



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

Module 3.1: Implementing and Financing Technology Solutions

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2. A Procedural Approach to Capacity Development
3. The Capacity Development Process
4. Establishing an Enabling Environment

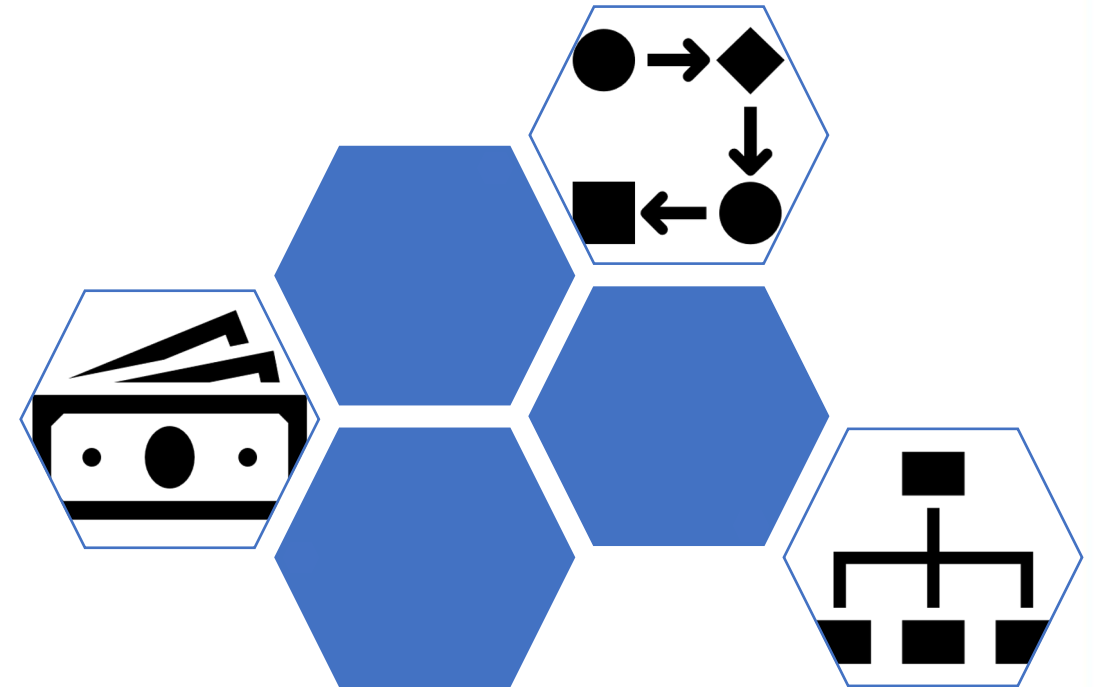
Learning Outcomes

At the conclusion of this Session, Participants will be able to:

- Recognize and understand the roles that different stakeholders play in the adoption and use of emerging technologies
- List the requirements and prerequisites of technology adoption, use, and long-term maintenance
- Recognize and assess risks associated with emerging technologies adoption
- Assess, prioritize, and pursue financing options to address emerging technology needs
- Identify regional and global partnerships and efforts aimed at expanding access to and uptake of emerging technologies, including South-South and triangular cooperation.

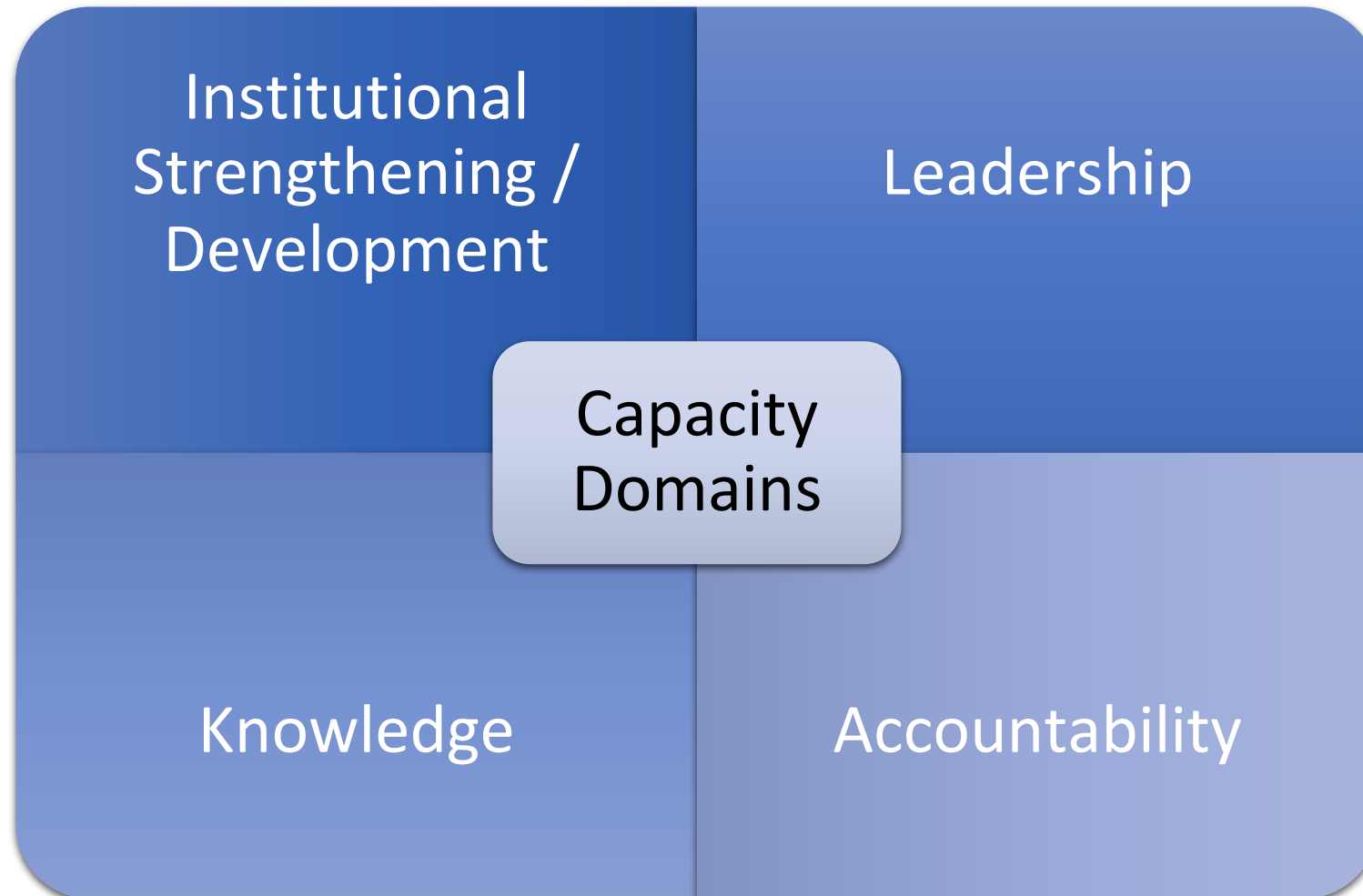
Implementation

- Capacity Assessment
- The Capacity Development Process
- A Strong Enabling Environment
- Funding and Resource Mobilization

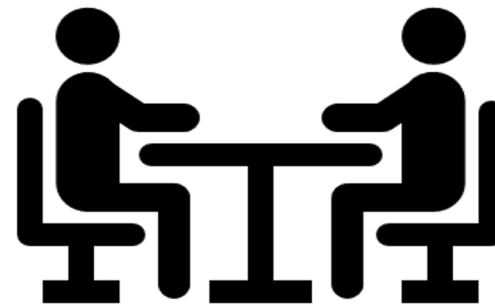


1. The Building Blocks of Capacity Development

Capacity Domains



Group Work and Activities



▪ **Discussion 1: 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.

▪ **Discussion 1: Capacity Domains in the Context of Emerging Technology (Continued)**

- **The Facilitator** can continue the discussion about how capacity elements apply to a specific category of emerging technology by discussing the functional and technical capacity needs that must be addressed in a capacity development effort.
 - Participants can consider the role of different stakeholders in either fostering capacity development or participating in capacity development activities.
- Participants can consider the role of different stakeholders in either fostering capacity development or participating in capacity development activities.
 - Participants should continue using the emerging technology category they have used in in previous discussions.

1. The Building Blocks of Capacity Development

Capacity Types and Elements

Functional Capacity Elements

- Support planning, leadership, resource management, implementation, and monitoring and evaluation
- **5 Categories:**
 - The capacity to engage with stakeholders
 - The capacity to assess a situation and define a vision and mandate
 - The capacity to formulate policies and strategies
 - The capacity to budget, manage, and implement
 - The capacity to monitor and evaluate

1. The Building Blocks of Capacity Development

Capacity Types and Elements

Technical Capacity Elements

- Typically associated with a subject matter or professional expertise
- Training to support technical capacity is cited as the most common form of capacity development

1. The Building Blocks of Capacity Development

▪ **Hard and Soft Capacities**

Hard Capacities

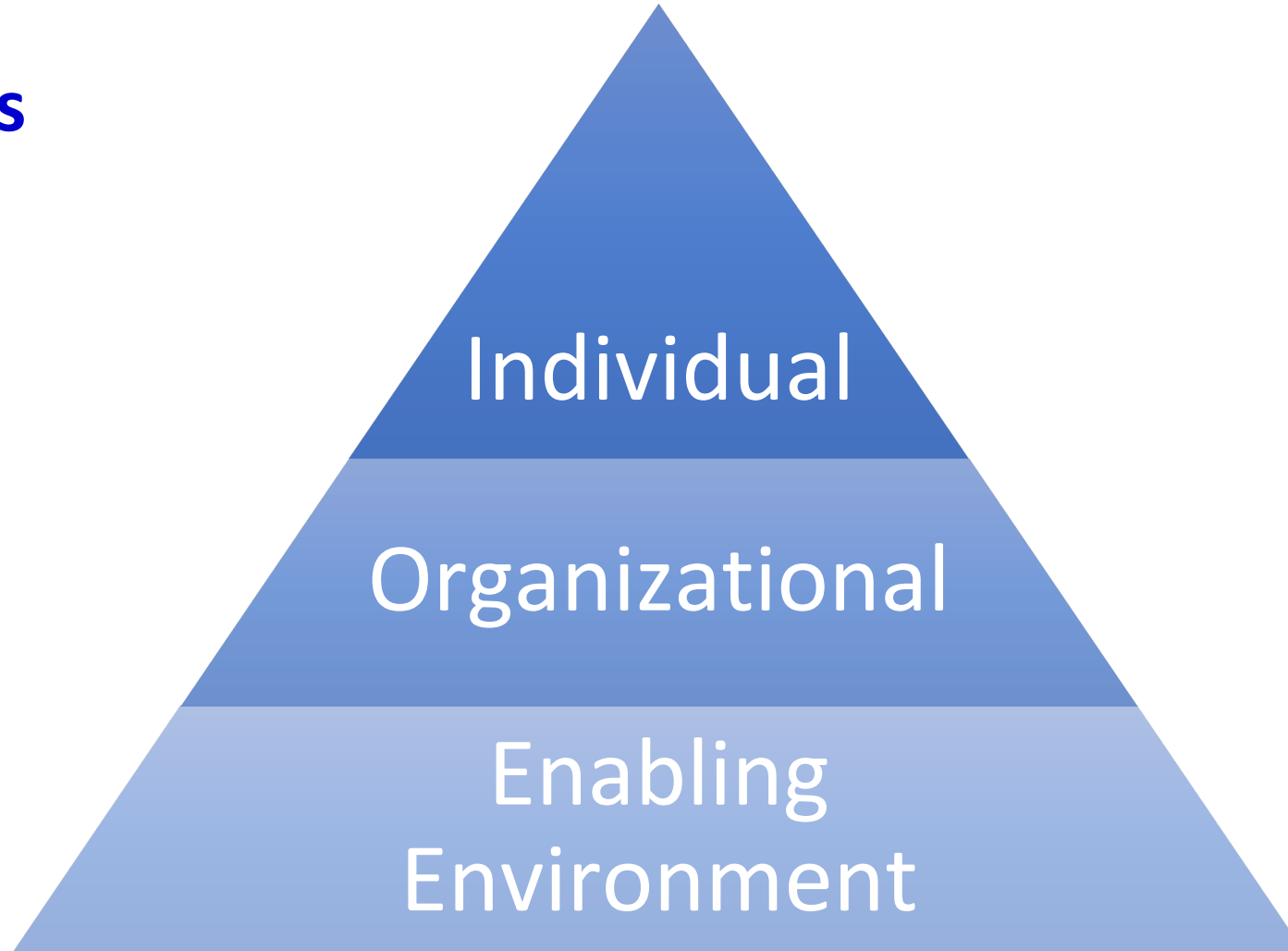
- Tangible / visible
- Easier to conceptualize, identify, and measure
- May be technical or functional
- e.g., *ability to set up a mesh network*

Soft Capacities

- Intangible / invisible
- Difficult to conceptualize, identify, or measure
- May include social or relational elements
- Examples include values, culture, commitment, flexibility

1. The Building Blocks of Capacity Development

- **Capacity Levels**



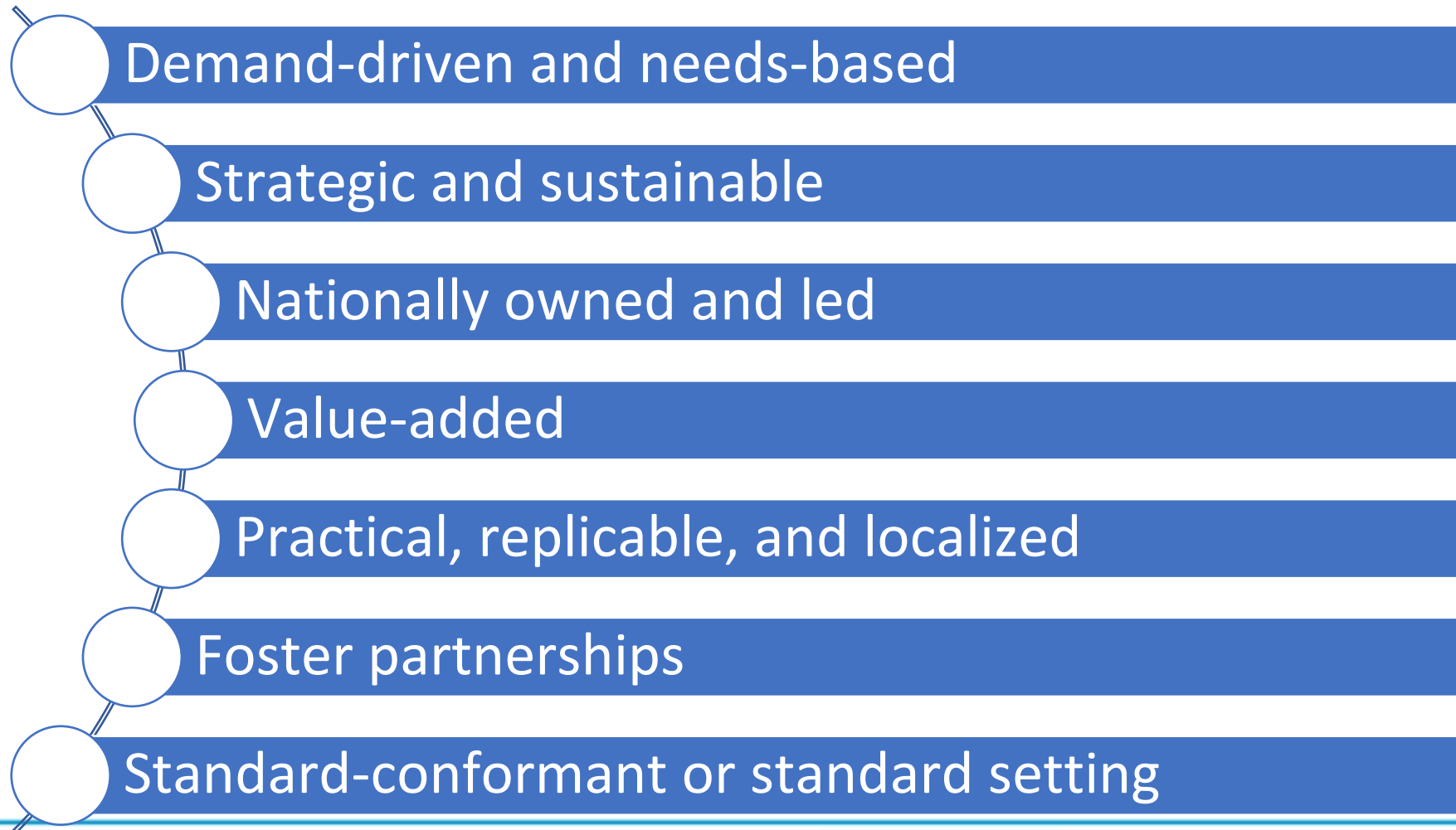
1. The Building Blocks of Capacity Development

Driving Principles of Effective Capacity Development



1. The Building Blocks of Capacity Development

Driving Principles of Effective Capacity Development



1. The Building Blocks of Capacity Development

▪ Foundational Elements of Effective Capacity Development



Source: <https://app.box.com/s/0b8amv35z7t247gl3ebfqw4wd6xpfpmv>

2. A Procedural Approach to Capacity Development

■ Theory of Change

*“A **theory of change** 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.”*

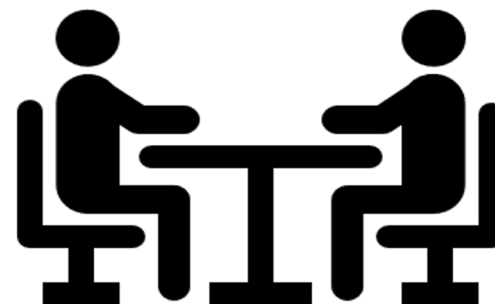
*“A **theory of change** helps to identify solutions to effectively address the causes of problems that hinder progress and guide decisions on which approach should be taken.”*

*“A **theory of change** also helps to identify the underlying assumptions and risks that will be vital to understand and revisit throughout the process to ensure the approach will contribute to the desired change.”*



Adapted from: UN Development Assistance Framework. n/d. Theory of Change: UNDAF Companion Guidance. UN Development Group. <http://bit.ly/31FyxZQ>.

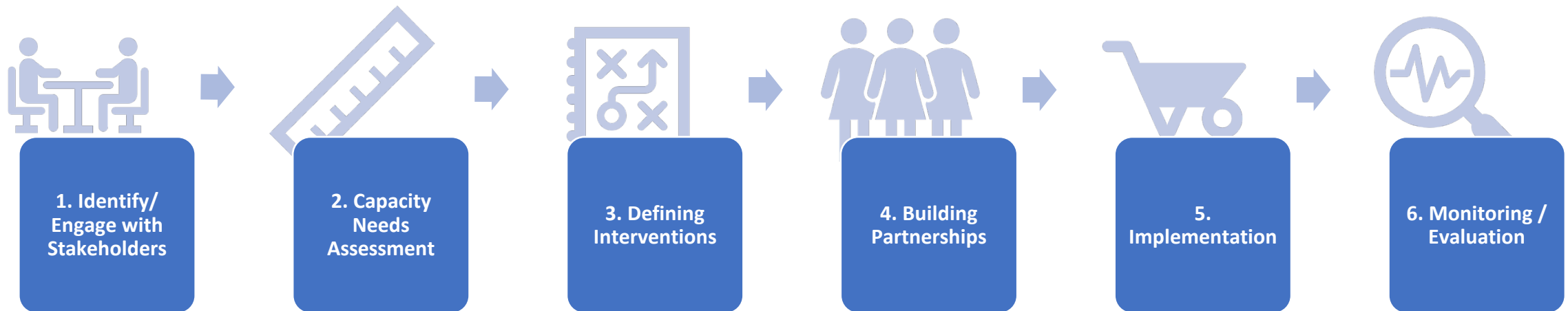
Group Work and Activities



- **Activity 2: A Theory of Change for Emerging Technologies Implementation**
- In this activity, Participants will envision what is involved in the development of a theory of change for the disaster risk management organization of a local community, as it pertains to a single category of emerging technology.
- **The Facilitator** can divide the participants into a total of 3 or 4 groups.
- The Facilitator can assign groups one of the following technology categories:
 - Big data analysis
 - UAV / Drones or Social Media
 - Virtual Reality
 - 5G Technology / IoT.
- Groups will be developing a theory of change diagram that applies to a local community. The group can provide a brief description of their theoretical community, in terms of population, location and function (e.g., coastal, mountain, transportation hub, commercial hub), and other descriptors as desired.

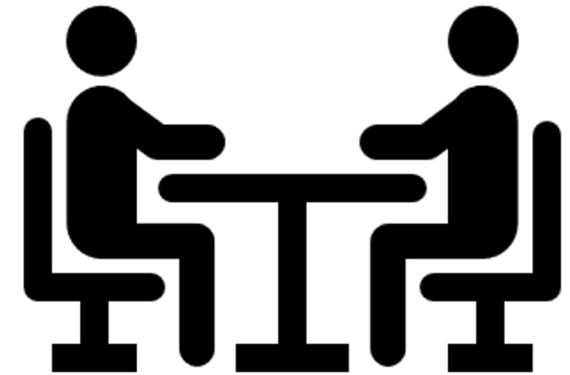
- **Activity 2: A Theory of Change for Emerging Technologies Implementation (continued)**
- Each group should develop a theory of change that involves the following components:
 - - The desired change
 - What is needed (for the desired change to occur)
 - Assumptions and risks ○ Partners and actors.
- **The Facilitator** can provide each group with a copy of Appendix 10 of the UNDRR document **Strategic Approach to Capacity Development for Implementation** of the Sendai Framework for Disaster Risk Reduction, which provides an example of a theory of change. This document can be found at: <http://bit.ly/2vyZpzk>.

Capacity Development Process



▪ Step 1: Identify / Engage with Stakeholders

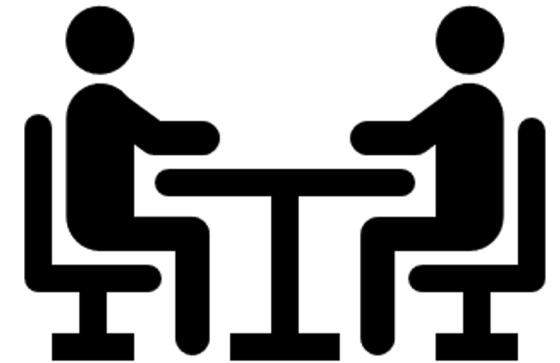
- Sendai Framework calls for “*a broader and a more people-centred preventive approach to disaster risk.*”
- Engagement with those who stand to benefit:
 - Recipients / users
 - Contributors
 - Providers
 - Beneficiaries
- Goal: Initiate relationships / dialogue



▪ **Step 1: Identify / Engage with Stakeholders**

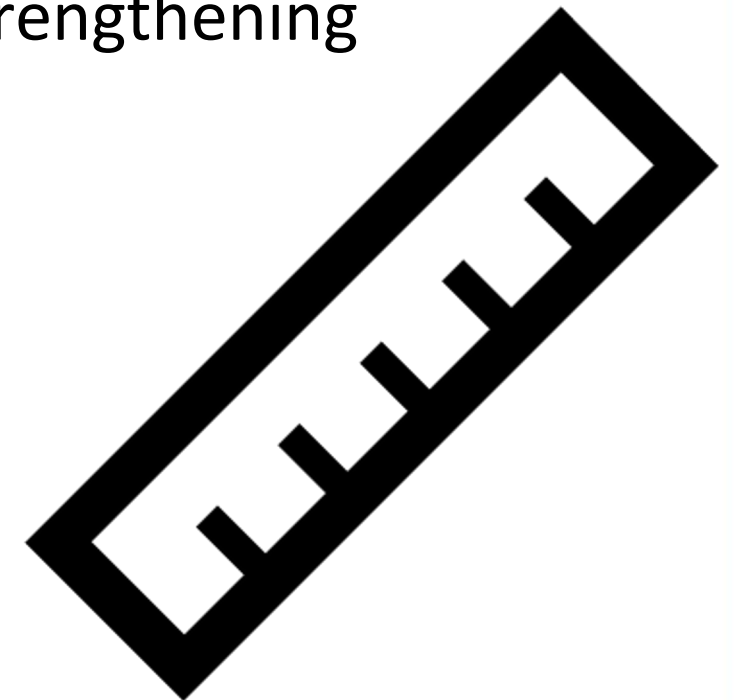
• **Stakeholders:**

- National Government (including elected leaders, parliamentarians, and line ministries)
- Local and Sub-national Government
- Private Sector
- Nongovernmental and Civil-Society Organizations (NGOs and CSOs)
- Academia
- Individuals and Households
- Regional Organizations including IGOs
- The United Nations, International Organizations, and International Financial Institutions



■ Step 2: Capacity Needs Assessment

- Process by which the capacity of a group, organization, or society is reviewed against desired goals
 - Existing capacities identified for maintenance / strengthening
 - Capacity gaps identified
- Pursuit of better understanding of:
 - What capacities are needed
 - Why capacities are needed
 - Who the capacities are intended for
- Capacity should be based on actual needs



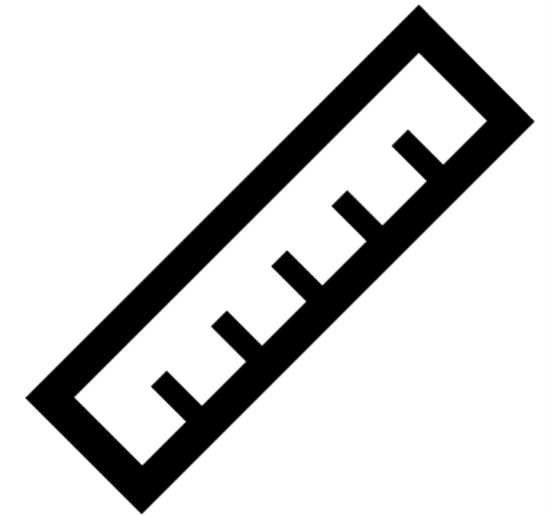
■ Step 2: Capacity Needs Assessment

• Three steps:

1. Mobilizing actors and designing the capacity assessment
2. Conducting the capacity assessment
3. Assessing and interpreting the results

• Goals

1. Articulate capacities, gaps, and points of entry at each of the three levels
2. Provide insight into the causes and impacts of gaps, and set the stage for the effective intervention ID
3. Provides the initial indicators by which progress may be measured in both process and outcome evaluation



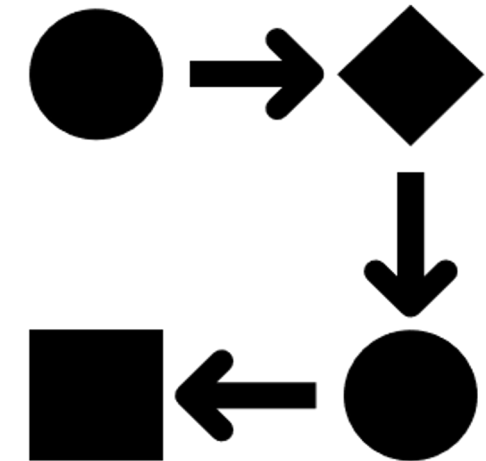
Step 3: Defining Interventions

Focus of Interventions

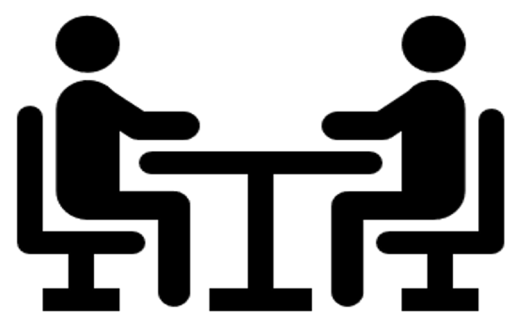
- Institutional Arrangements
- Leadership
- Knowledge
- Accountability

Capacities to Develop

- Capacities for Engagement
- Capacities to generate, access, and use information and knowledge
- Capacities for policy and legislation development
- Capacities for management and implementation
- Capacities to monitor and evaluate



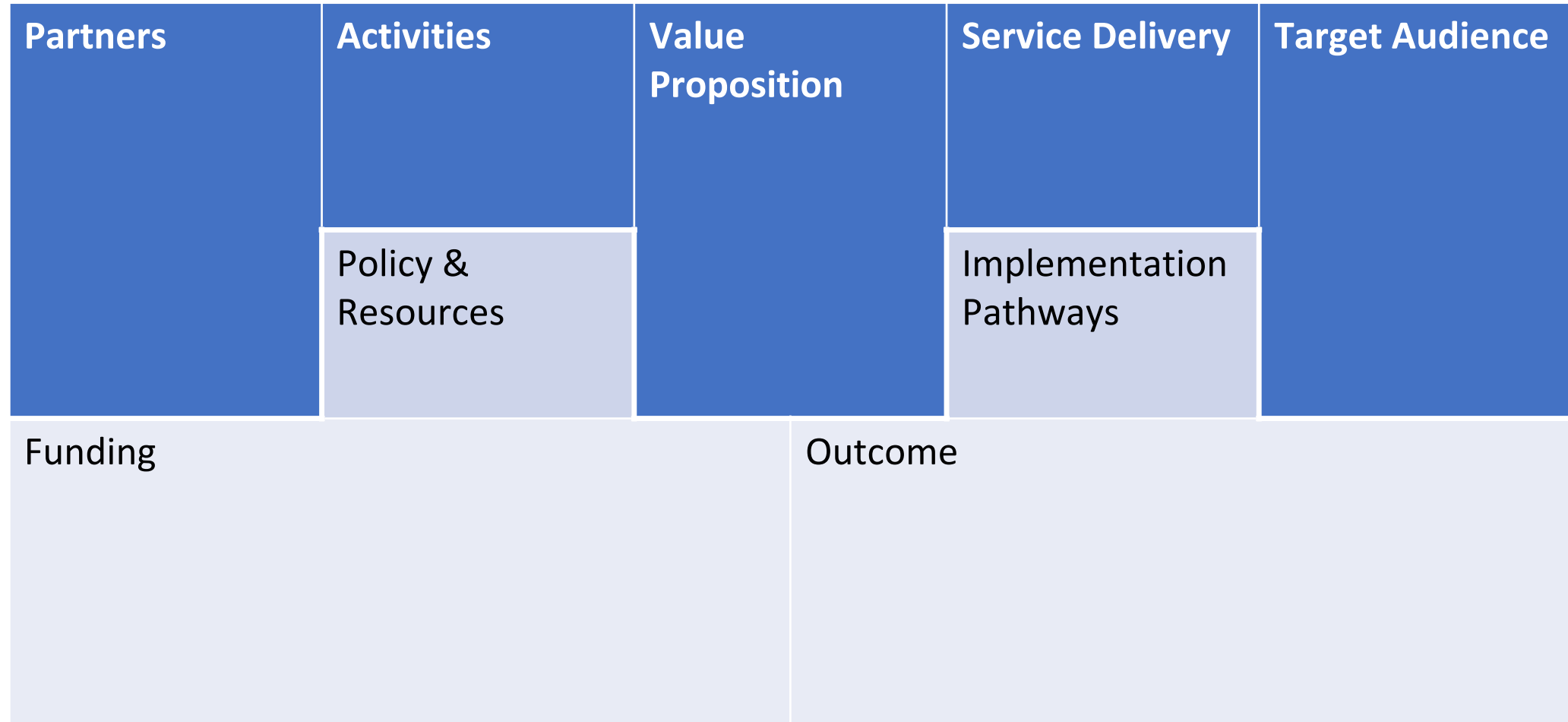
Group Work and Activities



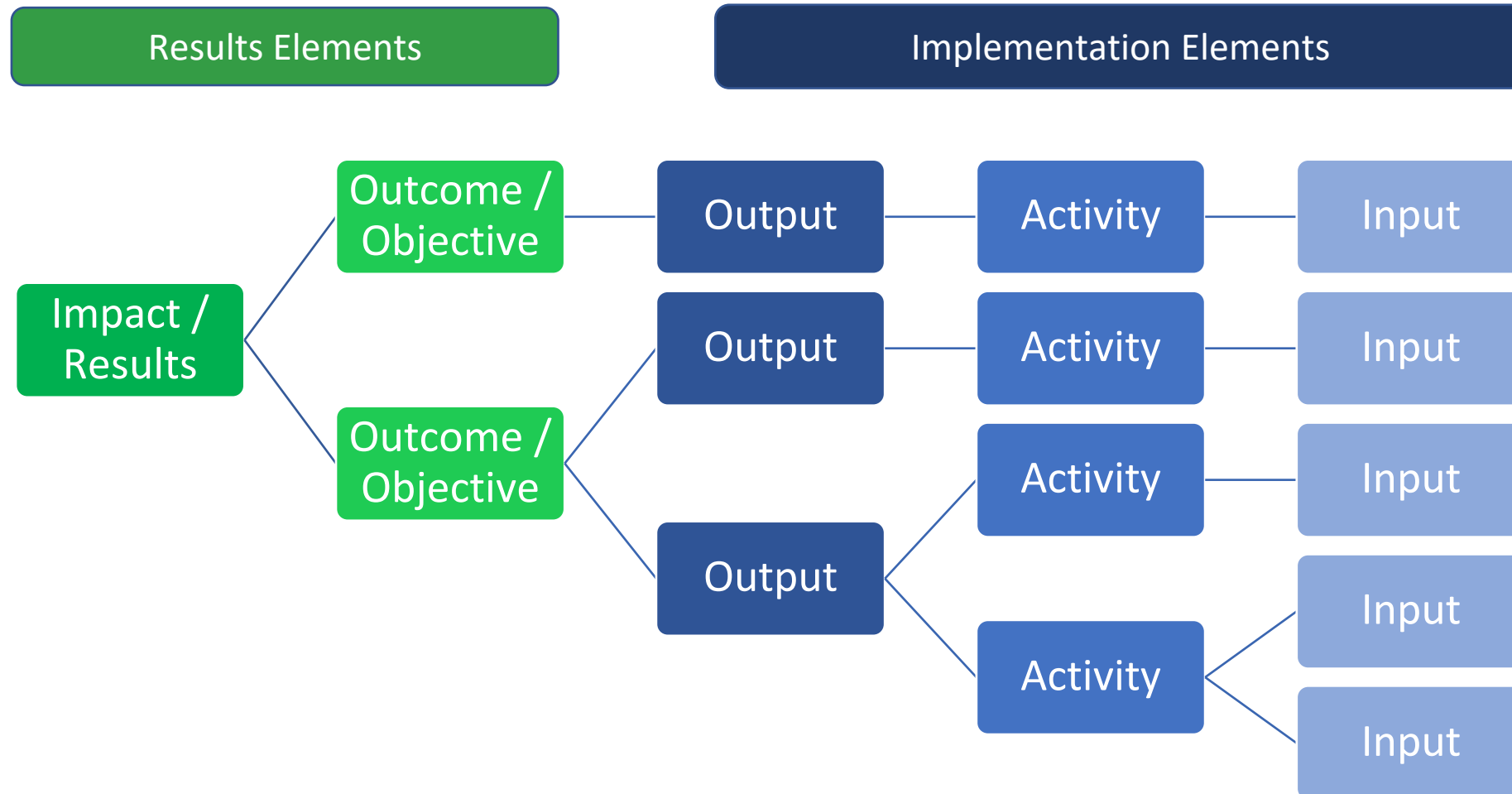
▪ **Discussion 3: Why do countries need STI policy?**

- Emerging technologies use is heavily influenced by policies at the various administrative levels of government, and within individual sectors, most significantly STI policies.
- **The Facilitator** can lead a discussion with Participants about how existing STI policies promote or otherwise support the implementation of emerging technologies, and how they need to be updated or enhanced.

Implementation Canvas



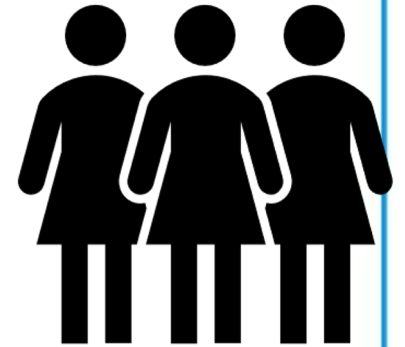
Results Framework



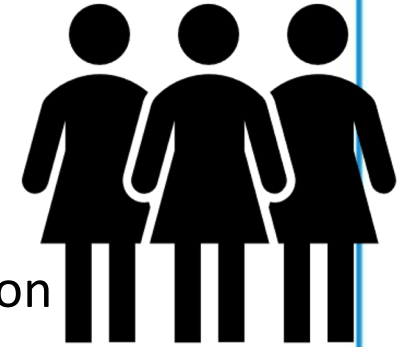
Step 4: Building Partnerships

Questions:

- Are the drivers (motives) for partnering on the part of different actors clear?
- Is the purpose of the partnership clear?
- Do the partners have a written agreement, and if so, what does it include?
- Are the benefits and risks of collaborating articulated?
- How is accountability of the partners described?
- What are the provisions for building, maintaining, reviewing and evaluating the partnership's impact and collaboration process?
- Is there a clear project structure and operating procedures with timetables?



Step 4: Building Partnerships (Continued)



Considerations

- What relationship does the partner have with STI stakeholders, disaster risk reduction stakeholders, or beneficiaries of the partnership?
- Will the partnership be cost-effective?
- Is the partner likely to stay engaged, and do they have the required capabilities for scalability and sustainability?
- Does the partner possess knowledge or skills relevant to the identified capacity needs?
- Does the partner have the resources, systems, and infrastructure needed to support implementation?
- Does the partner have relationships with key networks, decision-makers, or policy makers?
- Does the partner have any political clout, and are they considered politically neutral?
- Are there any regulatory challenges, risks, or conflicts of interest related to the partner's engagement?

Space Imagery Partnerships

Partnership Title	Purpose of Partnership
Disasters Charter	Partners (members) commit resources to provide satellite-derived disaster information. Service is free and international in scope. Activation is by authorized users from charter members. https://www.disasterscharter.org
Copernicus Emergency Mapping Service	Service is free and focused on Europe and areas of European interest. Activation is by authorized users. http://emergency.copernicus.eu
Sentinel Asia	Service, covering the Asia-Pacific region, is available primarily to Asian Disaster Reduction Center member organizations by request. https://sentinel.tksc.jaxa.jp/sentinel2/topControl.jsp
SERVIR	Products are free for approved projects, with international scope. Satellite-derived products focus on environmental monitoring, including near real-time. https://www.servirglobal.net
UNOSAT	Provides timely products to UN decision-makers, NGOs, and others integrating satellite imagery, GIS, and field data. Focal areas include crisis and situational mapping, damage and impact assessment, safety and security, and capacity building. Products are free and international in scope. www.unitar.org/unosat
MapAction	Non-governmental organization providing in situ geospatial information collected by disaster response volunteers. Products are free and international in scope. www.mapaction.org

Source: Aguilar-Manjarrez, José, Lisa C. Wickliffe, and Andy Dean. 2018. Guidance on spatial technologies for disaster risk management in aquaculture: A Handbook. FAO. <http://bit.ly/2OyGzhN>.

Case Study: UNITAR/UNOSAT and Radiant Earth

- **Problem:** The data demands of sustainable development efforts will continue to increase as problems increase in complexity.
- **Need:** Broad stakeholder access to data.
- **Obstacle:** Lack of knowledge or understanding about what space imagery can offer and how to get access to it.
- **Solution:** Collaboration to make data and solutions widely available to the global development community.

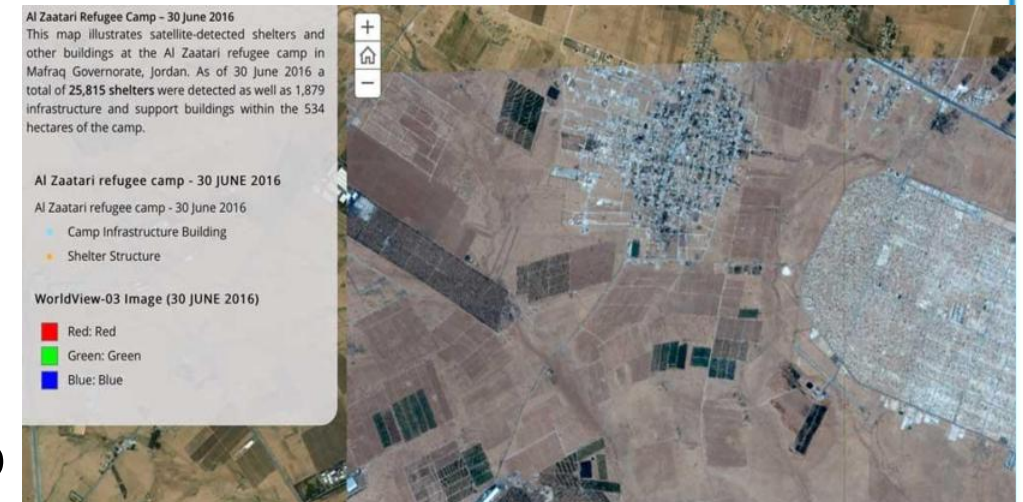


Image: UNITAR map showing satellite-detected settlements of internally-displaced persons in the Daraa and Quneitra Governorates of Syria. Source: UNITAR, 2016.

Case Study: International Charter

- **Problem:** Space imagery offers extraordinary assessment and analytical capabilities following major disasters.
- **Need:** Rapid access to space imagery.
- **Obstacle:** Few countries have their own satellites or have the resources to purchase private-sector satellite imagery on demand.
- **Solution:** Partnership of space agencies that offer no-cost space imagery in support of major disasters upon request.



Video: Saving Lives When Disasters Strike.
Source: ESA, 2015.

■ Step 5: Implementation of Capacity Development Efforts

Implementation is a process that turns strategies and plans into actions in order to accomplish strategic objectives and goals. Implementing your strategic plan is as important, or even more important, than your strategy. The strategic plan addresses the what and why of activities, but implementation addresses the who, where, when, and how.



Adapted from Erica Olsen, 2020.

Common Implementation Pitfalls

- Lack of ownership
- Lack of communication
- Getting mired in the day-to-day
- Out of the ordinary
- An overwhelming plan
- A meaningless plan
- Not considering implementation
- No progress report
- No accountability
- Lack of empowerment



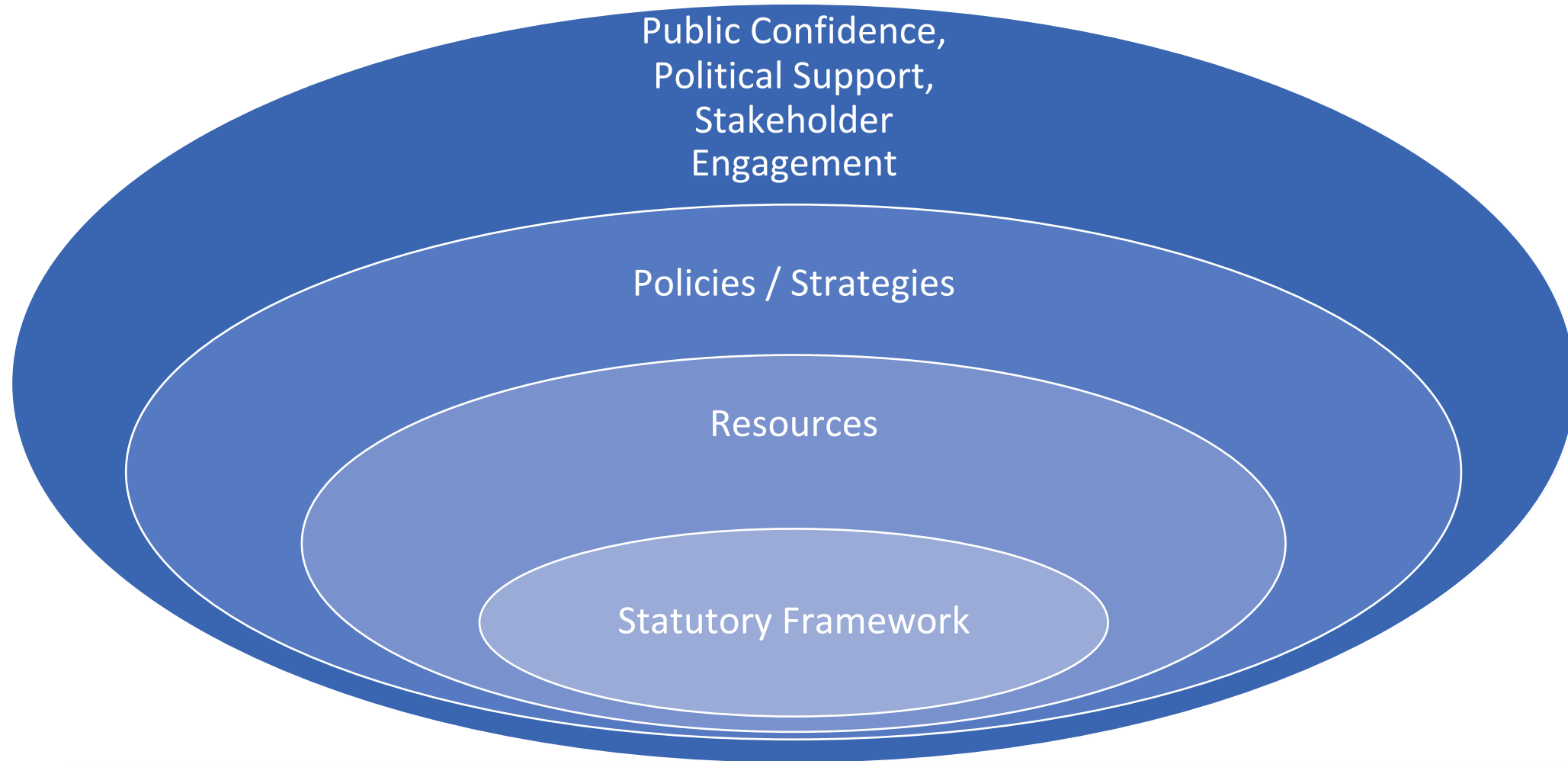
Adapted from Erica Olsen, 2020.

■ Step 6: Monitoring and Evaluation

- Vital, yet largely undervalued
- Conducted to:
 - Ensure implementation partners progress towards intended goals
 - Ensure goals are resulting in the desired changes
 - Facilitates the identification of and accommodation for unintended consequences
- Must not be limited to the *completion* of implementation efforts, but should also apply to the process
- Detailed in Session 3.3



Establishing an Enabling Environment





Statutory Framework

- Laws can constrain or support implementation
- The broad scope of emerging technology applications means many individual laws will have some impact or influence
- Laws may impact:
 - Directly (e.g., laws governing drone piloting)
 - Indirectly (e.g., laws guiding data protection)
- Laws should be explicit
- Legal frameworks should be flexible and responsive
- Considerations for:
 - Civil liberties
 - Security
 - Privacy
 - Other concerns



Case Study: Legislation to Support Citizen Science

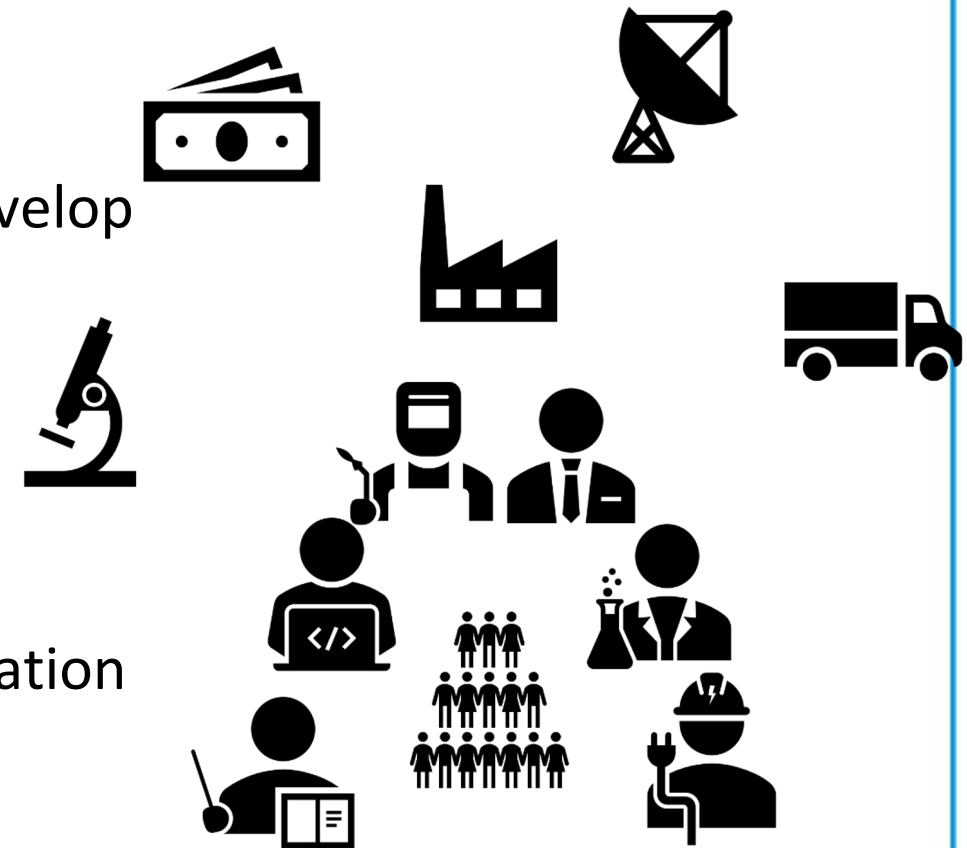
- **Problem:** Research efforts require significant data collection support.
- **Need:** Access to resources to increase citizen science opportunities.
- **Obstacle:** Traditional governmental grant programs may not have the eligibility provisions to support citizen science, nor are there other wraparound supports like a dedicated platform.
- **Solution:** National legal framework to guide and support citizen science.



Image: Screenshot of CitizenScience.Gov, 2020.
Source: US Government, 2020.

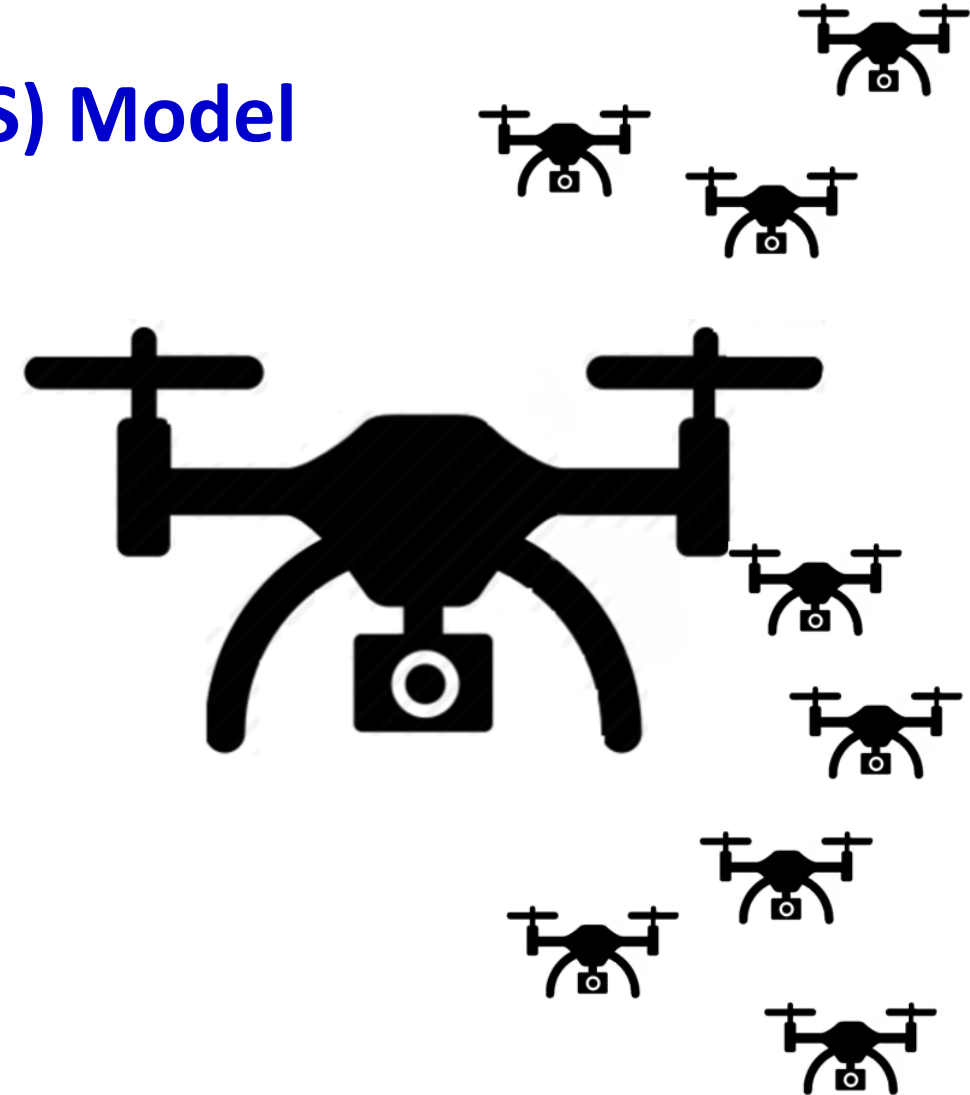
Access to Resources

- Resource deficiencies one of the greatest obstacles to DRR capacity development
 - For emerging technologies, there exist unique resourcing pathways and opportunities
- Capacity development includes the capacity to develop adequate resourcing channels
- Potential pathways:
 - Resource Sharing
 - Public Private Partnerships
 - Development Assistance
 - Mutual Assistance Agreements and Regionalization
 - South-South, North-South, and Triangular Cooperation for Technology Transfer



Case Study: Drone as a Service (DaaS) Model

- **Problem:** Disaster response and recovery assessments require widespread and immediate access to impact imagery.
- **Need:** The capacity to capture imagery quickly and economically.
- **Obstacle:** Resistance to public expenditure on drone acquisitions due to high costs and the risk of equipment becoming obsolete.
- **Solution:** Disaster-specific contracts with drone operators to provide post-disaster imagery.



■ Case Study: UN Technology Bank

- **Problem:** Several enabling elements of technology capacity are out of reach for the LDCs.
- **Need:** A blend of access to funding, development of human resources, partnership opportunities, and more.
- **Obstacle:** Reliable resources (human, financial, and other).
- **Solution:** UN International organization dedicated to supporting STI advancement in the LDCs.



UNITED NATIONS
TECHNOLOGY BANK
FOR LEAST DEVELOPED COUNTRIES

Image: <https://images.app.goo.gl/nRE3AsFSMzAYm8Zv7>

Case Study: Africa Drone and Data Academy

- **Problem:** Many African countries lag behind those in other regions with regard to adoption of emerging technologies.
- **Need:** A trained and skilled workforce.
- **Obstacle:** Training and education opportunities are lacking in the region.
- **Solution:** Academy supported with development assistance that provides no-cost training and education to students from countries throughout Africa, including those employed in the public sector.



Image: Students at the Africa Drone and Data Academy (ADDA) assemble a drone.
Source: Unicef, 2020.

Case Study: Regionalization of Space Data

- **Problem:** Space data enhances pre- and post-disaster risk reduction activities.
- **Need:** Access to imagery produced by satellites and other remote sensors.
- **Obstacle:** Many countries have little or no access to satellites, or do not have the capability to produce imagery on demand.
- **Solution:** Regional partnership of space and DRR agencies to address regionwide disaster risk.

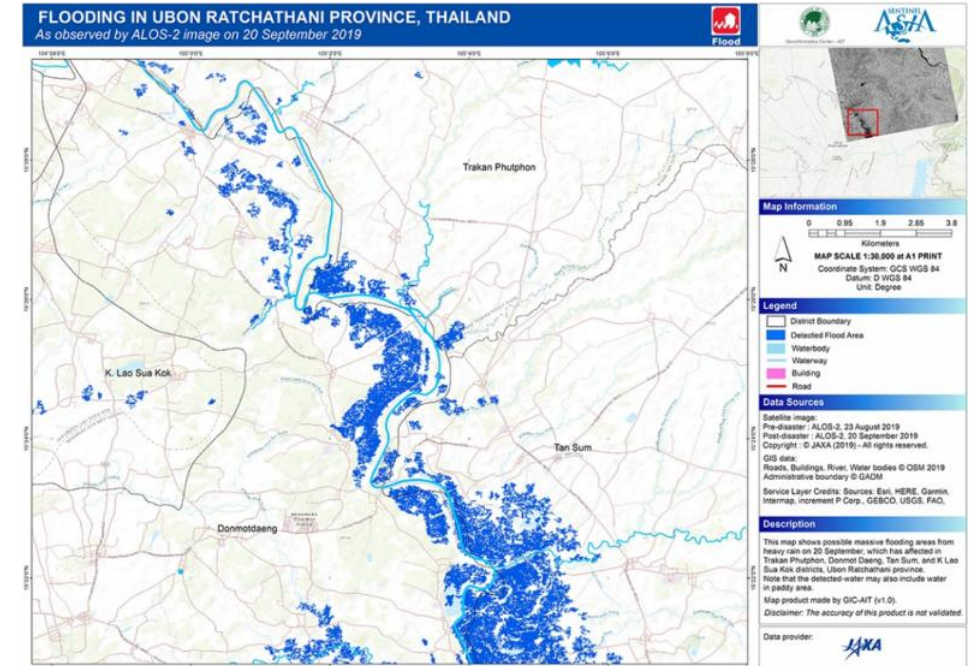


Image: Map of flooded areas in Thailand, 2019, based on imagery provided via Sentinel Asia.

Source: Sentinel Asia, 2019.

■ Case Study: Triangular Cooperation

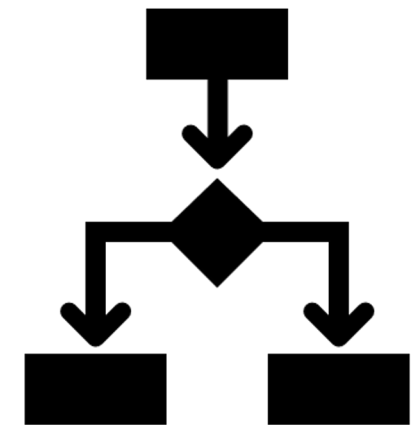
- **Problem:** Technology implementation requires significant human resources.
- **Need:** Human resource capacity development.
- **Obstacle:** Many SIDS do not have the facilities or the trainers to conduct capacity development efforts.
- **Solution:** Bilateral assistance through a triangular cooperation mechanism to provide technical training to development partners through a dedicated capacity development program.



Image: Participants on a SIDSTEC course field trip in February of 2018.
Source: SCPTA, 2018.

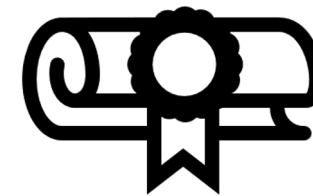
■ Clear and Competent Policies and Strategies

- Provide necessary social and institutional structure
- Required at all administrative levels
- Innovation and use will occur with or without clear policies
 - Clear policies help increase the likelihood that technologies and innovations have a positive impact
- STI policies should be linked to development, DRR, and other relevant policies
- Policies can limit unintended consequences / negative impacts
- Collective action on policies and strategies at the regional and global levels can help to address cross-border implications
- Policies governing data
 - Open data
 - Data preparedness
 - Reducing data disparities
 - Preventing data deluge
 - Preventing data distortion
 - Preventing data damage



Public Confidence, Political Support, and Stakeholder Engagement

- Technologies often represent change
- Leaders can foster or hinder efforts
- Public perceptions will drive acceptance / buy-in
- Stakeholders, including public, must understand risk, and the influence of technology on risk
- Many opportunities for stakeholders to engage



Case Study: Grassroots Technology Capacity Development

- **Problem:** Local communities are often left behind when technology advances disaster risk management capacity.
- **Need:** A workforce that appreciates the value of emerging technologies and that possesses the capacity to use them for DRM and other sustainable development purposes.
- **Obstacle:** Opportunities for capacity development are lacking in many developing countries, especially in rural areas.
- **Solution:** Development programme focused on local training and workforce development.



Video: Power of Local: Panama Flying Labs.
Source: WeRobotics, 2019.

<p>Key Readings</p>	<ul style="list-style-type: none"> • 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 • 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.
<p>Further Readings</p>	<ul style="list-style-type: none"> • Gray, Vanessa. 2019. Key Recommendations for Using Disruptive Technologies to Manage Disasters. ITC4SDG. http://bit.ly/2KxIMZe.



Thank you