



Assessment of Socio-Economic Impacts of Hydro-meteorological Disasters: Recent Experiences & Developments

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Objectives of the project

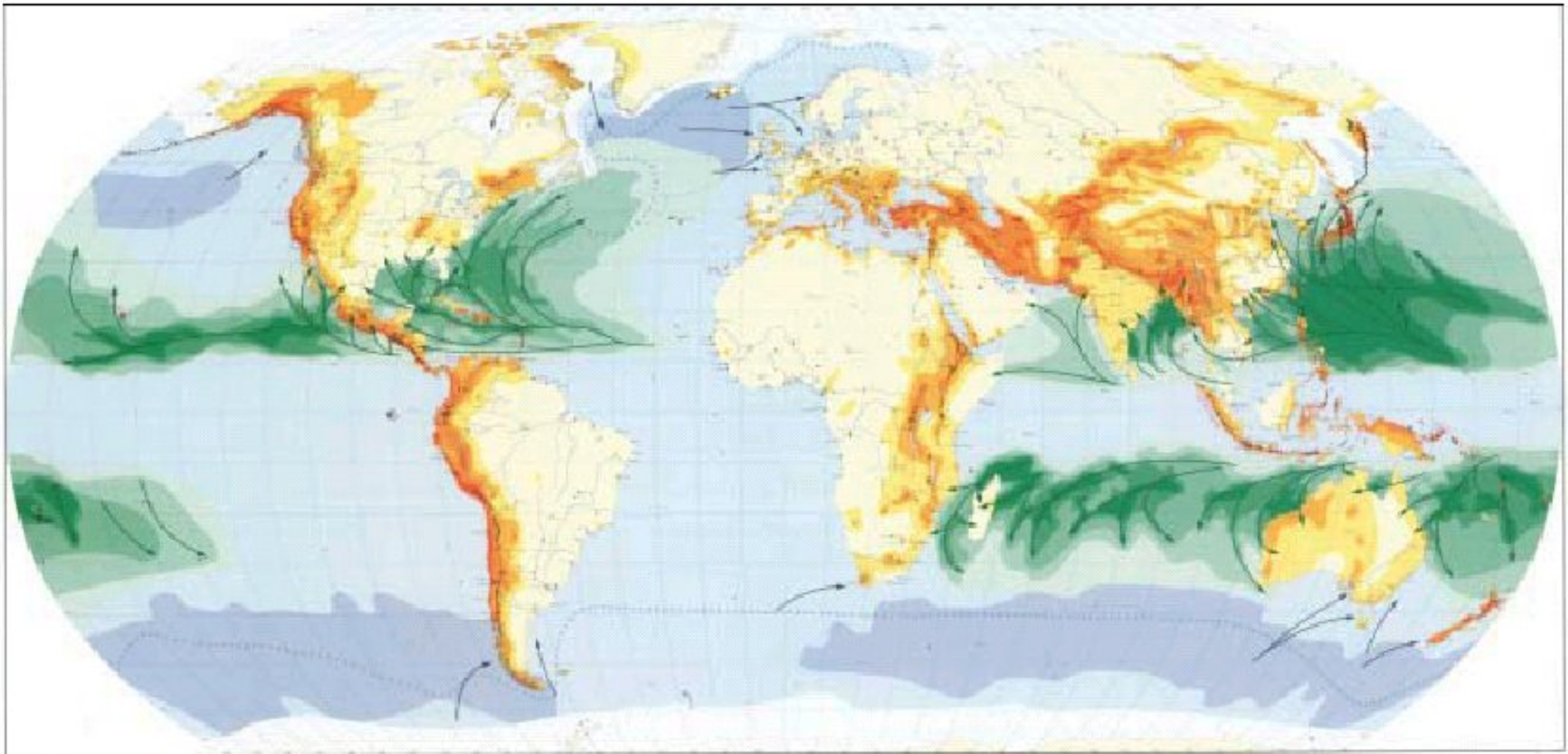
- Regional perspective
- ECLAC methodology
- Case studies for priority policies & strategies
- Lessons learned





World Map of Natural Hazards

Source: Munich Re

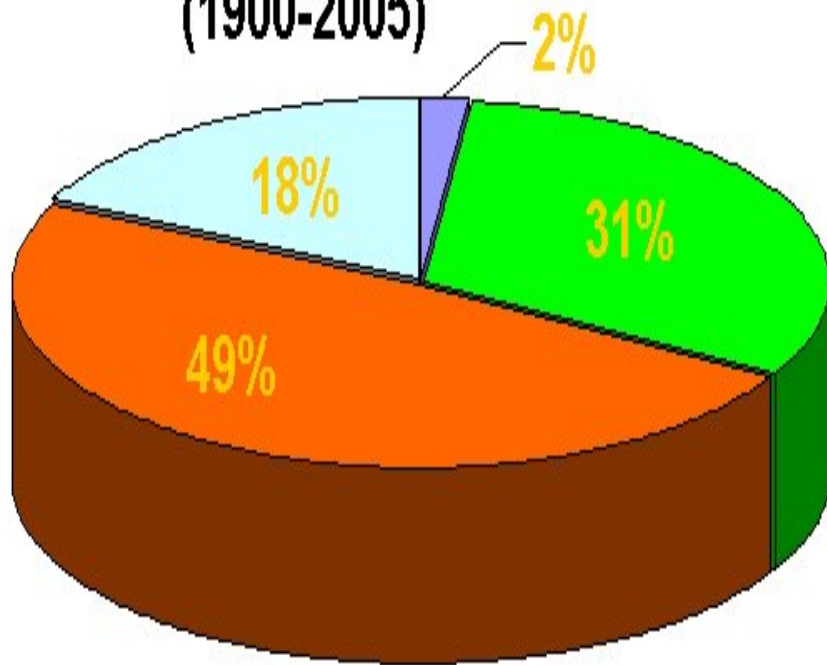


<p>Earthquakes</p> <ul style="list-style-type: none"> Zone 1: 0.001-0.01 Zone 2: 0.01-0.1 Zone 3: 0.1-1 Zone 4: 1-10 Zone 5: 10-100 <p>Large cities with Modified Mercalli</p>	<p>Volcanoes</p> <ul style="list-style-type: none"> High volcanic activity (1900-50) Low volcanic activity (1900-50) Periodic volcanic activity <p>Tsunamis and Storm Surges</p> <ul style="list-style-type: none"> High volcanic activity, sea waves Black sea level Normal sea level 	<p>Tropical Storms and Cyclones</p> <ul style="list-style-type: none"> Zone 1: 101-150 km/h Zone 2: 151-200 km/h Zone 3: 201-250 km/h Zone 4: 251-300 km/h Zone 5: 301-350 km/h <p>Prevalence of tropical storms</p>	<p>Extratropical Storms/White Storms</p> <ul style="list-style-type: none"> High extratropical storm activity Medium activity Prevalence of extratropical storms <p>Other Natural Hazards</p> <ul style="list-style-type: none"> Low risk High risk High risk with high frequency High risk with high frequency & 100% probability High risk with high frequency & 10% probability High risk with high frequency & 1% probability 	<p>Political Borders</p> <ul style="list-style-type: none"> State border State border (international) State border (national) <p>Coast</p> <ul style="list-style-type: none"> 0-100 km 100-200 km 200-300 km 300-400 km 400-500 km 500-600 km 600-700 km 700-800 km 800-900 km 900-1000 km 1000-1100 km 1100-1200 km 1200-1300 km 1300-1400 km 1400-1500 km 1500-1600 km 1600-1700 km 1700-1800 km 1800-1900 km 1900-2000 km 2000-2100 km 2100-2200 km 2200-2300 km 2300-2400 km 2400-2500 km 2500-2600 km 2600-2700 km 2700-2800 km 2800-2900 km 2900-3000 km 3000-3100 km 3100-3200 km 3200-3300 km 3300-3400 km 3400-3500 km 3500-3600 km 3600-3700 km 3700-3800 km 3800-3900 km 3900-4000 km 4000-4100 km 4100-4200 km 4200-4300 km 4300-4400 km 4400-4500 km 4500-4600 km 4600-4700 km 4700-4800 km 4800-4900 km 4900-5000 km 5000-5100 km 5100-5200 km 5200-5300 km 5300-5400 km 5400-5500 km 5500-5600 km 5600-5700 km 5700-5800 km 5800-5900 km 5900-6000 km 6000-6100 km 6100-6200 km 6200-6300 km 6300-6400 km 6400-6500 km 6500-6600 km 6600-6700 km 6700-6800 km 6800-6900 km 6900-7000 km 7000-7100 km 7100-7200 km 7200-7300 km 7300-7400 km 7400-7500 km 7500-7600 km 7600-7700 km 7700-7800 km 7800-7900 km 7900-8000 km 8000-8100 km 8100-8200 km 8200-8300 km 8300-8400 km 8400-8500 km 8500-8600 km 8600-8700 km 8700-8800 km 8800-8900 km 8900-9000 km 9000-9100 km 9100-9200 km 9200-9300 km 9300-9400 km 9400-9500 km 9500-9600 km 9600-9700 km 9700-9800 km 9800-9900 km 9900-10000 km
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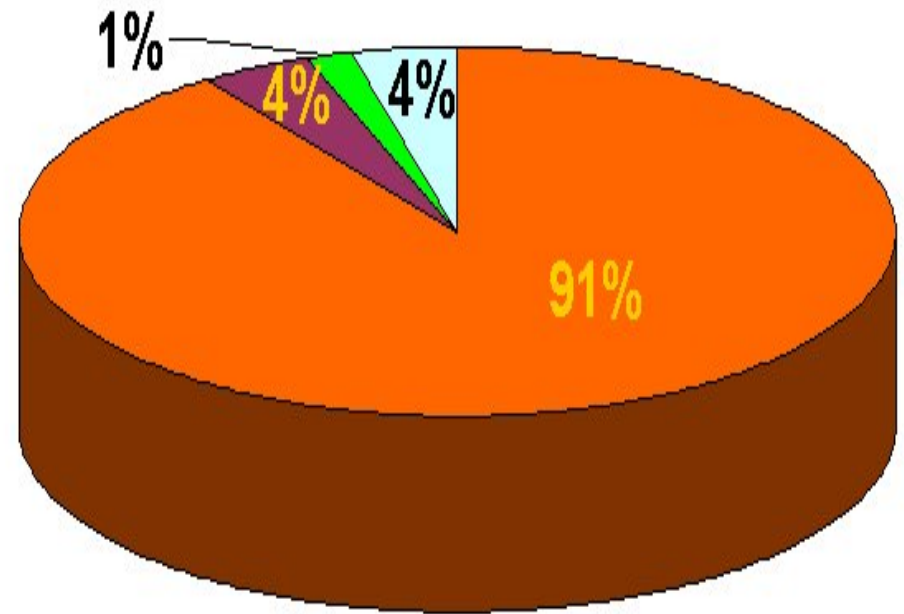


Damage in US\$ by Continents (1900-2005)

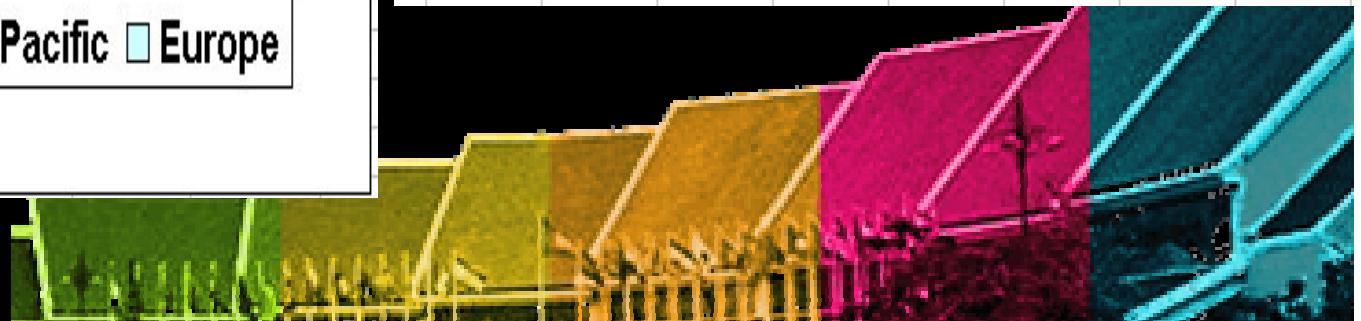


Africa America Asia+Pacific Europe

Number of Deaths by Natural Disasters by Continents (1900-2005)



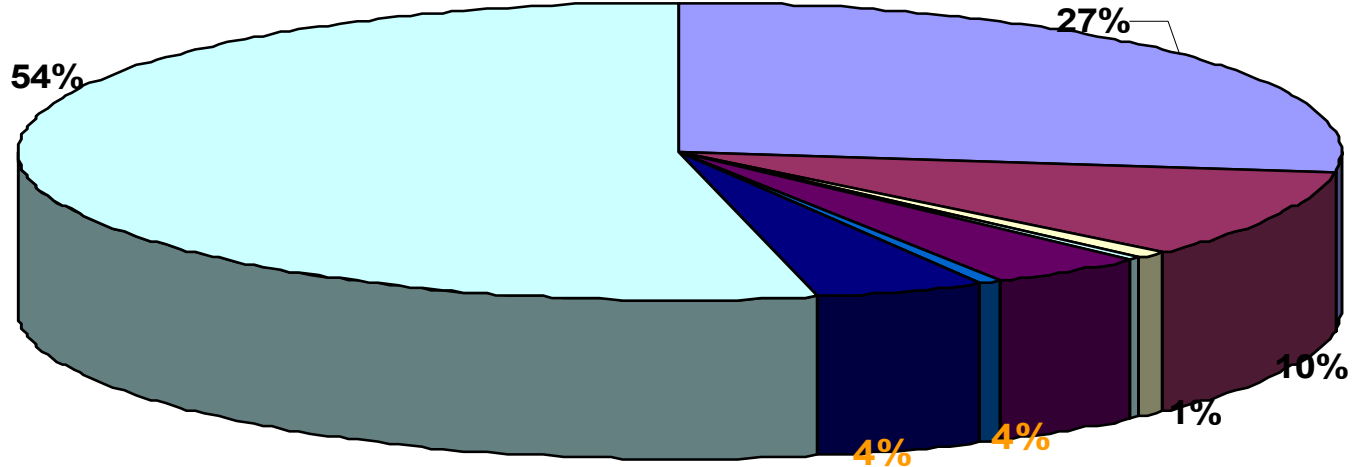
Asia-Pacific Africa America Europe



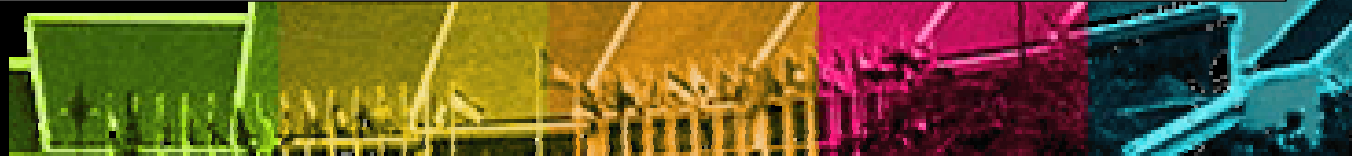


Number of Deaths by Disasters in Asia and the Pacific - 1950-2005

(Total: 5,536,242)



- | | | |
|---------------------|--------------------|--------------------|
| Drought | Earthquake | Epidemic |
| Extreme Temperature | Famine | Insect Infestation |
| Slides | Volcano | Wave / Surge |
| Wild Fires | Wind Storm + Flood | |

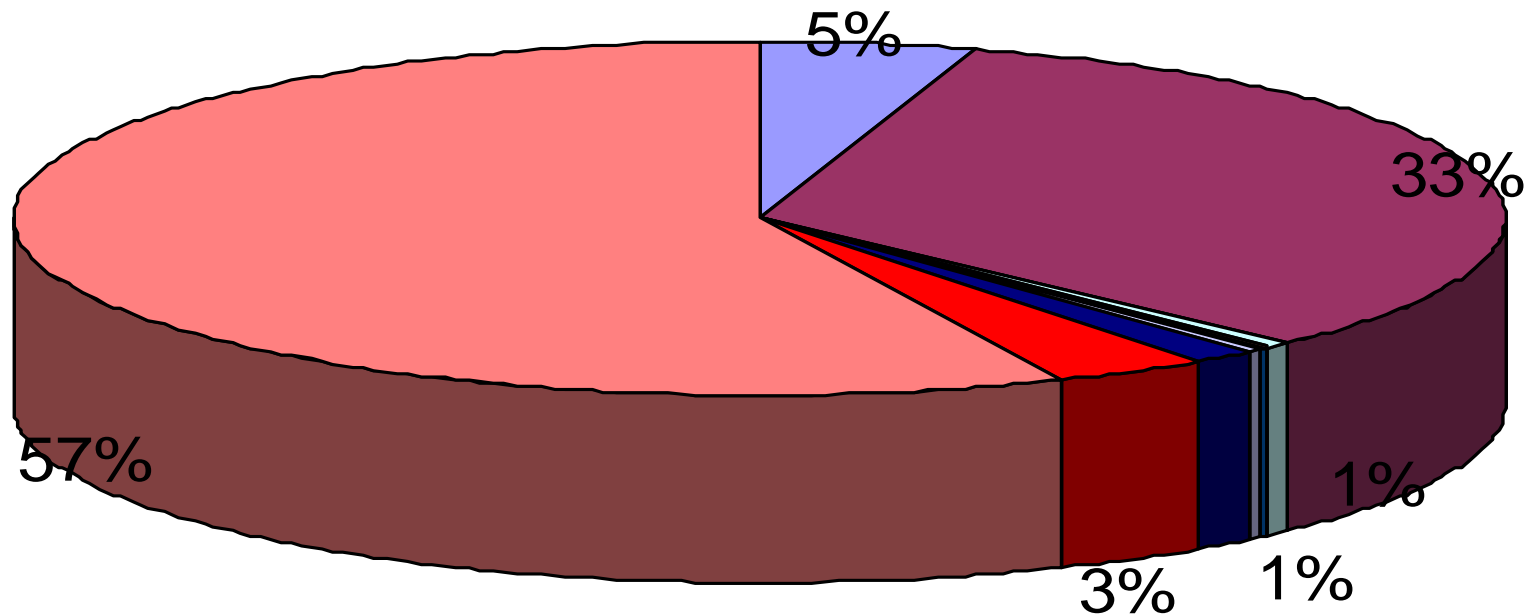




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Source: "EM-DAT: The OFDA/CRED International Disaster Database, www.em-dat.net - Université Catholique de Louvain - Brussels - Belgium"

Damage in US\$ in Asia & Pacific, 1950-2005 (Total=US\$588,015,432,000)



- | | | |
|---------------------|--------------------|--------------------|
| Drought | Earthquake | Epidemic |
| Extreme Temperature | Famine | Insect Infestation |
| Slides | Volcano | Wave / Surge |
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Regional trends of disaster impacts

- Important reduction in the average number of annual deaths by natural disasters from 100,000 people in the past five decades to 41,000 people during the past 15 years
- Average annual damage by natural disasters has increased from US\$10.6 billion to US\$29 billion
- Increasing severe impacts on the poor





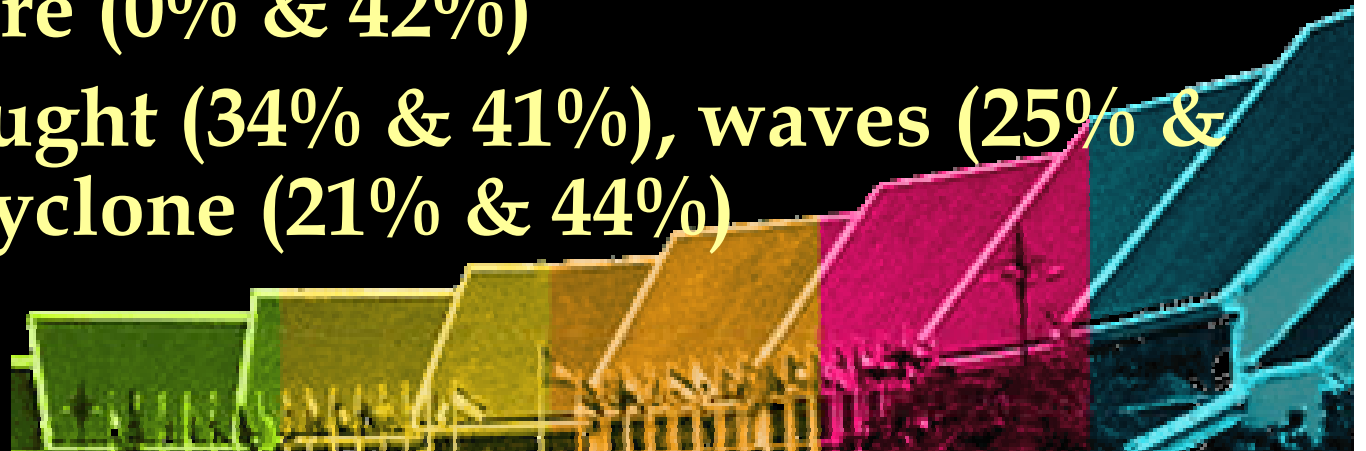
Major subregional disaster impacts (1950-2005)

	Deaths	Damage (US\$)
North-East Asia	2,649,275	386,608,653,000
Central Asia	38,200	47,811,747,000
South Asia	2,549,782	85,553,650,000
South-East Asia	291,230	41,209,436,000
Pacific	9,468	26,836,946,000
TOTAL	5,537,955	588,020,432,000



Major subregional disaster types

- **NEA:** flood/cyclone (81% death & 60% damage), earthquake (11% & 39%)
- **CA:** earthquake (73% & 51%), flood/cyclone (12% & 47%)
- **SA:** drought (59% & 15%), flood/cyclone (29% & 63%), earthquake (7% & 19%)
- **SEA:** Waves (61% & 12%), flood/cyclone (25% & 38%), wildfire (0% & 42%)
- **Pacific:** Drought (34% & 41%), waves (25% & 1%), flood/cyclone (21% & 44%)





Measuring the damage “delta” or damage gap

Pre-existing conditions (ex ante)

The measure of direct & indirect damages upon the pre-existing situation (sector by sector baselines) is aggregated into the national accounts and determines the resulting disaster-caused scenario, as the gap over the expected performance prior to the event. Several scenarios may be outlined, based on assumptions made for reconstruction process

Expected performance (w/o disaster) 3-5 yrs

Disaster impact (ex post) 3-5 years





Main Concepts

Direct damages

- Impact on assets

Infrastructure

Capital

Stocks

- Occur immediately during or after the phenomenon that caused the disaster

Indirect Damages

- Effects on flows

- *Production*

- *Reduced income & increased expenses*

- Are perceived after the phenomenon, for a time-period that can last from weeks to months, till recuperation occurs





Dynamic global effects

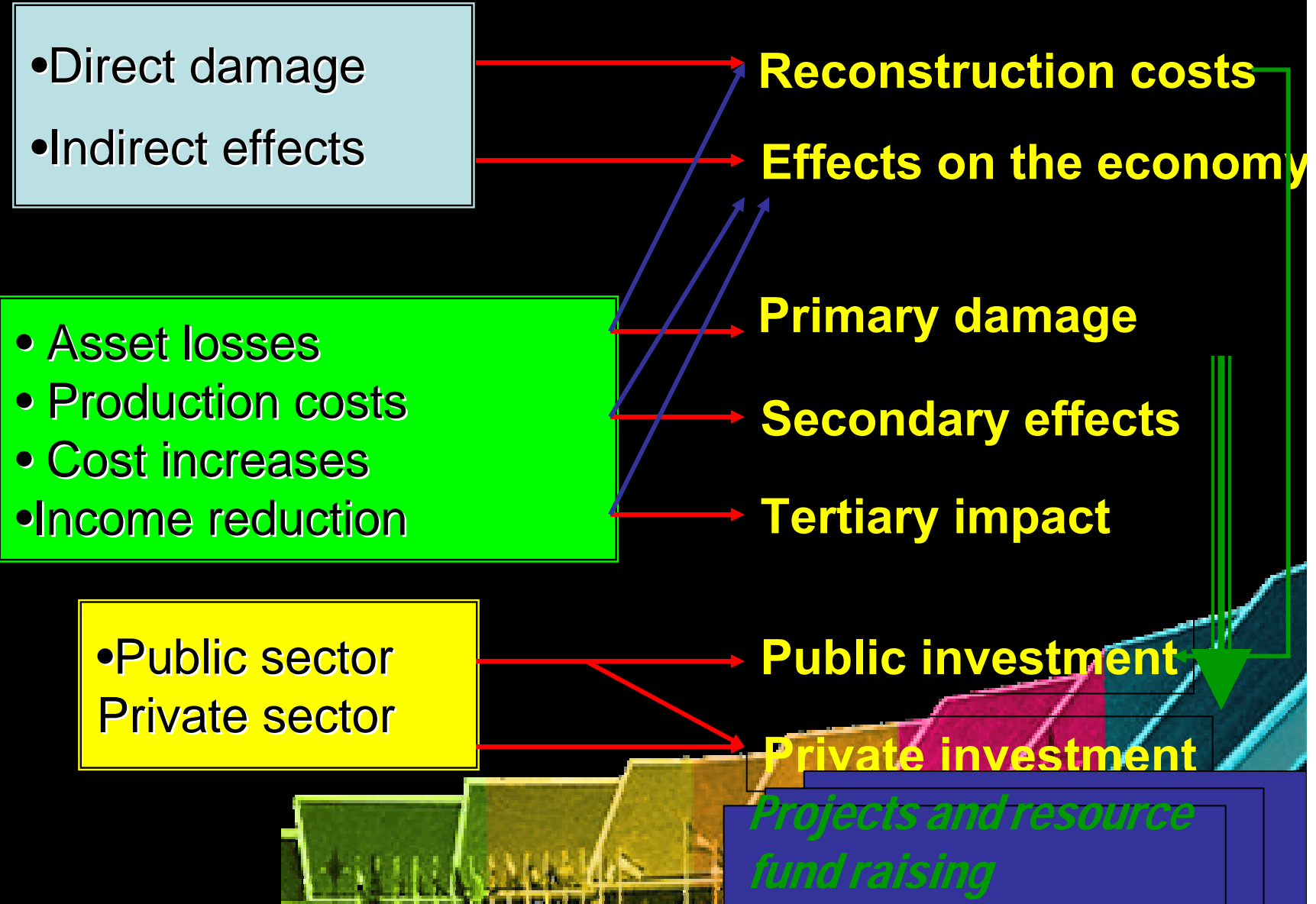
Macroeconomic effects

- Repercussions on the economic performance of national/regional economy affected by the disaster
- May persist for a number of years after the disaster, depending on the characteristics and magnitude
- Is reflected in
 - *Gross Domestic Product growth*
 - *Performance of the external sector*
 - *Evolution of public finance*
 - *Increases of prices and inflation*





Decomposition of total damage





ECLAC methodology and experiences of its application

- Impact in the social sectors
- *Impact in infrastructure*
- Impact in the economic sectors
- *Global effects of damage*





SECTOR BY SECTOR VALUATION

■ Social Sectors

- Housing
- Health
- Education, culture, sports

■ Infrastructure

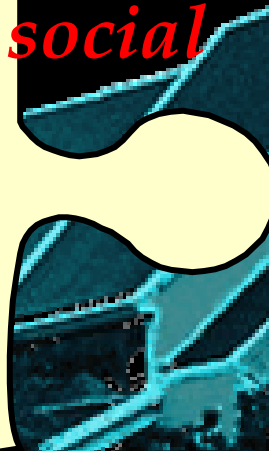
- Transport and communications
- Energy
- Water and sewerage

■ Productive sectors

- *Goods: agriculture, industry*
- *Services: commerce, tourism, etc.*

■ Global impact

- *On the environment*
- *Gender perspective*
- *Employment and social conditions*
- *Macroeconomic assessment*





Arrangements

- Seven case studies
- UNESCAP provides technical back up to case studies
- Country teams play prominent roles
- Learning from the past to propose changes
- Complementary among countries





The case studies

- China: flood
- Lao PDR: flood
- Pakistan: drought
- Philippines: flood & typhoon
- Sri Lanka: flood & drought
- Thailand: flood & landslides
- Viet Nam: flood





China case study

- ❑ Flood the Huai He River Basin – Zhouxian County – An Hui Province
- ❑ Zhouxian County is one of the poorest county of the country
- ❑ Indirect loss > 40% direct damage
- ❑ Impacts on the housing sector, most important. Possible procedures for systematic assessment were identified
- ❑ Recommendations: adoption with new formats for data collection and allocation of emergency resources.





Lao case study

- ❑ Flood in Vientiane plain
- ❑ Indirect loss in agriculture > 50%
direct damage
- ❑ Indirect loss in water supply > 40%
- ❑ Indirect loss in transport > 20%
- ❑ Total loss has almost doubled the
initial estimate
- ❑ Recommendations: adoption with
new formats for data collection





Pakistan Case study

- Indirect loss in livestock > 70% of direct damage
- Indirect loss in orchards > 70%
- Indirect loss in wheat > 100%
- Total loss: Rs32 billion versus Rs3.5 billion of direct damage
- Total loss: twice of GRDP
- Recommendation: templates for future assessment





Philippine case study





- Total loss > 3 times direct damage
- Macro-economic model was supported by detailed ECLAC assessment
- Systematic method of assessment of crop damage was incorporated
- Macro-economic modelling was used to support systematic assessment
- Recommendation: adoption for assessment and resources allocation
- Templates being prepared





PADDY:




Yield Loss in Clear Water Flooding

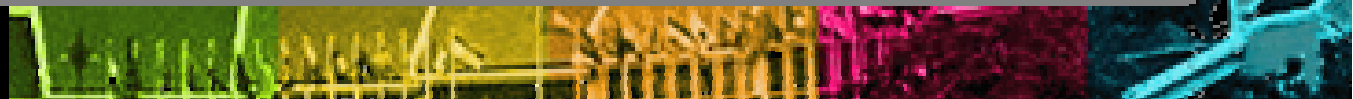
Growth Stage				
	Tillering	Panicle Initiation	Flowering	Ripening
Days Submergence	Estimated Yield Loss (%)			
1 - 2	10	15 - 25	10 - 15	0
3 - 4	15 - 20	20 - 45	15 - 25	10 - 15
5 - 6	20 - 30	30 - 80	20 - 30	15 - 20
7	30 - 50	50 - 100	30 - 70	15 - 20



CORN

Yield Loss Due to Strong Wind

Growth Stage			
	Vegetative	Reproductive	Maturing
Wind Velocity: 101 - 150 KPH	Estimated Yield Loss (%)		
< 12 hrs	20	55	25
≥ 12 hrs	25	60	30
Wind Velocity: > 150 KPH	Estimated Yield Loss (%)		
< 12 hrs	40	80	60
≥ 12 hrs	50	80 - 100	75





Sri Lanka case study

- Total loss Rs11.4 billion > direct damage of Rs2.78 billion
- Indirect loss in agriculture > 100% direct damage
- Social sector, incl. housing a major area of policy concern
- Central Bank has agreed to adopt the methodology for future assessment





Thai case study

- Flash flood and landslides
- First efforts mainly by Government to carry out field investigations
- Has improved existing data collection system
- Will further apply to other recent landslides





Vietnamese case study

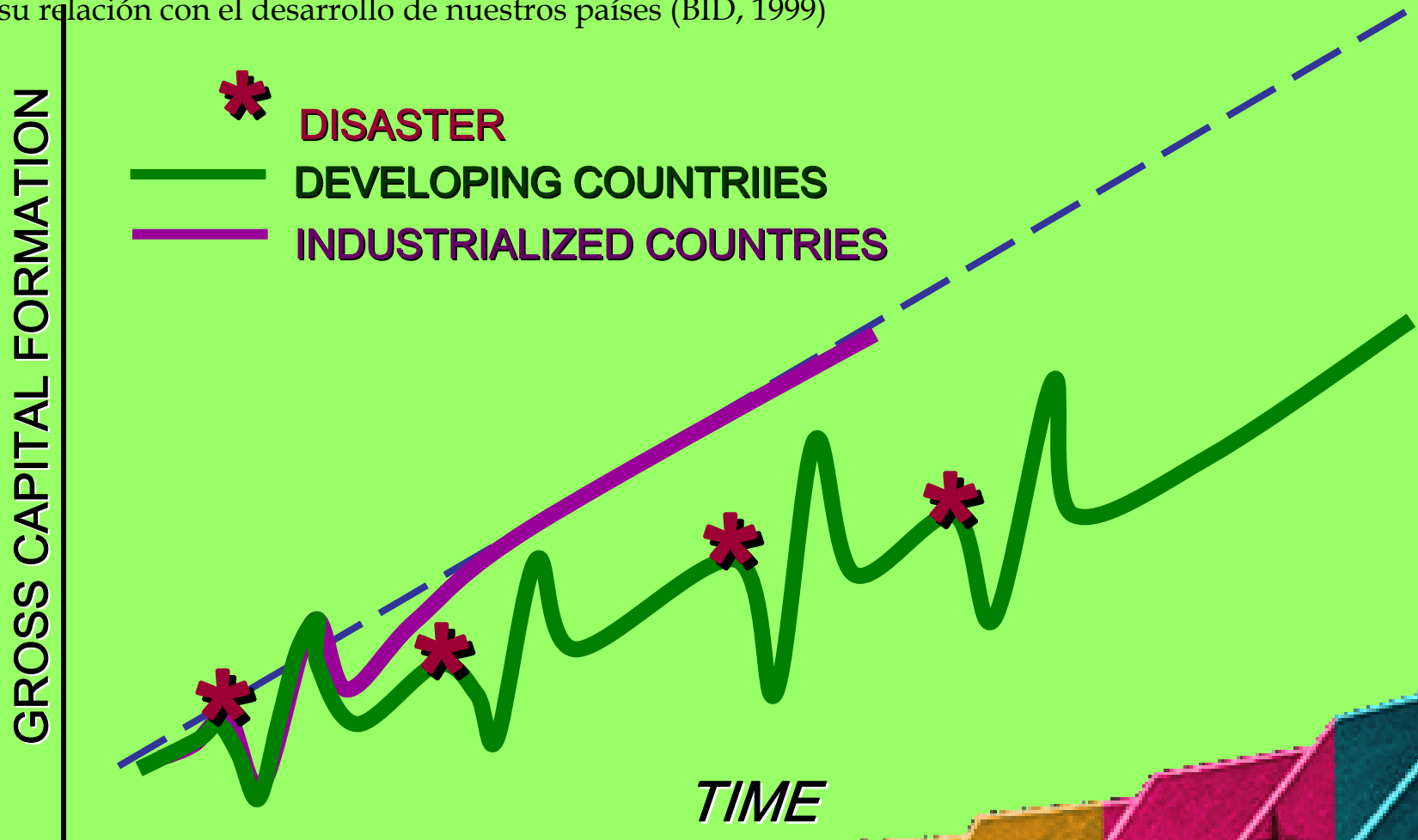
- Indirect impacts = 100% direct damage, especially for fruit crop
- Housing accounts 77% total impacts
- Houses are classified to facilitate rapid assessment
- Application being made for contingency planning





EFFECT OF DISASTERS ON CAPITAL FORMATION

Adapted from Mora, "El impacto de los desastres, aspectos sociales, políticos económicos, ambientales y su relación con el desarrollo de nuestros países (BID, 1999)





Lessons learned

- Impacts are significant different from the traditional estimates
- Impacts on the poor require more frequent assessment
- Mechanisms of assessment are important factors of overall assessment: NDMOs, Sectors, National planning
- Process of assessment to be improved





Future directions

- **Systematic training program:
Standardization to facilitate
application**
- **Establishment of Network of experts**
- **Integration of assessment for
effective implementation of HFA**
- **Support GRIP**





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Thank you

