

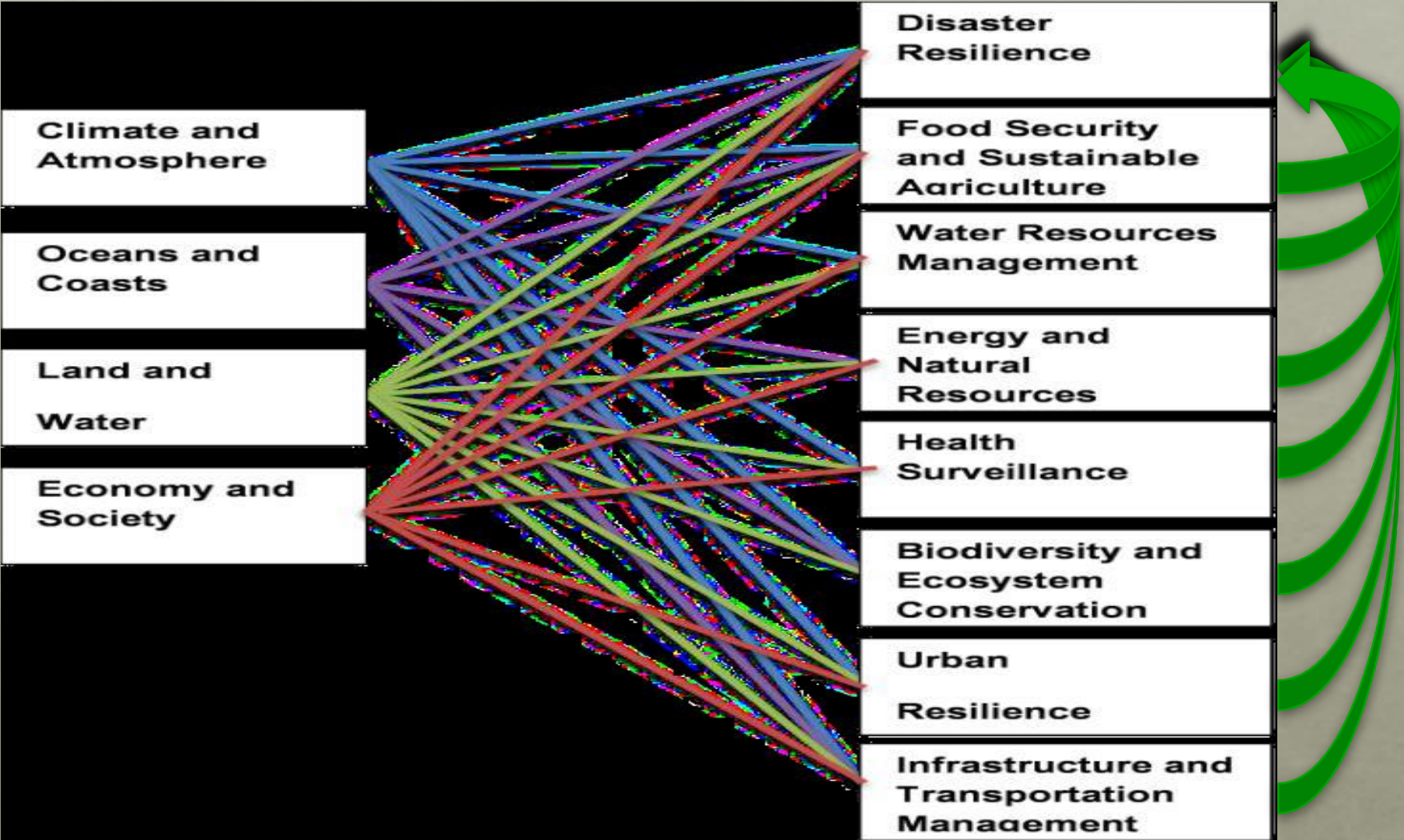
INTEGRATED RISK ASSESSMENT

Making Science Usable

Dr. Jane E. Rovins, PhD, CEM
DRR Solutions, Ltd & Massey University

APEC Climate Symposium 2015
Manila, Philippines

INTERACTION



HAZARDS vs. DISASTERS



STEPS IN RISK ASSESSMENT

- Step 1: Understanding of current situation, needs and gaps
- Step 2: Hazard assessment
- Step 3: Exposure assessment
- Step 4: Vulnerability analysis
- Step 5: Loss/impact analysis
- Step 6: Risk profiling and evaluation
- Step 7: Formulation or revision of disaster/emergency/development strategies and action plans

BASIC COMPONENTS OF RISK ASSESSMENT

Technical
Inputs/Local
knowledge

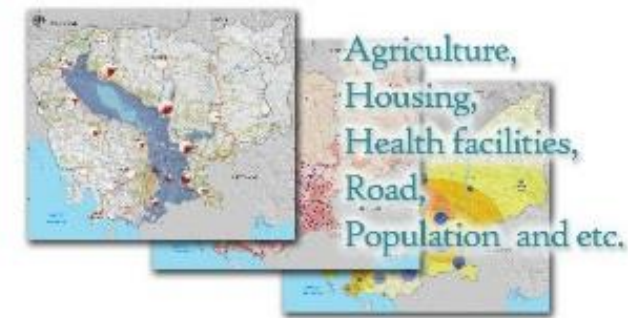
Hazard

Natural physical phenomenon which can lead to a loss of life or damage to objects, buildings and the environment.



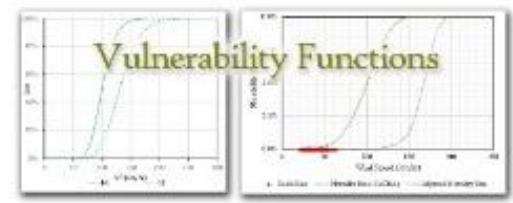
Exposure

People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses.



Vulnerability

The level of possible loss or injury or damage to humans, objects, buildings and the environment which can result from the nature hazard.



Risk

The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disturb or environment damage) resulting from interactions between hazards and vulnerability.



RISK MANAGEMENT PROCESS

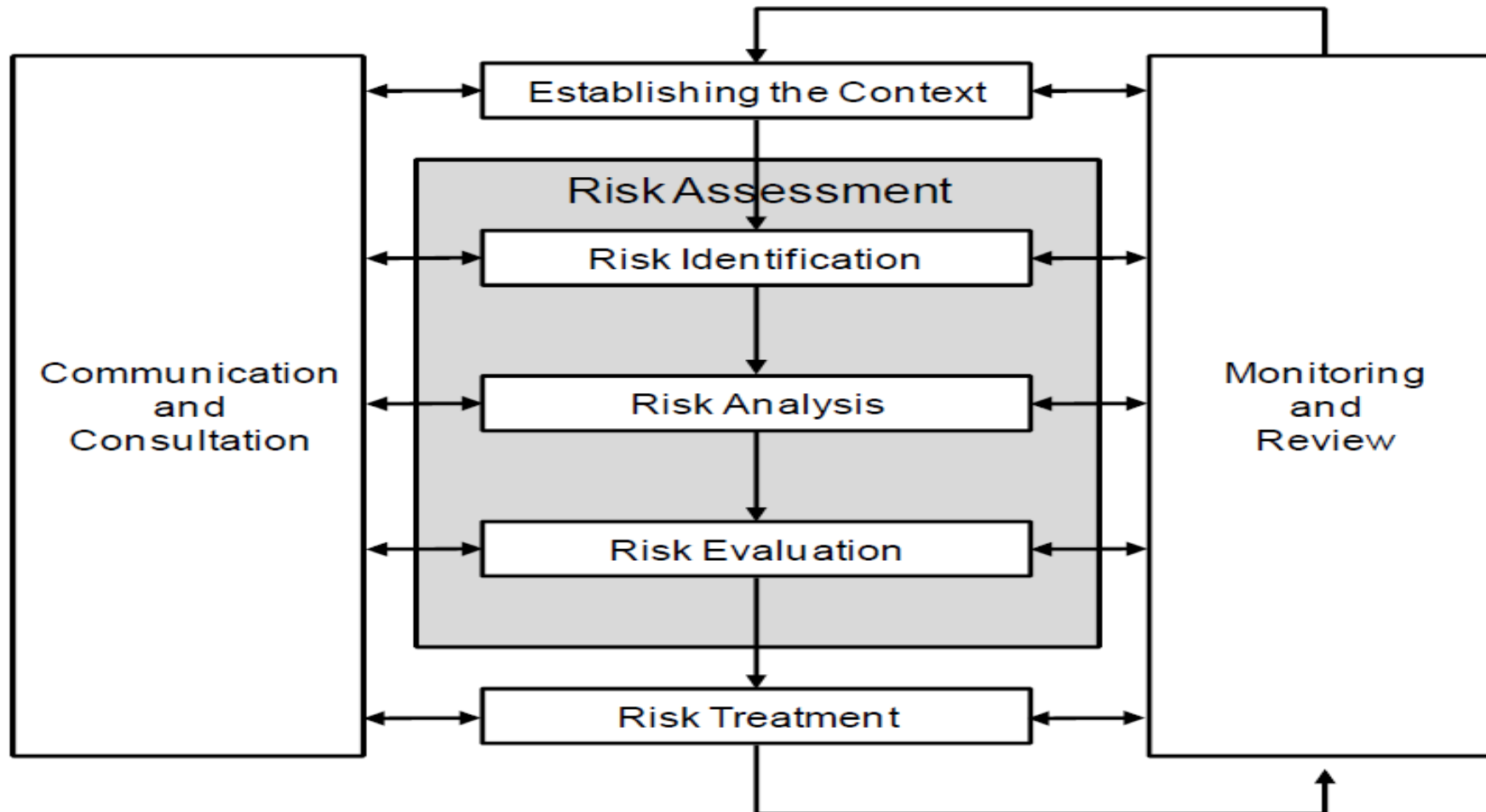


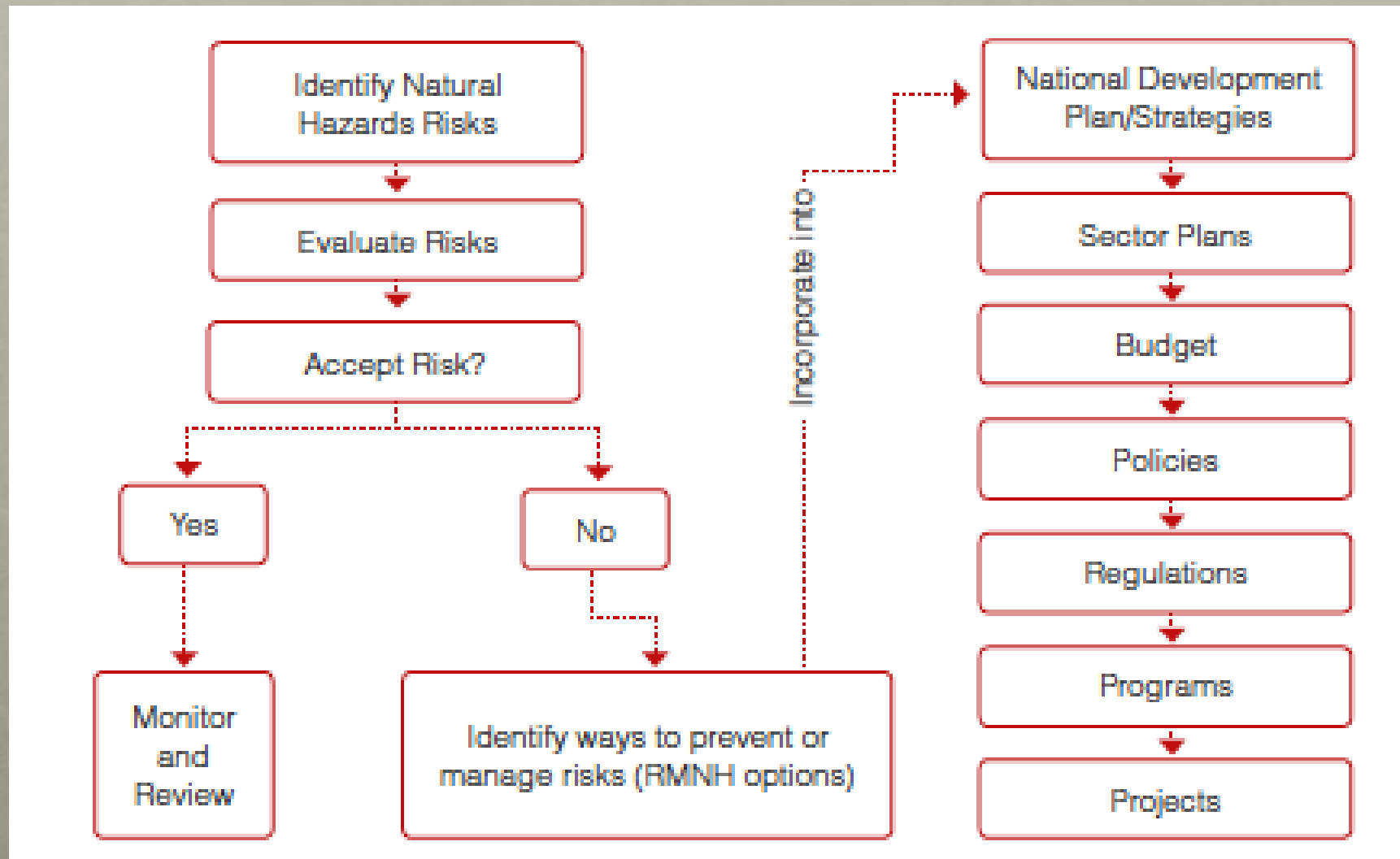
Figure 1: The Risk Management Process (from AS/NZS ISO 31000:2009)

WHO IS YOUR STAKEHOLDER?

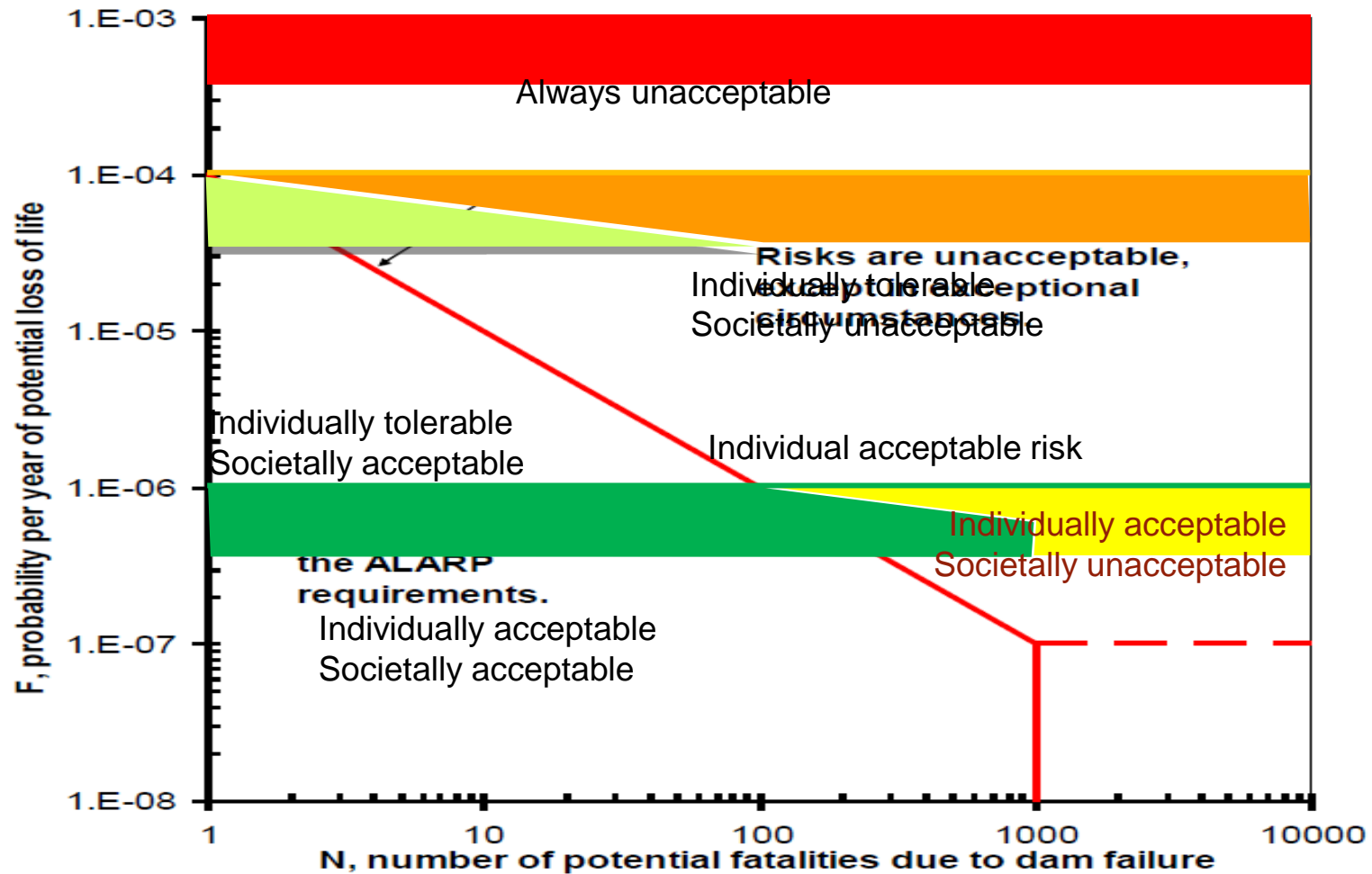
- Government Agencies – local, regional, national
- Community members, leaders, organizations
- Academia, researchers and scientists
- Non-Governmental Organizations (National and International)
- Businesses & Private Sector
- Media
- Other Stakeholders



INTEGRATING DISASTER RISK



SOCIETAL RISK



ACCEPTABLE vs. UNACCEPTABLE

- Is there something in between?
- Concept of tolerable risk (Sir Frank Layfield, 1987):
 - *“Although acceptable risk is often used in balancing risks and benefits it does not adequately convey the reluctance with which possibly substantial risks and benefits may be tolerated”*
 - Individuals are prepared to **tolerate** some risks that would otherwise be **unacceptable** in return for specific **benefits**.

WHO DECIDES WHAT IS TOLERABLE?

- Depends.....
- Generally the stakeholder - the client, regulator or an elected/government representative
- Role of the risk assessment expert is to undertake the analysis and provide guidance in the way of precedents, benchmarks, comparisons and lateral solutions

ROLE OF RISK SCIENTISTS

- Estimating risk and how it will change under various different possible courses of action
- Make the science understandable
- Making decisions about risks: wider social or political role
- Wide range of value judgements and should involve all those interested in or affected by risk (whether directly by the risk itself or by the measures adopted for its reduction)
- Make the science understandable!!!!

COMPETENCIES/PROFESSIONALS

TYPE	COMPETENCIES	TYPICAL PROFESSIONALS
HAZARD		
Earthquake	Seismic hazard analysis; fault identification;	Seismologist, Geologist, Engineer
Cyclone	Atmospheric modelling; storm surge modelling	Meteorologist, Coastal Hydrologist, Land-use Planner, Engineer
Flooding	Flood modelling	Hydrologist
Landslides	Geomorphic mapping; land stability analysis; aerial photo interpretation	Geomorphologist, Engineering Geologist, Geotechnical engineer
Drought	Hydrological modelling.	Meteorologist, Climatologist, Hydrologist, Agronomist
EXPOSURE	GIS proficient	Geospatial Analyst
VULNERABILITY		
Physical	Building damage estimation, structural engineering	Engineer; Structural Vulnerability Scientist
Social	Socio-economic modelling, social surveys and interviews	Social and/or Political Scientist
Infrastructure	Knowledge of local infrastructure capabilities and vulnerabilities	Engineer; Land-use Planner
Economic	Understanding of economic factors for the scale (e.g. regional, national) of assessment	Economist, Political Scientist, Lawyer
RISK ANALYSIS	Risk assessment process and broad knowledge of hazard, exposure, and vulnerability factors	Risk Scientist, Hazard Analyst, Emergency Manager

RISK MATRIX

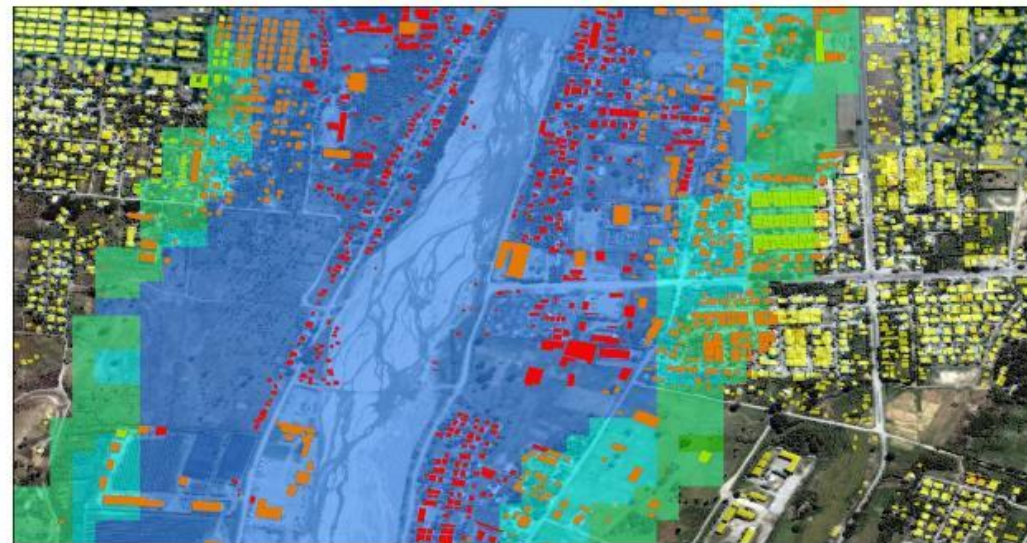
LIKELIHOOD	CONSEQUENCE				
	INSIGNIFICANT	MINOR	MODERATE	MAJOR	EXTREME
Almost certain	Moderate	High	High	Extreme	Extreme
Likely	Moderate	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

HAZARD vs. RISK



Flood Hazard Map

Flood Risk Map



CHALLENGES IN SEA

- Scale of assessment
- Availability of locally specific vulnerability information
- Data biases
- Data management practices and data availability
- Underutilization of local knowledge and culture & stakeholders
- Communication of risk assessment information
- Utilization of risk assessment

GOING FORWARD...

- Clearly define the purpose
- Promote and enable ownership
- Cultivate and promote the generation and use of open data
- Make better communication of risk information an priority
- Foster multi-disciplinary, multi-institutional; and multi-sectoral collaboration at all levels

GOING FORWARD...

- Consider the broader risk context
- Keep abreast of evolving risk
- Understand, quantify and communicate the uncertainties and limitation of risk information
- Ensure risk information is credible and transparent
- Encourage innovations

Wind speed

Religion

Wave a

What does it mean to my family / community / organization?

ethnicity

rainfall

Age

Ground motion

GENDER

DISASTERS ARE ABOUT...



THANK YOU

Jane.rovins@gmail.com

Twitter: @DRRSolutions