Risk Interpretation and Action (RIA)

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19th Science Committee Meeting

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Risk Interpretation and Action (RIA)

IRDR Science Plan- Objectives 2:

Understanding decision-making in complex and changing risk contexts.

Sub-objectives:

(2.1) Identifying relevant decision-making systems and their interactions;

(2.2) Understanding decision-making in the context of environmental hazards, and

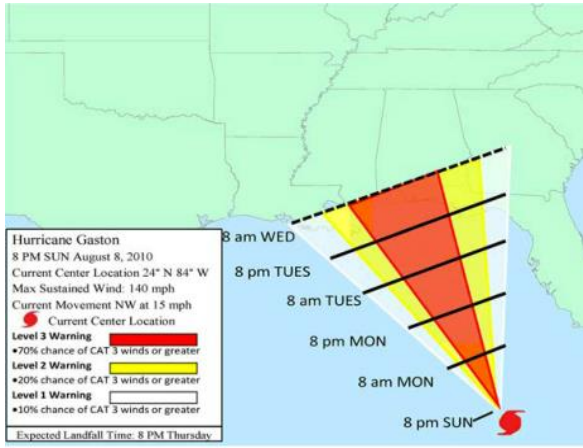
(2.3) Improving the quality of decision-making practice.

RIA focuses on four priority areas:

- Decision-making for uncertainty;
- Early warning systems;
- Adaptive management and resilience; and
- Individual perceptions and risk behaviour.

Achievements (2017-2018)

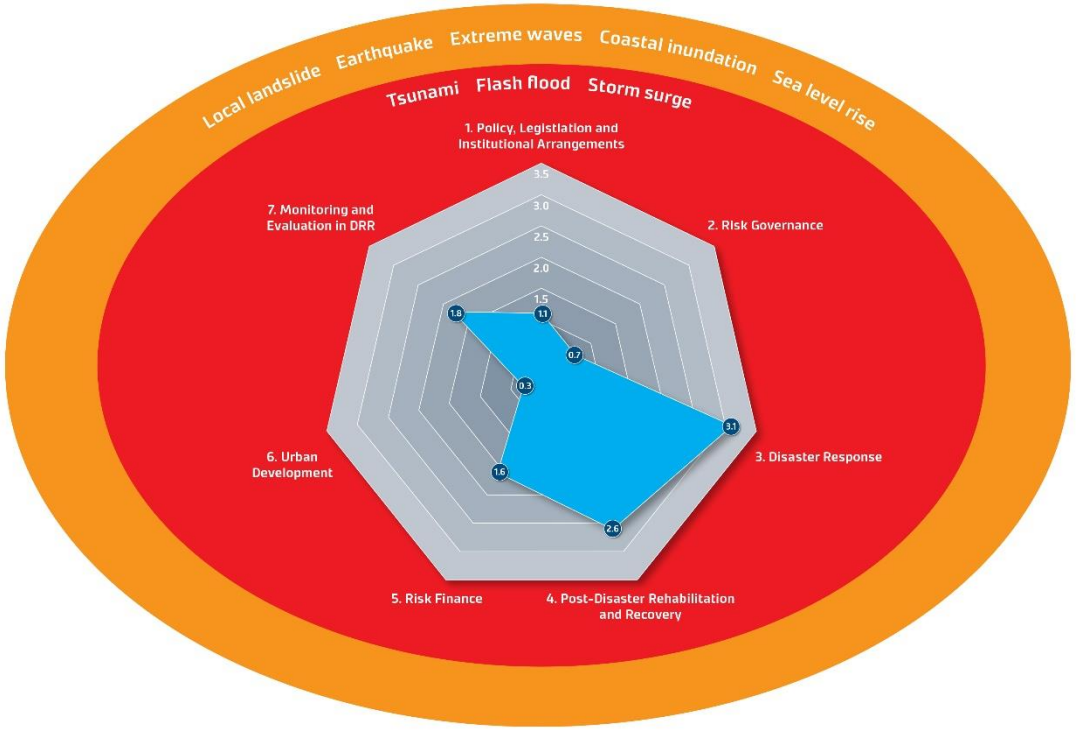
- ***RIA Objective 1: The shift from deterministic to probabilistic risk forecasting requires close working between scientists and policy makers to improve modeled risk interpretation, communication and action.***
  - Leading by ICoE
  - Demonstrated several cases on application probabilistic risk forecasting (e.g. WMO-CIFDP, EU-EFAS, ADB CRVA assessment)

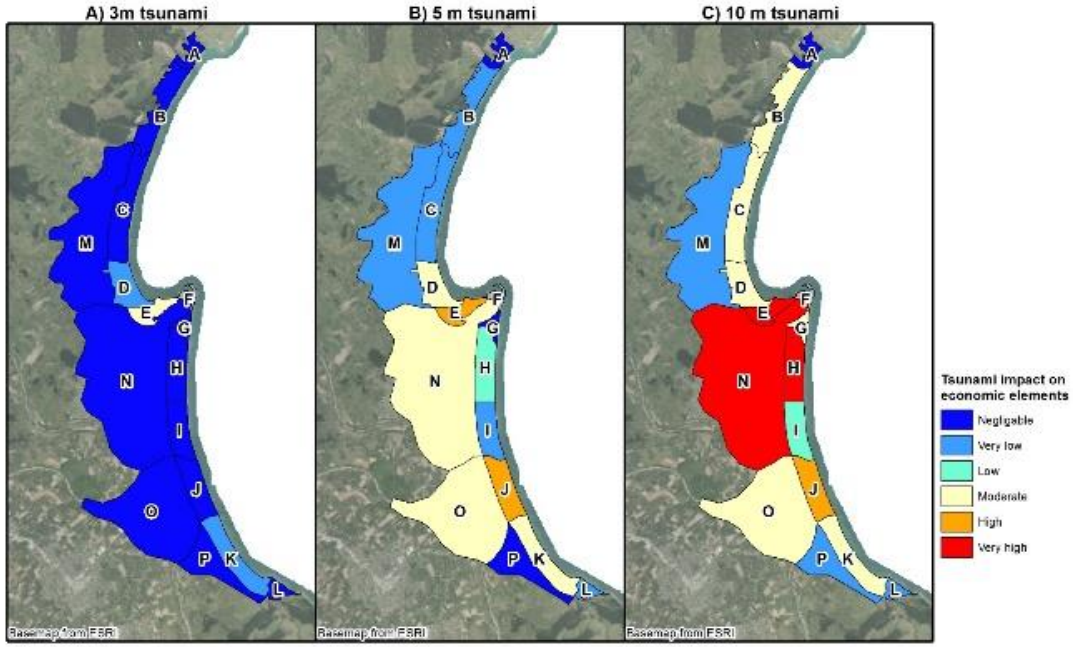


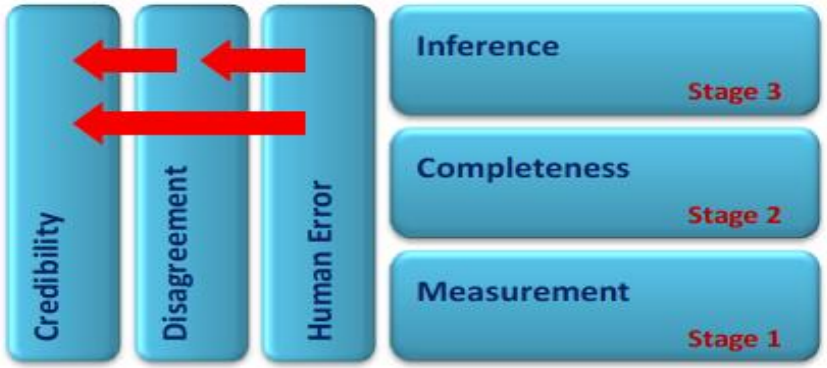
Sectors	Decisions	Forecast lead time requirement
Agriculture	Early harvesting, delayed planting, Fertilizer management	Short range
	Crop systems selection, subsequent crops	Seasonal
	Selling cattle, goats and poultry (extreme)	Seasonal
Transportation	Shifting cargo from shipping to another mean of transportation in case of low flow	Medium range
	Optimizing timing of transports to avoid additional cost in case of low flow	Seasonal
	Timing/suspending of dredge operations	Short range
Household	Storage of dry food, safe drinking water, food grains, fire wood	Medium range
Fisheries	Protecting fishing nets	Short range
	Harvesting fresh water fish from small ponds	Medium range
Civil Defense	Resources mobilization, planning evacuation and boats	Short range/medium range

Short range (≤ 7 days); Medium range (≤ 14 days); Seasonal (1-3 months)

Scope to Improve modelled risk interpretation, communication and action

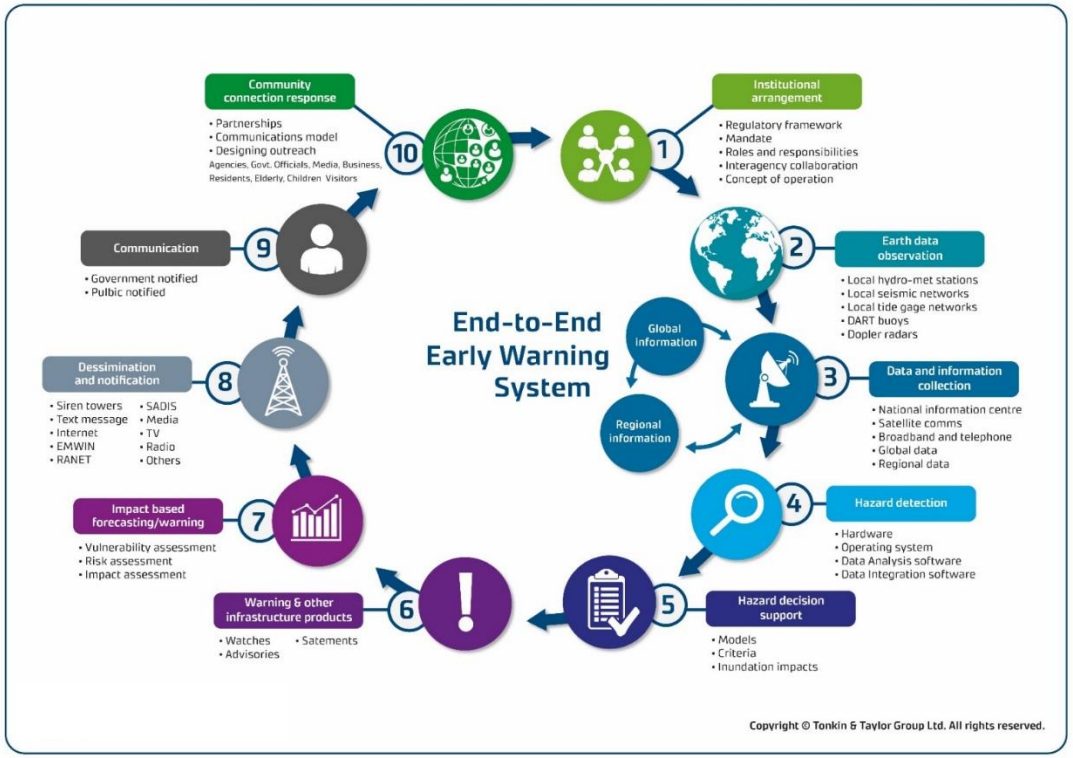




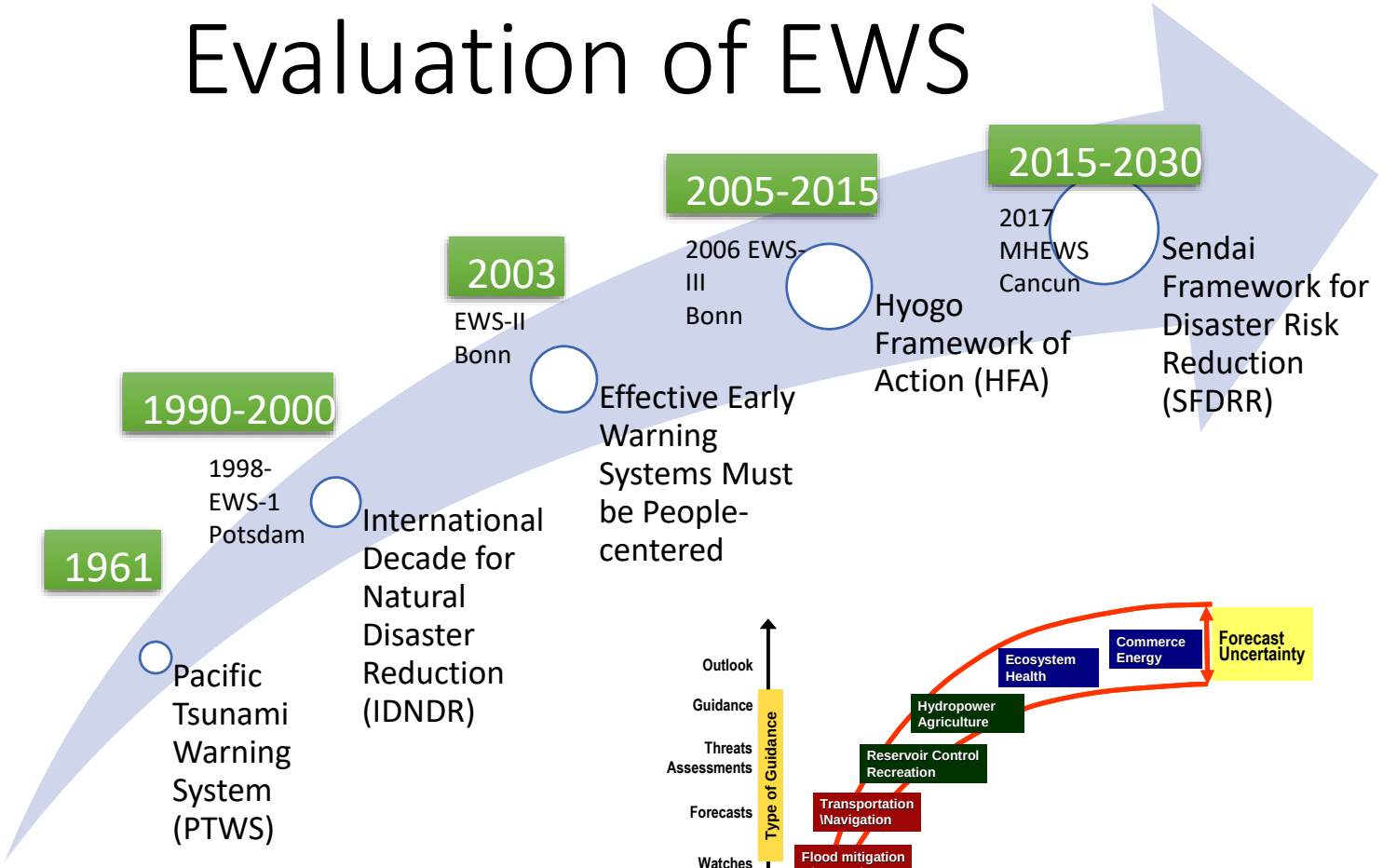


Achievements (2017-2018)

- ***RIA Objective 2: Unresolved challenges of communicating risk through early warning efforts including science-society communication and emergency response planning.***
  - RIA young scholars group by ICoE
  - Well appreciated IRDR EWS framework by WMO and other donors
  - System designed by many countries (e.g. Bangladesh, Cambodia, EU, Fiji, Indonesia, Thailand, Maldives, Sri Lanka, Samoa, Tonga



Evaluation of EWS



(Fakhruddin,2015)

Till 1980's: EWS focused on saving lives

1990's: Focus on saving lives + livelihood systems

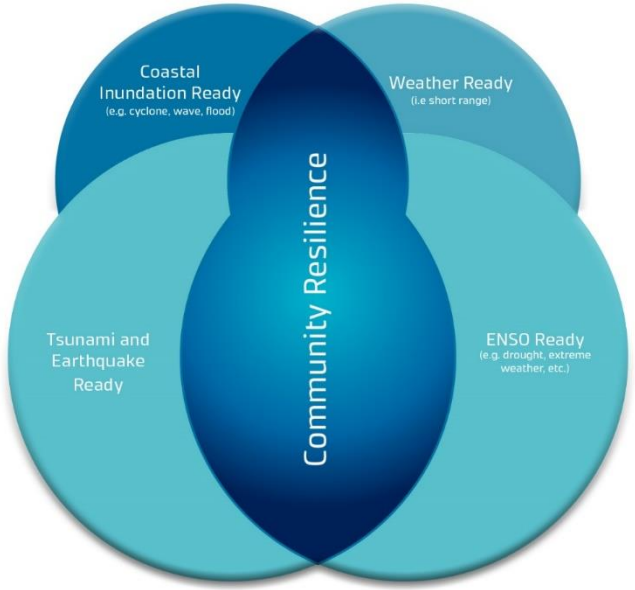
2000's : People centered approach. Lack of proven technology.

2010's on: Emerging technology but limited NWPs, data assimilation, limited case on EPS, communicating uncertainty

Currently: Opportunities through innovative, emerging probabilistic forecast technologies for impact based EWS

Achievements (2017-2018)

- ***RIA Objective 3: Resilience capacity and action rest upon knowledge production, management and learning. Approaches are needed to better identify, understand, and model knowledge environments for those managing and living with disaster risk.***
  - ICOE's providing evidence base Resilience Strategy
  - Several coastal community guidelines promoting integrat approach, lifelines and organizational resilience
  - Future Earth – IRDR – WCRP Risk Knowledge Action Network could be an important vehicle



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White Paper on International Network-to-Network Collaboration

Submitted to the U.S. National Science Foundation by the Future Earth Knowledge-Action Network (KAN) on Emergent Risks and Extreme Events

Key contacts: Ann Bostrom (University of Washington), Josh Tewksbury, Fumiko Kasuga,

Scope to Improve- Risk Governance

Asia S&T Status by IRDR, Future earth and ASTAAG, 2016

Science and Technology attributes			Countries	SFDRR Priorities			
Decision making	Investment in S&T	Linking to people		Understanding disaster risk	Strengthening disaster risk governance	Investing in disaster risk reduction	Enhancing disaster preparedness
2	1	2	Bangladesh	2	2	1	2
4	5	3	China	4	5	3	4
4	3	3	India	4	3	2	4
3	4	4	Indonesia	4	3	2	4
3	3	3	Iran	3	3	2	3
4	4	4	Japan	4	2	3	4
4	3	3	Malaysia	4	3	3	4
3	2	3	Myanmar	3	2	1	2
3	2	2	Pakistan	2	3	2	2
3	3	3	Philippines	2	2	2	3
3	2	2	Vietnam	3	4	1	4

Science and Technology attributes			Countries	RIA Priorities			
Decision making	Investment in S&T	Linking to people		Decision-making for uncertainty	Early warning systems	Adaptive management and resilience	Individual perceptions and risk behaviour
2	1	2	Bangladesh				
5	5	3	China				
4	3	3	India				
3	4	4	Indonesia				
3	3	3	Iran				
4	4	4	Japan				
4	3	3	Malaysia				
3	2	3	Myanmar				
3	2	2	Pakistan				
3	3	3	Philippines				
3	2	2	Vietnam				

Country	Observations Network	Data Transmission	Hydrological Modeling Capacity	Integration of NWP products & <1 to 2 days forecasts	Extended Forecasts 3-10 days & more	Capacity to generate tailor made forecasts	Integration to community response system and feedback
Bangladesh	2	2	3	3	2	2	2
Bhutan	2	2	2	2	0	0	0
Cambodia	1	1	1	0	0	0	0
China	4	4	4	4	3	2	2
India	4	4	3	3	2	2	1
Kenya	3	3	2	2	0	1	1
Lao PDR	2	2	2	1	0	1	1
Maldives	3	2	1	1	0	1	1
Madagascar	2	1	1	0	0	0	1
Myanmar	1	1	2	1	0	0	1
Mozambique	2	2	2	2	0	0	0
Nepal	3	2	2	1	0	1	0
Pakistan	3	3	3	2	0	1	1
Philippines	4	4	3	2	2	2	2
Sri Lanka	3	3	2	1	0	1	1
Thailand	4	4	3	2	1	1	1
Vietnam	2	2	3	2	1	1	1
Yemen	2	2	2	1	0	0	0

Note: Comparative rating: 5-excellent; 4-very good; 3-satisfactory; 2-needs improvement; 1-poor; 0-non-existent

Scope to Improve- Sectoral risk Interpretation

Project sites					Peril	Major Components				
SOL1	SOL2	SOL3	SOL4	SOL5		Bridges	Culverts	Sealed pavement	Unsealed pavements	Road corridor
High	High	High	High	High	Flash flood					
High	High	High	High	High	Riverine flood					
Low	Moderate	Moderate	High	Moderate	Coastal erosion					
High	High	High	Low	Low	Tropical cyclone					
Moderate	Moderate	Moderate	Moderate	Moderate	Extreme temperature					
Moderate	Moderate	Moderate	Moderate	Moderate	Drought					
Moderate	Moderate	Moderate	Moderate	Low	Sea Level rise					
Low	Low	Low	Low	Low	Land slide					
Moderate	Moderate	Moderate	Moderate	Low	Tsunami					
High	High	High	High	High	Earthquake					

SOL1 Town Ground to White River
SOL2 White River to Doma
SOL3 Tambea to Naro
SOL4 Naro Hill to Lambi
SOL5 Henderson to Mberande

Strong relationship
Potential relatationship (uncertain)
No apparent relationship

Selected activities in the U.S. since the fall 2017 IRDR-SC meeting

- Submitted collaborative statement for international network-to-network collaboration on Emergent Risk and Extreme Events to NSF December 3, 2017

  Ann Bostrom, Josh Tewksbury, Fumiko Kasuga, Thorsten Kiefer, Craig Starger, on behalf of the Future Earth Knowledge-Action Network (KAN): White paper submission for DCL 17-131: Seeking Community Input for Topic Ideas to Accelerate Research Through International Network-to-Network Collaboration.

- Organized, chaired session on disaster risk reduction research at the international Society for Risk Analysis meetings in Crystal City, Virginia, December 11, 2017. Invited speaker, presentation on "***An International Agenda for Risk Interpretation and Action research, with an application to Earthquake Early Warning***." University of Washington-Tohoku University Academic Open Space workshop on Natural Disaster Management focusing on public health. Organized by The Consulate General of Japan in Seattle, Allen Library, University of Washington, Seattle, February 23, 2018.

- Participant, Washington Committee for Communication, Education and Outreach for ShakeOut (U.S. West Coast Early Warning System).

IRDR RIA Project plan 2018-2020

Objectives: Build capacity and network of networks, and synthesize good practices on early warning systems, risk communication and decision making under uncertainty.

Scientific questions: Aligned with the Sendai Framework, how do people make decisions in the face of disaster risk (individually, collectively)?

1. **Human cognitive processes under risk and uncertainty** (micro-dynamics of perception, information processing and decision making; e.g., how do people respond to very short (seconds) early warnings as compared to longer term (hours to days) early warnings?),
2. **Human behavior in hazardous processes** (e.g., natural hazards, such as earthquakes, tsunamis, hurricanes, floods, as well as technological hazards) (meso-scale; individual and group behaviors and dynamics in hazard contexts),
3. **Causality in social and environmental changes resulting from hazardous processes** (geophysical and social macro-dynamics).

IRDR RIA Project plan 2018-2020 (continued)

Plan Activities: Global-strategic papers and policy documents; regional and national actions to ensure implementation and application to local contexts

Deliverables: Actively link WMO, UNISDR, 100 Cities Resilience, KAN and other partners (set up *"What Works Network*"- UK)

Support Needs: Funding to connect RIA networks, partnerships and projects.