Asia-Pacific
Economic Cooperation

2018/EPWG/SDMOF/017
Session:1a-i

Advancing Intergrated Research and Capacity Development for Disaster Risk Reduction - a Brief Update from Integrated Research on Disaster Risk

Submitted by: Integrated Research on Disaster Risk

APEC 2018
PAPUA NEW
GUINEA

12th Senior Disaster Management Officials Forum
Kokopo, Papua New Guinea
25-26 September 2018

IRDR
Integrated Research on Disaster Risk

Advancing integrated research and capacity development for DRR – a brief update from IRDR

12th Senior Disaster Management Officials Forum (SDMOF)
Kokopo, Papua New Guinea, 25th - 26th September,2018

Han Qunli, Executive Director
IRDR-International Programme Office

International Science Council
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A piece of information:

- **20th IRDR Scientific Committee Meeting, 15 Oct 2018, Chengdu, China, for the preparation for GP2019**

- **IRDR/STAG International Conference on Integrated Science & Technology Contributions for Informed National Policy-Making and Action for the Implementation of the Sendai Framework, 16-17 Oct 2018, Chengdu**
  - Review and contextualization of S/T road map and implementation strategy
  - New hazards anticipated by Sendai
  - Synthesis systems and national platforms of science and technology

IRDR mission and objectives

A 10-year international programme focused on Integrated Research on Disaster Risk

Mission: To develop trans-disciplinary, multi-sectorial alliances for:

1. In-depth, practical disaster risk reduction research studies, and

2. The implementation of effective evidence-based disaster risk policies and practices.

Objectives:

1. Characterisation of hazard, vulnerability and risk.

2. Effective decision-making in complex and changing risk context.

3. Reducing risk and curbing losses through knowledge-based actions.

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Scientific Committee Members

Scientific Committee Members

● IRDR International Programme Office

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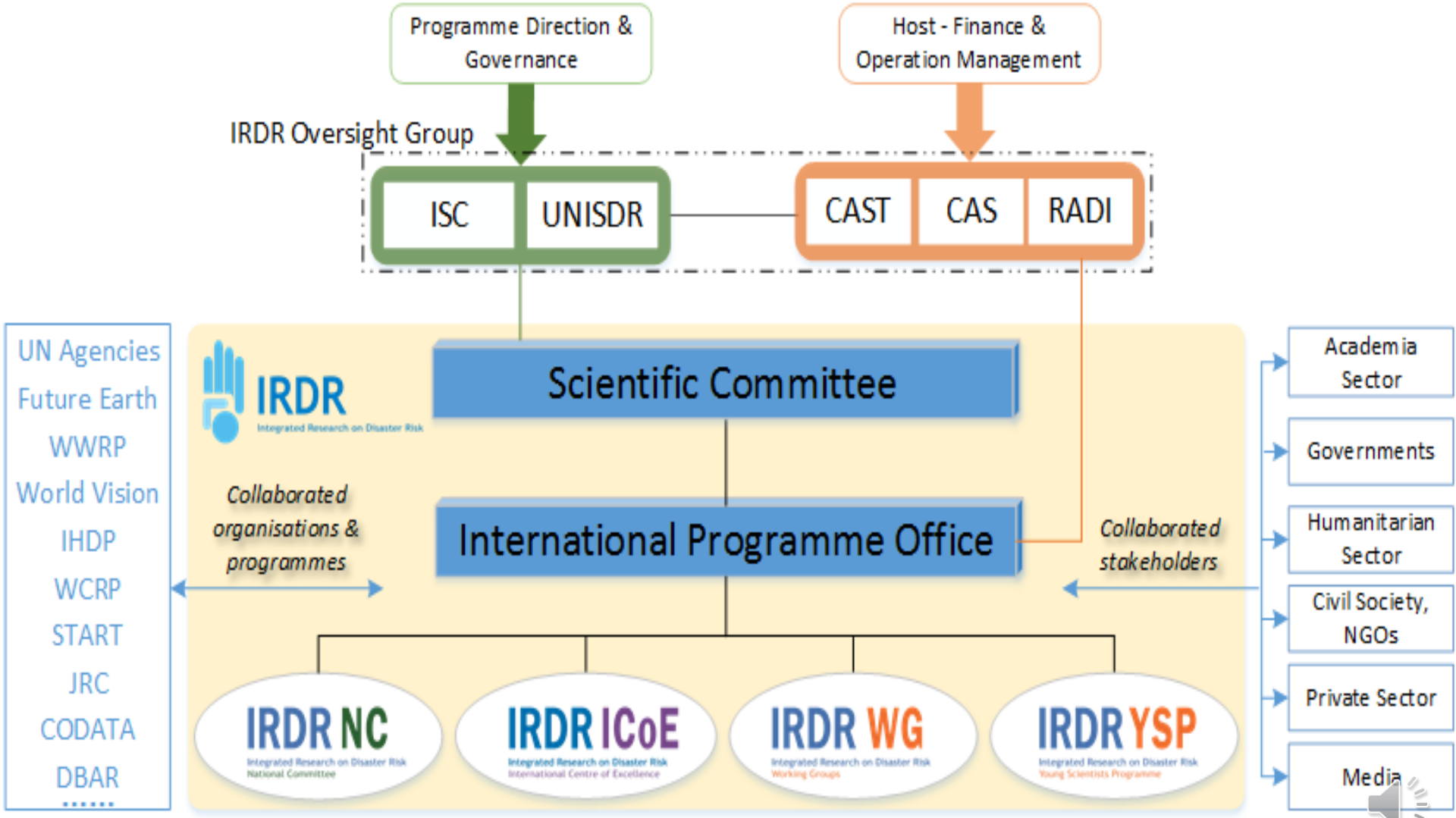
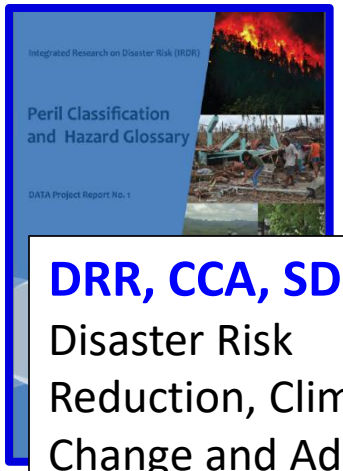
IRDR Structure



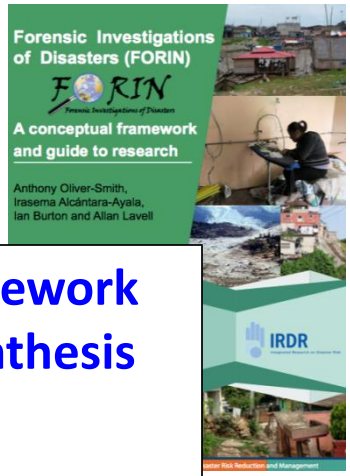
IRDR Working Groups

DATA
Disaster Loss DATA
Co-Chairs:
Virginia Murray & Bapon Fakhruddin



DRR, CCA, SDGs
Disaster Risk Reduction, Climate Change and Adaption, Sustainable Development Goals
Co-Chairs: Rajib Shaw & Rayanti Djalante

FORIN
Forensic Investigations of Disasters
Co-Chairs:
Ann Bostrom & Bapon Fakhruddin



Sendai Framework National Synthesis Reporting
Methods
Indicators
Formats

Co-Chairs: Harashi

AIRDR
Assessment of Integrated Resea
on Disaster Risk
Co-Chairs:
Virginia JIMENEZ & Shuaib LWASA

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Disaster Loss DATA

Objectives:

To study issues related to the collection, storage, and dissemination of disaster loss data

1. Bring together **loss data stakeholders** and develop and utilise synergies
2. Identify **the quality of existing data** and **what data are needed to improve** disaster risk management where practicable
3. Develops where possible **standards/protocols** to reduce uncertainty in the data

1. DATA publications

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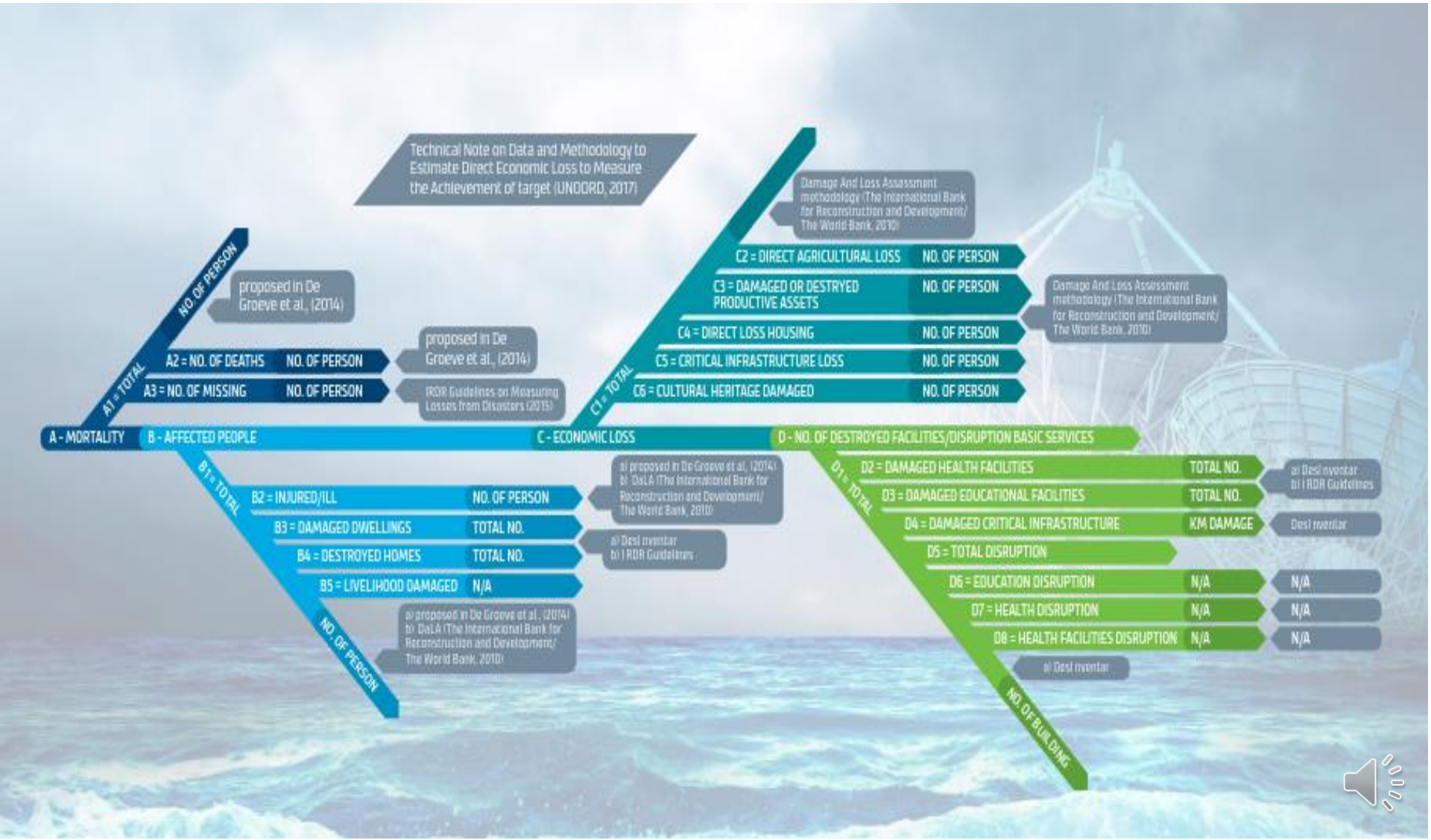
IRDR flagship project: Protocol to Collecting Disaster Loss DATA

(Protocols are being applied/applying by NZ Government, Bangladesh, Indonesia, Sri Lanka, Fiji, Samoa)



Science Technology Status on Disaster Risk Reduction

STATUS REPORT CHINA

1. PROFILE / CONTEXT*

CHINA

China has experienced some of the most destructive natural disasters in the world's history. China's natural disasters have the features of diverse range, wide geographic distribution, high frequency, significant damage and high disaster risk. As an inter-ministerial coordinating mechanism under the State Council, the National Commission for Disaster Reduction (NCDR) is responsible for drafting key disaster reduction policy and plans, coordinating major disaster reduction across the country, and to guide local government in this regard. The Expert Committee under the NCDR has been actively providing S&T support and mobilizing S&T forces at all levels in the all phases of national and local disaster risk reduction, particularly emphasizing the concept of comprehensive disaster reduction which looks at the overall picture of disaster prevention and reduction from research to decision-making, from policy to practice, and from national to local.

2. STATUS

	Attributes of Science and Technology to Disaster Risk Reduction (DRR)	1	2	3	4	5
1	**Science and Technology in decision making**					
1.1	Presence of Science and Technology advisory group to DRR nodal ministry and or/related ministries					■
1.2	Presence of Science and Technology group in DRR national platform					■
1.3	Existence of inter-ministerial discussion/dialogue on science related issues				■	
1.4	Implementation of risk, needs and damage assessment with involvement of Science and Technology group				■	
1.5	Existence of early warning system and mechanism with Science and Technology knowledge and tools					■
1.6	Availability of disaster data/statistics on damage and impacts and its data collection mechanism				■	
1.7	Involvement of Science and Technology group in infrastructure design					■
1.8	Scientific revision/updating of regulations, policies and guidelines for DRR including building codes, disaster response and preparedness plan etc.				■	
2	**Investment in Science and Technology**					
2.1	Existence of grant support by the national government to researchers in disaster related topics that focus on Science and Technology					■
2.2	Establishment of disaster related courses in higher-education					■
2.3	Presence of national research institutes and organizations for disasters					■
2.4	Investment/support by the national government in national/international conferences and events on disasters for knowledge sharing					■
2.5	Support to collaboration with academia and the private sector for developing innovative technical solutions			■		
2.6	Support to collaboration with academia and civil society for developing innovative social solutions			■		
3	**Link of Science and Technology to people**					
3.1	Availability of a hazard map to people, developed based on scientific knowledge			■		
3.2	Scientific validation of indigenous knowledge		■			
3.3	Involvement of Science and Technology group in developing program for evacuation drills			■		
3.4	Availability and participation of Science and Technology group in community discussion as facilitator or advisor/commentator	■				
3.5	Dissemination of science based early warning and forecast to people			■		
3.6	Involvement of Science and Technology group in developing disaster related education curriculum					■
3.7	Existence of facilities such as museum and events such as expo to disseminate disaster knowledge and deepen understanding on disasters among citizens					■

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*This report is prepared by Professor Peijung Shi and his colleagues in China.

STATUS REPORT CHINA

3. SCIENCE AND TECHNOLOGY IN DECISION MAKING

The Expert Committee under the China NCDR consists of over 100 board members and experts from all fields related to DRR. This committee is the key policy support body to national government including policy consultation, scientific guidance, technical support and S&T research.

The Expert Committee has direct channel to provide policy and implementation suggestion to the national major decision making and planning processes, emergency response and relief to major disasters, and post-disaster recovery and reconstruction. The committee also takes actions of reviewing and evaluation on major DRR engineering and research projects, investigating and assessment of major disasters, suggesting on strategy planning of national DRR, and participating in national and international S&T DRR cooperation. All these activities make significant influence in national and local decision making on DRR. This committee has direct route to reach Prime Minister and state council members for urgent and important issues.

National Disaster Reduction Center of China (NDRCC) under Ministry of Civil Affairs is the main body linking DRR S&T with government administration and decision-making at all levels. The provincial and city governments have also established their disaster reduction centers, which strengthened S&T utilization and implementation at local levels.

In case of large-scale disaster, Chinese government has the mechanism of establishing expert panel to ensure proper and timely decision-making.

4. INVESTMENT IN SCIENCE AND TECHNOLOGY

To ensure the sufficient investment in scientific and technological innovations in disaster prevention and reduction, the Chinese government compiled the Twelfth Five-year Special Planning for the National Science and Technology Development for Disaster Prevention and Reduction in 2012. This national S&T plan has not only identified the priorities of actions in DRR but also ensured sufficient investment to meet the national target. All provincial and local government uses this national plan to set up their 5-year targets and action plans.

Research and innovation programs in the field of DRR have been set-up to ensure S&T advance and implementation. These programs include natural science foundation program, S&T pillar program, high technology program, and fundamental research program. The national and provincial financial input, along with industrial matching funds, has become the main S&T research investment.

A series of critical technologies in DRR has been developed and implemented during the S&T research. The improvement of disaster information collection, database development and construction of national emergency platform has been achieved. A series of science and technology demonstration bases for disaster prevention and reduction and a number of state key laboratories and engineering and technology research centers for disaster prevention and reduction have been established.

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ASIA
Science Technology Status
For Disaster Risk Reduction

2016

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futurearth research for global sustainability

Priority 1	Priority 2	Priority 3	Priority 4
Action 1 Enhance disaster loss and damage accounting, national and local disaster risk assessment and communication of disaster risk	**Action 5** Strengthen science-policy-practice nexus at all levels	**Action 8** Make DRR an area of focus within education including networking between universities	**Action 12** Promote the role of inter-disciplinary science and technology in effective pre-disaster planning, preparedness, response, rehabilitation, recovery and reconstruction to build back better
Action 2 Use space and disaster risk mapping technologies, and emerging technologies and strengthen the capacity	**Action 6** Develop inter-disciplinary national science and technology plans to support implementation of the Sendai Framework	**Action 9** Ensure risk-sensitive investments	**Action 13** Develop an efficient and effective cooperation among the science community and business sector by utilizing the advancements of the fast developing information and communication technology (ICT) including big data
Action 3 Strengthen regional exchange on disaster risk information and science	**Action 7** Enhance collaboration between local governments, academia and other partners to promote local communities knowledge and traditions and to sustain and replicate many good practices that exist locally for science-based decision making	**Action 10** Develop young professionals in the field of multi-disciplinary disaster risk reduction	**Action 14** Research into innovative solutions to promote the whole-of-society engagement
Action 4 Develop a synthesis system under international cooperation		**Action 11** Enhance and showcase projects that promote science and technology-based DRR and encourage governmental and social investment in disaster risk reduction	

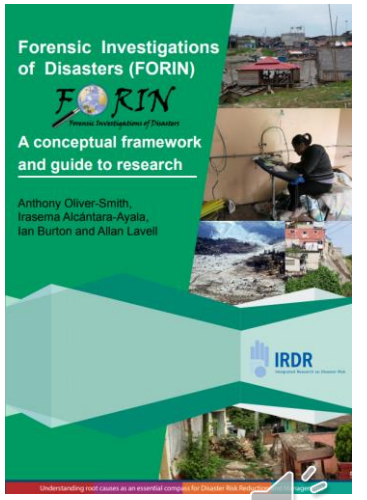
FORIN Working Group

Forensic Investigation of Disasters

Objectives:

To uncover, and then promote learning from, the root causes of disaster losses and risk by examining policy, management, social and cultural, and emergency response decisions made before, during and after disaster events. The goals are:

1. **Integrate knowledge** about how natural hazards and historically developed institutional structures, practices and perceptions create risk and shape vulnerabilities of communities.
2. **Advance the understanding of disaster risk scenarios** as part of concepts and practices of growth and sustainable development;
3. **Promote a learning culture in disaster risk management** whereby an understanding of "risk-drivers" can have impact on practices and policies.



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FORIN approaches

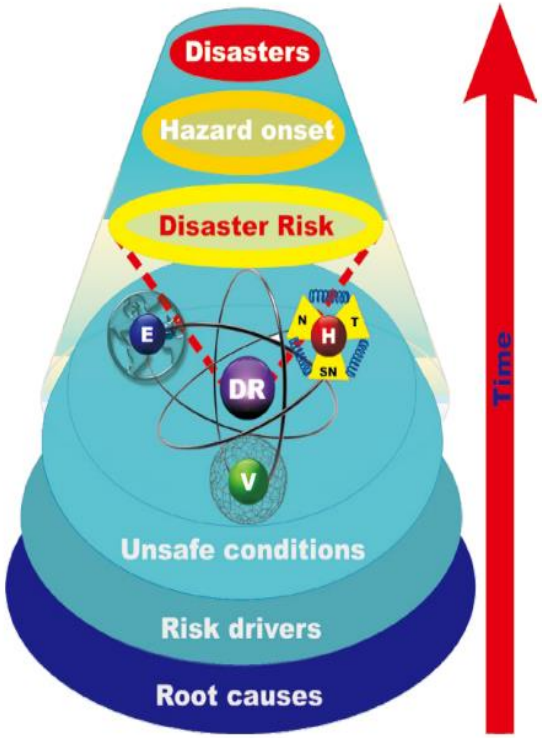

Figure 2 From the social construction of risk to the social production of disaster.

1) ***Retrospective longitudinal analysis (RLA)***, concerned with the temporal development of the processes that have produced disasters in the past.

2) ***FORIN disaster scenario building (FDSB)***, selected on the basis of a known hazard that preludes a possibly inevitable future event that is considered a factor in future disaster (basically looks forward into the future scenarios).

3) ***Comparative case analysis***—an event-based analysis that seeks to identify underlying causes of disasters by comparing disaster impacts or contexts in different social contexts.

4) ***Meta-analysis***—an event- or system-based review of the available literature carried out to identify and assess consistent and contrasting findings across diverse studies.

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National Committee

13 National Committees
1 Regional Committee

IRDR Australia	Bushfire & Natural Hazards Cooperative Research Centre (BNH CRC)	**IRDR New Zealand**	Natural Hazards Research Platform (NHRP)
IRDR Canada	Science and Technology Working Group, Canada's Platform for Disaster Risk Reduction	**IRDR USA**	Natural Hazards Center (NHC), Institute of Behavioral Science, University of Colorado at Boulder
IRDR China	China Association for Science and Technology (CAST)	**IRDR Iran**	A group of eight Iranian research institutes and scientific associations
IRDR Colombia	National Committee of Disaster Risk Knowledge, National Unit for Disaster Risk Management of the Presidency of the Republic of Colombia	**IRDR Indonesia**	Indonesia Institute of Sciences (LIPI)
		IRDR Japan	Science Council of Japan (SCJ)
IRDR France	Scientific Council, Association Française Pour la Prevention des Catastrophes Naturelles (AFPCN)	**IRDR Republic of Korea**	National Disaster Management Research Institute (NDMI) in Ministry of the Interior and Safety
IRDR Germany	German Committee for Disaster Reduction	**IRDR Nepal**	National Reconstruction Authority of Nepal

IRDR Regional Committee ICSU Regional Office for Latin America and the Caribbean (ICSU ROLAC)

IRDR Integrated Research on Disaster Risk

IRDR ICoE Integrated Research on Disaster Risk International Centre of Excellence

International Centre of Excellence (ICoE) - 16 centres

Community-based Resilience, New Zealand	ICoE- CR	Risk Education and Learning, South Africa	ICoE- REaL
Risk Interpretation and Action, UK	ICoE- RIA	Capacity building, research, Taipei	ICoE- Taipei
Understanding Risk & Safety, Colombia	ICoE- UR&S	Vulnerability & Resilience Metrics, USA	ICoE- VaRM
Critical Infrastructure & Strategic Planning, Germany	ICoE- CI&SP	Disaster Resilient Homes, Buildings, and Public Infrastructure, Canada	ICoE- DRHBPI
National Society for Earthquake Technology, Nepal	ICoE- NEST	Disaster and Medical Humanitarian Response, Hong Kong	ICoE-CCOUC
Disaster Risk and Climate Extremes, Malaysia	ICoE-SEADPRI-UKM	Spatial Decision Support for Integrated Disaster Risk Reduction, the Netherlands	ICoE-SDS IDRR
Transforming Development and Disaster Risk， Thailand	ICoE-TDDR	Integrated Research on Disaster Risk Science, Australia	ICoE-IRDRS
Resilient Communities & Settlements, India	ICoE-RCS	Disaster and Climatic Extremes, Pakistan	ICoE-DCE

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Young Scientists Programme and Training

115 IRDR Young Scientists
40 countries

Field of research	Research Topic
Geosciences, Environment and Spatial Planning	Climate risks in rural areas and adaptation processes: a national vision of Portugal
Civil and Environmental Engineering specialising in Disaster Man	Development of the "Build Back Better Tool" to Implement Sendai Framework Priority 4
Environmental and Urban Planning	Assessing Sendai Framework Execution in Afghanistan Context
Disaster Management	Assessing Geohazard Mitigation and Linking Disaster Risk Perception to Preparedness for Resilient Communities: A case study of Attabad landslide dam.
Structural Engineering	2015 Gorkha Earthquak reconstruction initiative in rural area of Nepal and its challenges
Geography of Enviornmental Risks and human security	Assessing institutional capacities of municipal urban planning departments to integrate future-oriented vulnerability information in the context of rapid urbanization into public infrastructure planning by city size
Disaster Management	Sustainable Socio-Economic Aspects of CPEC
Social Sciences	The Future Ground Urban planning under long-term climate uncertainty
Physical Geography	Continuity and Transformation of Community Resilience against earthquake in Nepalese cities

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S/T for DRR on preparedness, early warning, assessment and monitoring

A few examples

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IRDR Flagship Project
Silk Road Disaster Risk Reduction (SiDRR)

01 To identify and forecast natural hazards and improve natural hazard resilience and decrease the life and economic losses

02 To develop and expand the application of disaster prevention and risk reduction technologies, and to enhance level of disaster risk governance

03 Promote scientific cooperation and Establish international cooperation mechanism for hazard mitigation and management

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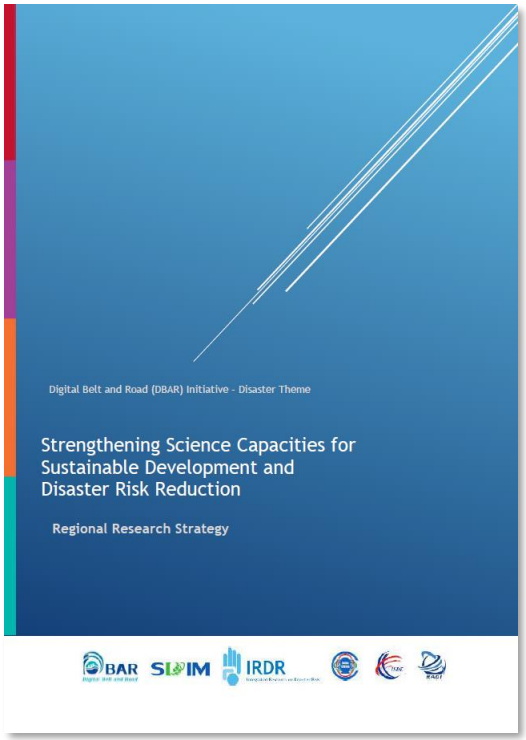
Partnership with the Digital Belt and Road (DBAR)

- Work Plan

Short-term (next 3 years)	Medium-term (upto 5 years)	Long-term (upto 10 years)
Action 1 Enhance disaster loss and damage accounting, national and local disaster risk assessment and communication of disaster risk **Action 9** Develop young professionals in the field of multi-disciplinary disaster risk reduction **Action 7** Make DRR an area of focus within education including networking between universities **Action 4** Strengthen science-policy-practice nexus at all levels	**Action 2** Use space and disaster risk mapping technologies and strengthen the capacity **Action 11** Develop an efficient and effective cooperation among the science community and business sector by utilizing the advancements of the fast developing information and communication technology (ICT) including big data **Action 3** Strengthen regional exchange on disaster risk information and science **Action 5** Develop inter-disciplinary national science and technology plans to support implementation of the Sendai Framework	**Action 8** Ensure risk-sensitive investments **Action 12** Research into innovative solutions to promote the whole-of-society engagement **Action 10** Promote the role of inter-disciplinary science and technology in effective pre-disaster planning, preparedness, response, rehabilitation, recovery and reconstruction to build back better **Action 6** Enhance collaboration between local governments, academia and other partners to promote local communities knowledge and traditions and to sustain and replicate many good practices that exist locally for science-based decision making



Communities engagement in geo-hazards warning, monitoring and reporting

Disaster management sectors in villages, towns and counties.

- Reporting
- Early warning
- Emergency responses
- Field surveys

Local villagers

- Training
- Monitoring by patrol
- Reporting
- Emergency responses

Bureau/Ministries in charge of of DRR

- Early warning
- Emergency responses
- Field surveys
- Researches and analysis
- DRR strategies

Information card for communities on floods/landslide (Chongqing, China)

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Engaging local people in hazards monitoring and reporting

- A geohazard case in Beijing, **11 August 2018**

8:20AM a trained DRR monitor noticed some falling stones on the road, he **reported** immediately to head of village for an **early warning of landslide**, then they stopped the vehicles and the passerby along the road

8:30AM a big landslide with a volume of 30,000 m^3 occurred, the villager saved 15 cars and life of 28 people.

There are 1, 671 villagers in Beijing who are trained by experts with basic geo-hazards knowledge and the skills of disaster monitoring.

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Typhoon Mangkhut

TROPICAL STORM

EVENT INFO

Max windspeed: 148.1 km/h

Max. Storm Surge: 3 m.

Current Coordinates: Lat: 21.6 Lon: 113.6

Warning ref.: JTWC - Bulletin #38

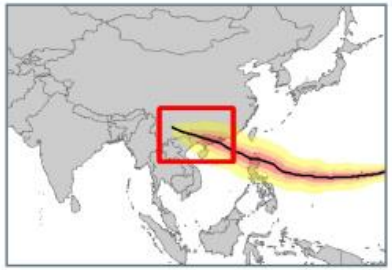
PEOPLE LIVING IN AREAS AT RISK

(All Countries Considered)

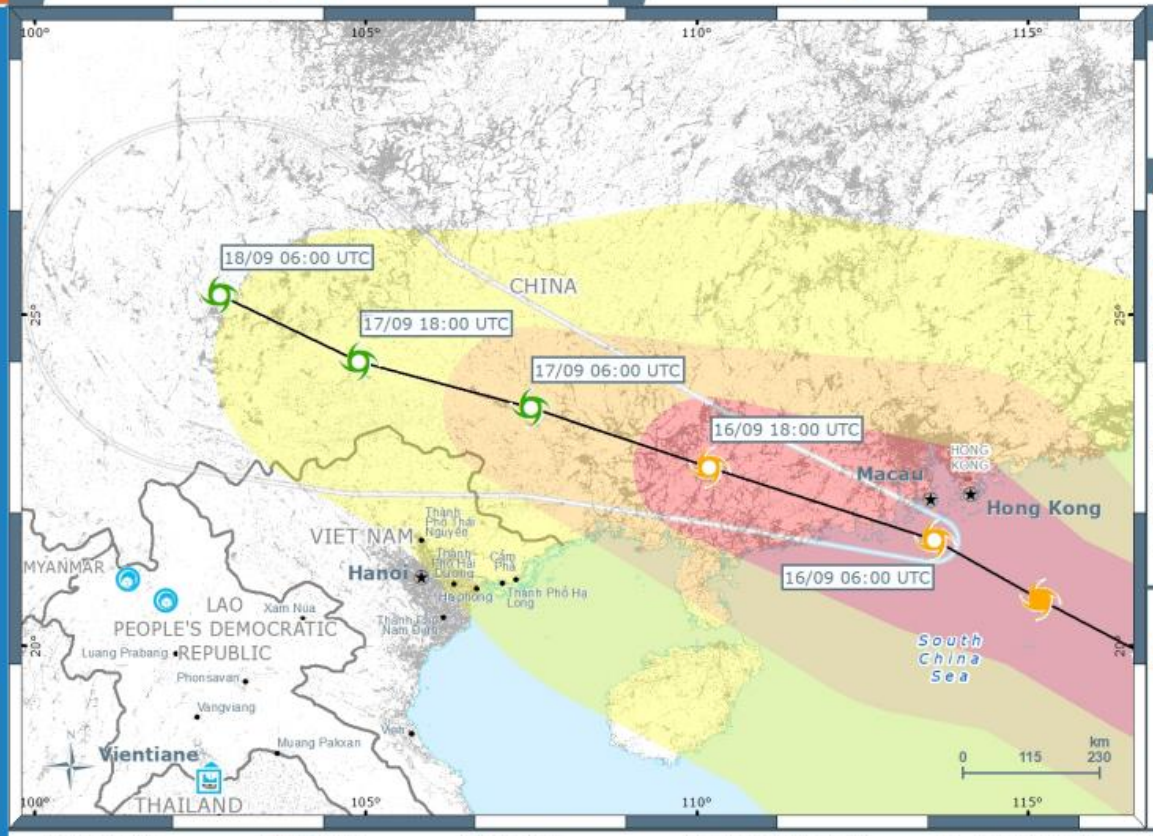
120 km/h windspeed | 77,190,000

90 km/h windspeed | 62,505,127

60 km/h windspeed | 144,706,012



Tropical Cyclone MANGKHUT



STORM CLASSIFICATION

Category 1

WFP WORLD FOOD PROGRAMME PRESENCE

CLOSEST
FACILITIES

Manila Country Office (PHL): 396 km on 15/09 at 00:00
Namtha Field Office (LAO): 498 km on 18/09 at 06:00
Xai Field Office (LAO): 500 km on 17/09 at 18:00
Pang Kham Sub Office (MMR): 507 km on 18/09 at 06:00
Myitkyina Sub Office (MMR): 543 km on 18/09 at 06:00

CLOSEST
HUMANITARIAN RESPONSE DEPOT

Subang Airport - Kuala Lumpur (MYS): 2361 km on 17/09 at 06:00

Automatically generated alert powered by:

ADAM - Automated Disaster Analysis and Mapping

16 September 2018 | 08:47:59 GMT

A collaboration with JRC

Follow alerts via Twitter: **@wfp_adam**

WFP Facilities
- Country Office
- Sub Office
- Warehouse

Wind buffers
- 120 km/h
- 90 km/h
- 60 km/h
- Uncertainty

Wind speed
- < 110 km/h
- 110 - 185 km/h
- 185 - 240 km/h
- > 240 km/h

Wind speed (forecast)
- < 110 km/h
- 110 - 185 km/h
- 185 - 240 km/h
- > 240 km/h

- National Capital
- Major Town
- Intermediate Town
- Densely Populated Area

Please report errors to hq.gis@wfp.org. Event ID: 1000498_38. Coordinate system: GCS WGS 1984. Sources: GDACS, Landscan 2015, GAUL, WFP, ESRI. The designations employed and the presentation of material in this map do not imply the expression of any opinion whatsoever of WFP concerning the legal or constitutional status of any country, territory or sea area, or concerning the delimitation of frontiers.

WFP wfp.org

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Early warning in China for Mangkut

One week before landfall

This month

11 day(s) ago

广东将遭遇双台风袭击，其中还有一个超强台风
广东三防

11 day(s) ago

双台风对准我国！23号台风百里嘉即将生成，可能去广东
中国气象爱好者

11 day(s) ago

超强台风进南海？山竹即将开启风王之路，它已锁定我国
中国气象爱好者

Potential landfall location and severe degree

11 day(s) ago

双台风排队来！"山竹"或有17级以上！超强台风不好惹，提前防范准…
mp.weixin.qq.com

3 days before landfall

This month

7 day(s) ago

应急管理部召开防御超强台风"山竹"会商研判视频调度会
中华人民共和国应急管理部

Emergency response plans from Ministry of Emergency Management

紧急通知！南海区各中小学、幼儿园下周一停课！其他区……
佛山发布

Emergency response plans from local governments for schools

"山竹"强势逼近 国家防总启动Ⅱ级应急响应
中国水利网

7 day(s) ago

下周一南海区中小学停课！佛山市、南海区教育局发布防御"山竹"紧急…
珠江时报

One day before landfall

This month

6 day(s) ago

广东防风最高级别响应！南海这些应急避难场所已开放！
view.inews.qq.com

Information of emergency shelters

6 day(s) ago

台风"山竹"携狂风暴雨来袭 直击广东第一现场
新华社

Current status of rainfall and wind

6 day(s) ago

再次北调！巨大的强台风山竹即将登陆广东，影响重点是珠三角！
mp.weixin.qq.com

Suspending of flights, high-speed trains, markets, schools, etc.

台风直播丨高铁停运！全省停课！广东防风最高级别响应

Messages delivered by TV, website, SMS, social media (**wechat**, weibo, etc.) through mobile phone apps

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DRR plans in China for Mangkut

Actions of Ministry of Emergency Management

Emergency response and rescues

Early warnings and preparations for secondary disasters

Early warnings and preparations for typhoon and floods

Risk analysis and co-designed decision-making with multi-sectors

Actions of Private Sectors

Local government signed contract with insurance companies for every citizens

By contacting with insurance companies by telephone or apps, citizens could claim their losses and get compensation.

About 4 millions people was relocated and over 49,000 fishing boats were protected, mortality was 4 .

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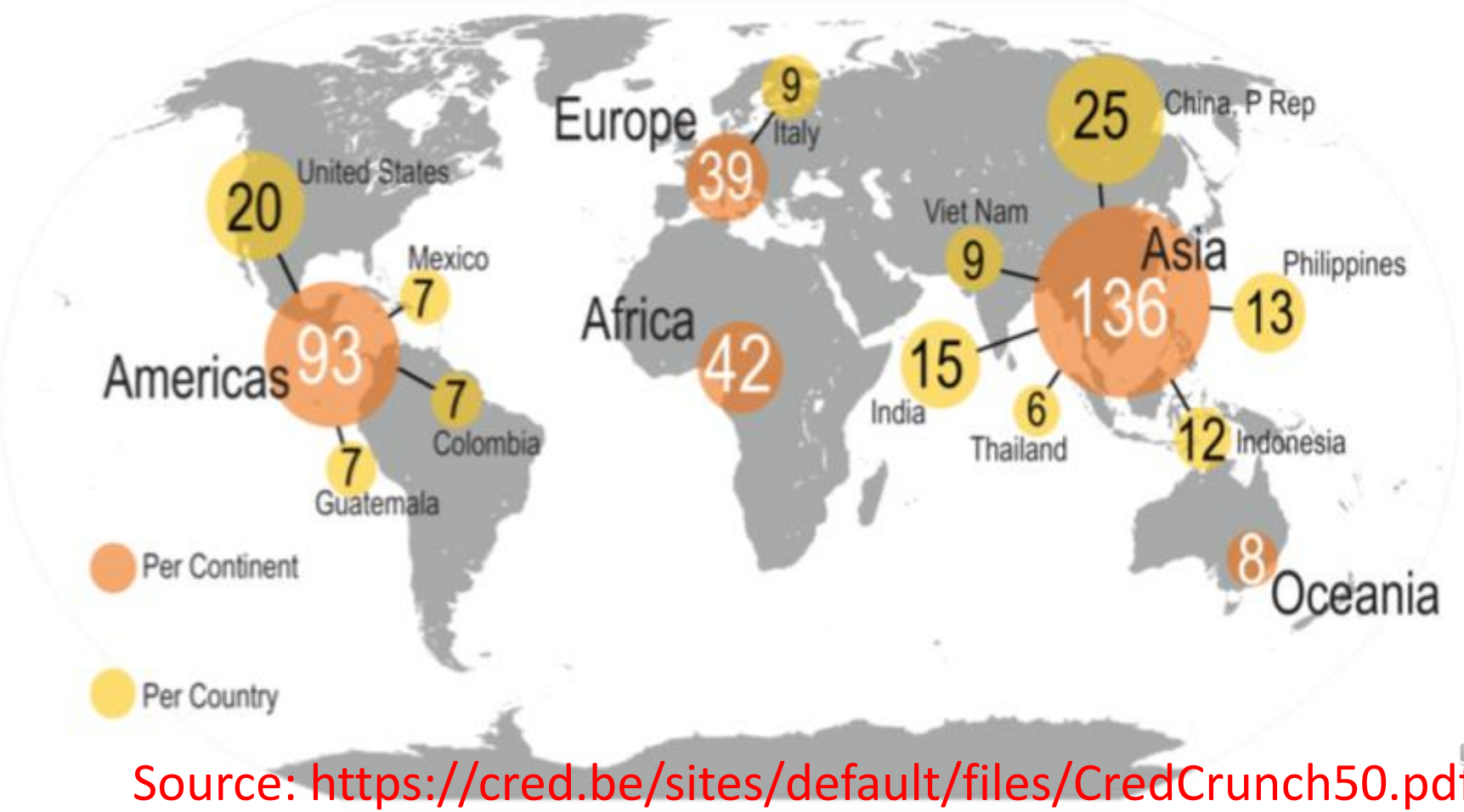
Disaster Statistics

2017

Number of reported disasters by country in 2017

UCL Université catholique de Louvain

USAID FROM THE AMERICAN PEOPLE



Source: https://cred.be/sites/default/files/CredCrunch50.pdf

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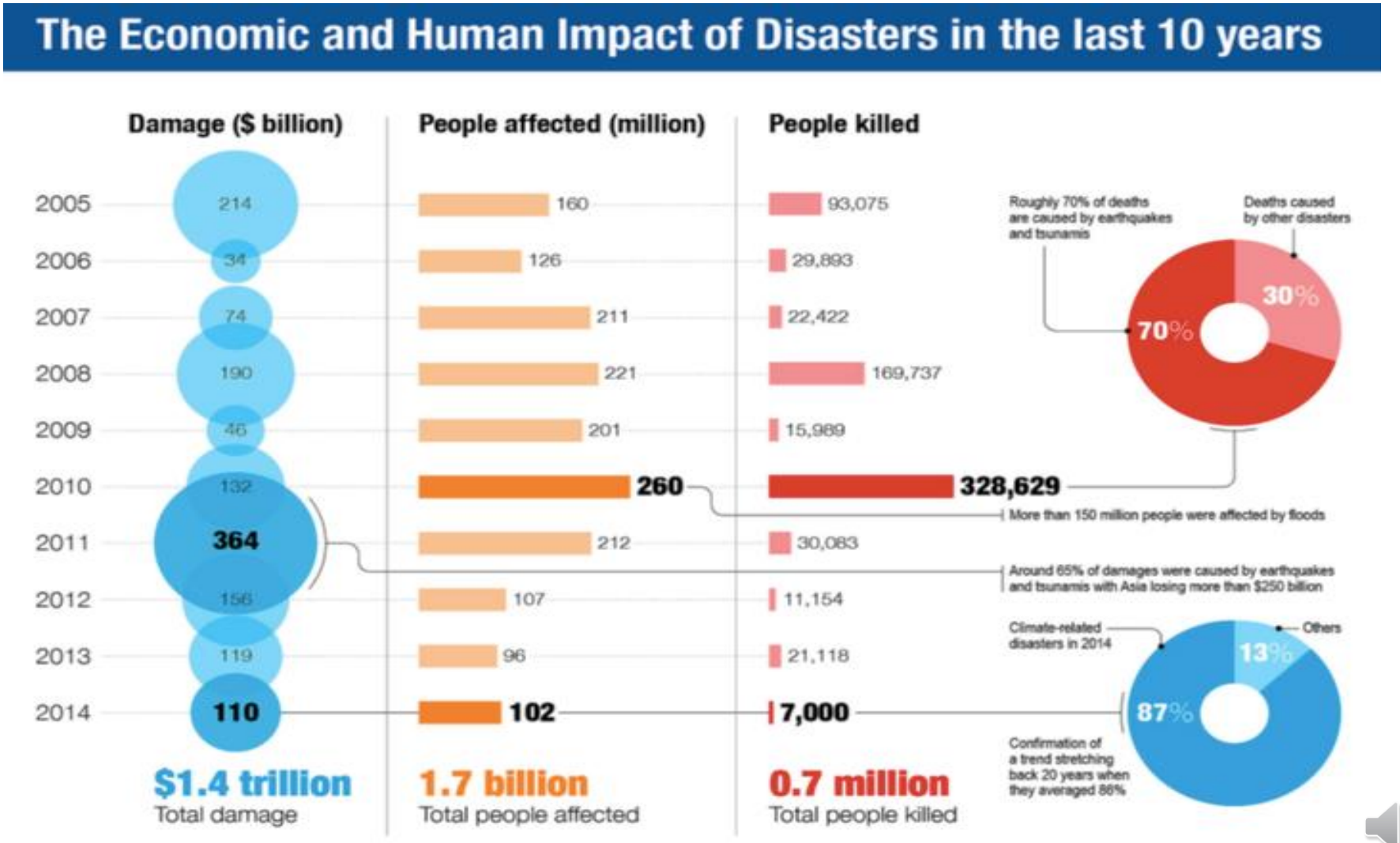
Disaster Statistics

UNISDR 2005-2014



Connecting across the Global Policy Agenda – Global 2030 Agenda

Sendai Framework for Disaster Risk Reduction 2015-2030

UN World Conference on Disaster Risk Reduction

Oceans

Peace – WSF 2017

Urban Agenda 2016

UNFCC - Climate Convention CoP21, 2015

From Professor Gordon McBean

International Science Council

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AMCDRR 2018

ASIAN MINISTERIAL CONFERENCE ON DISASTER RISK REDUCTION

☐ PREVENTING DISASTER RISK: PROTECTING SUSTAINABLE DEVELOPMENT ☐

ULAANBAATAR DECLARATION

3. *Recognize* the importance of ensuring coherence among the global frameworks such as the 2030 Agenda for Sustainable Development, the Paris Agreement on Climate Change, the Sendai Framework for Disaster Risk Reduction 2015-2030, the Addis Ababa Action Agenda on Financing for Development, the Agenda for Humanity, the New Urban Agenda, the SIDS Modalities of Action (SAMOA) Pathway, and regional inter-governmental processes including the Asia-Pacific Forum on Sustainable Development, the ASEAN Community Vision 2025, and the Framework for Resilient Development in the Pacific.

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Messages from IRDR

- IRDR will continue its commitment as an international scientific programme to advance disaster science and knowledge networking as its critical contribution to Sendai Framework.
- IRDR will continue promoting integrated research and actions through pilot projects and partnership with international, regional and national institutions and platforms.
- IRDR look forward to work with SDMOF and its institutions in capacity building and knowledge sharing on DRR.

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Thank you!

Photo is from UNSDG

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