**Inputs provided by:** *(please provide the name of your organization)*

1. **General description of mandates and objective(s) of your organization / associated network with institutional structure**

*(Please provide information on organizational mandates and objective(s) of the organization / associated network with organizational/institutional structure, as explicitly and/or implicitly relevant to addressing loss and damage associated with climate change impacts, including extreme weather events and slow onset events. Please feel free to expand the boxes as needed throughout the template. )*

The IRI works to understand the climate and its impacts, collaborating with governments and development organizations to design and implement policies and practices that help build more resilient societies. Our vision is to foster climate-smart and broad adaption goals through effective development and use of climate information targeted towards decision making and risk management. As a globally recognized climate research institute and a science partner in development projects, the IRI engages in specific decision and policy-making contexts such as agriculture, forestry, food security, insurance, water management, health, and disaster risk management. In all of these areas, IRI has developed strong partnerships at the global, regional, and national scale. The Institute has a comprehensive approach to climate risk management, which includes collaborating with stakeholders to identify development and humanitarian climate-related problems, developing actionable climate information to address these challenges, tailoring the information in formats that can be easily understood and readily used by end-users, and developing adaptation tools that integrate the information to transfer risk from vulnerable communities.

Understanding and preventing loss and damage is an underlying component of IRI's mission. By pushing forward the boundaries of climate science and the capability to better understand, anticipate, and manage climate risks and opportunities IRI and its partners are working to address loss and damage associated with climate change impacts, including extreme weather events and slow onset events.

2. **Relevant operational framework(s)**

*(Please provide information on the relevant operational framework(s) (e.g. programming principles, resource allocation strategies, coordination mechanism for operations at different levels etc.) within your organization/associated network as relevant to implementing work related to risk management for loss and management associated with climate change impacts)*

We work with a variety of partners (e.g. bilateral organizations, UN agencies, national meteorological services) and through existing frameworks to provide the scientific and technical expertise needed to address real world practical problems. This work is guided by the needs of our partners in various sectors including, agriculture, food security, natural resources management, disasters risk management and public health. Through these collaborations IRI helps design risk mitigation, adaptation and transfer processes, including mechanisms such as index insurance.

3. **Focus areas of risk management for loss and damage associated with climate change impacts**

*(Please provide information on the areas of work in relation to the items included in decision 3/CP.18 as listed in the introductory note as well as any additional focus areas, that your organization/associated network has been mandated to address. These could include relevant institutional policy statements/operational guidance documents etc. Please provide web links where further details can be found.)*

COP Decision 3/CP.18 identifies a range of undertakings to enhance action on addressing loss and damage. IRI and its partners are involved in all of these areas through a wide range of collaborations and activities. Components b), c), d) and g) are most closely aligned with our outputs and are described in further detail below. In the areas where IRI does not directly work, we collaborate with our partners to strengthen their abilities to engage in these efforts. This includes providing a strong science foundation for better understanding the climate and its impacts, as well as developing the human capacity to connect climate information with practical applications on-the-ground.

b) Identifying options and designing and implementing country-driven risk management strategies and approaches, including risk reduction, and risk transfer and risk-sharing mechanisms:

IRI helps people address climate risk through financial tools like index insurance and index-based disaster risk management. Through our partners, collaborators, and capacity building activities, we are engaging the players necessary to build community driven solutions. IRI projects have broken boundaries in bringing insurance to populations believed to be unreachable, due to poverty or technical issues, leading to extremely popular products with demonstrated impacts and overwhelming demand, often scaling by an order of magnitude each year. We have worked in over a dozen countries on hundreds of index contracts with many tens of thousands of policies purchased by farmers. For many years, we have partnered in exploring the potential for using index insurance in developing countries to assist emerging markets, increase the productivity of smallholder farmers, and reduce the threats from climate risk. Through our work on index insurance for climate adaptation and poverty reduction, we have unlocked many of the key constraints for index insurance to be able to meaningfully address poverty at large scales, overcoming what have previously been considered impossible hurdles in technology, information, poverty levels, and farmer involvement using a strong science base, cooperative design and validation, and strategic integration into adaptation and development packages.

(Please also see section d) below for examples of our work in Early Warning/Early Action and other risk reduction approaches.)

Examples include:

- R4 Rural Resilience Initiative in Ethiopia/ Horn of Africa Risk Transfer for Adaptation (HARITA): A climate change resiliency and development project that focuses on designing a scalable risk management package for low-income farmers in Ethiopia, including weather index insurance based on satellite rainfall data. R4 Ethiopia has scaled up from 200 farmer households in 2009 to over 19,000 in 2012. In October and November of 2012, satellite data triggered payouts to more than 12,000 farms in Ethiopia, putting this type of index insurance and the scaling up process to its largest test to date. http://www.climate-services.org/content/r4-rural-resilience-initiative-ethiopia

- USAID supported Climate Resiliency and Index Insurance (CRII) project in the Dominican Republic: IRI is working with local partners such as REDDOM to systematically engage with farmers to identify resiliency opportunities and strategies for linking insurance to development and adaptation goals.

IRI also supports disaster risk management strategies through index-based tools. Building upon successful work we have done in West Africa on floods and in the Caribbean on hurricanes (with groups such as the Red Cross), IRI collaborates with local experts and decision-makers to develop climate thresholds for action. These thresholds enable the development of a decision support tools, customized for specific end-users, in which a set of pre-determined actions are established to be triggered by various levels of forecast information.

Examples include:

- Building the Capacity to Manage Water Resources and Climate Risk in the Caribbean: A partnership between the University of the West Indies' Centre for Resource Management and Environmental Studies (CERMES), the Caribbean Institute for Meteorology and Hydrology (CIMH) and three institutes of Columbia University: IRI, Columbia's Water Center (CWC), and the Center for New Media Teaching and Learning (CCNMTL) to developing effective strategies to manage climate- and water-related risk for development gains in the region. This project focuses on improving the translation of climate information into actionable information through the use of index-based tools.

c) <u>The systematic observation of, and data collection on, the impacts of climate change, in particular slow onset impacts, and accounting for losses, as appropriate:</u>

IRI is developing and mainstreaming new climate services that inform decision-making and assist vulnerable countries and communities to anticipate, plan for, and effectively respond to impacts associated with climate change. Working through partnerships, IRI is creating opportunities to improve climate risk management by advancing climate science -- including forecasting on seasonal and sub-seasonal timescales, decadal-scale climate change and variability, real-time climate monitoring, and tailoring of climate information to specific user needs. The IRI's Climate Program is a center of expertise in the development and communication of forecasts, monitoring, historical analyses and other climate-information products. We design these products in collaboration with our partners to meet the needs of local decision makers and others who work in sectors such as agriculture, water resources and public health.
IRI has proven experience:

- Developing and validating coupled and uncoupled GCM prediction systems
- Developing and undertaking comparative evaluation of downscaling methodologies, including high resolution regional models, in support of demonstration activities
- Improving forecast verification methodologies with emphasis on demonstration regions
- Developing statistical techniques and tools that combine, downscale and tailor global model outputs (includes weather statistics and daily sequences)

- Advancing methods to characterize historical decadal variability; assessing information content from initialized dynamical predictions at decadal scale; experimental near-term climate projections
- Developing layered forecast information products for climate across scales of seasons to decades.
- Analyzing physical mechanisms of observed and modeled climate variability, predictability and change, for demonstration projects
- Advancing climate risk simulation tools (seasonal-interannual - multi-decadal)
- Developing decision support systems for agriculture, flood management, reservoir operations and epidemic early warning

Examples include:

- The Climate Predictability Tool (CPT): specifically designed to assist National Meteorological Services to produce their own tailored, downscaled seasonal climate forecasts, either using global datasets (such as sea temperature measurements) or dynamical model outputs from the WMO's Global Producing Centres.

- Farmers in Senegal use Climate Information to Combat Risk: In Senegal, the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), the Senegalese National Meteorological Agency, the country's agriculture extension service, IRI and many farmers groups, are working to equip farmers with the information needed to better manage droughts and other climate risks: http://irithree.ldeo.columbia.edu/news/farmers-in-senegal-use-forecasts-to-combat-climate-risks/

d) Implementing comprehensive climate risk management approaches, including scaling up and replicating good practices and pilot initiatives:

As mentioned throughout this document, the IRI works in response to development organizations and government demands and needs. Our work engages processes that are geared toward scaling and ultimately at serving societies. In order to achieve scale and to build capacity in our partner institutions we are proactive in the transfer of our technology and knowledge. IRI also works to develop information that meets the specific decision making needs of our development and humanitarian partners. Most of our work is based in long-term relationships with our institutional partners.

Additionally, we work through mechanisms like the Climate Services Partnership to evaluate and understand good practices and to disseminate these broadly (www.climate-services.org)

Examples include:

- IRI-IFRC Partnership to Save Lives: a partnership with IFRC in the use of climate information to enhance IFRC's national and regional offices' capacity in effective early warning-early action to minimize the effects of weather- and climate-related natural disasters. Through this partnership the IRI tailors weather and climate information for the disaster risk management

community and has developed strong partnerships with humanitarian agencies, enabling identification and development of decision-relevant information, and building of capacity to use that information. http://www.climate-services.org/content/climate-information-disaster-management-and-decision-making-iri-ifrc-partnership

- Climate Services Partnership: IRI leads the Secretariat and is an active member of The Climate Services Partnership (CSP), a platform for knowledge sharing and collaboration aimed at promoting resilience and advancing climate service capabilities worldwide. The Climate Services Partnership works to improve climate-smart decision-making in a range of contexts. As part of this effort, the CSP identifies, promotes, and fosters the establishment of effective policy and good practices. The CSP also supports engagement and communication among climate information providers, decision-makers, and policy communities, thereby furthering the extent to which climate information can contribute to improved development outcomes. http://www.climate-services.org/

g) Enhancing access to, sharing and the use of data, at the regional, national and subnational levels, such as hydrometeorological data and metadata, on a voluntary basis, to facilitate the assessment and management of climate-related risk:

The IRI Data Library is a vital global public good that serves as a point of access and means of understanding climate and social science metrics to facilitate the assessment and management of climate-related risks. It offers free access to hundreds of high-value datasets and provides the tools and training to perform analysis and inform decisions. The Data Library compiles raw climate, geophysical, health and agriculture data from numerous providers and formats into a common framework that makes powerful cross-disciplinary research and analysis possible. This process can revolutionize the way individuals and organizations approach their work by providing access to accurate and actionable data in planning, research, and governance. This platform is currently  Over the last year, over 211,000 unique visitors, from almost every country in the world, have accessed this tool.

The Data Library is unique in the breadth and depth of its data, as well as for its flexibility to serve as a platform for users to build up their own services and programs. More countries are adopting its underlying technology every year as a platform to make their own information public and usable.

Examples include:

- Enhancing National Climate Services (ENACTS): A partnership between IRI, the Ethiopian MNA and the University of Reading utilizes the Data Library to improve data availability, access and use in Ethiopia. The Ethiopian NMA is now hosting this this technology on its own server, using it to share data and filling gaps in existing climate observations. A suite of open-access climate products and tools are also available through the Ethiopian NMA server and aim to support decision making in climate-sensitive sectors (with a strong focus on public health). http://www.climate-services.org/content/enacts-ethiopia-partnerships-improving-climate-data-availability-accessibility-and-utility

- Data Library Map Rooms: designed for rapid access to needed information for particular user groups, allow users to select and manipulate certain variables to create custom spatial

visualizations of regions, timeframes, and subjects of interest. (http://iri.columbia.edu/data/maprooms)

### 4. Geographic coverage

Since IRI's work is targeted around the project and policy needs of its partners, the geographic scope of the institution tends to be driven by these engagements. Our partners work at the global (e.g. Red Cross Red Crescent Climate Centre), regional/sub-regional (e.g. African Center of Meteorological Applications for Development (e.g. ACMAD)), national (e.g. Indian Meteorological Department) and sub-national level (e.g. Relief Society of Tigray (REST)), with some of our work being piloted in local communities. IRI typically supports activities in developing countries, including for example countries such as Ethiopia, Senegal, Indonesia, India and Uruguay. Regions such as West Africa, East Africa and the Southern Cone of South America have also been a focus of our collaborative work.

### 5. Key stakeholders

Collaboration with stakeholders is vital to IRI's work and is at the heart of our engagement in practical problems. We work in partnership with organizations to address real development and humanitarian problems. Partners give us context for our work. IRI has significant existing engagements with the following organizations, together working to help societies minimize the impacts of loss and damage:

Bilateral organizations (e.g. USAID, IFAD), UN agencies (e.g. WFP, WHO, UN ILO, FAO), humanitarian organizations (e.g. IFRC, Red Cross Red Crescent Climate Centre, Oxfam America), financial institutions (e.g. World Bank, Swiss Re), national government agencies -- including national meteorological agencies (e.g. Ethiopian NMA), research and climate institutions, (e.g. NOAA, WMO, AGRHYMET Regional Centre, CCAFS), local universities (e.g. Bogor Agriculture University Indonesia, Universidad Nacional Colombia)

### 6. Implementation modality / delivery mechanisms

In order to better understand and reduce the impacts of climate change, IRI takes advantage of preexisting structures, institutional arrangements, and experts in different climate-related sectors, and fosters interactions. IRI engages through specific key institutional entry points, in-region, in order to collaborate directly with stakeholders to identifying relevant climate-related issues, and inform and deliver actionable information. In order to enable effective communication of climate information and its incorporation in decision-making, planning and policies IRI makes use of existing networks.

IRI works to build the capacity of stakeholders to address climate risk management and development challenges. IRI's capacity building processes is focused on maintaining a two-way dialogue with end users to capture and share institutional knowledge through participatory processes and trainings. This process has helped clearly identify what information matters to end users, which has in turn driven IRI's own scientific process. Engaging users in the initial and subsequent discussions has also

cultivated a sense of trust between IRI and the organizations and individuals it works with, enabling maintenance of long-lasting partnerships. The benefit of such partnerships is a better tailoring and reception of IRI's knowledge, data, tools and products, as well as enhanced application of information towards decision-making.

The Data Library as described in section three, under component g) is also a key implementation mechanism.

Please provide information related to the technical, financial and institutional support mechanism

IRI is funded through a compilation of university funding, grants and gifts. Primary funders include the US Agency for International Development, the CGIAR, the US National Oceanographic and Atmospheric Administration, and several United Nations agencies including (WMO, ILO, and the WFP).

Please provide information related to reporting, if any

**7. Key activities / outputs to date**

Overview of projects, by location: http://irithree.ldeo.columbia.edu/our-projects/

Index insurance in action: *Poor Ethiopian Farmers Receive "Unprecedented Payouts*: http://irithree.ldeo.columbia.edu/our-projects/

Seasonal climate forecasts: http://irithree.ldeo.columbia.edu/our-expertise/climate/forecasts/seasonal-climate-forecasts/

Recent publications: http://irithree.ldeo.columbia.edu/resources/publications/

**8. Any additional information and contact details**

IRI is part of the Earth Institute at Columbia University in the City of New York.