

**IRDR International Centre of Excellence (ICoE)  
Expression of Interest:**

**IRDR Center of Excellence in Understanding Risk & Safety  
(ICoE:UR&S)**

Submitted by  
Institute of Environmental Studies (Instituto de Estudios Ambientales – IDEA)  
National University of Colombia (Universidad Nacional de Colombia)  
Disaster Risk Management Task Force

**Organization and Mission**

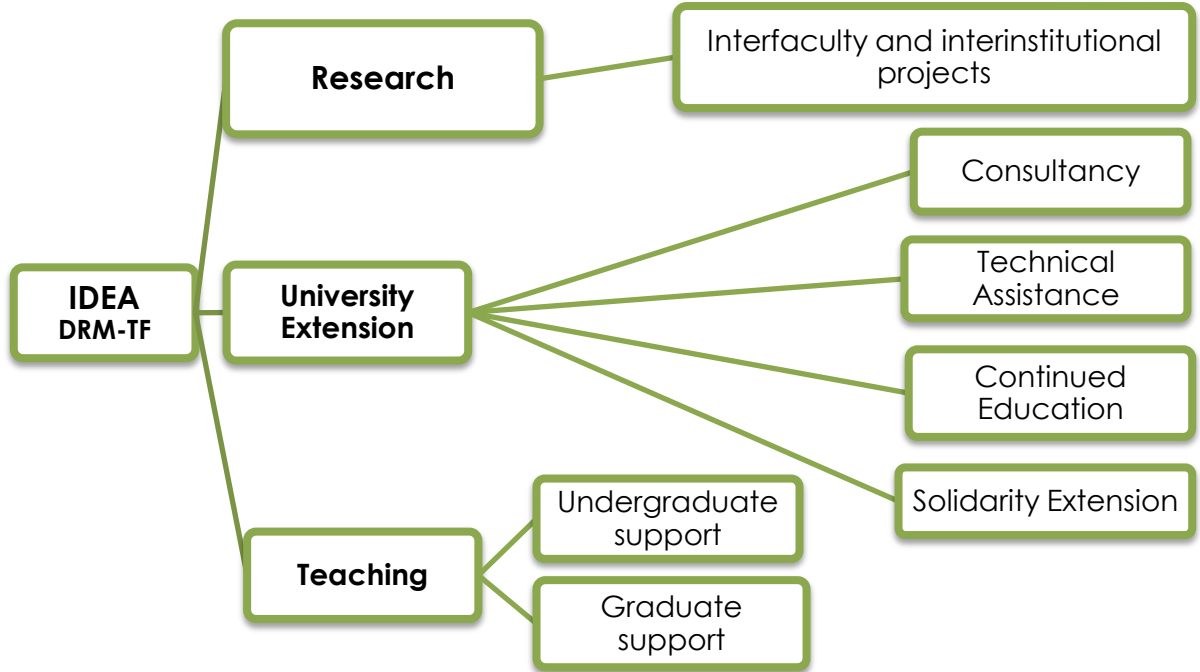
The Institute of Environmental Studies (IDEA) at the National University of Colombia in Manizales City is requesting this specialized ICoE to support the trans-disciplinary and integrated research on disaster risk and safety for the region of Latin America and the Caribbean. IDEA is an interfaculty research and graduate training center created in 1991 and focused on development of models, methodologies and studies to improve sustainability and resilience. The mission of the IDEA is to contribute, in the context of interdisciplinary and interagency environmental knowledge, understood as a vision of reality in which ecosystem and cultural processes interact, to the sustainable use of their aptitudes and to resolve the conflicts at regional, national and global levels, to improve the quality of life by creating thought, generating educational processes, scientific research and technological development. The main partners of IDEA are the national and local governments and it is considered the technical “soul” of Manizales; a city considered as the more advanced in Disaster Risk Management in Latin America in the last decade.

**Vision**

IDEA is an academic unit that develops interdisciplinary and interagency environmental research, including disaster risk management and adaptation to climate change, to guide the sustainable development, contributing to the solution of environmental problems and to offer, in conjunction with the University faculties, advanced and updated training programs for the Institute’s areas of interest.

**Approach**

The three principles of work of IDEA are: inter-disciplinarity, community participation and environment management. The Disaster Risk Management Task Force (DRM-TF) activities and projects follow the IDEA approach based on research, university extension and teaching. The figure presents a scheme on the approach of the Institute:



### Collaborating Organizations

DRM-TF of IDEA has been the scientific and technical support mainly for the City Administration of Manizales and for the Regional Environment Authority (Corporación Regional Autónoma del Medio Ambiente de Caldas CORPOCALDAS). The current programs of risk knowledge, on-line hazard surveillance and monitoring, and applied research for awareness and land-use planning, financed using the specific city's state-tax for the next few years is close to US\$ 5 million dollars. Other national entities are very close to IDEA and DRM-TF, such as the National Unit for Disaster Risk Management of the Presidency of the Republic (UNGRD), the National Science Foundation (COLCIENCIAS), the Minister of Housing, Cities and Territory, the Minister of Environment and Sustainable Development, among others. It is important to highlight the recent contributions made, from specialists of the DRM-TF, using technical and participative approaches, for the update (new law) of the national disaster risk management system and policy of the country and for the new national plan for disaster risk management.

### Other Network Connections

At international level, IDEA and the DRM Task Force specialists have several activities regarding international projects and initiatives. One of the main linkages has been La RED, Network of Social Studies on Disaster Prevention in Latin America (Red de Estudios Sociales en Prevención de Desastres de Latinoamérica, La RED). Also the Ibero-American Network of Sustainable Cities in coordination with the UNESCO Cathedra and the Polytechnic University of Catalonia (UPC). Special work have been developed with the International Center of Numerical Methods in Engineering

(CIMNE) of Barcelona, Spain, with the implementation from 2001 of the e-training /e-learning International Course for Integrated Disaster Risk Management, in which more than 600 professionals, officers, researchers have been involved until date. Also the agreements made with Florida International University (FIU), from 2005, to make annually the International Internship of Disaster Risk Management for selected experts from Latin American and the Caribbean with the support of OFDA-USAID. Other important activities are the work related to the CAPRA (Comprehensive Approach for Probabilistic Risk Assessment) initiative with the World Bank, the Inter-American Development Bank (IDB) and the UNISDR (the first CoE of CAPRA training at international level). In addition, the contributions to the Global Assessment Report (GAR) from the UNISDR that have been oriented to develop and support the Global Risk Model (GRM) used in the GAR 2013 for 204 countries and GAR 2015 (in process) and the development of the Loss Exceedance Hybrid Curve and risk stratification (risk curve) for GAR 2011 and GAR2013 using the DesInventar local disaster database and CAPRA platform, in cooperation with CIMNE and the GRM partners, such as University of Geneva, Norwegian Geotechnical Institute, CIMA in Savonna, GEM in Pavia, and the close advise and technical interchange with the Institute of Environment and Human Security (EHS) of the United Nations University (UNU) in Bonn. Lastly, to mention the participation of the DRM Task Force director as the leader of ICSU-ROLAC Natural Disasters Planning Committee, the IRDR Scientific Committee, the IPCC SREX and AR5 writing reports, the Global Earthquake Model (GEM) Scientific Board and the Board of Directors of the International Association for Earthquake Engineering (IAEE).

### **Key Personnel**

The Disaster Risk Management Task Force of IDEA (ICoE:UR&S) is led by a Director (Dr. Omar-Dario Cardona), UN Sasakawa Price of Disaster Prevention 2004, with a complement of 25 faculty, staff, consultants and affiliated professors and researchers who work with IDEA on different activities and projects. The disciplines of the professors and researchers include hydrology, geology, physics and mathematics, civil, environment, electrical, electronic and chemical engineering, computer science, architecture and urban planning, business administration, sociology, political science, philosophy, journalism and history. The Director of IDEA (Dr. Freddy-Leonardo Franco) and the full-time personnel work collaboratively with the broader research staff to develop proposals, conduct research, and produce high quality publications in the areas of integrated research. In addition, IDEA fully or partially supports 10 to 15 master and doctoral students who also provide additional scientific research capacity.

### **Funding Sources**

IDEA is funded mainly by government funds such as the National University of Colombia, COLCIENCIAS (National Science Foundation), the City Administration of Manizales, the Regional Authority of Environment (CORPOCALDAS) and other local and national, and often international, sources through extramural research grants.

## Research and Professional Activities Conducted

IDEA has been involved in several projects related to environment management, climate and ecosystems research. From the middle of 1990s there exist a permanent Observatory of social development, environment and economical indicators of Manizales and the region. IDEA has been undertaking research on environment thinking, methodologies for development of environment profiles, urban studies, hydrographic basins management, air quality, and retreat of glaciers. These projects have been undertaken with teaching and research by its own staff, affiliated graduate students, contracted researchers and affiliated research partners since its creation in 1991. Over the last years, particularly related to integrated disaster risk management the Institute has made or is undertaking currently several projects, some emblematic examples are the follows:

- Development of Disaster Risk and Disaster Risk Management Indicators for the countries of the Americas (supported by the IDB, Washington).
- Diagnostic of Disaster Risk Management and Improvement of Resilience in the city of Manizales (supported by the city administration).
- Integrated Plan of Disaster Prevention of Manizales for the Development Plan (supported by the city administration).
- Emergency Response Plan of Manizales (supported by the city administration).
- International Course on Integrated Disaster Risk Management (supported 9 times by ODFA-USAID and FIU, PREDECAN, IDB, Organization of American States, OAS).
- Laboratory of Automatic Seismic Instrumentation, LISA, for early real time post-earthquake losses diagnostic (contribution to SmartCity projects).
- Real time Network of Meteorological and Hydrological Stations of the city and the province with own technology (contribution to SmartCity projects).
- Disaster Risk Perception and Training of Communities for Risk Understanding (supported by CORPOCALDAS).
- Development and updating of the Information Geographic System for Disaster Risk Management for Manizales –SISMAN+ Risk (supported by CORPOCALDAS).
- Design of the a disaster risk collective insurance to cover freely the low-income householders through cross-subsidies using the property tax payment (supported by the World Bank, the IDRC of Canada, Prevention, National Department of Planning and the city administration).
- Disaster risk mapping in the ordering and management plan of the Chinchiná River (supported by ASOCARS, Government of Netherlands, CORPOCALDAS).
- Holistic approach for disaster risk evaluation: Urban Disaster Risk Index, methodology for Bogotá, Manizales, Barcelona, Metro-Manila , Istanbul (supported by Bogotá City, Manizales City, CIMNE, and EMI).
- Seismic macrozonation and harmonization of site effects studies to earthquake resistant design and construction requirements (Norm NSR-10) in Manizales (supported by CORPOCALDAS).
- Landslides, flooding and other territorial hazard risk assessments for the land-use and territorial ordering plan of Manizales (supported by CORPOCALDAS).

- CAPRA platform training for the evaluation of hazard, vulnerability and risk due to volcanoes, earthquakes, tsunamis, rainfall, tropical cyclones, floods, landslides (supported by CORPOCALDAS).
- Development of the projects for the Law and Decrees that established the new National System for Disaster Risk Management and the National Plan.

Lastly, the professional activities of the DRM-TF of IDEA include the publication 37 peer reviewed scientific papers in indexed journals, 22 book chapters, 22 monographs and 15 books.

### **Vision for Incorporating and meet IRDR Objectives**

The overall vision of the ICoE:UR&S is to develop and apply science-based comprehensive models, methodologies, and measures that provide scientific and technical support for disaster risk and safety understanding and assessments for management policy, planning and decision making. This vision will be implemented in different ways. The ICoE:UR&S will support the IRDR objectives related to the characterization of risk and safety –including vulnerability and resilience- through theoretical and empirical approaches. Such approaches include empiric and analytical models that link social and economic vulnerability, natural hazards and exposure at a variety of spatial scales; composite social, environment and development indicators to reflect disaster risk and risk management for comparison over time and among countries, subnational areas and urban centers; probabilistic hazard and risk modeling to obtain risk metrics useful for risk transfer, macroeconomic valuations, contingent fiscal liabilities, sovereign risk and land-use decision-making. Examples of these effort are the development and application of the Disaster Deficit Index (DDI), the Local Disaster Index (LDI), the Prevalent Vulnerability Index (PVI) and the Risk Management Index (RMI) for 24 countries of the Americas and the Urban Disaster Risk Index (UDRi,) applied in different urban center worldwide; the multi-hazard risk evaluation CAPRA platform and the hybrid loss exceedance curve (based on DesInventar database and CAPRA), used in several countries from the Americas, Europe and Southeast Asia, and in the framework of the Global Risk Model (GRM) of the UNISDR GAR. The ICoE:UR&S plan is to expand and improve such risk and safety understanding and evaluation approaches and models for use not only in other regions and countries but at subnational and local level, and to work collaboratively to develop new approaches including the suitable evaluation of climate risks from a holistic point of view. A second IRDR objective is to reduce and curb losses through knowledge-based actions of disaster risk management and adaptation to climate change derived from trans-disciplinary and comprehensive understanding of vulnerability and risk and taking into account the underlying development causes, from social, economic, governance, and environment perspectives. Finally, our vision is to continue to promote the capacity building by training the national institutions and the next generation of disaster risk researchers, objectives of both IRDR and IDEA. The plan is to continue with the international virtual and in place courses and to encourage master and doctoral students and scientists for short term study visits to Manizales; the recognized and awarded resilient city due to its real disaster risk management

outcomes. Given the resource constraints, the vision of the ICoE:UR&S will be to provide some baseline support for three of the working groups of IRDR-DATA, AIRDR, and FORIN. This support would consist of science inputs into DATA and AIRDR and the promotion and advocacy to develop FORIN projects in the country with the support of the IRDR National Committee of Colombia (EoI in process) lead by the UNGRD. The ICoE:UR&S is not designed to completely support the working groups in their activities, but rather to help facilitate the science behind the working group efforts.

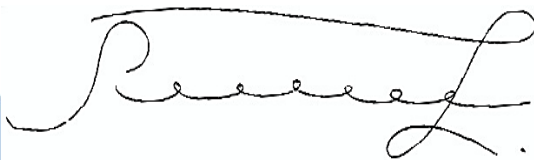
### Funding

The National University of Colombia in Manizales will provide approximately \$50,000 annually to support IDEA and then the IRDR ICoE. These funds depend from the internal transfers (overhead) received by the University as result of the all projects development by the Institute. These funds will be used to directly support the mission and objectives of IRDR generally and more specifically to support the research and networking of the IRDR working groups. The vision of this ICoE:UR&S will be to provide baseline support mainly for the DATA project and for the working groups of IRDR Risk Interpretation and Action (RIA), Assessment of Integrated Research on Disaster Risk (AIRDR) and Forensic Investigators of Disasters (FORIN). Additional funds to support the working groups might be procured through project-specific grants and funding.

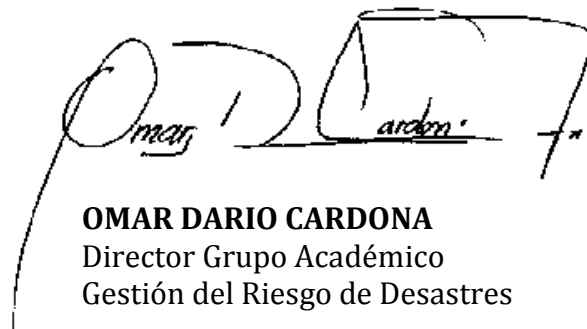
### Implementation:

The ICoE on Understanding Risk and Safety will be headed by the Director of the Disaster Risk Management Task Force (Dr. Omar-Dario Cardona). It will have a 3-5 person international advisory board to be established in consultation with the IRDR Scientific Committee, the UNGRD and the IDEA of National University of Colombia. At least two of the members of the advisory board would be from Latin America and the Caribbean and represent other relevant DRM institutions; and at least one member will be from the IRDR Scientific Committee. In this way, the advisory committee will be linked to both regional and international research efforts as well funding sources. If approved ICoE:UR&S can be fully supported, staffed, and operational immediately.

Yours sincerely,



**FREDDY LEONARDO FRANCO I.**  
Director IDEA  
Universidad Nacional de Colombia



**OMAR DARIO CARDONA**  
Director Grupo Académico  
Gestión del Riesgo de Desastres