出國報告（出國類別：國際會議）

赴義大利佛羅倫斯參加「貝蒙論壇-跨國政府科技組織第一次範疇工作會議與執行委員會」報告

服務機關：科技部
姓名職稱：廖宏儒助理研究員
派赴國家：義大利
出國期間：106 年 6 月 3-10 日
報告日期：106 年 9 月 4 日

摘　要

近幾十年來，世界各國已經充分認知到自然災難帶來的破壞性後果。相關國際架構及倡議活動逐步將跨學科科學與利益相關方的知識結合起來，以有效地管理減災。Belmont Forum Collaborative Research Action Scoping Workshop (DR3)匯集來自國際災害研究和利益相關者的代表，以及對災害風險研究和管理投資感興趣的資助組織(計劃)成員，藉由議題討論，凝聚各方共識，研擬預計於 2018 年啟動的“減少災害風險和抵禦能力(DR3)”合作研究行動之共同主題和優先事項。

本次會議我國代表除陳于高前司長（現職國立臺灣大學地質系教授）與筆者代表科技部與會外，另有災害防救領域專家學者一同與會，包括國立成功大學副校長陳東陽教授、國立臺灣大學土木工程系謝尚賢教授（兼行政院災害防救應用科技方案執行秘書）、行政法人國家災害防救科技中心主任秘書李維森研究員、國立臺灣大學土木工程系謝其泰博士等人，一同為我國在防災科技上的努力成果向國際發聲。

目　　次

壹. 緣起及目的

臺灣地小人稠，位處菲律賓海板塊與歐亞板塊交界的活動帶上，地震發生十分頻繁，又四面環海，位處太平洋西岸，在颱風即有可能侵襲的路徑上，時常面臨颱風與地震所造成的多重威脅。根據世界銀行發行之 Natural Disaster Hotspots- A global risk Analysis (2011) 指出：全球約 25%陸地人口比率面對 1 項以上的天然威脅，但在臺灣，約 90%陸地人口比率面對 2 項以上、73%陸地人口更是面對 3 項以上天然災害威脅，堪稱是天然災害高風險地區。在歷經多次的大型天災後，我國目前防災的是以「遠離災害、躲避危險」為最高指導原則，在無法改變環境的態勢下，除提升預警與監測的科學技術與研究外，平時就需掌握地質、水文、大氣、天氣、氣候、海洋等環境的基本資料與監測變異，以預防與避免災害造成國人生命財產的威脅。另外災害防救具有國際性與區域性，區域型災害的經驗可提供鄰近類似條件的國家作為以後的防救災參考，並可連接國際，以模組式推廣經驗。

近幾十年來，全球社會已經充分認知到自然災難帶來的破壞性後果。相關國際架構及倡議活動逐步將跨學科科學與利益相關方的知識結合起來，以有效地管理減災。Belmont Forum Collaborative Research Action Scoping Workshop(DR3)匯集來自國際災害研究和利益相關者的代表，以及對災害風險研究和管理投資感興趣的資助組織(計劃)成員。目標是確立預計於 2018 年啟動的“減少災害風險和抵禦能力(Disaster Risk, Reduction and Resilience, DR3)”合作研究行動之共同主題和優先事項。首屈一指的防災學研單位現在所關注的最新議題與災害的主要研究領域以做為學門規劃的參考。「他山之石，可以攻錯」以期學門未來的規劃研究課題更能兼顧本土化與國際化，使未來的防災科學技術研究能在世界上居於領先地位。

貳、出國行程與過程

一. 地點與行程

地點：**義大利(佛羅倫斯)**

二. 行程

日期	地點	行程
106.6.3 (六)	臺灣(桃園)-德國(法蘭克福)	去程
106.6.4 (日)	德國(法蘭克福)-義大利(佛羅倫斯)	去程
106.6.5 (一)	義大利(佛羅倫斯)	會議
106.6.6 (二)	義大利(佛羅倫斯)	會議
106.6.7 (三)	義大利(佛羅倫斯)	會議+Field Trip
106.6.8 (四)	義大利(佛羅倫斯) - 德國(法蘭克福)	會議+返程
106.6.9 (五)	德國(法蘭克福) -臺灣(桃園)	返程
106.6.10 (六)	臺灣(桃園)	返程

三、會議情形 Belmont Workshop – Disaster Risk, Reduction and Resilience (DR3)

貝蒙論壇(BF, Belmont Forum)前身為國際全球變遷政府間聯合基金會(IGFA, The International Group of Funding Agencies for Global Change Research)，於 2014 年 10 月，貝蒙論壇與 IGFA 合併，會員為國際間推動全球變遷研究之各國補助機關或法人機構，宗旨為有效支援及規劃全球變遷相關研究。科技部於 2015 年成為論壇正式會員，是我國於國際事務可以對等身份與會之國際性大型科學組織之一，聯絡人為科技部自然科學與永續研究發展司司長（因職務調整，現由前司長陳于高教授續其任務）。

貝蒙論壇之推動方式以各會員國補助其本國學者研究團隊的研究經費為基礎，進行多邊協議研究行動方案之推動(Collaborative Research Actions; CRA)，主要研究課題著重於全球變遷及永續發展議題進行相關跨國 CRA 實質合作的推動，每年以推動 2-3 CRAs，並於每年大會中評估與討論新提的 CRAs，以及目前正在進行中的 CRA，我國目前亦成立計畫辦公室並積極參與多項 CRA，推動實質參與及共同領導的 CRAs 及 ERANET 包含: 資訊基礎建設和資料管理、永續都市全球倡議(SUGI)糧食-能源-水鏈結。保持關注的 CRAs 則有: (1) 永續轉型; (2) 生物多樣性與生態系統服務情境-II；(3) 永續海洋跨領域研究; (4) 災難風險減少與韌性。同時，自 2015 年貝爾蒙論壇亦積極與新一代國際永續科學計畫-未來地球(the Future Earth)進行合作與分工。我國科技部自然科學與永續研究發展司積極參與及瞭解相關活動，以及國際全球變遷研究。

圖 1. 參與貝蒙論壇組織的國家一覽，我國以科技部參與（取自官網 http://www.belmontforum.org/）

本次 Belmont Workshop(DR3) 會議之具體目標是在 2017 年 6 月之前，定義國際合作研究行動(CRA)並制定與貝蒙論壇相對應的優先事項清單(研究領域/議題)，以利在年底貝蒙大會（預定在）通過徵求建議書來實現優先事項(也就是制定方案)。本次會議為年底貝蒙論壇研討會之議題研擬暨規劃籌備會，擬提出的 DR3 是以 Risk 為基礎延伸到 Reduction 及 Resilience。目前規劃計畫執行時間為 4 年，主軸應以整合及落實為基礎，引入國際(區域)整體思考並加入臺灣在地災防經驗，未來應以長期永續及系統性為目標。

我國為此次 DR3 論壇會議議題起草與主辦單位之一，除陳于高前司長（現職國立臺灣大學地質系教授）與筆者代表科技部與會外，另有災害防救領域專家學者一同與會，包括陳東陽教授（國立成功大學副校長）、謝尚賢教授（國立臺灣大學土木工程系教授/行政院災害防救應用科技方案執行秘書）、李維森博士（行政法人國家災害防救科技中心主任秘書/研究員）、謝其泰博士（國立臺灣大學土木工程系教授/行政

院災害防救應用科技方案）等。

本次會議包含 3 場 Keynote 演講、3 場議題式討論、1 場分組討論及現地參訪。6 月 5 日下午會議正式揭開序幕，首先進行第一場 Keynote 演講，主題為 Global overview on developments and progresses of the Disaster Reduction Risk, and Resilience，主持人為陳于高教授及 Antonello PROVENZALE 先生，演說題目分別為由 Dr. Hassan VIRJI 所分享的 Disaster Risk Reduction and Resilience: essential ingredients for Earth System Sustainability，以及 Dr. Fausto GUZZETTI 所發表之 Issues and Challenges in Forecasting Natural Hazards。隨後進行 2 場議題式討論，主題分別為 scientific advances in the identification and assessment of disaster risk (DR3 theme 1)及，examples of inter- and intra-disciplinary collaboration on disaster reduction (DR3 theme 2)，其中陳于高教授擔任 DR3 theme 2 之主持人。

首場的專題演講是由 Dr. Hassan VIRJI（the director of the Global Change System for Analysis, Research and Training, START）演講 Disaster Risk Reduction and Resilience: essential ingredients for Earth System Sustainability，

Hassan VIRJI 博士在演講中強調，鑑於地球系統科學在轉型變革時期面臨的複雜挑戰，對現實世界的問題解決有一種新的緊迫感和壓力感。這些挑戰包括在有限的地球界限內為地球人口提供食物，重視和保護自然界的服務和生物多樣性，向低碳社會轉型，適應更溫暖更城市的世界。他表示，自然科學和社會科學的科學學科將不得不相互協作，並與相關的社會團體進行合作，以確定重要的綜合問題，共同探索成功實現全球可持續發展的途徑。這種整合是一個反覆的過程，其中涉及所有利益相關者的反思。

第 2 個演講是 Dr. Fausto GUZZETTI 所發表之 Issues and Challenges in Forecasting Natural Hazards，講者提到從科學的角度來看，預測自然災害本身就是一項艱鉅的任

務，每一個特定的自然威脅都有許多複雜的特徵。但最大的挑戰之一是危害機率預測，因為這很少有一個清晰連貫的機率框架。恰當的機率框架的定義不僅是一個哲學問題，而且具有巨大的科學含義。例如，客觀數據和模型的合理化，主觀專家意見的預測/危害模型，或者對獨立數據進行有意義的測試的可能性，都不能做任何形式的的機率框架。相反，預測和自然災害評估是基於不連貫機率框架的，這種機率首先被認為是信度程度，然後被用作測試模型的頻率。從實際角度來看，機率預測對決策者提出了嚴峻的挑戰。 在不確定情況下作出決策意味著不可能做出與事後相同的決定。講者認為沒有「正確的」或「錯誤的」決定，而是「合理」或「不合理」的決定。這可以通過適當的方式實現定量預測和理性決策程序。講者在地震和火山情境下，強調需要在整個決策過程中闡明合作夥伴的角色和責任。這種區分允許所涉及的每個合作夥伴保護其具體評估的完整性，並建立清晰的、合理和可審計的決策協議，另外必須充分合理和道德地使用科學訊息來降低社會風險是非常重要的。

演講之後進行 2 個討論主題，主題 1 是對於災害風險的確認和評估科學上進展（scientific advances in the identification and assessment of disaster risk），主題 2 是跨學門和跨學科的減災合作的例子（examples of inter- and intra-disciplinary collaboration on disaster reduction）這 2 個議題主要是與會各國的專家學者，就科學對於災害評估的方法與理論發表意見並進行討論，此會議是採開放式討論，會中並沒做成結論。

6 月 6 日上午進行第二場 Keynote 演講，主題為 Broader spectrum for DR3 implementation with government, scientific community, NGOs, citizens, …，主持人為陳于高教授。演說題目分別為由李維森主任秘書演講「Smart Preparedness and Capacity Building for Enhancing Regional Disaster Resilience」，以及 Mr. Salvano BRICENO 以「現階段對於降低災害風險的挑戰（Current challenges on Disaster Risk Reduction）」為題進行演講分

享。

李維森博士的演講提到臺灣位處世界高災害風險區，每年遭受的災害不計其數，尤其近幾十年來面對各種災害（颱風、洪水、地震、土石流等單一種類或複合式災害），從各種災害中政府與民間記取教訓，並發展臺灣在地的防災與救災模式。講者介紹臺灣曾發生的主要各類型災害，對與會各國專家來說皆感到不可思議，另外提到我國所推動的「災害防救應用科技方案」，將防災科技落實到民生應用，對於確實降低災害損失，各國代表均多所讚賞。

Mr. Salvano BRICENO 演講之 Current challenges on Disaster Risk Reduction，則介紹目前世界各國的防減災面臨的挑戰，並以聯合國推動的兵庫行動綱領和 2015 年的仙台宣言為起點。自 2005 年以來，各國一直通過兵庫行動綱領來應對這一挑戰，該綱領主要目標在 2015 年時將大幅減少各國和社區的生命和社會，經濟和環境資產的災害損失。這個演說對於兵庫行動綱領的背景下如何管理災難風險的理解，以及政府面臨的挑戰和問題，也讓大家面對自己的機會。災害風險管理降低不確定性，增強人們信心，降低成本，創造價值。認識現在風險管理需要轉化為 2015 年後新的減少災害風險框架中更系統的方法 2015 年 3 月在日本仙台被聯合國會員國採納。加強的災害風險管理政策指標提供了及時指導，以支持 2015 年後減少災害風險之綱領（即仙台綱領）。

隨後進行第 3 場議題式討論，主題則為 Actions through co-designing, coworking and co-implementing among key stakeholders to build disaster resilience (DR3 Theme 3)，主持人為 Dr. Hassan VIRJI，我方代表成功大學陳東陽副校長及台灣大學謝尚賢教授於討論中提出我國政府在面臨天災時之因應對策及後續做為，並將推動「行政院災害防救應用科技方案」的產官學鍊結的經驗與國際友人分享，亦獲得與會成員的肯定。

6 月 6 日下午進行第三場 Keynote 演講，主題為 To accelerate DR3 for accommodating various demands of disasters: Natural, Technological, Social，主持人為 Hiroshi TSUDA（津田博司）。演說題目分別為由 Dr. Mikiko ISHIKAWA（石川幹子）所分享的 Lessons learned from Great East Japan Earthquake in 2011 ~ Restoration Process & Roles of Multi Stakeholders，以及 Dr. Fumiko KASUGA（春日文子，日本 Future Earth 全球中心主任）所發表之 Risk, Life and Science。

石川幹子博士是日本中央大學人間總合理工學科教授，她以 311 東日本大地震為範本，分享日本從這次大地震災後恢復過程中，各方參與的相關利益者的角色。她提到民眾、科學家、政府、企業在這次大規模災難中，在災後的投入、公部門與私部門的共同合作經驗，使得日本快速從災難中恢復，科學界與業界也提升之後地震海嘯的預警技術。

春日文子博士是日本 Future Earth 全球中心主任，她以全球變遷、永續發展的角度分享如何面對現今全球天氣變化急遽的環境下，對於災害與全人式永續發展、公共衛生、健康的鍊結議題進行分享，並以日本當地為例，原本是高危險與高污染區，以公民參與並透過科學家的進駐研究，提供資料和證據給政府，並喚起民眾的自覺，使環境、民眾與工商業達到平衡，達到永續發展的目標。

隨後進行分組討論，主題為 Science Priorities to explore opportunities and gaps related to DR3。本次會議的目的在於凝聚共識，以利後續推動防災國際合作之議題，因此各國代表就科學上的重點議題進行發表包括地震、颱風、颶風、豪大雨等天然災害，甚至包括人為災害亦有專家發表看法。另外因為各國的經濟條件不同，可投入的資源亦有所差異，對於各國可能的合作方式大家也提出看法。

分組討論結束後隨即由主辦單位安排 Palazzo Medici Riccardi, Exhibition of the 50th

anniversary of the flood in Florence “La bellezza salvata”參訪。謝尚賢教授也針對該議題以 Institutional Implementation on Solution-based Disaster Risk Reduction 為題，以臺灣學界的實際作為，對與會的國際友人說明我國學界對於防減災的研究與貢獻。

6 月 7 日上午進行前日分組討論之成果發表，以及前述活動之建議與提問時間。下午則針對後續國際合作研究行動(CRA)及制定貝蒙論壇相對應的優先事項清單(研究領域/議題)進行討論，並確立時間表，以利年底貝蒙論壇之舉行。

本次會議亦安排 Field Trip，到 Palazzo Medici Riccardi, Exhibition of the 50th anniversary of the flood in Florence “La bellezza salvata”參訪。回溯至上世紀（1966 年的 11 月 4 日），當時義大利發生洪災，阿諾河的水位因暴潮上漲到創紀錄的 1.94 公尺，造成多人喪生且大量古蹟及藝術作品被毀。今年恰好為佛羅倫斯大淹水 50 週年，參訪的古蹟也保留當時淹水之水位高度線，另外還有以及許多受損之古蹟文物修復過程展示。

圖 2. 會場會議海報（具體呈現我國科技部 logo）

圖 3. 會議進行情形

圖 4.李維森主秘發表演說

圖 5. 謝尚賢教授發表演說

圖 6. 陳東陽副校長提出建言

圖 7. 陳于高教授與其他國家代表交換意見

圖 8. 災防科技中心李維森主任秘書分享我國災防經驗

圖 9. 分組議題討論

圖 10. 筆者與會議海報合影

參、心得與建議

本次參訪是筆者至科技部任職後與國內災防領域學者一同參加國際論壇討論會議，從以下幾個面向闡述本人此次參訪的心得與建議，供日後推動相關研究規劃之參考。

1. 防災學術研究本土化與國際化：

與國外機構合作，藉由國際合作，將自己開發的技術輸出至國外，除展現自己的研發能量外，重要的是將我國的災防科技研發成果推上國際舞台。藉由此次會議與國際其他國家進行交流，筆者覺得我國防災界的科學研究與成果之推廣工作與國際參與度仍有待努力。因此建議學門應扮演更積極得角色，至少將科技部補助的研究計畫，在不違反著作權與研究者的意願下，將研究成果提供給政府相關部門參考，另規劃在議題設定下，國內研究團隊進行跨域國際合作，透過此一合作平台，使我國防災的技術國際化，並居領導地位。

2. 防災課題的規劃應由地區連結全球性

目前我國防災科技透過科技部自然司防災學門進行基礎科研，和災害防救應用科技方案串連各部會的災防科技研發，已有效串連研究和政府施政與災害應變。而在跨領域的整合研究（例如跨地球科學、工程與社會科學，甚至結合 AI、IoT 最新科技等不同領域）是未來的發展目標。建議在進行學門發展規劃時，應確實將此設定為目標，透過重要議題設定，以主動規劃案方式進行跨域整合研究，尤其是自然工程科學與社會科學的合作，是學門未來應努力的目標。

3. 全面性防減災科研專責機構之設立

我國目前尚未建立一個能瞭解國內災防整體情況及與國際災防學術機構接軌之

專責單位，故無法直接性的與次區域、跨界和進行雙邊合作，以減少我國災害之風險。專責單位之設立目標為能夠積極參與「全球減災論壇」與區域性減災風險平台與主題減災性平台，經由定期評估有關於災害風險資訊政策、項目和投資之執行進度並分享實踐方法和相關知識，包括發展氣候議題、在適當時機下促進災害風險管理納入其他相關部門的整合等。區域性政府間組織在減少災害風險之區域性平台中應該扮演重要的角色等。而相關專責科研機構的建立可以有助於以下工作推動：1.加強對於全球災防研究變化之了解。2. 創建研究機會，培訓科學家及開發專業人員。3.以科學家和政策制定者，共同加強決策者對災防風險的理解。4.促進亞洲和太平洋地區之合作區域研究。

附錄：攜回資料

1. 議程

2. 討論議題

3.貝蒙論壇介紹

BELMONT FORUM

Scoping meeting CRA
'Disaster Risk, Reduction and Resilience – DR^3'

Agenda

Florence, Italy
Accademia dei Georgofili
5 – 7 June 2017

BELMONT FORUM

Schedule and Agenda

Scoping meeting CRA
'Disaster Risk Reduction and Resilience – DR^3'
5-7 June 2017, Florence, Italy

DAY 1: Monday, 05 June 2017

13.30 - 14.00 Registration

14.00 - 14.10 **Welcome Remarks**

CNR

14.10 - 14.30 **BF Introductions and CRA Process**

Co-chairs, Belmont Forum

14.30 - 15.40 **Global overview on developments and progresses of the Disaster Reduction Risk, and Resilience**

Based on decades of research and actions to promote and implement disaster risk reduction strategies, keynotes presentations at this workshop will provide comprehensive reviews and forward-look prospects through discussion of key issues, international agendas, global trends and recent progress. The talks will form the basis for the three-day meeting focusing on capacity building to fulfil gaps, goals and properties highlighted by the Sendai Framework for Disaster Risk Reduction 2015-20130 (SFDRR).

Session Lead: Yue-Gau CHEN / Antonello PROVENZALE

- Keynote Address (20 min): Dr. Hassan VIRJI, Emeritus START Director
  "Disaster Risk Reduction and Resilience: essential ingredients for Earth System Sustainability"

  Q& A (10 min)

- Keynote Address (20 min): Dr. Fausto GUZZETTI, Director of the Research Institute for Geo-Hydrological Protection
  "Issues and Challenges in Forecasting Natural Hazards"

  Q & A followed by overall discussion (20 min)

15.40 - 16.00 **Break**

16.00 - 17.00 **Assessing the Current Landscape 1: scientific advances in the identification and assessment of disaster risk (DR^3 theme 1)**

Session Lead: Prof. Fabio CASTELLI / Dr Fausto GUZZETTI

17.00 - 18.00 **Assessing the Current Landscape 2: examples of inter- and intra-disciplinary collaboration on disaster reduction (DR^3 theme 2)**

Session Lead: Yue-Gau CHEN

18.00 **End of Day 1**

DAY 2: Tuesday, 06 June 2017

08.30 – 08.45 **Recap of day 1 and welcome**

Yue-Gau CHEN and Silvia GIAMBERINI

08.45 – 09.55 **Broader spectrum for DR^3 implementation with government, scientific community, NGOs, citizens, ...**

"Best practices sharing" showcases what are the challenges and benefits, while implementing DR3 with engagement among relevant key stakeholders- scientists, decision makers, citizens, practitioners and NGOs. Values of DR^3 fall on broader-spectrum dialogues to formulate consensus and momentum for within the sessions, two speakers will give regional cases or achievements on DR^3 with participation of the whole society, including practices of cross-boundary collaborations and regional synergies on DR^3.

Session Lead: Yue-Gau CHEN

- Keynote Address (20 min): Dr. Wei-Sen LI, Secretary General at National Science and Technology Center for Disaster Reduction
  "Smart Preparedness and Capacity Building for Enhancing Regional Disaster Resilience"

  Discussion (15 min)

- Keynote Address (20 min): Mr. Salvano BRICENO, Science Committee Member, Integrated Research on Disaster Risk
  "Current challenges on Disaster Risk Reduction"

  Discussion (15 min)

09.55 - 10.30 **Break**

10.30 - 11.30 **Assessing the Current Landscape 3: Actions through co-designing, co-working and co-implementing among key stakeholders to build disaster resilience (DR^3 Theme 3)**

Session Lead: Hassan VIRJI

11.30 - 13.00 **Lunch Break**

13.00 –14.10 **To accelerate DR3 for accommodating various demands of disasters: Natural, Technological, Social, ...**

In the last decades, social environment, economic development, national and international politics, and dynamic characteristics of diverse hazards have reshaped the landscape of DR^3. For decision makers, scientists, engineers and practitioners, evidence-based tools for disaster risk, reduction and resilience (DR^3) are key momentum to push DR^3 agenda forward. This session, keynotes will highlight and identify common themes and priorities in consideration of existing or new-type impacts brought by different hazards.

Session Lead: Hiroshi TSUDA

- Keynote Address (20 min): Dr. Mikiko ISHIKAWA, Professor of Integrated Science and Engineering for Sustainable Society
  Title: "Lessons learned from Great East Japan Earthquake in 2011 ~ Restoration Process & Roles of Multi Stakeholders"

  Discussion (15 min)

  Keynote Address (20 min): Dr. Fumiko KASUGA, Global Hub Director – Japan, Future Earth Secretariat
  Title: "Risk, Life and Science"

  Discussion (15 min)

14.10 - 14.45 **Break**

14.45 - 16.45 **Roundtable Discussions: Science Priorities to explore opportunities and gaps related to DR^3**

- Subject Group A: Disaster Risk Reduction
  Chair: Yue-Gau CHEN, Rapporteur: Roel MARSMAN
- Subject Group B: Disaster Resilience
  Chair: Antonello PROVENZALE, Rapporteur: Susanna EHLERS
- Subject Group C: Disaster Response
  Chair: Maria UHLE, Rapporteur: Silvia GIAMBERINI / Elisa PALAZZI

17.30 Travel to Palazzo Medici Riccardi, Exhibition of the 50th anniversary of the flood in Florence "La bellezza salvata"

- Special guided tour from Professor Fabio CASTELLI, University of Florence

DAY 3: Wednesday, 07 June 2017

08.30-08.45 **Recap from day 2 and welcome**

Yue-Gau CHEN and Silvia GIAMBERINI

08:45–09.45 **Reports by Groups A, B, and C**

- Group A (15 min)
  Discussion (10 min)
- Group B (15 min)
  Discussion (10 min)
- Group C (15 min)
  Discussion (10 min)

09.45 –11.15 **Review of discussion, questions, and closing statements from experts**

11.15 –12.45 **Lunch break**

Closed meetings for interested funders and in-kind contributors to DR^3

12.45 – 13.15 **Review of CRA development process**

13.15 – 14.00 **Discussion of expert inputs, current international efforts**

14.00 – 15.00 **Funding priorities and programmatic outlook**

15.00 – 15.30 **Coffee break**

15.30 – 16.30 **Scoping of thematic objectives, potential award instruments, and timeline**

16.30 – 17.00 **Recap of closed meeting, election of TPO, outline of next steps and timeline**

- End of Scoping meeting CRA
"Disaster Risk Reduction and Resilience – DR^3" -

Dear participants in the Belmont Forum Scoping Workshop "DR3-Disaster Risk, Reduction and Resilience":

We thank you very much for your registration to the workshop and interest to take part.

The workshop will take place at the Accademia dei Georgofili in Florence, Logge Uffizi Corti (close to the Uffizi Museum), on June 5th – June 7th. Registration will be open beginning at 13:30 of June 5th.

Attached you will find the final agenda. The programme includes three discussion sessions:

DR3 theme 1: Assessing the Current Landscape 1: scientific advances in the identification and assessment of disaster risk

DR3 theme 2: Assessing the Current Landscape 2: examples of inter- and intra- disciplinary collaboration on disaster reduction

DR3 theme 3: Assessing the Current Landscape 3: Actions through co-designing, co-working and co-implementing among key stakeholders to build disaster resilience

PLEASE SEND ONE SLIDE / PAGE TO SILVIA GIAMBERINI (giamberini@igg.cnr.it) with short sentences or questions to be used by the session leads to initiate discussion before May 29.

LOGISTICAL INFORMATION:

Please read carefully the following important information and answer promptly (before May 29):

All participants need to CONFIRM THE FOLLOWING INFORMATION with **Silvia Giamberini and Assunta Donato: Giamberini@igg.cnr.it; assunta.donato@igg.cnr.it**

- Confirm your attendance, date of arrival and date of departure
- Communicate to us any dietary restriction
- Confirm if you are interested in either **joining the reservation(s) below** or **making your own dinner reservation for June 5th and June 6th** (at your own expense) We recommend booking ahead as good restaurants in the centre of Florence are usually busy. For those interested in joining the reservations below, we have negotiated a prix fixe menu with the restaurants on your behalf.

We have made some tentative reservations at the following restaurants:

June 5th: Restaurant Finisterrae: http://www.finisterraefirenze.com/?locale=en (Italian)

June 6th: Restaurant La Carabaccia: http://www.trattorialacarabaccia.com/ (traditional Florence restaurant)

[a] Confirm if you are interested to join the visit to the Exhibition "Beauty Saved" at Palazzo Medici Riccardi (see below for details)

EXHIBITION "BEAUTY SAVED": VISIT ON JUNE 6TH 2017 – 17.30 – 19:00

We are pleased to offer a guided tour to the exhibition "La Bellezza Salvata" (Saved Beauty):

Florence and Tuscany experienced a huge flood in 1996 that caused severe damages and remained stuck in the historical memory of the population.

Among the several damages, one has been the damage to the huge artistic heritage that Florence hosts.

As it was 50 years from the flood in November 2016, many events have been organized for celebrating this sad anniversary. One of this is an exhibition about the efforts to save paintings and other works and to restore them, called " la bellezza salvata" (saved beauty), hosted in an iconic palace of the Florence history and of the flood: Palazzo Medici Riccardi, which was the home of the Medici Family, the rulers of Florence that gave birth to Renaissance and that was heavily damaged during the flood.

More info about the exhibition here:

http://www.firenzeturismo.it/en/news-eventi-2/3049-beauty-saved-an-exhibition-in-florence.html

One of the most highly-anticipated exhibitions for the 50th anniversary of the flood in Florence (1966-2016) takes place at the Palazzo Medici Riccardi, and is entitled La bellezza salvata (Beauty Saved).

The choice of venue is no accident, because the Palazzo Medici Riccardi was the ***Museo Mediceo*** *in asmuch as it was the first city building of the family until November 1966, when it was completely destroyed due to the* ***flooding of the Arno****.*
The exhibition ***La bellezza salvata*** *goes back through the moments when everyone became aware of the damage caused to the artistic heritage by water mixed with fuel and mud.*

After the initial shock, the race to take the "first emergency" measures to save the damaged works and the volunteer work of so many young people from around the world to help Florence, was a time of intense action involving experts from a number of disciplines - scientists, art historians, and restorers who used every method to save the cultural heritage damaged in Florence.
The great tragedy of the wounded city became a time for exchanging knowledge, developing new techniques and growing toward excellence in the art of restoration.

The damaged works provided the school of restoration with the impetus to establish, in 1975, the higher education school of the Opificio delle Pietre Dure.
Bearing witness to this context is the exhibition curated by Cristina Acidini and Elena Capretti, through documents, historical photographs, paintings, sculptures, and books. Thirty institutions are represented, institutions whose cultural heritage was affected by the flood and that had to act in order to recover.

The exhibition also presents some works that have been waiting since 1966 to be restored.
As mentioned, the exhibition is housed in the museum of Palazzo Medici Riccardi, from ***December 1 to April 17****, delayed to July 2.*

*****************PLEASE ALSO TAKE NOTE OF THE FOLLOWING IMPORTANT INFORMATION*****************************

The Accademia dei Georgofili is an historical building, subject to some restrictions:

- It is not possible to leave the luggage in the lobby. The participants are invited to leave the luggage at their respective accommodations before the meeting and on the day of check out.

- Posters cannot be hung inside the Accademia premises.

- The wi-fi signal and the mobile phone signal are very low inside the building.

1. Background and Rationale

Disasters are the direct result of environmental events that are extreme or that have extreme impacts and that can negatively influence economic, health, infrastructure, social, and other systems. Bearing in our mind for long is how to deal with the disaster reduction since most of them are inevitable. In recent decades, through international initiatives, promotions, and frameworks our global society has had gradually learned to jointly manage the devastating consequences and fully acknowledged that disaster mitigation can be most efficiently managed by integrations of interdisciplinary scientific understanding with stakeholder knowledge. The Belmont Forum intends to support the co-development of science and stakeholder-based approaches to disaster risk evaluation and hazard prevention; therefore aims to accelerate the research momentum on risk reduction and resilience by again a joint call for proposals.

2. Main themes

a. To Assess and Reduce the Disaster Risk

Quantitative risk identification is a key to measure impacts of a disaster. It is also helpful in knowledge mobilization and communication between scientists and stakeholders for the risk reduction. Effective proxy (e.g. vulnerability) to evaluate the risk is urgently needed while considering multiple attributes of a disaster, which can be simply categorized into physical and social. Therefore, the new orientation for such a research subject will be considering not only the physical parameters but also the social ones. Also it should be approaches with multi-scales. The spatial coverage of a disaster is always crossing borders because it is generated by natural systems, no matter atmospheric or crustal. On the other hand, the time scale widely covers from seconds to hundred years or even longer if the disaster happening time and nurturing period are both considered. Therefore, the studies on disaster risk assessment and reduction are usually characterized by regional or global plus multiple time scales. Furthermore, to different stakeholders the central focuses for the risk differ. To develop an innovative and implementable technologies on risk reduction, an operable and flexible mechanism or institution to facilitate inter-disciplinary

collaborations and engage all stakeholders, is of essential to function as an interface connecting end-to-end demands and supplies for strengthening disaster management with scientific empowerment.

b. To Build up Disaster Resilience for Stakeholders

Disaster resilience is generally defined as the ability of different stakeholders in different sizes from individuals through communities to wider regions undertaking adaption or recovery from disasters or hazardous stresses with little influence on long-term prospects. It is therefore of multi-scale in temporal, spatial, magnitude, or even types of hazards. For any specific stakeholder it is necessary to set a goal to strengthen it through capacity building, education and awareness raise to cope with clashes brought by disasters. The useful information, however, has to be correctly identified to facilitate the disaster risk reduction. Based on the impact and vulnerability evaluation for each specific scenario, the route to build up disaster resilience usually can be clearly understood. In such a context not only scientific and engineering but also social approaches are all possible practices offering knowledge, technology and policy to meet challenges of disaster management and sustainable development.

c. To Have a Proper Disaster Response by the Aid of Scientific and Technological Actions

Disaster response is the managing phase during disaster happening. It contains all actions immediate before and after the disaster, which are considered as effective as to lower the damage and to prevent the further loss. There are a number of implements executed before and approved successful in risk reduction, such as early warning, evacuation, search and rescue, damage assessment, immediate/continuing aid, rapid restoration of vital infrastructure. All above are implemented by collaborations among scientists and governors, and different stakeholders. A key in there is the fast management on knowledge data, which consists of a few steps from nearly real-time data collection, to effectively communication, and to optimistically choosing action plan. However, if disasters and stakeholders are different, the data demands are different. For the purpose of rapid but correct responding a disaster, disaster impacts have to be simulated

forehand for each specific disaster and stakeholder based on modeled scenarios under many parameters, i.e., cultural, social, geographical, technological, economical, etc. By the assistance of ICT coupled with a well-prepared databank, most possible impact hence can be efficiently acknowledged during the disaster response

Knowledge-Action Network (KAN)
on Emergent Risks and Extreme Events
- Reducing Disaster Risks under Environmental Change –

Co-proposed by a drafting group from Future Earth, IRDR and WCRP
but not formally approved yet by those programmes

Motivation

Disasters, as the direct result of environmental events that are extreme or that have extreme impacts on economic, health, infrastructure, social, and other systems, including destruction of housing, triggering displacements, or economic losses, continue to rise both in developing and in industrialized countries. This is despite of the development of science and technology in detecting, understanding and predicting natural hazards, and in supporting preventative actions against disasters. There is a fundamental lack of understanding of integrated human, ecological, and physical processes shaping risk cycles cascades and feedbacks in the context of the anthropocene, and partly due to missing governance structures and legislation for emergent and complex risk.

Without better understanding of the root causes of risks, which are co-determined by social and physical system interactions, an opportunity will be missed to reduce risk through development, and break cycles of risk accumulation. Growing observed risk and losses are functions of unsustainable and inequitable development that increases exposure, vulnerability and reduces the scope for enhanced wellbeing as an outcome of disaster response and risk management. Breaking cycles of risk accumulation requires not only fundamental and action oriented science but science to be an active stakeholder in facilitating and contributing to policy processes at all scales on the risk-development nexus.

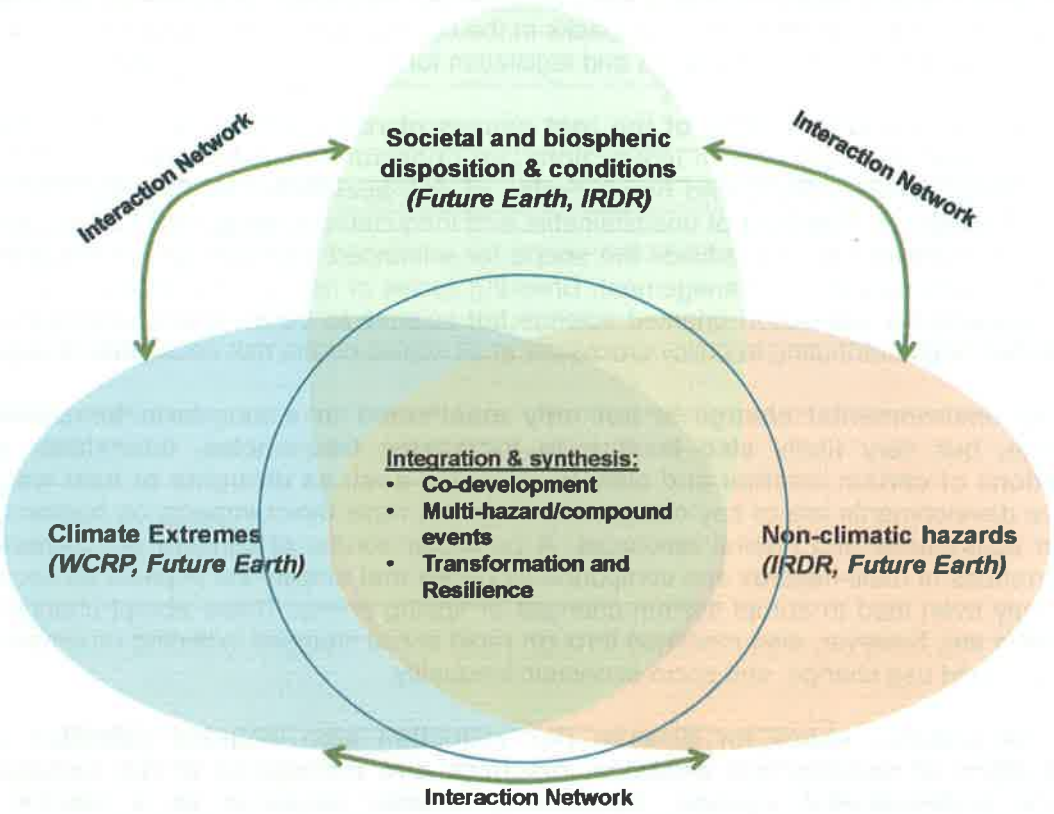
Global environmental change is not only manifested in a long-term temperature change, but very likely also leading to increasing frequencies, intensities, and durations of certain weather and climate extremes such as droughts or heat waves. These developments are of key concern, as they can have direct impacts on humans, or affect ecosystems and natural resources. A particular source of concern are increasing occurrences of multi-hazards and compound extremes that amplify the impacts on society, and may even lead to abrupt system changes or tipping points. These abrupt changes in societies are, however, also mediated through rapid social changes including urbanization, lifestyle, land use change, and socio-economic inequality.

The full solution space for disaster risk reduction also includes reflection and redirection of development priorities, practices and trajectories in the context of global environmental change. Recognising disaster causation as a function of development requires a fundamental reappraisal of the relationship between development, risk and risk management. Risks can only partially be managed through preparedness, response and recovery. This realisation is especially acute because of very complicated and cascade-shaped hazard impacts and risks emerging from existing development pathways. Globalised development pathways and global environmental change both expose local places to globalised processes masking simple cause and effect relationships and governance solutions for risk management.

To date, interventions continue to focus on single hazards and sectoral interventions. This contrasts with international agreements that recognise the grand challenge posed by systemic, complex and cascading risk. The Sendai Framework for Disaster Risk Reduction (SFDRR), the UN Sustainable Development Goals, UNFCCC Paris Agreement and New

Urban Agenda in particular are clear about the need for integrated work that can cut across policy sectors and scales. The international science community is connected to each of these agendas, for example through the UN Science and Technology Major Group and the IPCC process.

This Knowledge-Action Network (KAN) aims to define an interaction network between its partners and wider stakeholders to allow a structured integration and synthesis of expertise, professional and local knowledge to accelerate action on multi-hazard and compound events and so to support a transformation of development towards an equitable, sustainable and resilient future. The goal of reducing complex, actual and present disaster risk in an integrated manner requires a focused and dynamic scientific collaboration among multiple existing expert communities and with the stakeholders in the society. In this context, three ICSU programmes, World Climate Research Programme (WCRP), Integrated Research on Disaster Risk (IRDR) and Future Earth, are establishing a new KAN on Emergent Risks and Extreme Events.



Objectives of the KAN

- To build a global partnership and network of science excellence across disciplines to accelerate integration and synthesis for ground breaking and solution oriented research for disaster risk reduction and its governance under global environmental and societal change
- To jointly identify priorities and support complementarity of research on systemic risk including the interaction of climate-change induced extreme events and other disasters
- To explore and enhance the role of science as an active participant in transformation to sustainability and resilience through systematic research, facilitation and convening roles among diverse science communities and in collaboration with stakeholders

Working principles of the KAN

- Provide an open platform for scientific communities from across science disciplines and engineering working on extreme events and disaster risk reduction and governance under the ICSU programmes, to exchange information, knowledge and data, for co-development of research.
- Define scientific focus with key principles being added value and addressing key policy and practice knowledge needs that are not currently tackled by single one of the partner.
- Engage with societal actors from local/national/international policy communities, business sector, practitioners, civil society and UN frameworks to co-design research agendas and deliver new knowledge for effectively reducing disaster risks through partnerships and joint outputs.
- Stimulate groundbreaking and solution-oriented scientific research with major impact on the development of effective strategies for transitioning development from a risk accumulation to a risk reduction process..
- Follow a common risk framing and terminology across science and practice communities, if applicable, and make efforts to provide or generate the necessary data and knowledge to feed into those communities
- Address systemic, complex and cascading risk by synthesis of various scientific approaches and products, in addition to small-scale frequent disasters and large-scale geophysical and climate extremes, also in order to contribute to the Sustainable Development Goals.
- Support informed decision-making by multiple-actors seeking social-ecological resilience or transformation by enhancing understanding and prediction of and open data and knowledge bases for risk cycle and its management.
- Support societies seeking to transform development pathways through promoting and strengthening national platforms for disaster risk reduction, and so to contribute to the Sendai Framework for Disaster Risk Reduction (SFDRR).

Rationale for Collaboration

Each of the three co-proposing programmes brings a specific science orientation and community of practice. IRDR contributes a core focus on vulnerability and risk analysis from behaviours through to social sciences and a multi-hazard understanding of risk, it also brings close connections to UNISDR and through its International Centres of Excellence to nationally embedded action oriented research excellence. WCRP brings in extensive expertise and data resources on climate change, weather and climate extremes and other climate related hazards, and is contributing significantly to the IPCC assessment reports. Future Earth, having various research agendas and expertise including for instance various social sciences, environmental sciences, and the nexus of societal and environmental sciences, within Global Research Projects, Cluster Initiatives and KANs, stakeholder engagement, focusing on longer-term development and associated risk scenarios, a broader sustainability perspective to risk and vulnerability, provides open and interactive platforms for facilitation of collaboration, in particular through KANs. At the same time, every programme has also challenges, such as difficulties in prioritizing research themes, actualizing transdisciplinary researches by stakeholder engagements, and budget deficiencies, etc. Having foundation from Extreme Events and Environments – from climate to Society, E^3S scoping workshop in Berlin, Feb 2016 (http://www.e3s-future-earth.eu/index.php/ConferencesEvents/ConferencesAmpEvents), and through the first joint discussion meeting in Paris, Mar 2017, three programmes strongly believed that the

collaboration can complement the weaknesses but provide holistic understanding on the complex interaction among various hazards, emergent risks, and impacts on the society, effective and pragmatic solutions, and also opportunities of specific research agenda for the funders to support scientific activities for the society.

Strength in collaboration

By collaborating through the KAN, the programmes can

- cover wide range of scientific expertise and identify and fill the gaps which were not well recognized by single programmes
- provide integrative synthesis capacity across disciplines by a mix of inter-/trans-disciplinary expertise
- jointly engage and contribute to international stakeholders we have already
  - ➢ Future Earth: ISSC, UNESCO, WMO, UNU, SDSN, UNEP, Belmont Forum, STS forum, IPCC, IPBES and other Strategic Partners and Partners
  - ➢ IRDR: ISSC, UNISDR, SFDRR, Asian Ministerial Conference on Disaster Risk Reduction, and Partners
  - ➢ WCRP: WMO, UNESCO-IOC, IPCC, and Partners

  and through ICSU,
  - ➢ Union and National members, Regional Offices/Committees, Urban Health & Wellbeing and other Thematic Organizations, Monitoring and Observation systems, Data and Information related initiatives, and more international academic societies/partners
- share experiences and methodologies in research and stakeholder engagement, and regional and national structures
- share resources including secretariat supports and budgets in some of the operations
- coordinate outreach to funders they have in common (e.g. Belmont Forum)
- collaborate in capacity building of young researchers and professionals and also of the supporting national systems
- align and coordinate joint research agendas

Possible research agenda examples

- What are the expected serious potential impacts that might be caused by extreme events in the future across different societal sectors?
- What are the most important measures to understand and cope with the impacts and underlying vulnerability and hazard factors to achieve resilience and transformation of development pathways (including prediction, infrastructure, education, economic and social policy and disaster response etc.)?
- What are the largest obstacles to overcome_across and between sectors (lack of knowledge, lack of governance, etc.) in order to find and establish sustainable and just solutions?
- How are extreme events and impacts conceived by theory and policy?
- What kind of data needs urgent attention in order to better identify the factors and mechanisms that determine the location, intensity, and frequency of various extremes?
- What are meaningful indices to describe and quantify extremes, their impacts and transitions to more sustainable and just development pathways?
- How can science, research, teaching and learning be best positioned to support critical reflection and goal orientation towards more resilient and sustainable development pathways?
- How to incorporate knowledge into decision-making tools and wider governance

contexts to better deal with global systemic risks with unintended consequences?
- How can science and technology provide opportunities for innovation and economic growth in disaster risk reduction scenarios?

Initial leadership

- Future Earth
  - ➢ Cluster Activity "Extreme events and environments: from climate to society (E3S)" (Markus Reichstein, Dorothea Frank and Miguel Mahecha)
  - ➢ Global Research Project "Integrated Risk Governance (IRG) Project", but not limited and other projects will be invited in due time and steps
  - ➢ Secretariat coordinators (Thorsten Kiefer and Fumiko Kasuga)

- IRDR
  - ➢ Link to IRDR SC (Science Committee) members, NC (National Committees) and ICoE (International Center of Excellence) (Mark Pelling and Shuaib Lwasa)
  - ➢ Link to IRDR working groups: FORIN, DATA and RIA
  - ➢ Link to IRDR Young Scientist network
  - ➢ Feedback through science and other stakeholders dialogues at regional and global levels

- WCRP
  - ➢ Co-lead (Jana Sillmann) and co-chair (Sonia Seneviratne) of the WCRP Grand Challenge on Weather and Climate Extremes

Planning process to date

1. April 2017, Initiation meeting between Future Earth, WCRP, IRDR convened by ICSU with Belmont Forum participation.
2. 13-14 May 2017, Shenzhen, China, information sharing opportunity with IRDR and IRG.
3. 22-23 May 2017, Cancun, IRDR Science Committee and International Centres of Excellence support development of the KAN.

Planned steps and possible participatory occasions forward

1. Belmont Forum Scoping Workshop on D3R: 5-7 June, 2017 in Florence, Italy
2. ICSS International Conference on Sustainable Sciences: 24-26 Aug 2017 in Stockholm
3. Global Forum on Science and Technology for Disaster Resilience 2017, 23-25 November 2017, Tokyo, Japan
   - ➢ KAN Scoping workshop (possibility to be sought for)
4. Davos-Sendai World Bosai Forum (IDRC 2017): 25-28 November, 2017, Sendai, Japan
5. Establishing Development Team: from the end of 3rd to 4th quarter, 2017
6. WCRP/GEWEX Open Science Conference: 30 April – May 5, 2018, Banff, AB, Canada
7. WCRP meeting: May 1-3, 2018 in Barcelona
8. Preparatory development tasks: 4th quarter, 2017 to 3rd quarter, 2018
   e.g.
   - ➢ Elaboration of research agendas with stakeholders
   - ➢ Structuring collaboration across existing programmes/projects
   - ➢ Identifying stakeholders and engaging them
   - ➢ Developing fundraising strategies and governance principles

9. The Adaptation Futures meeting in Cape Town, 11-14 June, 2018
10. Establishing Steering Group and formal launching the KAN: by 4th quarter, 2018

E-Infrastructures

BELMONT FORUM

A 2-year community engagement process has led to the development of funding and strategic science policies that were adopted by the Forum in 2015.

The Belmont Forum adopts this **policy** and **principles** to:

- widen access to data and promote its long-term preservation in global change research
- help improve data management and exploitation
- coordinate and integrate disparate organizational and technical elements
- fill critical global infrastructure gaps
- share best practices
- foster new data literacy

Data should be:

Discoverable through catalogs and search engines

Accessible as open data by default, and made available with minimum time delay

Understandable in a way that allows researchers -- including those outside the discipline of origin -- to use them

Manageable and protected from loss for future use in sustainable, trustworthy repositories

The Belmont Forum recognizes that significant advances in open access to data have been achieved and implementation of this policy and these principles requires support by a highly skilled workforce.

The Belmont Forum recommends a broad-based training and education curriculum as an integral part of research programs and encourages researchers to be aware of, and plan for, the costs of data intensive research.

The Belmont Forum's ambition is that this policy and these principles will take positive steps towards establishing a global, interoperable e-infrastructure based on cost-effective solutions that can help enable actionable and societlally beneficial science.

http://www.belmontforum.org

E-Infrastructures

BELMONT FORUM

The implementation of the Belmont Forum open data policy and principles will be achieved through four action themes and an E-infrastructures Collaborative Research Action.

Coordination

The Forum is establishing a **data and e-infrastructure coordination office.**

This office will:

- implement, monitor, support, and evaluate interoperability capabilities among Belmont Forum-funded projects
- reduce or avoid duplication
- leverage resources
- map the data and e-infrastructure landscape
- facilitate global interoperability convergence and communication

Planning

In all Belmont Forum funded research, good data stewardship will be promoted through an **Enhanced Data Plan** (EDP).

The EDP includes project details about:

- data management
- the connection of the data to an associated context
- facilitating the discoverability of the data
- ensuring data is capable of reuse

Use cases

The Forum will solicit case studies at scoping workshops and through international calls to identify **best practices and policy** for future Belmont Forum projects.

These studies will ensure:

- common international practice
- optimized data exploitation
- that science need -- not technological availability -- leads policy

Training

Skilled experts knowledgeable of interdisciplinary science and data informatics are key to the success of implementing the Forum's data policy.

The Forum will launch an **immersive curriculum** of international short courses to:

- build capacity in interdisciplinary data-intensive science
- improve data delivery to environmental, social, and computer scientists

For more information on the Coordination Office and Implementation, visit: http://www.bfe-inf.org .

Common Themes

There are six thematic areas that demonstrate how Belmont Forum projects move beyond established knowledge and show the implications of new findings. The cornerstone of this success is the Forum's use of integrated working relationships. Although the improvement of scientific models, tools and approaches is invariably critical to a project's findings, the Forum projects' use of collaboration between researchers and stakeholders has facilitated a variety of cascading actions.

Content: Framing the project mindsets

- Community centered approaches drive solutions that are limited by fragmented interventions.
- Adaptation is driven by values, scale and context.
- Co-production and co-design creates opportunities to extend projects impacts, connecting stakeholders and addressing gaps between society, policy and practice.

Co-design: Involving stakeholders

- Engagement, credibility, legitimacy, and data quality are important for stakeholder buy-in and impact.
- Sensitivity to issues and contexts are necessary to societal problems.
- Legacies of projects and the communities are often serendipitous results that go beyond the scope and ownership of involved researchers and stakeholders.

Gaps: Identifying next steps

- Improve dissemination and communication of products to end users and decision makers.
- Coordinate among multiple actors and integrate research and engagement efforts to overcome numerous logistical challenges.
- Reconcile scales of time, space and complexity with the need for long term, large scale planning and policy for maximum impact.

Transdisciplinary benefits: Understanding the why

- Reframing of questions and problems through transdisciplinary thinking provides way of tackling complex problems with no definitive solutions.
- Bridging disciplines enhances and benefits disciplinary perspectives by strengthening the capacity, engagement and practice of each discipline.
- Developing a greater understanding of what decision-makers need from scientific studies to augment the science-policy-practice cycle when appropriate can be developed.

Achievements: Moving the knowledge needle

- Integration of hazards data and human factors (e.g., values, governance, culture, economic) developed credible and appropriate adaptation actions.
- Novel approaches and innovative tools and methods have been developed.
- Facilitated learning and capacity building promote action at multiple locations and scales.

Transdisciplinary challenges: Pushing the boundaries

- Communicating and translating from technical to common descriptions, while finding common ground between, within, and across disciplines.
- Appreciating different frames of reference by respecting the values, biases, assumptions and agendas of both scientists and stakeholders
- Building trust and relationships in the face of continuity challenges and varying levels of social memory challenging.



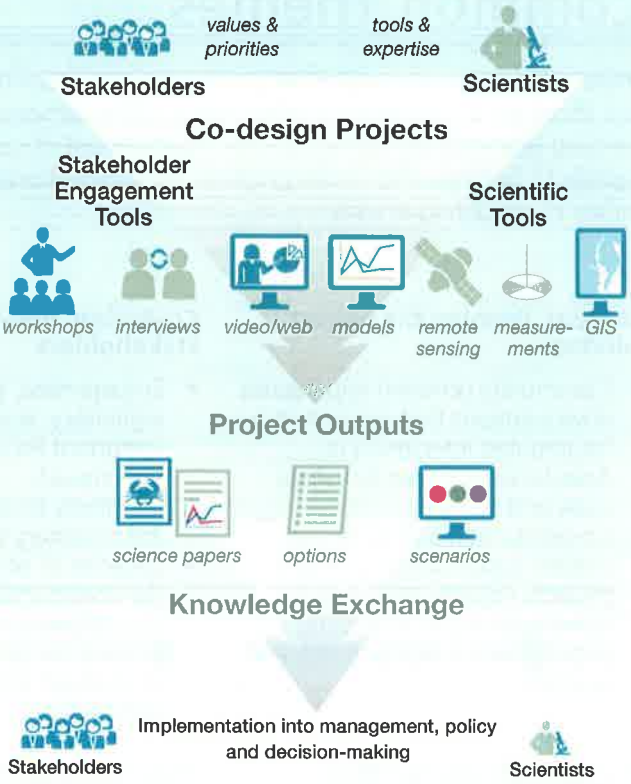

The synthesis workshop served as a forum for projects to learn from each other, and the ability to knit together the results of such a diversity of projects revealed a promising approach for addressing some of the world's most pressing and difficult issues.
Image Credits: Heath Kelsey & Vanessa Vargas

Approaches

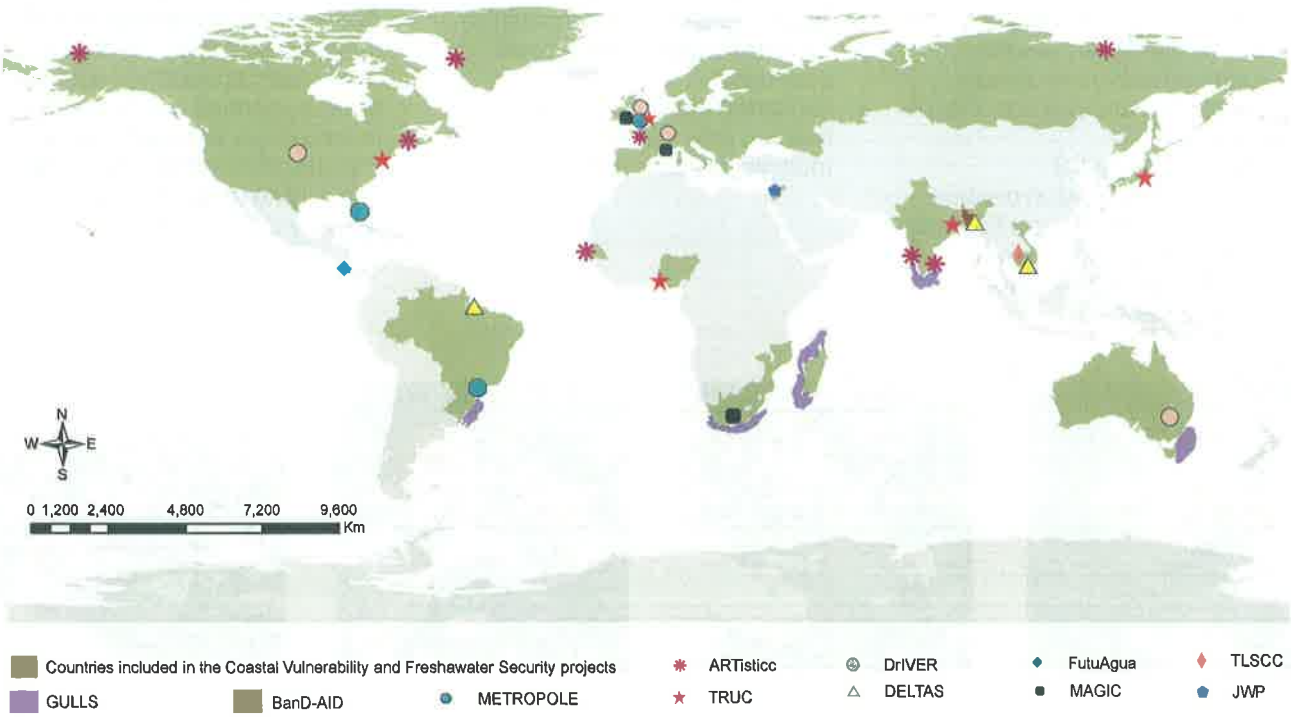
Stakeholders worked with science teams to co-design research projects to address a diversity of complex coastal vulnerability issues (e.g., sea level rise, urban development) and freshwater security issues (e.g., drought, water management). Stakeholders contributed their values and priorities and the science teams contributed tools and expertise.

The projects employed a variety of scientific tools (e.g., models, remote sensing, field measurements, geographic information systems) as well as a variety of tools for stakeholder engagement (e.g., workshops, interviews, questionnaires, videos, websites, art shows). Various options and scenarios to aid in decision making were produced to address coastal vulnerability and freshwater security issues.

The common approach developed for Belmont Forum projects was to have stakeholders and scientists co-design projects, and then a variety of stakeholder engagement tools and scientific tools were employed to produce project outputs. These outputs facilitated knowledge exchange between stakeholders and scientists for implementation into management, policy and decision-making.



Projects were transnational



World map with countries that were studied in the Coastal Vulnerability and Freshwater Security initiatives highlighted and specific locations where each of the 11 projects represented in the workshop were active.