Towards a unified concept of risk, including both hazards associated with climate change and risk-reduction from the climate change response

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Trieste – 16-18/05/2018
IPCC Expert Meeting on Assessing Climate Information for the Regions

HARD SCIENCE AND DISASTER

Where is each type of hazard likely to be presented and why?

What scientific principles govern the process responsible for the disaster?

How often do these hazards develop into disasters?

How can each type of disaster be predicted and/or mitigated?

RISK

$$R = H \times \left[\left(\frac{V}{C} \right) - M \right]$$

H = Hazard (flood; drought; landslides; etc.)
V = Vulnerability (social; physical; economical; technological; cultural; ecological; etc.)
C = Protection Capacity
M= Mitigation

PLEASE DO NOT LOOK THIS “EXPRESSION” AS AN EQUATION

Fully Integrated System of DRR Disaster Risk Governance

Quantitative targets

- Poor documentation of disaster losses (national and global scales)→underestimation
- Few systematic and comprehensive loss accounting systems

What to measure?

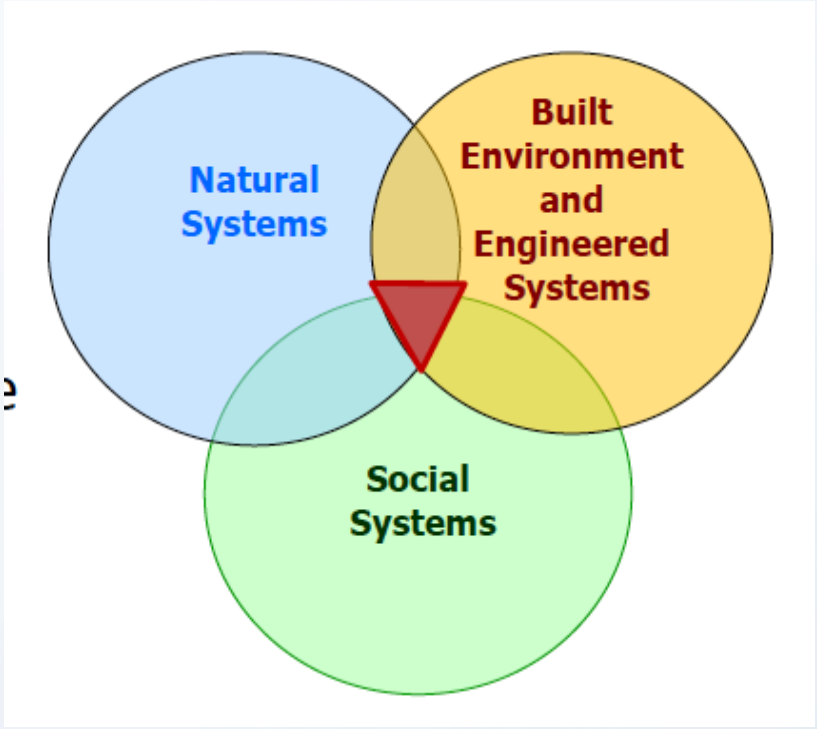
- Absolute values or referent baselines
- Deaths, economic loss, other parameters
- What time frame?
- What spatial unit (subnational, national, global)?

What it means:

- Standardized protocols for definitions and measurement
- Transparency/accountability in measurement
- Curation by meteorological service, statistical bureaus, universities

Science inputs into Sendai targets monitoring

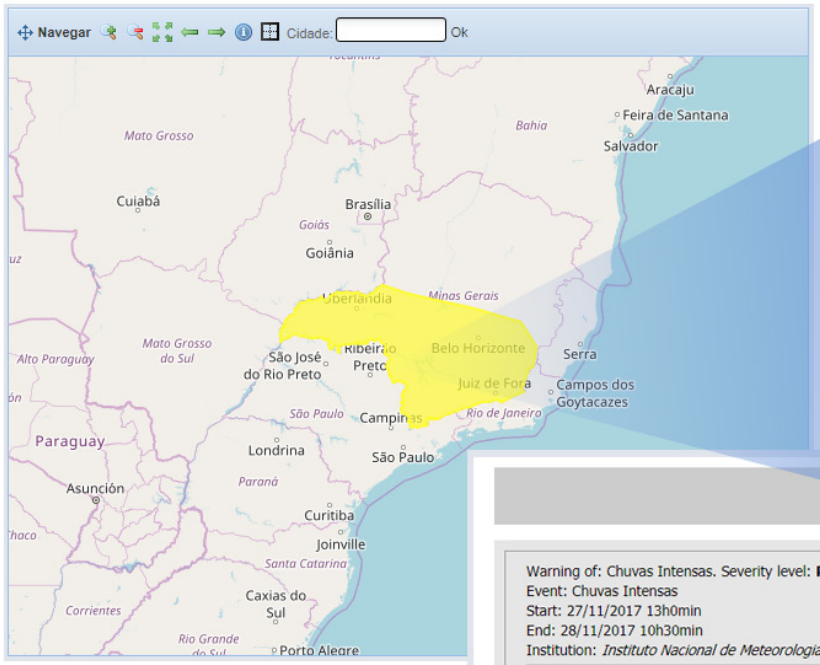
DRR knowledge for policies related to the Sendai Framework, SDGs and UNFCCC

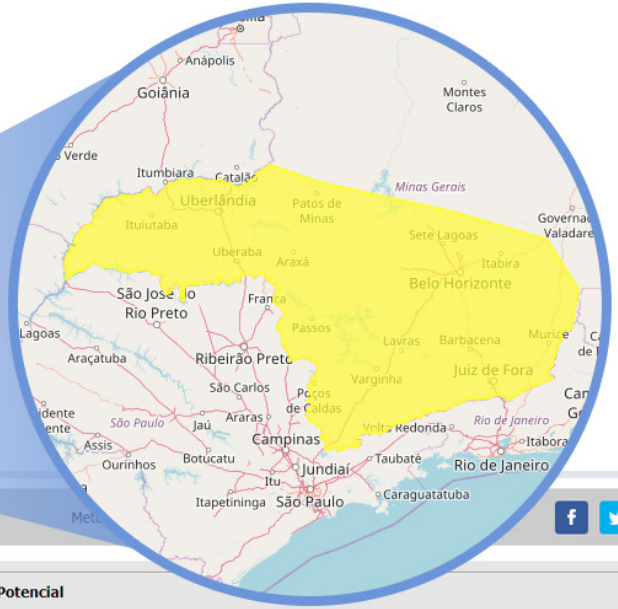


Disasters are complex problems
Requires integrated knowledge and understanding Holistic view

- Threats to local communities, national security
- Consequences amplified by unsustainable development
- Variability in exposure and vulnerability of communities and assets

“Meteorological Warning” issued on 27/11/17; start at 13:00 (27) end at 10:30 (28)





Warning of: Chuvas Intensas. Severity level: **Perigo Potencial**
Event: Chuvas Intensas
Start: 27/11/2017 13h0min
End: 28/11/2017 10h30min
Institution: *Instituto Nacional de Meteorologia*

Potential Risks:

INMET publica aviso iniciando em: 27/11/2017 13:00. Chuva entre 20 e 30 mm/h ou até 50 mm/dia, ventos intensos (40-60 Km/h). Baixo risco de corte de energia elétrica, queda de galhos de árvores, alagamentos e de descargas elétricas.

Instructions:

- ***Em caso de rajadas de vento: (não se abrigue debaixo de árvores, pois há leve risco de queda e descargas elétricas e não estacione veículos próximos a torres de transmissão e placas de propaganda).***
- ***Evite usar aparelhos eletrônicos ligados à tomada.***
- ***Obtenha mais informações junto à Defesa Civil (telefone 199) e ao Corpo de Bombeiros (telefone 193).***

Cities:

Abadia Dos Dourados - MG (3100104), Abaeté - MG (3100203), Abre Campo - MG (3100302), Acaiaca - MG (3100401), Água Comprida - MG (3100708), Aguanil - MG (3100807), Aiuruoca - MG (3101201), Alagoa - MG (3101300), Albertina - MG (3101409), Além Paraíba - MG (3101508), Alfenas - MG (3101607), Alfredo V... see more

Affected area:

Aviso para as áreas: Triangulo Mineiro/Alto Paranaiba, Central Mineira, Vale Do Rio Doce, Metropolitana De Belo Horizonte, Zona Da Mata Mineira, Campo Das Vertentes De Minas, Oeste Mineiro, Sul/Sudoeste Mineiro, Noroeste Mineiro

Legenda

“Meteorological Warning” issued on 27/11/17; start at 13:00 (27) end at 10:30 (28)

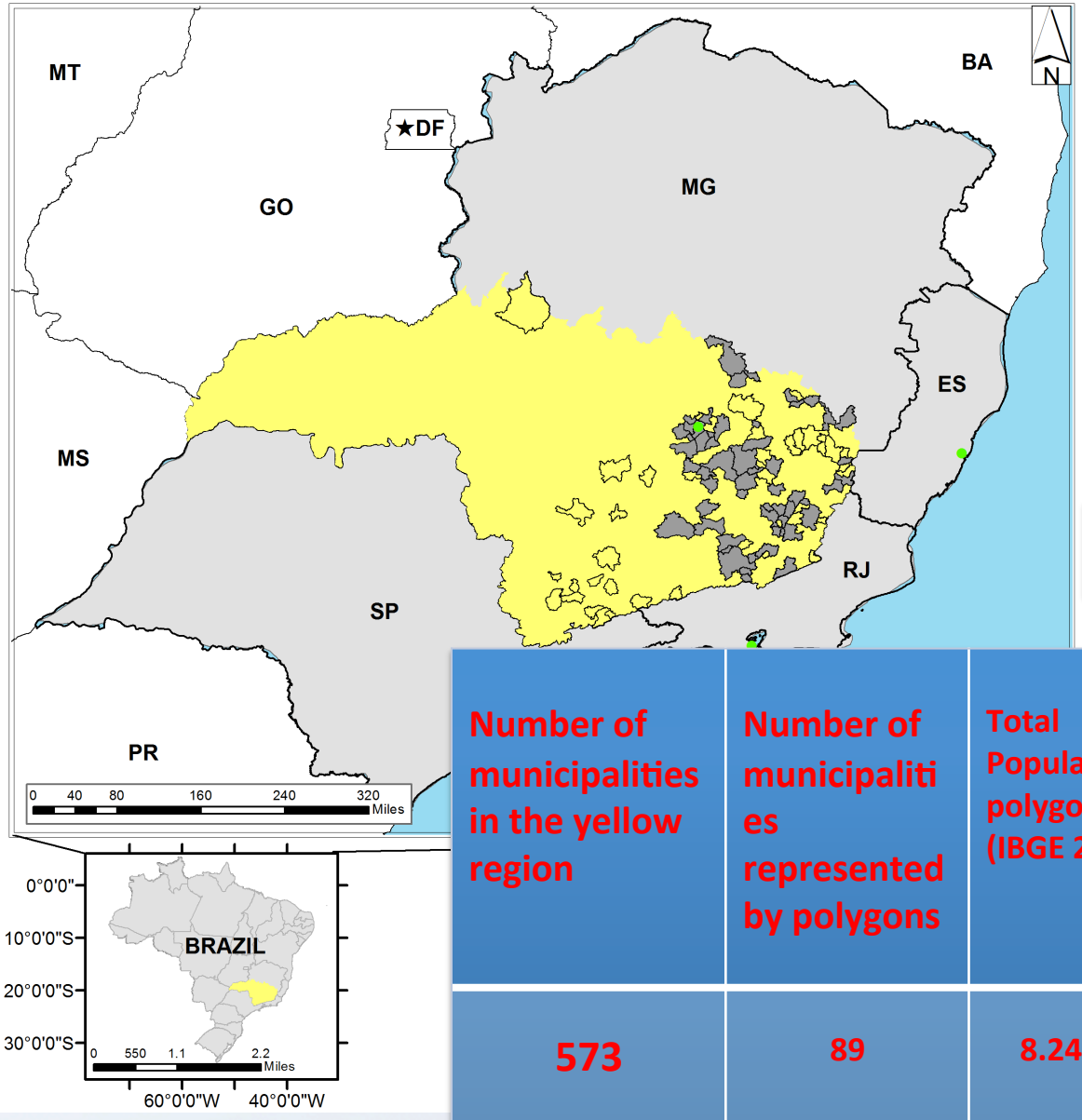
NECESSARY BUT NOT SUFFICIENT

WHY ?

EVENT IS NOT A DISASTER

DISASTER IS THE IMPACT

INMET warning regions & CEMADEN monitored municipalities



Capitals: Belo Horizonte, Vitória, Rio de Janeiro e São Paulo

Municipalities with data at-risk population (cooperation CEMADEN & IBGE)

CEMADEN monitored municipalities

INMET Warning region

*Very high social vulnerability: very high exposure and low disaster response capacity

Number of municipalities in the yellow region	Number of municipalities represented by polygons	Total Population in polygon area (IBGE 2016)	Number of risk areas in the polygons area	% At-risk population in situation of very high social vulnerability*
573	89	8.245.599	9.000 approximately	15%

The importance of a common and updated terminology on disaster risk reduction was highlighted in The Sendai Framework for Disaster Risk Reduction 2015-2030:

"to support the implementation, follow-up and review of the this framework through …leading, in close coordination with States, the update of 2009 Terminology on Disaster Risk Reduction in line with the agreed terminology by States;…" (paragraph 48 c) and *"…recommends that the Working Group* [comprising experts nominated by Member States] *considers the recommendations of the Scientific and Technical Advisory Group on the update of the 2009 UNISDR Terminology on Disaster Risk Reduction by December 2016,…"* (Sendai Framework, paragraph 50).

7 GLOBAL TARGETS

decrease	increase
disaster mortality/ Global population Average 2020-2030 << Average 2005-2015	increase the number of countries with national and local DRR strategies 2020 value >> 2015 value
Affected people/ Global population Average 2020-2030 << Average 2005-2015	enhance international cooperation to developing countries 2030 value >> 2015 value
Disaster economic loss/ Global gross domestic product 2030 proportion << 2015 proportion	increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people 2030 value >> 2015 value
reduce disaster damage to critical infrastructure and disruption of basic services 2030 value << 2015 value	

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TIMELINE

2002 First set of UNISDR Disaster Risk Reduction

2004 Following feedback from experts and practitioners

2005 Hyogo Framework for Action 2005-2015

2009 UNISDR Terminology on Disaster Risk Reduction

2015 Second set of UNISDR Disaster Risk Reduction.

UNISDR
United Nations Office for Disaster Risk Reduction

FUNDAMENTAL TERMINOLOGY

- ✓DISASTER
- ✓DISASTER RISK
- ✓RISK MANAGEMENT
- ✓DISASTER RISK MANAGEMENT
- ✓DISASTER RISK REDUCTION

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Risk Management *comprises risk assessment and analysis, and the implementation of strategies and specific actions to control, reduce and transfer risks. It is widely practiced by organizations to minimise risk in investment decisions and to address 27 operational risks such as those of business disruption, production failure, environmental damage, social impacts and damage from fire and natural hazards. Risk management is a core issue for sectors such as water supply, energy and agriculture whose production is directly affected by extremes of weather and climate.*

Disaster Risk Management *is an extension of the more general term "risk management" to address the specific issue of disaster risks. Disaster risk management aims to avoid, lessen or transfer the adverse effects of hazards through activities and measures for prevention, mitigation and preparedness.*

RISK MANAGMENT

2002: The systematic management of administrative decisions, organization, operational skills and responsibilities to apply policies, strategies and practices for disaster risk reduction

2009: The systematic approach and practice of managing uncertainty to minimize potential harm and loss.

2017: The organization, planning and application of measures preparing for, responding to and, initial recovery from disasters.

DISASTER RISK MANAGMENT

2002: The systematic management of administrative decisions, organization, operational skills and responsibilities to apply policies, strategies and practices for disaster risk reduction (RM only).

2004: The systematic process of using administrative decisions, organization, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. This comprises all forms of activities, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards.

2009: The systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster.

2015: The application of disaster risk reduction policies, processes and actions to prevent new risk, reduce existing disaster risk and manage residual risk contributing to the strengthening of resilience.

2016: 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.

DISASTER RISK REDUCTION

2002: The systematic development and application of policies, strategies and practices to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) adverse impact of hazards, within the broad context of sustainable development.

2004: The conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development.

2017: Disaster risk reduction is aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development.

2018: is the policy objective aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience (in: Words into *Action Guidelines - Implementation guide for local disaster risk reduction and resilience strategies: A companion for implementing the Sendai Framework target E (public consultation version)*

WMO - Selected DRR-related Terminology

(based on the 2009 UNISDR Terminology on Disaster Risk Reduction, unless indicated otherwise. Note that this terminology is undergoing a substantial, intergovernmentally agreed review with an updated terminology expected in late 2016)

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WORLD METEOROLOGICAL ORGANIZATION
WEATHER CLIMATE WATER

DISASTER: A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources.

RISK: Probable impacts, expressed in terms of expected loss of lives, people injured, property, livelihoods, economic activity disrupted or environmental damage.

RISK ASSESSMENT/ANALYSIS: A methodology to determine the nature an extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that could pose a potential threat or harm to people, property, livelihoods and the environment on which they depend.

RISK IDENTIFICATION: The process used to determine what can happen, why and how events arise.

RISK MANAGEMENT: The systematic management of administrative decisions, organization, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. This comprises all forms of activities, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards.

RISK REDUCTION: The conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development.

SREX – Glossary Terms – IPCC 2012

Disaster: Severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery.

Disaster management: Social processes for designing, implementing, and evaluating strategies, policies, and measures that promote and improve disaster preparedness, response, and recovery practices at different organizational and societal levels.

Disaster risk: The likelihood over a specified time period of severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery.

Disaster risk management (DRM) : Processes for designing, implementing, and evaluating strategies, policies, and measures to improve the understanding of disaster risk, foster disaster risk reduction and transfer, and promote continuous improvement in disaster preparedness, response, and recovery practices, with the explicit purpose of increasing human security, well-being, quality of life, and sustainable development.

Disaster risk reduction (DRR) : Denotes both a policy goal or objective, and the strategic and instrumental measures employed for anticipating future disaster risk; reducing existing exposure, hazard, or vulnerability; and improving resilience.

DISASTER

UNISDR 2017: A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts. **(Approved by the General Assembly on 01/12/2016)**

WMO 2016: A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources.

IPCC 2012: Severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery.

DISASTER RISK

UNISDR 2017: The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity **(Approved by the General Assembly on 01/12/2016).**

WMO 2016: Probable impacts, expressed in terms of expected loss of lives, people injured, property, livelihoods, economic activity disrupted or environmental damage (RISK)

IPCC 2012: The likelihood over a specified time period of severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects that require immediate emergency response

RISK MANAGMENT

UNISDR 2017: The organization, planning and application of measures preparing for, responding to and, initial recovery from disasters.

WMO 2016: The systematic management of administrative decisions, organization, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. This comprises all forms of activities, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards.

SREX- IPCC 2012: *"**Risk management** is employed in this chapter and report, it should be interpreted as being a synonym for disaster risk management" pp34 – Chapter 1.*

DISASTER RISK MANAGEMENT

UNISDR 2017: 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.

WMO 2016: No presented in WMO DRR definitions

IPCC 2012: Processes for designing, implementing, and evaluating strategies, policies, and measures to improve the understanding of disaster risk, foster disaster risk reduction and transfer, and promote continuous improvement in disaster preparedness, response, and recovery practices, with the explicit purpose of increasing human security, well-being, quality of life, resilience, and sustainable development.

DISASTER RISK REDUCTION

UNISDR 2017: Disaster risk reduction is aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development. .

WMO 2016: The conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development (RISK REDUCTION)

IPCC 2012: Denotes both a policy goal or objective, and the strategic and instrumental measures employed for anticipating future disaster risk; reducing existing exposure, hazard, or vulnerability; and improving resilience

Methodology to Risk and Disaster Analysis

(definitions are not enough to stablish a DRR and Adaptation policy)

More than [illegible] ent of a[illegible]s caused by natural disa[illegible] occu[illegible] in developing countries, a[illegible]e to natural disasters are 20 tim[illegible]s a percentage of GDP) in developing[illegible]th[illegible]industrialized countries (U[illegible]

THIS IS MY DATA BASE

IS THERE ONLY ONE AND UNIVERSAL DATA SET TO IDENTIFY, CHARACTERIZE AND QUANTIFY DISASTERS AND IMPACTS?

EM-DAT database (University of Louvaine)

PUBLIC ACESS

Sigma Database (*Swiss Reinsurance Company*)

RESTRICT ACESS

Natural Catastrophes Service (NatCatSERVICE, *Munich Reinsurance Company*)

RESTRICT ACESS

Emergency Events Database (*Centre for Research on Epidemiology of Disasters* – CRED)

PUBLIC ACESS (used by national and international organizations)

Inventory System of the Effects of Disasters (DesInventar)

PUBLIC ACESS (developed by La Red: Latin America and the Caribbean, Asia and Africa)

Source: Muñoz et al, 2017

Methodology to Risk and Disaster Analysis
(definitions are not enough to stablish a DRR and Adaptation policy)

Disasters registered in the University of Louvaine database are not initiated by statiscally extreme events, but rather exhibit extreme properties expressed as severe interruptions in the local social and economic events.

data included in DesInventar database has:

- **TIME:** frequency and seasonality
- **SPACE:** where and geographic scope
- **IMPACTS:** social and economic damages (directs and no directs);
- **CAUSE:** natural, social or technologic trigger

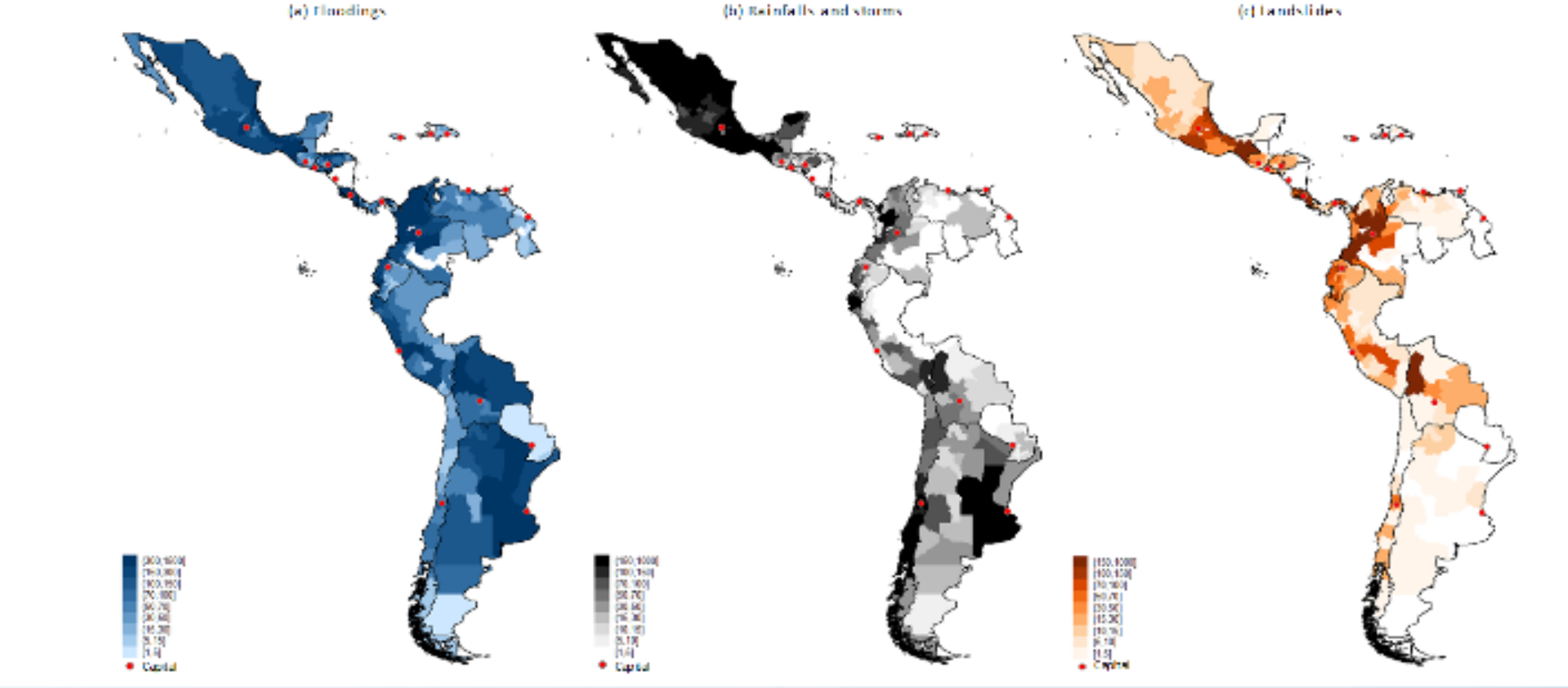
WHEN

WHERE

WHAT

WHO

Is there something strange is these pictures?



Geographic distribution of main ND at LA - Source; Garlati, A., 2013.

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Thanks for your attention

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