially	Not
Coordinating and communicating information					
Responding to participants questions and needs					
Describe Training material(s) provided					
Comments					

6. Follow-up commitments

What 3 things do you plan to do or have already done as a follow up to your participation in this Training?					
Responding to participants questions and needs	Extremely ☐	Very likely ☐	Not sure ☐	Hardly Likely ☐	Not ☐
Do you foresee any challenges or obstacles in applying information/knowledge/skills acquired in this Training into practice? If so, please describe the challenges.					
If so, in what ways could UN DESA, and partners be of assistance in addressing such challenges?					

7. Event Structure and Logistics

	Rating				
	Extremely	Mostly	Not sure	Hardly	Not
Do you think the time allocated for discussion and Q&A sessions were sufficient?					
Comments or Suggestions					
Do you think the time allocated for knowledge sharing and networking sessions was appropriate?					
Comments					
Do you think the overall length of the Training was appropriate?					

Comments or Suggestions					
How satisfied were you with the Training's logistics?					
How satisfied were you with the Training's conference facilities?					
Comments or Suggestions					

8. Follow up and Overall satisfaction rating of the event

Overall, how satisfied were you with the Training?	Entirely ☐	Mostly ☐	More or Less ☐	Hardly ☐	Not Satisfied ☐
Would you recommend the Training to a colleague?	Yes ☐ May be ☐ No ☐				
Why? Or Why not?					
What other topics were not covered that you think are useful to further develop your knowledge, skills, and competencies?					
Please share three proposals on future topics you would like to see addressed through similar in-person or online training.	1. 2. 3.				

- To ensure constant improvement of our capacity development activities and country outreach, what were some of the challenges you experienced during the Training, substantially, administratively or logistically?

- Please share any general comments / suggestions on improving the Training for future audiences

- Additional comments and suggestions for organizers

- What type of capacity building activities would you like to see more of from the organizers in the future?

- Do you see a need for advisory services/a follow-up national workshop on Risk-informed Governance and Innovative Technologies for DRR and Resilience in your country?

- What was the best/most useful element of the workshop you attended?

CONTACT INFORMATION

Full Name: _____

Title: _____

Country: _____

Organization: _____

Email: _____

Phone: _____

Thank you for your participation!

Annex V – Post Event Email Follow up Template

Follow up Email Subject | *DATE*

LOGOS

We want to extend a special thank you to the xxxx __PARTNERS ___for their co-organization of EVENT NAME and a thank you to all ____OTHER PARTNERS____.

We summarize here some of the key national findings and lessons presented by Member States

COUNTRY NAME – Institution Represented

policy or progress presented summary (one sentence)

INSERT EVENT PHOTOS

Please contact us at Email

Use the official hashtag #EVENTNAME
Join the conversation and follow us on socialmedia @UNDESA

Annex VI – Impact Evaluation Form (6 months After)

Impact Evaluation Form

As a follow up to the training on **Risk-informed Governance and Innovative Technology for Disaster Risk Reduction and Resilience**, we value your feedback and would like to solicit your insights on the impact of the training for your organization or country. Your suggestions will assist us to develop our future capacity development programmes to better meet your needs for achieving the 2030 Agenda.

1). Since your participation in the training, have there been any follow up activities or actions that you took as a result?

2). Six months after the training, what knowledge, concepts or ideas have you retained most?

3). Do you feel that the training imparted useful knowledge, skills, or networks for your professional or institutional needs?

□ **Yes**
□ **No**

4). If you answered yes, please elaborate on how your participation in the training benefitted your institution.

5a). At this time, do you feel you could benefit from further training related to Risk-informed Governance and Innovative Technology for Disaster Risk Reduction and Resilience?

□ **Yes**
□ **No**

5b). If you answered yes, please state what topics your institutions would most benefit from in terms of further training?

6a). For future capacity development, please choose the types or methods you would prefer from the choices below.

□ Online distance learning through webinars
□ Online distance learning through multi week courses (e.g. 4-week courses)
□ Face to face short trainings of 3 - 5 days
□ Face to face conferences, symposium, seminars, and similar networking events
□ Other

6b). If you selected other, please specify the types or methods you would prefer?

Contact Information (Optional)

Name:_____

Department/Organization:_____

Country:_____

Email:_____

Annex VII – Agenda of the Curriculum Courses on Governance for the SDGs