DISASTER RISK REDUCTION AND CHALLENGES FOR INTERDISCIPLINARY APPLIED RESEARCH IN LATIN AMERICA

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- Latin American countries have increased the number and magnitude of disasters the last decades, which are close interrelated to the growing figures of poverty and uneven socioeconomic development.
- Volcanic eruptions, floods and waterlogging, earthquakes and tsunamis, forest fires and droughts have affected Chile the recent ten years imposing serious limitations to reach sustainable development
- Stakeholders, social representatives and communities are demanding much more and better scientific knowledge to be applied in preparation, coping and reconstruction of disasters
- Disasters have become large social, cultural, political, physical and economic events in Latin America. However scientific knowledge is still unable to answer social needs related with their occurrence, specially due to the lack of resources and mainly in most devastated countries.
- The integration of scientific and local knowledge, seems to be fundamental to propose countermeasures that should be based mainly in the understanding and solution of social vulnerability
- International programs are not reaching scientific and social communities in developing nations and academic institutions are starting with multidisciplinary initiatives, confronting epistemological and institutional constraints

Total Number of Deaths and of People Affected by Natural Disasters by 100,000 Inhabitants: 1974-2003





So urce: Word Bank

INCREASE OF WEATHER-RELATED DISASTERS IN LATIN AMERICA AND ITS RELATIONSHIP WITH EXPOSURE, ECONOMIC AND SOCIAL DISPARITIES

Frequencies	Droughts	Floods	Storms	Total 365	
2000-2009	33	239	93		
1990-1999	24	123	63	210	
1980-1989	14	101	28	143	
1970-1979	9	60	19	88	
Total	80	523	203	806	

Table 1. Frequencies of Major Weather-Related Disasters (Floods, Droughts, and Storms) in Latin America, 1970–2009

Table 4. Summary of Reduced Form Regressions Predicting Mortality for Floods and Storms, 1980-2000

	1. Log (killed/capita floods) (reduced form, $N = 91$)			2. Log (killed/capita floods) (incl. dummy, $N = 91$)		3. Log (killed/capita storms) (reduced form, $N = 30$)			
Variable	В	SE B	В	В	SE B	β	В	SE B	β
Log (exposure)	0.64	0.11	0.45*	0.55	0.13	0.38+	0.51	0.32	0.30
Log (GDP/capita)	-0.59	0.13	-0.38^{+}	-0.63	0.14	-0.40+	-0.79	0.38	-0.33++
Log (Gini-index)	0.94	0.35	0.23*	0.63	0.43	0.15	_	_	_
Log (arable land)	_	_	_	_	_	_	0.58	0.30	0.30+++
Dummy LA	_	_	_	0.60	0.84	0.14	1.11	0.70	0.25
R ²		0.46			0.47			0.36	

p < 0.01; p < 0.05; p < 0.1.

Source: WDI 2010; Freedom House 2010; UNDP 2004(b).

NATIONAL EXPENDITURE (% GDP) IN RESEARCH AND DEVELOPMENT

COUNTRY	2006-2010	2011-2015
GERMANY	2,89	2,92
AUSTRIA	2,77	2,84
DENMARK	2,88	2,98
FRANCE	2,28	2,26
ARGENTINA	0,65	
BRAZIL	1,21	
COLOMBIA	0,18	0,17
GUATEMALA	0,05	
PARAGUAY	0,05	

Source: The World Bank

NUMBER OF RESEARCHERS PER 1000 WORKERS: 17.4 IN ISRAEL, 15.7 IN FINLAND, 8.7 IN USA, 0.8 IN CHILE, 0.2 IN INDONESIA

NUMBER OF RESEARCHERS, PUBLICATIONS, % GDP, AND PATENTS

COUNTRY	RESEARCHERS/MILLION PERSONS 2005-2012	PUBLISHED ARTICLES 2011	% GDP 2005-2012	PATENTS APPLICANT RESIDENTS 2013
UNITED STATES OF AMERICA	3 979	208 611	2,77319	287 831
UNITED KINGDOM	4 824	48 035	1,72	14 972
JAPAN	5 158	47 106	3,39	271
ARGENTINA	1 236	3 863	0,65	2013
BRAZIL	710	13 148	1,21	4 959
CHILE	317	1 979	0,42	340
COSTA RICA	1 289	106	0,48	21
BOLIVIA	162	47	0,16	
ECUADOR	103	60	0,23	4
GUATEMALA	25	22	0,05	4
EL SALVADOR		9	0,03	
HONDURAS		10		

Repercusiones tras la renuncia de Francisco Brieva a Conicyt:

Políticos y científicos abogan por la creación del ministerio de Ciencia

Dicen que es crucial que Chile aumente su gasto en el rubro para acercarse al 1% del Producto Interno Bruto. Senador Girardi piensa rechazar el presupuesto si no se hace nada al respecto.

ALEXIS IBARRA O.

I viernes pasado Francisco Brieva se preparaba para dejar su oficina de Moneda 1375, la misma que lo acogió trece meses mientras era presidente de la Comisión Nacional de Investigación Científica y Tecnológica (Conicyt). Días antes había presentado su renuncia tras seis meses sin recibir un sueldo y hastiado de la burocracia del Estado que no lo dejó actuar. También por la poca importancia que se les daba a la ciencia, la tecnología y la innovación en los



El senador Girardi (al centro), acompañado de Jorge Babul (izq.) y Juan Asenjo (der.), apelaron a la Presidenta para que cree un ministerio de Ciencia.

314.981 millones

de pesos sería el presupuesto de Conicyt para 2016, incluyendo fondos para la Iniciativa Científica Milenio, que ahora pasa a ser administrada por la institución. Scientists and politicians advocate for the creation of Science and Technoogy Ministry and for at least 1% GDP financial support. (aprox. 2.800 million dollars) Currently its Budget is only 50 million dollars per year which has caused Resignation of the President of the National Research Comission

Fuente: El Mercurio. Nacional-A15. 03-11-2015



Environmental Geography like a support for integration of Knowledge about nature and society, passing from externality to interference between both traditional branches, According to Castree et al., 2009 and Demeritt, 2009.

The loading-dock model of decision support for practices (Ingram and Stern, 2007) has been regular practice among Climate scientists. They propose models, products, forecasts or other information for general use without consulting with, or understanding the needs of, the anticipated users.

Mistaken ideas of the model:

- a) Stovepipes: Information flows in narrow, restricted channels, among specialists isolated from neighbouring disciplines and applications
 b) Pipelines where scientific information flows from the
- "well heads" to "storage tanks"

c) Decision spaces or the range of realistic options available to decision makers to resolve particular problems

Source: Feldman and Ingram, 2009.

Figure 2 The multidimensionality of disciplinary divides in geography



Figure 1. Road map for integrating knowledge, actions and stakeholders for disaster risk reduction.

AFTER GAILLARD AND MERCER, 2012

DIALOGUE OF SCIENTIFIC AND LOCAL KNOWLEDGE, OUTSIDE AND INSIDE STAKEHOLDERS AND TOP-DOWN AND BOTTOM-UP INITIATIVES IS CENTRAL FOR DISASTER RISK REDUCTION

ANDEAN INDIGENOUS PEOPLE KNOWLEDGE AND CULTURE ARE OUTSTANDING SOURCES OF LOCAL KNOWLEDGE AND SOCIO SPATIAL DISTRIBUTION ABOUT RISK REDUCTION











8 de abril 2012



21 de marzo 2012

26 de mayo 2012

Figure 1 The construction of the conscious community and the role of flooding SOURCE: COATES (2015)

Building and strengh of conscious communities and social capital should be a central focus in disaster risks reduction









MULTIHAZARDS IN URBAN AREAS. 1986 FLOODING AND WATERLOGGING, 2010 TSUNAMI IN CONCEPCION-TALCAHUANO GROWING OF CITIES ON AREAS AFFECTED BY NATURAL HAZARDS: EARTHQUAKES,

TSUNAMIS, FLOODS AND WATERLOGGINLACK OF LAND USE PLANNING AND DISASTER RISK REDUCTION DUE TO RAPID AND UNPLANNED URBAN SPRAWL

SCIENTIFIC AND INSTITUTIONAL WEAKNESS, LIMITED SOCIAL AND POLITICAL PARTICIPATION





72°26'0"W 72°25'30"W 72°25'0"W 72°24'30"W 72°24'0"W 72°23'30"W Evolución de la Plana Urbana Leyenda posterior al desastre Complejos_Habitacionales calles de constitución Curvas de Nivel c/10m reas afecatadas por el desastre del 27F lana Urbana 2009 luevos sectores construidos al 2014 Orillas del Río Maule Bernardo O'Higgins Felipe Cubill Villa Vista Hermos Villa Los Aromo Villa Altas Cumbres villa Verde uinta Gaete obl. Francisco Meza Seco 900 Meters fau 72°25'30"W 72°25'0"W 72°24'30"W 72°24'0"W 72°23'30"W 72°26'0"W

GENERATION OF SOCIAL VULNERABILITIES MIDDLE AND LOWER CLASSES WERE MORE AFFECTED BY NATURAL HAZARDS IN CONCEPCION

PHERIPHERICAL URBANIZATION PRODUCED BY SOCIAL, ECONOMIC AND POLITICAL REASONS HAS GENERATED NEW VULNERABILITIES

REAL SOCIAL IMPROVEMENTS OF RECONSTRUCTIONS MUST BE A PART OF URBAN SUSTAINABLE DEVELOPMENT

RECENT MULTIDISCIPLINARY INITIATIVES IN CHILEAN UNIVERSITIES

- UNIVERSITY OF CHILE, DIRECTION OF SCIENTIFIC RESEARCH, VICERRECTORATE OF RESEARCH AND DEVELOPMENT (2015)
- INTERDISCIPLINARY COMMISION ON REDUCTION AND MANAGEMENT OF SOCIO-NATURAL DISASTERS
- FACULTY OF MEDICINE: PUBLIC HEALTH
- FACULTY OF ARCHITECTURE AND URBANISM; DEPARTMENTS OF ARCHITECTURE AND HOUSING AND RESIDENTIAL HABITAT (ANTISEISMIC DESIGNS AND CONSTRUCTIONS), GEOGRAPHY (NATURAL HAZARDS AND SPATIAL VULNERABILITY);
- FACULTY OF LAW: LAWS AND INSTITUTIONS
- FACULTY OF MATHEMATICAL AND PHYSICAL SCIENCES: DEPARTMENTS OF GEOPHYSIC (SISMOLOGY, TSUNAMIS, VOLCANISM, METEOROLOGY), GEOLOGY, ENGINEERING
- FACULTY OF FORESTRY AND NATURE CONSERVATION SCIENCES: FOREST FIRES
- FACULTY OF VETERINARY SCIENCES: ANNIMAL CARE AND RESCUE
- FACULTY OF AGRONOMIC SCIENCES: CLIMATE CHANGE AND AGRICULTURE, DESERTIFICATION
- FACULTY OF SOCIAL SCIENCES: SOCIAL VULNERABILITY AND RESILIENCE
- INTERDISICPLINARY CENTERS ON CLIMATE CHANGE AND SOCIAL VULNERABLITY,
- THE NATINAL SEISMOLOGICAL SERVICE AND THE SEISMIC NATIONAL MONITORING NETWORK
- AIMS:
- INITIALLY, TO FACILITATE THE KNOWLEDGE AMONG DIFFERENT SCHOLARS WORKING IN MAINLY ISOLATED CONDITIONS AND DISCIPLINARY FIELDS IN DIFFERENT AND DISTANT DEPARTMENTS AND FACULTIES, AND THEN, TO PURSUE ACADEMIC ACTIVITIES TO DEVELOP MULTIDISLINARY RESEARCHES
- TO PROMOTE ACADEMIC PARTICIPATION IN NATIONAL PUBLIC DEBATES, INSTITUTIONAL CHANGES AND PUBLIC POLICIES PROPORSALS
- TO ANSWER SOCIAL NEEDS OF INFORMATION, EDUCATION AND PARTICIPATION

Conclusions

- Dialogue between national and international programs and institutions, scientists and social actors, private and public organizations, and natural and social scientists must be strongly emphasized
- Academic multidisciplinary programs are a necessary response to social and political demands of applied research to decision support systems
- Developing nations- especially the poorest and more devastated countries-, must substantially increase public support for science and development activities and a reconfiguration of international collaboration seems to be very relevant
- Social vulnerability is a main cause of disasters in Latin America and its reduction is a necessary step to advance in sustainable development
- Boundary institutions and organizations are very important to facilitate dialogue among scientists, politicians, stakeholders and communities
- Aims, programs and objectives related with World Organizations for Disaster Risk Reduction should mean a window opportunity to overpass current limitations for development of mutidisciplinary applied research in Latin America
- Some regional universities are organizing multidisciplinary initiatives but they have to fight against individual and monodisciplinary research traditions and funding programs, academic legitimacy and resources hard competence.