

Accredited qualifications for capacity development in disaster risk reduction and climate change adaptation

Sarah L Hemstock¹; Leigh-Ann Buliruarua²; Emily YY Chan³; Gloria Chan³; Helene Jacot Des Combes²; Peter Davey⁴; Paul Farrell⁵; Sian Griffiths⁶; Henning Hansen⁷; Tim Hatch⁸; Ailsa Holloway⁹; Teuleala Manuella-Morris¹⁰; Tess Martin¹¹; Fabrice G. Renaud¹²; Kevin Ronan¹³; Benjamin Ryan¹⁴; Joerg Szarzynski¹⁵; Duncan Shaw¹⁶; Soichiro Yasukawa¹⁷; Tiffany Yeung¹⁸; Virginia Murray¹⁹

- ¹ European Union PacTVET Project, SPC, Suva, Fiji.
- ² European Union PacTVET Project, The University of the South Pacific, Suva, Fiji.
- ³ Collaborating Centre for Oxford University, Oxford, United Kingdom
Chinese University of Hong Kong, Hong Kong, China.
- ⁴ Griffith University, Brisbane, Australia.
- ⁵ World Association of Disaster and Emergency Medicine, Madison, USA.
- ⁶ Healthcare UK London, United Kingdom.
- ⁷ International Federation of Environmental Health, London, United Kingdom.
- ⁸ Alabama Department of Public Health, Montgomery, USA
- ⁹ Research Alliance for Disaster Risk Reduction, Stellenbosch University, Matieland, South Africa.
- ¹⁰ European Union PacTVET Project, The University of the South Pacific, Funafuti, Tuvalu.
- ¹¹ European Union PacTVET for Sustainable Energy and Climate Change Adaptation, The University of the South Pacific, Suva, Fiji.
- ¹² United Nations University Institute for Environment and Human Security, Bonn, Germany.
- ¹³ Central Queensland University, Rockhampton, Australia.
- ¹⁴ James Cook University, Cairns, Australia.
- ¹⁵ United Nations University, Bonn, Germany.
- ¹⁶ The University of Manchester, Manchester, United Kingdom.
- ¹⁷ United Nations Educational, Scientific and Cultural Organization, Paris, Switzerland.
- ¹⁸ Public Health England, London, United Kingdom.
- ¹⁹ Public Health England, London, United Kingdom
UNISDR STAG, Geneva, Switzerland.

© The Author(s) 2016. (Copyright notice)

Author correspondence:

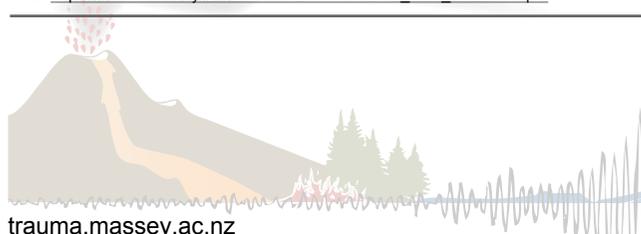
Sarah Hemstock,
C/- The Pacific Community,
3rd Floor, Lotus Building,
SPC – Private Mail Bag, Nabua,
Fiji.
Email: sarahh@spc.int

URL: http://trauma.massey.ac.nz/issues/2016-1/AJDTS_20-1_Hemstock.pdf

Abstract

Increasingly practitioners and policy makers working across the globe are recognising the importance of bringing together disaster risk reduction and climate change adaptation. From studies across 15 Pacific island nations, a key barrier to improving national resilience to disaster risks and climate change impacts has been identified as a lack of capacity and expertise resulting from the absence of sustainable accredited and quality assured formal training programmes in the disaster risk reduction and climate change adaptation sectors. In the 2016 UNISDR Science and Technology Conference on the Implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030, it was raised that most of the training material available are not reviewed either through a peer-to-peer mechanism or by the scientific community and are, thus, not following quality assurance standards. In response to these identified barriers, this paper focuses on a call for accredited formal qualifications for capacity development identified in the 2015 United Nations landmark agreements in DRR and CCA and uses the Pacific Islands Region of where this is now being implemented with the launch of the Pacific Regional Federation of Resilience Professionals, for DRR and CCA. A key issue is providing an accreditation and quality assurance mechanism that is shared across boundaries. This paper argues that by using the United Nations landmark agreements of 2015, support for a regionally accredited capacity development that ensures all countries can produce, access and effectively use scientific information for disaster risk reduction and climate change adaptation. The newly launched Pacific Regional Federation of Resilience Professionals who work in disaster risk reduction and climate change adaptation may offer a model that can be used more widely.

Keywords: capacity development, accreditation, disaster risk reduction, climate change adaptation, training.

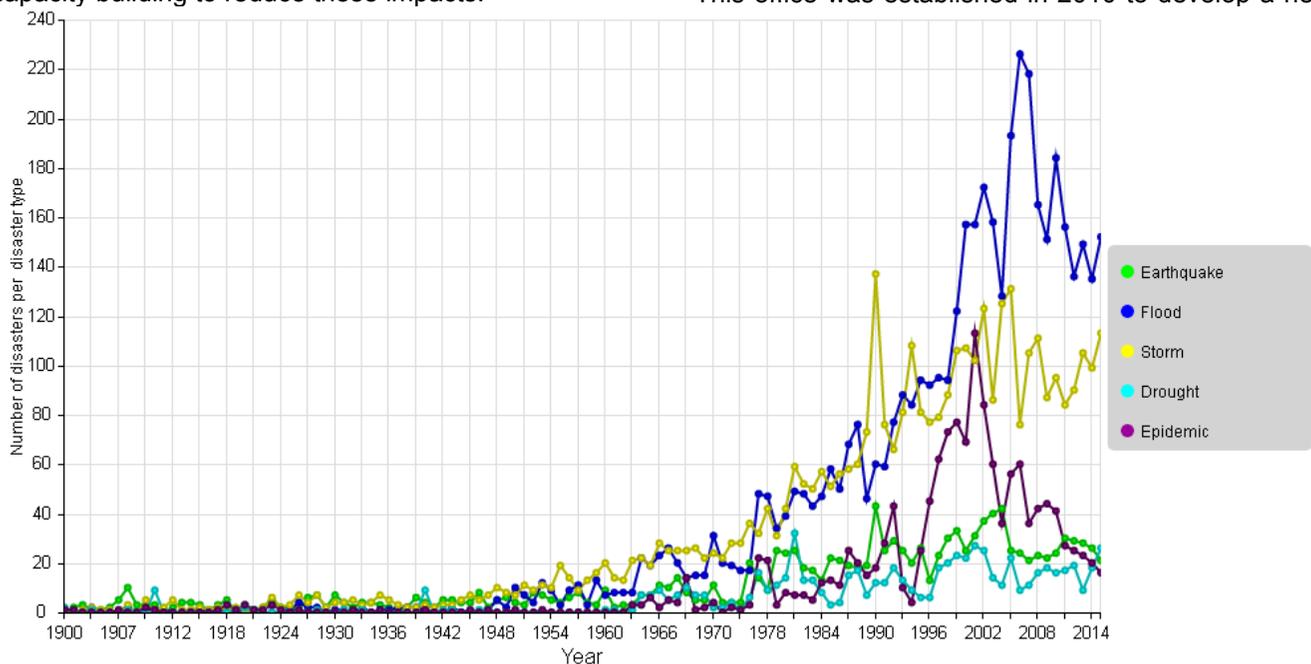


This paper calls for accredited formal qualifications for capacity development identified in the 2015 United Nations (UN) landmark agreements in disaster risk reduction (DRR) and climate change adaptation (CCA). It will be particularly important to provide an accreditation and quality assurance mechanism that is shared across boundaries. The current paper argues that by leveraging support for a regionally accredited capacity development, the production of, access to, and effective use of, scientific information for DRR and CCA can be achieved in all UN member states.

The number of reported disasters has steadily increased since the 1950s. As shown in figure 1, this trend was peaking at the beginning of the current century. Between 2005 and 2015, it is estimated that over 0.9 million people lost their lives and more than 1.8 billion people were affected by disasters in various ways, with women, children, and several other vulnerable groups impacted disproportionately (CRED/EMDAT, 2016). Disaster impacts also set back hard-won economic development gains and affect all socioeconomic strata, societal institutions, and sectors in one way or another. The total economic loss was estimated to have exceeded USD 1.5 trillion over the 2005–2015 period (CRED/EMDAT, 2016). There is an urgent need to support sustainable capacity building to reduce these impacts.

Disasters are not natural events. They are endogenous to society and disaster risk arises when hazards interact with the physical, social, economic, and environmental vulnerabilities and exposure of populations (UNISDR, 2015b). Therefore, the attention of the policy community has naturally fallen on the hazards and the related physical processes that result in disasters. This attention is now increasingly linking these with the consequences of climate change (IPCC, 2012), as shown in figure 1.

The IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation states that, “Inequalities influence local coping and adaptive capacity, and pose disaster risk management and adaptation challenges from the local to national levels (high agreement, robust evidence)” (IPCC 2012, p. 10). Harris and Baker (2011) from the Institute for Development Studies reported that practitioners and policy makers working across the globe are recognising the importance of bringing together disaster risk reduction (DRR) and climate change adaptation (CCA). For example, in the Philippines, disaster risk reduction and climate change laws mandate the inclusion of DRR and climate change, respectively, in school curricula (Murray et al., 2012). The UNISDR’s Office for Northeast Asia and Global Education Training Institute (UNISDR ONEA-GETI) forms another example. This office was established in 2010 to develop a new



EM-DAT: The OFDA/CRED International Disaster Database - www.emdat.be - Université Catholique de Louvain, Brussels - Belgium

Figure 1. Total Number of reported natural disasters between 1900 and 2015. Reproduced from *EM-DAT: The OFDA/CRED International Disaster Database*. Brussels, Belgium: Université Catholique de Louvain. Reproduced with permission.

cadre of professionals in DRR and CCA for disaster resilient societies. This institute supports the increased recognition of the value of mainstreaming CCA and DRR activities, to reduce vulnerability and increase resilience.

By focusing on one part of the world, the Pacific Islands Community, studies across 15 Pacific island nations have shown that a lack of capacity and expertise, resulting from the absence of sustainable, accredited and quality assured formal training programmes in the DRR and CCA sectors forms a key barrier to improving national resilience against disaster risk and climate change impacts (Buliruarua et al., 2015; Jordon et al., 2010). Considering that this regional finding may correspond to a global issue, this concept paper focuses on a broader call for accredited formal qualifications for capacity development. Note that this wider need has also been identified in the three 2015 United Nations (UN) landmark agreements in disaster risk reduction and climate change adaptation, which are discussed below.

The Three UN Landmark Agreements and Their Implementation

The year 2015 presented an unparalleled opportunity to align important global agreements through convergence of the three main UN landmark agreements:

- The Sendai Framework for Disaster Risk Reduction 2015–2030 (Sendai Framework), finalised in March 2015;
- The Sustainable Development Goals (SDGs), finalised in September 2015; and
- The Paris Agreement (COP21), finalised in December, 2015.

The timeframes of each of these agreements are summarised in figure 2 below.

As shown in figure 2, these major global policy instruments align to better facilitate science and technology (S&T) participation in DRR, sustainable development, and climate change mitigation and

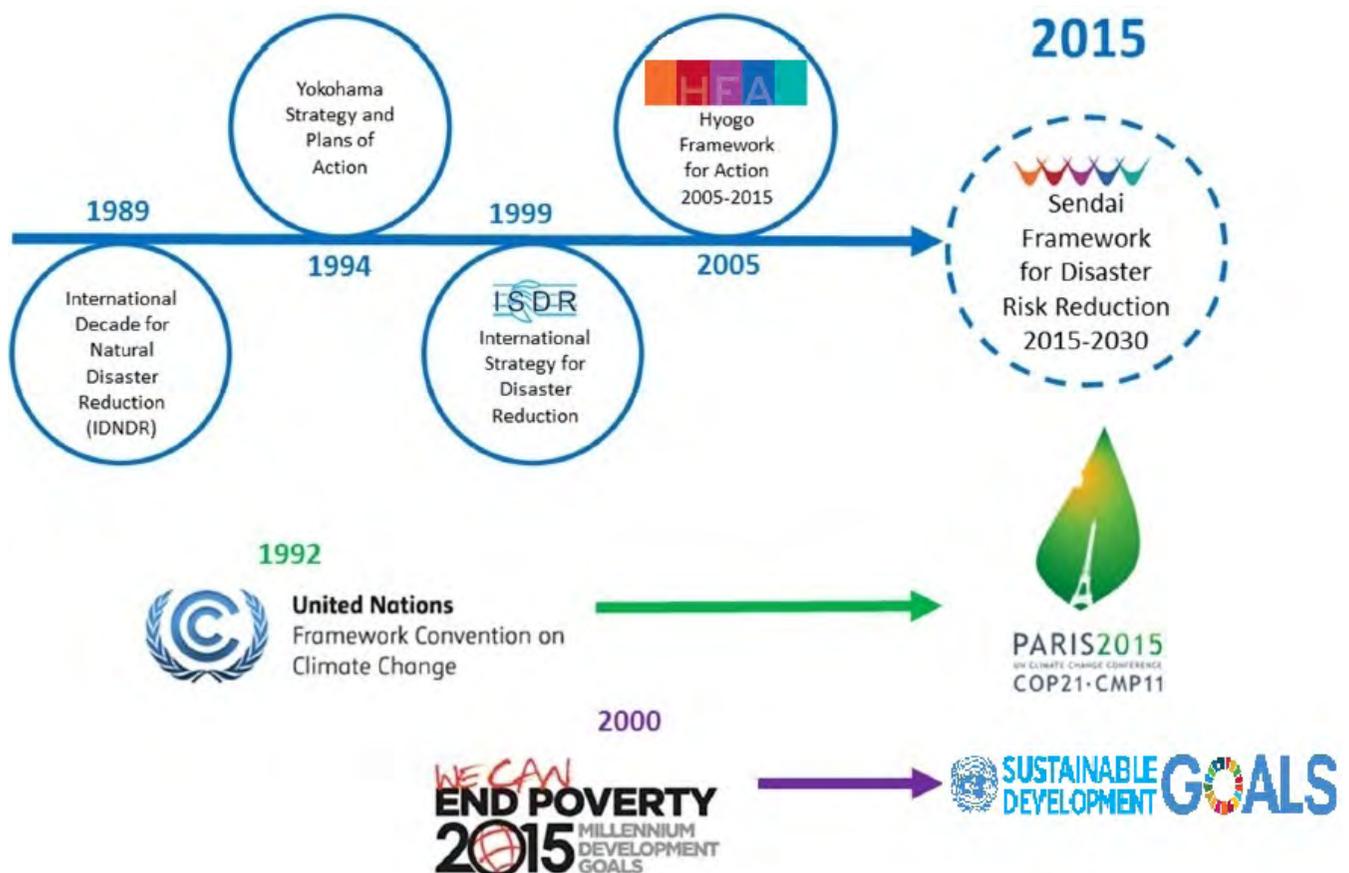


Figure 2. Twenty five years of international commitments to disaster risk reduction. Reproduced from *Launch of the 2015 Global Assessment Report on Disaster Risk Reduction* by Andrew Maskrey, 2015, Geneva, Switzerland: UNISDR. Reproduced with permission.

adaptation. Capacity building for appropriate DRR and CCA responses is one particular area of alignment where there is an identified need for input from the science and technology community (Buliruarua et al., 2015). The current paper is based on a review of each of the three global agreements, performed by science and technology stakeholders to the Sendai Framework, the SDG's and the COP21. Key statements on training and capacity development have been identified as a result.

The Sendai Framework was developed from the need to ensure DRR policy reflects the evolved understanding of the complexity of disaster risk in the twenty-first century. Implementation requires close collaboration among all sectors including the wider health and environmental health sectors, in order to prevent, prepare for, respond to, and recover from disasters that result from highly interdependent and evolving risks.

The Sendai Framework emphasises the role of S&T in DRR. Additionally, the role of capacity development and training is clearly outlined as a means to implement the Sendai Framework to achieve its goal to, "prevent new and reduce existing disaster risk..." (UNISDR, 2015b, p.12). The role of S&T and capacity development and training have been identified in all parts of the framework including in each of the four priorities for action: 1) Understanding disaster risk; 2) Strengthening disaster risk governance to manage disaster risk; 3) Investing in DRR for resilience; and 4) Enhancing disaster preparedness for effective response and to 'Build Back Better' in recovery, rehabilitation and reconstruction. The key statement from the Sendai Framework on accredited formal qualifications for capacity development DRR is:

27 j) to promote the development of quality standards, such as certifications and awards for disaster risk management with the participation of the private sector, civil society, professional associations, scientific organisations and the United Nations.

(UNISDR, 2015b, p.18)

Answering the call from the Sendai Framework for an emphasis of S&T capacity development, the UNISDR Science and Technology Advisory Group (STAG) identified six scientific functions in shaping the UNISDR Science and Technology Road Map, one of which was an emphasis on "Capacity development to ensure that all countries can produce, access, and effectively use scientific information" (Aitsi-Selmi et al., 2016, p.5).

The need for appropriate capacity development is amplified by the UNISDR Science and Technology Road Map which was published as an outcome from the conference. This Road Map included a recommendation to "support capacity building and ensure that capacity development for disaster risk management is interdisciplinary, shared across international boundaries, and demand-driven"(UNISDR 2016b, p.24) where deliverables are expected to be "Training and capacity building of science and technology in disaster risk reduction" (Aitsi-Selmi et al., 2016, p.6) and "Measures to build capacity development in knowledge management, innovation and learning, research and technology..." (UNISDR, 2016b, p.6). In 2008, UNISDR published its terminology on DRR where it stated that capacity development could be defined as "The process by which people, organizations and society systematically stimulate and develop their capacities over time to achieve social and economic goals, including through improvement of knowledge, skills, systems, and institutions" (p.6). The following annotation was added to this entry in the list of terminology:

...capacity development is a concept that extends the term of capacity building to encompass all aspects of creating and sustaining capacity growth over time. It involves learning and various types of training, but also continuous efforts to develop institutions, political awareness, financial resources, technology systems, and the wider social and cultural enabling environment.

(UNISDR, 2009, p.6)

The SDG's are a set of global aspirational goals that were developed and agreed upon by the United Nations Development Programme as the successor to the Millennium Development Goals. The SDG's cover a broad range of sustainable development concerns, and address many issues relating to capacity development and training. Goal 3 specifies ensuring healthy lives and promoting well-being for all at all ages, and calls for efforts to:

3.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks

The United Nations (2016a, para 3)

Goal 13, in particular, is about climate change adaptation, while DRR is a theme cutting across the specified targets. This goal articulates the urgency for combating climate change and its impacts with three out of the five component targets aimed at capacity development. This goal therefore outlines the importance of addressing capacity development in CCA & DRR sectors. The two targets (United Nations, 2016a) in Goal 13 aimed at capacity development are:

13.3) Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

13.5) Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.

(The United Nations, 2016a, para 13)

In 2015, at the United Nations Climate Change Conference, the United Nations declaration concerning COP21 identified actions to be taken on capacity building post 2015 in all global regions, with a particular focus on developing countries. The Durban Forum on Capacity-building was established as a result of the Conference of the Parties (Climate Change Policy & Practice, 2016), with more in-depth discussion to be held during the fifth meeting of the Durban Forum during the 44th session of the Subsidiary Body for Implementation (SBI) (United Nations, 2016b). However there appears to have been no mention of accreditation or standards for capacity development at the time of writing the current paper.

In addition to the strong call for capacity development identified in the three UN landmark agreements, there remains a clear academic and technical argument for capacity building in DRR. Menoni et al. (2014) stated that “civil protection, emergency, disaster risk management (DRM) have been traditionally considered professions to be learnt on the ground” (p.3) but they went on to report that:

...there is an increasing demand for more training, more skills in the field of organisational management, in juridical aspects connected with administrative responsibilities, economic elements related to the cost of prevention, lack of prevention and intervention during crises.

(Menoni et al., 2014, p.3)

Menoni’s call for more systematic educational approaches to disaster risk-related capacity building resonates with observations that extend back to the 1980s, and which were reflected, as one example, during the 1986 establishment of the Asian Disaster Preparedness Centre in Bangkok, Thailand. A decade later, Alexander (1997) made the critique that despite these advances, limited cross-disciplinary training in the disaster risk domain still resulted in it “constantly being reinvented by practitioners who were unaware of previous work outside their own field” (Alexander, 1997, p.298). He lamented both the persisting absence of “agreed standards of training for disaster specialists” (Alexander, 1997, p.298) and limited “consensus on the body of general knowledge of disasters that the neophyte should be required to absorb” (Alexander, 1997, p.298).

Encouragingly, in the past two decades, there has been growing momentum for more systematic, cross-disciplinary and sustainably embedded approaches to disaster risk-related capacity building. This is particularly evident in Africa where, despite the urgency to build strategic and technically competent human capital in the field, DRM capacity-building capabilities in 2005 have tended to lag substantially behind those of Asia and the Americas (Holloway, 2005, 2009, 2014). In a departure from efforts in other regions, the purposeful introduction of disaster risk reduction elements into continental university curricula appears to have substantially changed Africa’s skilled DRM human resource profile. By 2016, these deliberate efforts to sustainably integrate the disaster risk domain within institutions of higher learning have been materially reflected in more than 20-30 accessible disaster risk-related academic programmes and modules across the continent. These programmes appear to have been offered in English, French and Portuguese, as well as in national languages, for example Amharic and Malagasy.

Africa’s rapid acceleration in self-generated disaster risk-related capacity building has been facilitated through the Periperi U partnership, building on early disaster risk curricula successes in South Africa (Holloway; 2009, 2014). Beginning in 2006-2007 as a pilot project, by 2016, Periperi U has incrementally scaled-up to constitute twelve universities with more than 1,000 registered students and 170 staff.

Prompted by a shared commitment to mobilise higher education to address the continent's complex risk-scape, Periperi U has consistently argued "that African higher education institutions should be more active in filling this capacity gap, given that disaster risk management and reduction are core areas of scholarship and practice" (Periperi U, 2015, p.5). In this context, Periperi U has shown that academia is in many ways as important as the political call for capacity development. The effectiveness of their approach has been independently confirmed, with external evaluation noting that:

Periperi U is providing evidence that well designed interventions through and by the higher education sector offer very significant advantages in efforts to build capacities that can serve the continent during a time of increasingly powerful man-made and natural disasters.

(Ofir & Mentz, 2015, p.iii).

This solution provides a clear identification of training needs for DRR and in part CCA but does not yet resolve the need for practitioner accreditation. Periperi U is nonetheless a good example of how shared academic and community practitioner capacity development can deliver much needed DRR knowledge building and practice. Other organisations in Asia and around the world can also deliver these capacity developments. Some examples are cited in Appendix 1. From the viewpoint of practitioner led capacity development, it is apparent that academic and other training organisations are best if they work in partnership to reflect the local needs on the ground while also providing global learning.

An Example: The Reality of Training for DRR and CCA in the Pacific Islands Region

The Pacific Islands Region (PIR) can be used as an example which outlines and contextualizes DRR and CCA linkages. This region also highlights how climate change can be recognised as a slow-acting hazard. During the lifetimes of the Pacific Islands Framework for Action on Climate Change 2006-2015 and the Pacific Disaster Risk Reduction and Disaster Management Framework for Action 2005-2015, efforts were made to integrate DRR and CCA policy. These efforts are ongoing at the time of writing because the intended replacement for these policies, the Framework for Climate and Disaster Resilient Development in the Pacific (FRDP), has yet to be approved by all 15 Pacific-

African, Caribbean and Pacific (P-ACP) countries. The FRDP will provide a new regional policy tool with guidelines on an integrated management of CCA and DRR, with the goal of improving the resilience of Pacific Island communities. Implementation of the FRDP, as with the Sendai Framework, relies to a great extent on capacity building. The FRDP states that "such needs-based capacity building can provide a significant return on the investment" (p.27) and has identified that in order for component goals to be achieved:

Training, education, community planning workshops involving multi-sector participation, and other forms of human resources development are critical to building resilient communities, who can more effectively participate in risk-reducing initiatives and protect the interests of their most vulnerable people..

(UNISDR, 2016, p.27)

Many, if not all, policies linked to CCA and DRR also appear to reflect the need for capacity building (Appendix 1). For example, Tuvalu asks specifically for capacity building support at a central government level, to assist with "Improving Understanding and Application of Climate Change Data, Information and Site Specific Impacts Assessment to Inform Adaptation and Disaster Risk Reduction Programmes" (Buliruarua et al., 2015, p.22). Palau's Climate Change Policy For Climate and Disaster Resilient Low Emissions Development (2015), states that by 2020, Palau's educational system will include coordinated climate change and disaster risk information in its curriculum and will offer professional development. A full analysis of these particular policies has been published by Martin et al. (2015).

For the Pacific, a regional and interdisciplinary approach to DRR and CCA capacity development is essential. This is because PIN countries face similar hazards types and negative impacts of climate change, with varying but comparable effects on the countries' economy and the livelihood of their inhabitants. Moreover, countries such as Tuvalu, Republic of Nauru, Niue, Cook Islands and Republic of Palau have small populations ranging from 1,500 to 20,000. These countries may therefore not have the capacity to establish effective national quality assurance systems.

The integrated interdisciplinary approach to DRR and CCA shown in figure 3 is based on the links identified between these areas of concern (UNISDR, 2016). Formal education is needed to develop national capacities to reduce vulnerability and anticipate, plan for and

respond to and recover from disasters that result from interdependent and evolving vulnerabilities. The needs-based development of regionally-specific, accredited qualifications in this context is highly innovative. This approach to development forms the impetus for the European Union Pacific Technical Vocational Education and Training in Sustainable Energy and Climate Change Adaptation Project (EU PacTVET). However, at the time of writing, structures remain to be put in place for quality assurance of regional qualifications as well as regionalization / globalisation and mutual recognition of broader qualifications.

The Pacific Register of Qualifications and Standards, maintained and quality assured by the Pacific Community’s Educational Quality and Assessment Programme (EQAP) only recognises national qualifications, without focusing on CCA or DRR. In this regard, and in response to DRR and CCA being significant challenges currently facing the region, EU PacTVET is proposing strategies to develop DRR and CCA qualifications and support their recognition/

accreditation at national and regional levels, including the establishment of a federation for resilience.

As a result of these deliberations the development of and launching of the Pacific Regional Federation of Resilience Professionals who work in DRR and CCA will work in partnership with EQAP, to support mechanisms for accreditation, development and/or the endorsement of formal qualifications in the TVET sector at a regional level for DRR and CCA (Jacot Des Combes et al., In Press).

Examples of Training Systems Available and Their Benefits

Selected examples of training systems, which have and are being developed to provide training related to DRR and CCA regionally and globally, are summarised in table 1. A more detailed table is provided in Appendix 2. Table 1 summarises the accreditation systems for Doctoral and Masters Qualifications which are generally accredited through the offering university but short courses do not generally appear to be accredited. Only

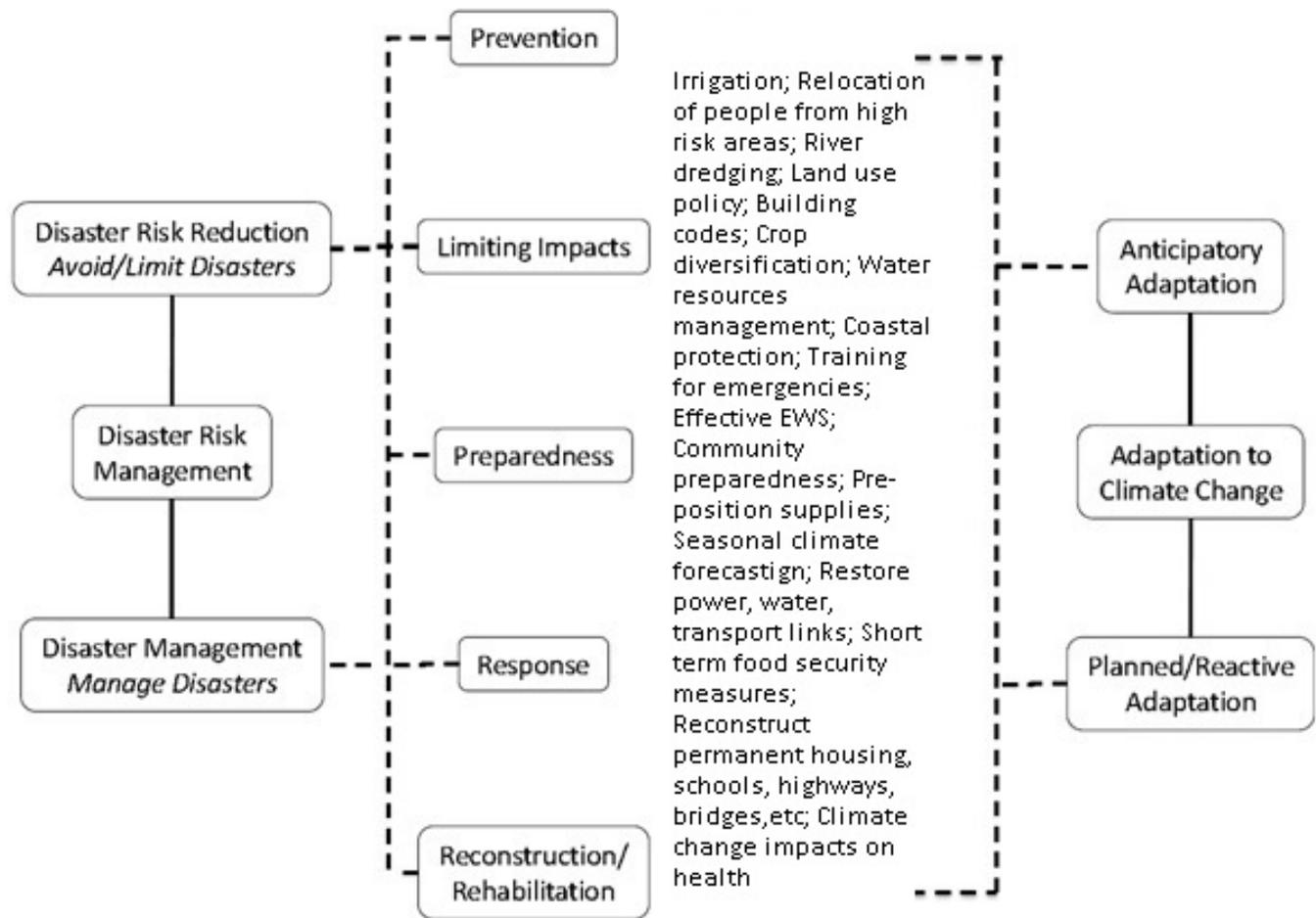
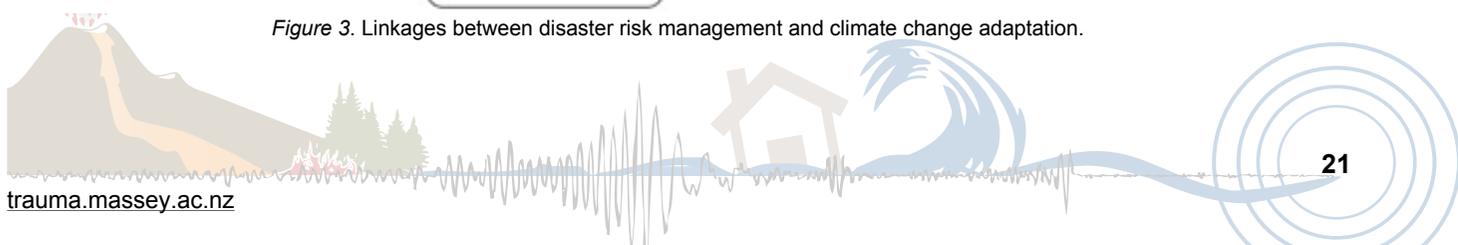


Figure 3. Linkages between disaster risk management and climate change adaptation.



the TVET project has a clear accreditation. This project is accredited by the Fiji Higher Education Commission and is listed on the Pacific Register of Qualifications and Standards, Pacific Community Education Quality and Assessment. In summary, accreditation for DRR and CCA appears mostly academic, among local institutions focusing on Master and PhD programs. Few other programs have wider remits.

Discussion

By encouraging international collaboration there may be an opportunity for interdisciplinary partnerships which actively build integrated preparedness, leadership and other solutions. These partnerships may support sustainable capacity development in DRR and CCA for practitioners. Currently, few of the training systems listed in Table 1 fulfil the UNISDR S&T Road Map UNISDR (2016b) recommendation to “support capacity building and ensure that capacity development for disaster risk management is interdisciplinary, shared across international boundaries, and demand-driven” (p.24). The remit and accessibility of these partnerships would benefit from expansion.

As part of implementing the Sendai Framework through the judicious application of S&T, it is crucial to purposefully align the development of cross-disciplinary disaster risk research with disaster risk capacity building for decision-makers, practitioners and associated professionals. The UNISDR Science and Technology Conference on the implementation of the Sendai Framework resulted in a short concept note on capacity development. This note highlighted substantial, global disparities in capacity development for science in the DRM field (UNISDR, 2016a). The concept note also indicated a heavy dependence on international organisations and associated experts to support training in developing countries. This was in addition to limited South–South cooperation which is also, albeit partially, identified in Appendix 2.

Until recently, the majority of formal capacity development efforts appear to have followed a highly specialised natural sciences pattern, for example geo-sciences. Over the last ten years or so, capacity development has transitioned towards more inter- and trans-disciplinary approaches. This change was summarised in Box 7.6 of the 2015 Global Assessment Report which documents

Table 1.
Examples of Initiatives that Aim to Provide DRR/CCA Capacity Development Training

Type of Diploma	Organisation/Initiative*	Accreditation
PhD, Doctorate School	Academic Network for Disaster Resilience to Optimise Educational Development (ANDROID) Online Doctoral School & Residential Doctoral School; Association of Pacific Rim Universities-International Research Institute of Disaster Science (APRU-IRIDeS) Multi-Hazards Program; New Zealand universities; United Nations University (UNU); USP; The University of Manchester: Humanitarian and Conflict Research Institute (HCRI)	Generally accredited through the offering university
Masters	International Institute of Seismology and Earthquake Engineering (IIEE), A Centre of Excellence of UNESCO, Master Program in Seismology, Earthquake Engineering and Tsunami Disaster Mitigation; New Zealand universities; UNESCO Master courses by International Centre for Water Hazard Risk Management (ICHARM, Japan) on water related hazard management; United Nations University (UNU) Joint Master (M.Sc.) Geography of Environmental Risks and Human Security with the University of Bonn; University of the South Pacific the University of Manchester: the Humanitarian and Conflict Research Institute (HCRI)	Generally accredited through the offering university
Short Courses	Collaborating Centre for Oxford University and CUHK for Disaster and Medical Humanitarian Response (CCOUC) Disaster and Humanitarian Specialised Public Health Courses, Summer Short Courses, Croucher Summer Course, e-Learning courses: climate change and health; Griffith University- Environmental Health and Disaster Management 5 day Short Course training endorsed by International Federation of Environmental Health (IFEH); Partners Enhancing Resilience for People Exposed to Risks (Periperi U) RADAR's short course on Community Risk Assessment (accredited at NQF level 6)	Uneven accreditation patterns
Technical and Vocational Education and Training	Pacific Community / University of the South Pacific - European Union Pacific Technical Vocational and Education in Sustainable Energy and Climate Change Adaptation Project (EU PacTVET)	Accredited by Fiji Higher Education Commission and listed on the Pacific Register of Qualifications and Standards, Pacific Community Education Quality and Assessment

*This list is based on the authors' experience and does not represent an exhaustive list of available training.

the key activities related to the Hyogo Framework for Action (HFA). This section of the Global Assessment Report (UNISDR 2015b) recommended supporting the development of scientific, technological, technical and institutional capacities needed to research, observe, analyse, map and, where possible, forecast natural and related hazards, vulnerabilities and disaster impacts. The Global Assessment Report also recommended the development and improvement of relevant databases and establishing and strengthening capacities to summarize, disseminate, and exchange statistical information and data on hazards mapping, disaster risks, impacts, and losses. The development of common methodologies for risk assessment and monitoring was also recommended.

Low education baselines in many countries limit progress in implementing cross-disciplinary tertiary level learning processes in emerging risk and resilience domains (UNISDR, 2016a). On this note, it is important to consider the conceptualisation of any DRR/CCA curriculum to ensure it is capable of operating in the local context and economic setting of the initiative, including whether the curriculum responds to identifiable stakeholder needs (Hagelsteen & Burke, 2016).

The accumulation of global experience in disaster risk-related training and education, especially successful capacity building efforts that are culturally coherent and contextually nuanced, require formal capacity-building processes. Note that the Sendai Framework makes extensive reference to the delivery of culturally sensitive DRR related activities. Attention to cultural context and inclusiveness therefore need to be integrated aspects of implementing capacity development.

With rapidly growing global demand for disaster risk information, the scientific community is challenged to consider how the dissemination of training modules and other capacity building tools can be achieved through existing and forthcoming technologies. These challenges include methods for harmonising communication and technologies as well as making these methods accessible in remote locations. Ad hoc training, lack of quality assurance and low national capacity to sustainably and collectively deliver training leads to failure when trained individuals leave the original training context (Woods et al., 2006). This issue foregrounds the importance of accessible training, which is culturally appropriate and communicated in local languages and dialects. With risk communication often constrained by language barriers, there is scope for technologies to

enable the interpretation into different languages and culturally appropriate materials, in addition to handing this aspect of capacity building over to local colleges and other schools. These approaches would allow the training to be appropriately delivered in a language that communities understand, while helping facilitate local ownership of the training materials (Buliruarua et al., 2015).

Another key issue is providing an accreditation and quality assurance mechanism that transcends professional and national boundaries. This mechanism should include systems for continuing professional development. This would in turn enhance the recognition of professions actively involved in DRR and CCA.

Initial Stocktake of Progress: Baseline Assessment, Good Practice Exemplars

An initial scoping, assessment and stocktake of developments related to formal qualifications for capacity development in DRR and CCA has clearly indicated bona fide progress. This progress includes progress in developing a significantly increased number of formal qualifications in the higher education sector (Ronan, 2015a, 2015b). Such qualifications could have a number of benefits, including:

1. A baseline assessment to help us better measure progress across the Sendai Framework and the other agreements.
2. Data that can be leveraged off and learned from to help plan for the next 15 years and beyond. This would include: exemplars of good practices, innovative ways to establishing training programs, and multi-disciplinary training; means used to evaluate effectiveness of training programs, both in terms of learning/capacity-building outcomes but also combined DRR-CCA outcomes; means used to successfully implement and sustain these programs; and means of resolving issues that have arisen across training programs related to formal accreditation challenges and successes.

Such an initial stocktake, assessment and analysis should not be limited to higher education as narrowly defined by the Bologna Process (see European Higher Education Area, 2014) but should also include national technical and vocational training and the potential pathways between them. For the technical and

vocational education and training sector, the assessment and analysis should focus on a competency-based approach and take into account skills, knowledge and attributes. This assessment should be regularly updated to integrate new science and innovative technologies where relevant (Buliruarua et al., 2015). The result of this initial stocktake, assessment and analysis can then be translated into important next steps, including enhancing pathways for developing formal qualifications and accreditation frameworks.

Formal Accreditation Standards

The development of accreditation standards can be complicated and accreditation processes generally appear to have been taking place at the national level. However, a more widely shared set of multi-disciplinary common principles can still be established and validated at regional or global levels before being utilised within country specific contexts. This has occurred in other areas of capacity development. Some examples of multi-country agreed training systems with certification and other forms of accreditation outside of directly addressing DRR and CCA are provided below.

The only universal training that the current authors have identified and that is led by a UN system organisation comes from the International Maritime Organisation and relates to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978 which was adopted on 7 July 1978 and came into force on 28 April 1984. The main purpose of this Convention is to promote safety of life and property at sea and the protection of the marine environment by establishing commonly agreed international standards of training, certification and watchkeeping for seafarers.

Some training is aligned with standards developed by standards organizations such as the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), the European Committee for Standardization (CEN), and national standards bodies. These organisations have developed best practice norms for how DRR can be organized. Guidelines are also produced and made widely available by non-governmental organisations such as the International Federation of Red Cross and Red Crescent Societies and other international organizations such as the International Organization for Migration.

Industry training providers support trainees in understanding how to implement standards in an

organization and how to meet the requirements for certification. For example, worldwide provision is offered by a collaboration between the British Standards Institution (BSI), American National Standards Institute (ANSI) and the American Society for Quality (ASQ) (ANSI-ASQ National Accreditation Board). This collaboration seeks to offer a suite of local accreditation by these international providers.

Each of the initiatives outlined above cost money, for example, to develop and deliver training materials alongside possible accreditations. There is also a large number of private companies in most countries that sell support, accreditation and training for the implementation of the most popular standards. Examples include ISO 14001 Environmental Management, ISO 31000 Risk Management, and ISO 22301 Business Continuity Management. This approach to standards could spread to disaster-specific standards such as ISO 22315 Mass Evacuation and ISO 22319 Spontaneous Volunteers in Emergencies.

In terms of developing standards, ISO uses their ISO Academy to provide training materials on a range of subjects about standards and standardisation. This includes support for people who want to share their best practices by developing a particular standard through one of its committees. The role of developing countries is critical in ISO standard development. Their involvement will help ensure the global relevance of standards, encourage capacity development in these countries, and help ensure that valuable standards are exploited in a range of country settings. The five outcomes that ISO (2016) is pursuing include:

- Outcome 1: Standardisation has a recognized, effective role in support of public policies
- Outcome 2: National standards bodies' strategic capabilities strengthened
- Outcome 3: National standards bodies' capacity strengthened at the operational and technical levels
- Outcome 4: Increased involvement of developing country members in international standardization
- Outcome 5: Coordination and synergies with other organizations and among projects implemented

(ISO, 2016, page 6)

The plan to achieve this is to: disseminate materials, tools and information services; focus on regional-based capacity-building and awareness-raising projects;

provide country-based training and technical assistance to build the capacity of national standards bodies (ISO, 2006). It seems that ISO sees the focus on developing countries as part of corporate social responsibility. Perhaps there is a role for other sorts of providers to align a corporate social responsibility agenda with the delivery of CCA and DRR training.

A wide range of organisations have accreditation systems for training that are recognised by individual organisations or more widely. For example, the Projects IN Controlled Environments (PRINCE2) is a globally recognized process-based method for effective project management. Another example is Advanced Trauma Life Support (ATLS), which is a course on concisely assessing and managing patients with multiple injuries.

There are numerous accredited courses in subjects that relate to DRR and CCA. These include the following:

- Certified Emergency Manager (CEM) and Associate Emergency Manager (AEM). This is qualification is administered by the International Association of Emergency Managers. It also forms a recognition of excellence which is earned by emergency managers who demonstrate a strong understanding of the emergency management field through knowledge, experience, work history, training, education, and contributions to their profession. More than 1,375 emergency management leaders currently hold these credentials.
- Certified Floodplain Management (CFM). This course is offered by the Association of State Floodplain Managers. This program to certify floodplain managers is recognised in all states of the USA.
- Disaster Recovery Institute International (DRI) provides an international qualification in business continuity management. There are currently more than 14,000 professionals registered as accredited by the DRI and working in a range of settings.
- Royal Institute of Chartered Surveyors (RICS). This institute has over 127,200 qualified fellows and training members identified as accredited Chartered Surveyors, working in countries around the world.
- The Chartered Institute of Logistics and Transport (CILT). Their Humanitarian suite of qualifications includes a series of certificate qualifications for humanitarian logistics professionals or those in operational positions in the humanitarian field.

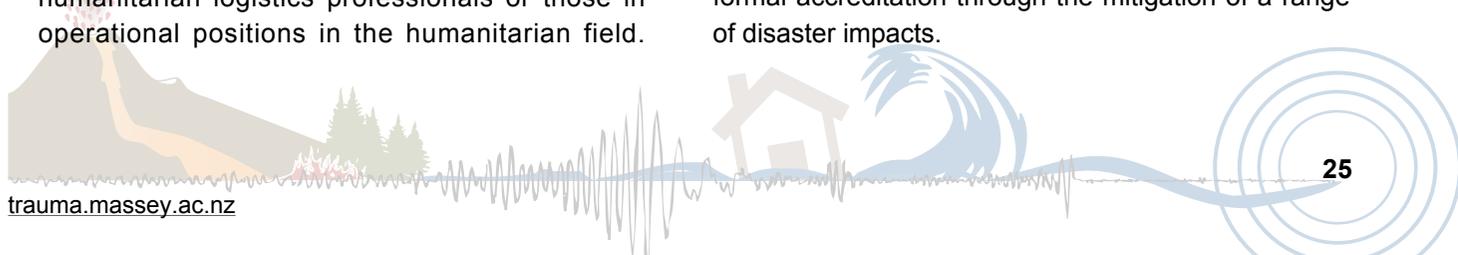
These qualifications are accredited by CILT UK and provide a recognised standard for practitioners in the humanitarian sector.

- Project Management in Development (PMD Pro). This organisation issues a certificate qualification for Project Managers working in the development sector. It is accredited by Accrediting Professional Managers Globally (APMG) International and is widely recognised by the international non-governmental organisation sector.

Some accredited qualifications are recognised in more than one country, but not all recognise related professional status. The current authors are aware of other groups interested in supporting a call for developing accredited formal qualifications for capacity development in DRR and CCA, including the Worldwide Universities Network (2016).

Although the current paper calls for a globally accredited training system for DRR and CCA, the context for developing a globally recognised training system varies widely between and within different countries. This requires discussions about complicated combinations of aspects such as specific training required and the content of that training. There is nonetheless a need for countries to start by working together towards a regional platform, where partnerships and networks are created for education systems. This will also help facilitate shared, rather than, replicated training resources.

It would be of particular value to find where such regional collaborations fit as part of developing a staged approach from local, national, regional to global. It seems that the need for professionally qualified emergency practitioners can only really be recognised though considering a more regional approach to fit for purpose training programmes. For example, reviewing the learning of different organisations and processes concerning development of and launching of the Pacific Regional Federation of Resilience Professionals who work in DRR and CCA has illustrated mechanisms for accreditation, development and/or the endorsement of formal qualifications in the TVET sector at a regional level for both DRR and CCA (Jacot Des Combes et al., In Press). The current authors consider that this development will add credibility to the professionalization of the emergency management sector. This will demonstrate the value of DRR and CCA formal accreditation through the mitigation of a range of disaster impacts.



Limitations

The current concept paper recognises how complicated an accreditation process for DRR and CCA practitioners can be. The need for globally accredited DRR and CCA training and the complications of implementation have also made it very complicated to develop a concept paper on this topic. Relevant accreditation processes aim to address a range of complex DRR and CCA settings and scenarios, through the consideration of diverse stakeholder groups and their interests. These complications may help explain why the concept of accredited qualifications for capacity development for DRR and CCA remains mostly within the administrative bounds of academic and local institutions, with a focus on Master and PhD programs and postgraduate diplomas at some universities.

Wider systems for accreditation can be fraught from a multitude of perspectives. The current group of authors have tried to identify the current knowledge of what is available. In doing so, it has become clear that a more detailed review was well beyond the scope of this concept paper. The current approach has nonetheless been able to identify DRR and CCA training systems where a wider system of accreditation has been developed. A good example may be the International Federation of Environmental Health (IFEH) which has been providing a pathway for environmental health DRR training recognition. However, this approach still relies on endorsement by the IFEH via a Memorandum of Understanding (MOU) with Griffith University in Australia. Training is delivered by a combination of partner universities and environmental health professionals across the IFEH Asia and Pacific Region. This approach therefore depends on a single university and collaborating practitioners. In order to maintain trust, partnerships are required when addressing administrative procedures including records, management review, course content, tutor and candidate selection, training and performance review, continuing professional development, and issuing training certificates.

Conclusion

There has been a call for accredited formal qualifications for capacity development identified in the three 2015 UN landmark agreements: the Sendai Framework, the SDG's, and the COP21. However, no single solution has yet been identified. The recent development and launch of the Pacific Regional Federation of Resilience

Professionals who work in DRR and CCA may support professionalisation of the DRR and CCA sector. The progress of this regional federation will nonetheless need to be monitored to determine if it could form a model for a single global solution for accrediting specialist DRR and CCA practitioners.

We consider that the Pacific Federation may provide a solution for quality assured practitioners in DRR and CCA. This federation may be able to provide a sustainable approach, while supporting tailored programmes that respond to the specific needs of countries where those programmes are implemented. The Pacific Federation will also provide a platform for reviews of training modules and tools. These reviews will be carried out by the scientific community in an effort to ensure accuracy and reliability, for both higher education in universities and in technical and professional training offered by national providers. Ideally, scientific reviews will be associated with methods focused on local indigenous knowledge, and cultural and linguistic considerations. Reviews from the scientific community will help ensure that all practitioners, who are not always trained in universities, have access to the latest scientific developments in their field. The validation of the training modules and tools by the scientific community will become one aspect of recognised quality assurance mechanisms on a global basis and this could complement the recognition of local requirements together with broader guidance on DRR and CCA legal requirements.

These steps, together with other measures outlined in the current paper, mark how more rapid progress in support of the three landmark UN agreements can be achieved through attention to accreditation standards and processes for the professionalisation of DRR and CCA practice. By leveraging global support for capacity development, the scientific community and a range of other stakeholders will help ensure that all countries can produce, access, and effectively use scientific information for DRR and CCA.

Acknowledgements

We would like to sincerely acknowledge contributions from the following members of the EU PacTVET team including: Sustainable Energy Advisor, Mr Nixon Kua, Curriculum Advisor, Mr Viliame Sakiti (Fiji National University), and the University of the South Pacific in-country coordinators, Mr Tapulolou Tuilemafua (Samoa), Mr William Arudovo (Vanuatu), Ms Birtha Tonghai (Niue),

Mr Tevita Fakaosi (Tonga), Ms Betty Sigrah (Federated States of Micronesia), Ms Pelenise Alofa (Kiribati), Mr Moses Asitarau (Solomons), Mr Dustin Langidrik (Republic of the Marshall Islands), Ms Ashmita Devi (Fiji), Mr Tyrone Dieye (Nauru), Ms Vaine Wichman (Cook Islands), Mr John Walenenea (Interim ICC, Papua New Guinea), Ms Carol Emaurois (Palau International Coral Reef Centre, Palau), Ms Tessa Koppert (National Directorate for Climate Change, Timor Leste), and Mrs Taputukura Mariri (Coordinator, Cook Islands National Council of Women).

We would also like to acknowledge other contributions from the Educational Quality Assessment Programme (SPC, Pacific Community), the Fiji Higher Education Commission and individuals in the following countries.

- Cook Islands: Ms Ana Tiraa, Director, Climate Change, Office of the Prime Minister; Ms Elizabeth Wright–Koteka, Head of Ministry, Office of the Prime Minister; Mr Isao Frank Jr., Micronesia Red Cross Society.
- Federated States of Micronesia: Mr. Willy Kostka, Executive Director, Micronesia Conservation Trust; Ms Marion Henry and Mr Hubert Yamada, Secretary and Assistant Secretary, Department of Resource and Development; Mr Rupeni Mario, Team Leader, Pacific Community North Pacific ACP Renewable Energy and Energy Efficiency Project.
- Kiribati: Ms Saitofi Mika and Ms Bwakura Metutera-Timeon, Deputy Secretary and Secretary, Office of te Beretitenti; Mr Ruatu Titaake, Acting Deputy Secretary, Ministry of Education; Elliot Ali, Secretary for Ministry of Public Works and Energy.
- Palau: Mr Fred Sengebau, Director, Bureau of Agriculture, Ministry of Natural Resources, Environment and Tourism; Mrs Carol Ngiraidis, Chair, Palau Organic Growers Association; Ms Priscilla Subris, Coordinator, National Emergency Management Office; Mr Xavier Matsutaro, Coordinator, Climate Change Office.
- Tuvalu: Mr Apinelu Vakalasi and Mrs Katalina Pasiale, Secretary and Director, Ministry of Education; Mr Mataio Tekinene, Director, Ministry of Environment; Mr Kapuafe Lifuka and Mr Avafoa Irata, Acting Director of Energy and Secretary, Ministry of Works & Energy.
- Nauru: Ms Alamanda Lauti, Director, USP Campus-Nauru; Mr Elkoga Gadabu, Secretary, Department

of Commerce, Industry and Environment; Mr Elkoga Gadabu, Acting Secretary, Department of Commerce, Industry and Environment.

We would like to acknowledge the comments and help from Sarah Wade-Apicella and Sanjaya Bhatia, UNISDR ONEA-GETI; Pedro Basabe, (UNISDR; Gary Reynolds, Head of Training Product Development, Royal Institute of Chartered Surveyors, London UK; and Christina J. Pickering, University of Ottawa, research assistant with the EnRiCH International Collaboration and intern at Public Health England.

Glossary

ANDROID	Academic Network for Disaster Resilience to Optimise Educational Development
ANSI	American National Standards Institute
APMG	Accrediting Professional Managers Globally
APRU-IRIDeS	Association of Pacific Rim Universities-International Research Institute of Disaster Science
ASQ	American Society for Quality
AUDEM	Asian University Network of Environment and Disaster Risk Management
BSI	British Standards Institution
CC	Climate Change
CCA	Climate Change Adaptation
CCOUC	Collaborating Centre for Oxford University and CUHK for Disaster and Medical Humanitarian Response
CEN	European Committee for Standardization
CILT	The Chartered Institute of Logistics and Transport
COP21	The 2015 United Nations Climate Change Conference
CSR	corporate social responsibility
DRR	Disaster Risk Reduction
DRM	Disaster Risk Management
GRIPS	(Japan National) Graduate Institute for Policy Studies
EHEA	European Higher Education Area
EHADI	Environmental and Humanitarian and Disaster Assistance Initiative
EPFL	École Polytechnique Fédérale de Lausanne
EU PacTVET	European Union Pacific Technical Vocational Education and Training in Sustainable Energy and Climate Change Adaptation Project
ICHARM	International Centre for Water Hazard Risk Management
IEC	International Electrotechnical Commission
IFEH	International Federation of Environmental Health
IFRC	International Federation of Red Cross and Red Crescent Societies
IISEE	International Institute of Seismology and Earthquake Engineering
ISO	International Organization for Standardization
JICA	Japan International Cooperation Agency
MLIT	Ministry of Land, Infrastructure, Transport and Tourism

MOU	Memorandum of Understanding
MPH	Master of Public Health
MSc	Master of Science
NGOs	Non-governmental Organisations
P-ACP	Pacific-African, Caribbean and Pacific Countries
PDPs	Professional Development Programmes
Periperi U	Partners Enhancing Resilience for People Exposed to Risks
PIR	Pacific Islands Region
PMD Pro	Project Management in Development
RICS	Royal Institute of Chartered Surveyors
SBI	Subsidiary Body for Implementation
SDG	Sustainable Development Goals
Sendai Framework	Sendai Framework for Disaster Risk Reduction 2015-2030
SPC	Secretariat of the Pacific Community
SRDP	Strategy for Climate and Disaster Resilient Development in the Pacific
STAG	Major Group on Science and Technology
UN	The United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNISDR	The United Nations International Strategy for Disaster Reduction
UNU	United Nations University
UNU-EHS	United Nations University Institute for Environment and Human Security
USP-EU GCCA	European Union Global Climate Change Alliance Project
WADEM	World Association for Disaster and Emergency Medicine

References

- Aitsi-Selmi, A., Blanchard, K., Al-Khudhairy, D., Ammann, W., Basabe, P., Johnston, D., ... Murray, V. (2015a). *UNISDR Science and Technical Advisory Group report 2015: Science is used for disaster risk reduction*. Retrieved from <http://preventionweb.net/go/42848>.
- Aitsi-Selmi, A., Murray, V., Wannous, C., Dickinson, C., Johnston, D., Kawasaki, A., ... Yeung, T. (2016). Reflections on a science and technology agenda for 21st century disaster risk reduction. Based on the scientific content of the 2016 UNISDR Science and Technology Conference on the Implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030. *International Journal of Disaster Risk Science*, 7, 1-29. doi:10.1007/s13753-016-0081-x
- Aitsi-Selmi, A., Egawa, S., Sasaki, H., Wannous, C., & Murray, V. (2015b). The Sendai Framework for Disaster Risk Reduction: Renewing the global commitment to people's resilience, health, and well-being. *International Journal of Disaster Risk Science*, 6, 164-176. doi: 10.1007/s13753-015-0050-9
- Alexander, D.E. (1997). The study of natural disasters, 1977-1997: Some reflections on a changing field of knowledge. *Disasters*, 21, 284-304. doi: 10.1111/1467-7717.00064
- Buliruarua, L.A., Hemstock, S.H., Jacot Des Combes, H., Kua, N., Martin, T., Satiki, V., & Manuella-Morris, T. (2015). *P-ACP Training needs and gap analysis. Reports for Fiji, Cook Islands, the Federated States of Micronesia, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor Leste, Tonga, Tuvalu and Vanuatu. The Pacific Community and The University of The South Pacific*. Suva, Fiji: EU PactVET.
- Climate Change Policy & Practice (2016). *UNFCCC reports on capacity-building activities*. Retrieved from <http://climate-1.iisd.org/news/unfccc-reports-on-capacity-building-activities/>
- European Higher Education Area. (2014). *Bologna Process - European Higher Education Area*. Retrieved from www.ehea.info/
- EM-DAT (2016). *The CRED/OFDA international disaster database*. Retrieved from www.emdat.be/disaster_trends/index.html
- Field, C.B., Barros, V., Stocker, T.F., Qin, D., Dokken, D.J., Ebi, ... P.M. Midgley (Ed.s) (2012). *Managing the risks of extreme events and disasters to advance climate change adaptation. A special report of working groups I and II of the Intergovernmental Panel on Climate Change*. Cambridge, United Kingdom: Cambridge University Press.
- Hagelsteen, M., & Burke, J. (2016). Practical aspects of capacity development in the context of disaster risk reduction. *International Journal of Disaster Risk Reduction*, 16, 43–52. doi:10.1016/j.ijdr.2016.01.010
- Harris, K., & Bahadur, A. (2011). *Harnessing synergies: mainstreaming climate change adaptation in disaster risk reduction programmes and policies*. Retrieved from <http://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/2491/Harnessing%20synergies.pdf?sequence=1>
- Holloway, A. (2005). Disaster risk science in southern Africa: Taking it into the academic mainstream. In J. Teggle (Ed.), *Know risk* (pp.113-114). Geneva, Switzerland: United Nations Inter-Agency Secretariat of the International Strategy for Disaster Reduction.
- Holloway, A. (2009). Environmental and geographical science sans frontières: Unfolding disaster risk science in the Western Cape. *Gateways: International Journal of Community Research and Engagement*, 2, 98-118. Retrieved from <http://epress.lib.uts.edu.au/journals/index.php/ijcre>
- Holloway, A. (2014). *Strategic mobilization of higher education institutions in disaster risk reduction capacity-building: Experience of Periperi U. Input Paper for the 2015 Global Assessment Report on Disaster Risk Reduction*. Geneva, Switzerland: UNISDR. Retrieved from www.preventionweb.net/english/hyogo/gar/2015/en/bgdocs/Holloway,%202014.pdf
- ISO (2016). *ISO Action plan for developing countries 2016-2020*. Retrieved from www.iso.org/iso/iso_action_plan_2016-2020_en_id.pdf
- Jacot Des Combes, H., Buliruarua, L.A., Hemstock, S.H., Kua, N., Marawa, T., Martin, T., & Satiki, V. (In Press). *Report of the P-ACP Regional Industry Standards Advisory Committee - Fiji, Cook Islands, the Federated States of Micronesia, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor Leste, Tonga, Tuvalu and Vanuatu*. Suva, Fiji: The Pacific Community.
- Jordon, A., Huitema, D., Van Asselt, H., Rayner, T., & Berkhout, F. (2010). *Climate change policy in the European Union: Confronting the dilemmas of adaptation and mitigation*. Cambridge, United Kingdom: Cambridge University Press.

- Martin, T., Hemstock, S.H., Jacot Des Combes, H., Kua, N., Satiki, V., Buliruarua, L.-A., & Marawa, T. (2015). *P-ACP Training needs and gap analysis. Synthesis report. European Union Pacific Technical and Vocational Education and Training in Sustainable Energy and Climate Change Adaptation project (EU PacTVET). EU PacTVET - FED/2014/347-438*. Suva, Fiji: The Pacific Community
- Menoni, S., Bonadonna, C., Szarzynski, J., Frischknecht, C., Ballio, F., Di Prisco, ... de Vita, D. (2014). *Higher education curricula aimed at training disaster risk managers of the future. Input paper prepared for the 2015 Global Assessment Report on Disaster Risk Reduction*. Geneva, Switzerland: UNISDR.
- Murray, V., McBean, G., Bhatt, M., Borsch, S., Cheong, T.S., Erian, W.F., ... Suarez, A.G. (2012). Case studies. In C.B. Field, V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, ... P.M. Midgley (Eds.), *Managing the risks of extreme events and disasters to advance climate change adaptation. A special report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC)* (pp.487-542). Cambridge, United Kingdom: Cambridge University Press.
- New Zealand Universities. (2015). *Disaster risk management studies: Higher education opportunities in New Zealand*. Retrieved from www.wcdrr.org/conference/events/1276
- Ofir, Z., & Mentz, M. (2015). *Periperi U phase III summative evaluation*. Retrieved from www.riskreductionafrica.org/wp-content/uploads/2016/02/PPU-Phase-III-Evaluation-Report-FINAL.pdf
- Periperi U. (2015). *A risk education network: Extending connections – reinforcing resilience*. Retrieved from www.riskreductionafrica.org/wp-content/uploads/2015/03/PPU-brochure_WEB-2.pdf
- Ronan, K.R. (2015a). *Disaster risk reduction and disaster risk management training in higher education: An initial scoping review*. Paris, France: UNESCO.
- Ronan, K. R. (2015b). *Many advances, continuing challenges towards HFA2 and Post-2015: Policy-practice-research summary and recommendations. Hyogo Framework for Action Thematic Review: Priority for Action (PFA) 3 – Core Indicator (CI) 2: School curricula, education material and relevant training including disaster risk reduction and recovery concepts and practices. Background Chapter prepared for United Nations Office for Disaster Risk Reduction and the Global Assessment Report on Disaster Risk Reduction, 2015*. Paris, France: UNESCO. Geneva, Switzerland: UNICEF.
- UNESCO Institute for Lifelong Learning. (2015). *Global inventory of qualifications frameworks*. Hamburg, Germany: UNESCO Institute for Lifelong Learning.
- UNISDR (2009). *UNISDR terminology*. Retrieved from www.unisdr.org/we/inform/terminology
- UNISDR (2013). *Number of climate-related disasters around the world (1980 -2011)*. Retrieved from www.flickr.com/photos/isdr/7460711188/in/album-72157628015380393/
- UNISDR (2015a). *Sendai framework for disaster risk reduction 2015–2030*. Geneva, Switzerland: UNISDR. Retrieved from www.unisdr.org/files/43291_sendaiframeworkfordrren.pdf
- UNISDR (2015b). *Global assessment report on disaster risk reduction - Making development sustainable: The future of disaster risk management*. Geneva, Switzerland: United Nations International Strategy for Disaster Reduction.
- UNISDR (2016a). *Launching UNISDR science and technology partnership and the science and technology road map to 2030. Short concept note: Work stream 4, working group 2*. Retrieved from www.preventionweb.net/files/45270_unisdr-cnws4wg2capacitydevelopment.pdf
- UNISDR (2016b). *The science and technology road map to support the implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030*. Retrieved from www.preventionweb.net/files/45270_unisdr-scienceandtechnologyroadmap.pdf
- UNISDR (2016c). *Framework for resilient development in the Pacific: An integrated approach to climate change and disaster risk management*. Retrieved from www.pacificdisaster.net/dox/SRDP.pdf
- United Nations (2016a). *Sustainable development goals*. Retrieved from <https://sustainabledevelopment.un.org/?menu=1300>
- United Nations (2016b). *Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015. Addendum part two: Action taken by the Conference of the Parties at its twenty-first session*. Retrieved from http://unfccc.int/meetings/paris_nov_2015/meeting/8926/php/view/documents.php
- Woods, J., Hemstock, S.L., & Bunyeat, J. (2006). Bio-energy systems at the community level in the south Pacific: impacts & monitoring. Greenhouse gas emissions and abrupt climate change: positive options and robust policy. *Journal of Mitigation and Adaptation Strategies for Global Change*, 41, 473–499. doi: 10.1007/s11027-005-9009-2

Appendix 1 : Key Policies by Country

Country	Key Policy
Cook Islands	Cook Islands Joint National Action Plan for DRM & CCA Climate & Disaster Compatible Development Policy 2013-2016
Fiji	National DRM Plan 1995 National Disaster Management Act 1998 Fiji National CC Policy 2012 Draft Energy Policy
Federated States of Micronesia	Joint State Action Plan for CC & DRM Draft National Policy
Republic of Kiribati	Kiribati Joint Implementation Plan for CC and DRM 2014-2023
Republic of Nauru	Nauru has not yet established a specific environmental policy. A no regrets approach has been adopted to adaption accommodating climate and sea level change considerations and implementation of the National Environmental Action Plan and the Rehabilitation Master Land Use Plan
Niue	Niue's Joint Action Plan for DRM & CCA
Republic of Palau	Palau Climate Change Policy For Climate and Disaster Resilient Low Emissions Development 2015
Papua New Guinea	The National Development Strategic Plan (2011-2030)
Republic of the Marshall Islands	RMI Joint Action Plan for CCA & DRM Vision 2018 (2003-2018) National Climate Change Policy Framework 2011 Ministry of Education Strategic Plan (2013-2016)

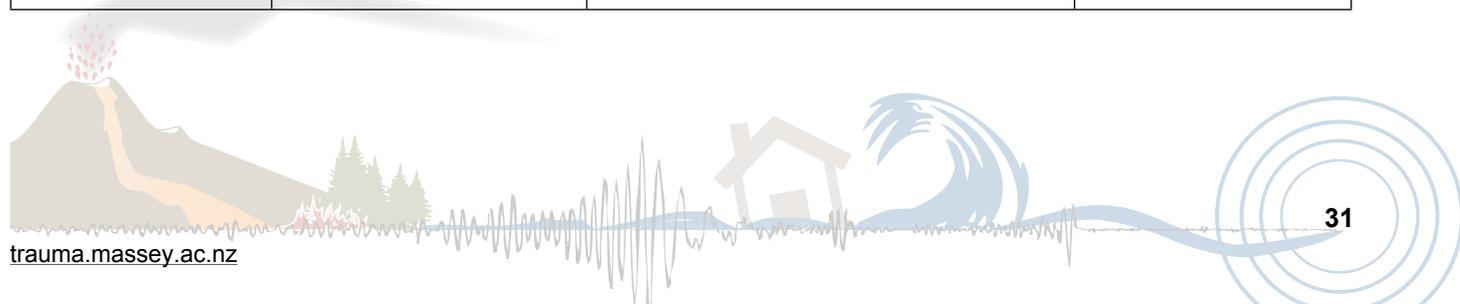
Country	Key Policy
Independent State of Samoa	National Policy of Combating Climate Change 2007 Greenhouse Gas Abatement Strategy 2008 Strategic Action Plan 2008 Samoa National Action Plan for DRM 2011-2016
Solomon Islands	Solomon Islands National Disaster Risk Reduction Policy (2010) National Development Strategy 2011-2020 Solomon Islands Climate Change Policy (2012)
Democratic Republic of Timor-Leste	National Strategic Development Plan (2011) National Disaster Risk Management Policy/ Plan (PNJRD/NDRMP) National Adaptation Programme of Action on Climate Change (NAPA)
Kingdom of Tonga	Tonga National Climate Change Policy and Joint National Action Plan for CCA & DRM 2010-2015 A Resilient Tonga by 2035
Tuvalu	Tuvalu National Strategic Action Plan for CCA & DRM 2012-2016
Republic of Vanuatu	Vanuatu Disaster Risk Reduction and Disaster Management Plan 2006-2016 Republic of Vanuatu National CCA Strategy (2012-2022) Climate Change and Disaster Risk Reduction Policy 2016 - 2030

Appendix 2: Examples of Initiatives that Aim to Provide DRR/CCA Capacity Development Training

This list is based on the experience of the authors and does not represent an exhaustive list of the available training.

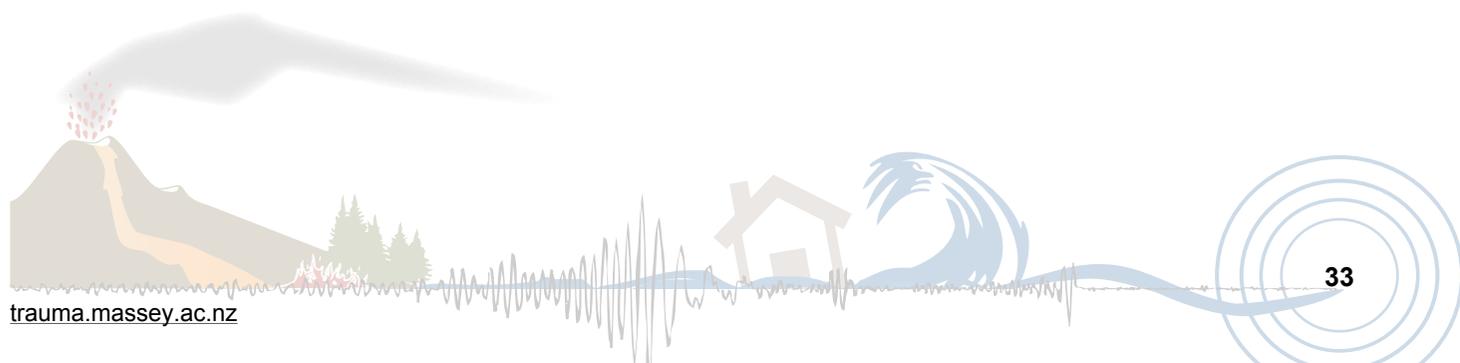
Organisation	Initiative	Brief Description	Accreditation
Academic Network for Disaster Resilience to Optimise Educational Development (ANDROID)	Online Doctoral School & Residential Doctoral School	EU Inter-disciplinary consortium focused on several major capacity-building and baseline knowledge acquisition on innovative inter-disciplinary approaches to working, mapping of DRR teaching and research programs, policy capacities, emerging risk and open educational resources.	
Asian University Network of Environment and Disaster Risk Management (AUDEM)		Platform for university partnership to reduce disaster and climate change risks in Asia, including a specific focus on CCA-DRR interface. Focus includes building multi-disciplinary DRR-CCA capacity through the higher education sector.	
Association of Pacific Rim Universities- International Research Institute of Disaster Science (APRU-IRIDeS) Multi-Hazards Program		Large collaboration of universities in Asia-Pacific with main aim of building "safer and more disaster resilient societies through education, research, and partnerships" (Fernandez & Shaw, 2016, p.215-225)).	

Collaborating Centre for Oxford University and CUHK for Disaster and Medical Humanitarian Response (CCOUC)	Disaster and Humanitarian Specialised Public Health Courses and Summer Short Courses	Formal disaster and humanitarian technical training for Master of Public Health (MPH) students and field practitioners at the Chinese University of Hong Kong.	Certificates for individual courses for non-MPH students, or Master's degree upon completion of MPH degree requirements
	Croucher Summer Course	Five-day residential summer course, aimed at postgraduate students and early career. Researchers in relevant fields from Hong Kong and the wider region on Research Methodology for Disaster and Medical Humanitarian Response.	Non formal: Certificate of completion
	E-Learning Courses: Public Health Principles in Disaster and Medical Humanitarian Response; Climate Change and Health; Others in development	Free online courses for individuals studying and working in health, policy, education and humanitarian sectors.	Non formal: Students who obtain 60% or above in the final assessment will be issued a printable certificate in recognition of completing the course
	Train the trainer workshops in Mainland China and Asia	In collaboration with government, academia and civil society stakeholders, the training develops the capacity of international and local practitioners on disaster preparedness and resilience in urban, suburban and rural communities.	
	Professional Development Programmes (PDPs) for Secondary School Teachers	Working with Hong Kong's Education Bureau to assist teachers to apply public health principles to disaster management using case studies and prepare for the teaching of Globalisation and Public Health modules in the liberal studies curriculum.	Non formal: Certificate of attendance
Griffith University, Australia	Environment Humanitarian & Disaster Initiative Environmental Health Disaster Management Course	Courses that will include DRR and Resilient Cities approaches plus the existing CDC Environmental Health Training in Emergency Response to state and Local City Government and other specialists. Currently looking to expand to other countries.	Endorsed by the International Federation of Environmental Health (IFEH) via an MOU.
International Federation of Environmental Health (IFEH)	Establishing SIGs on DDR World Congresses and World Academic Congresses on Environmental Health	The IFEH covers and connect 43 national EH organisations and 26 universities globally – and thereby some 50,000 environmental health professionals. These initiatives will be used as a platform in order to create awareness about Disaster Risk Reduction, in order to build capacity and in order to exchange and share knowledge on DDR	
	IFEH is endorsing the course offered by Griffith University: Environmental Health Disaster Management Course which includes Disaster Management as well as Disaster Risk Reduction.	Environmental health professionals and university masters students are provided with five days of intensive training with the skills and knowledge required to ensure they can adequately prepare for, respond to, recover from, and mitigate the adverse environmental health impacts of disasters.	
International Institute of Seismology and Earthquake Engineering (IISEE). A UNESCO centre of excellence.	Masters Program in Seismology, Earthquake Engineering and Tsunami Disaster Mitigation (in cooperation with National Graduate Institute for Policy Studies (GRIPS). Earthquake Engineering for Latin America in Spanish. Global Seismological Observation Course.	Training courses in English in seismology, earthquake engineering and tsunami disaster mitigation to researchers and engineers since 1960, in cooperation with the Japan International Cooperation Agency (JICA) and the Ministry of Land, Infrastructure, Transport and Tourism (MLIT).	



Japan International Cooperation Agency (JICA)	Knowledge Co-Creation Program since 1955	More than 400 training and dialogue programs annually cover wide range of subject areas, with more than 20 courses on DRR including flood, landslide, tsunami, earthquake, meteorology, and comprehensive DRR.	
New Zealand Universities		Several New Zealand universities offer sub-degree courses, graduate and post-graduate degrees in DRR, DRM and Emergency Management (e.g. Massey University, University of Auckland, Auckland University of Technology, University of Canterbury and Lincoln University).	Formal –Open2Study Emergency Management MOOC, Graduate Certificate, Graduate Diploma, Postgraduate Diploma, Masters and PhD. (Part of the PGDip CC awarded by USP).
Pacific Community / University of the South Pacific	European Union Pacific Technical Vocational and Education in SE and CCA Project (EU PacTVET)	National Certificate Levels 1 to 4 in Resilience –DRR & CCA.	Accredited by Fiji Higher Education Commission and listed on the Pacific Register of Qualifications and Standards, Pacific Community Education Quality and Assessment Programme.
Partners Enhancing Resilience for People Exposed to Risks (Periperi U)	For example, RADAR's short course on Community Risk Assessment is benchmarked at NQL 6 and is credit-bearing.	University partnership in Africa with locally relevant risk reduction short courses and formal, accredited DRM/R/S academic programmes available. They are designed to align with local needs and capacities.	
Secretariat of the Pacific Community (SPC)	Global Climate Change Alliance: Pacific Small Island States	Government employee training on cost benefit analysis, project planning, and disaster response.	Non-formal – Certificate of participation
	Geosciences Division	Training on post disaster recovery for National Disaster Management Officers.	Non-formal – Certificate of participation
United Nations Educational, Scientific and Cultural Organization (UNESCO)	Masters courses by International Centre for Water Hazard Risk Management (ICHARM, Japan) on water related hazard management National Observatory of Athens (Greece) and Tribhuvan University (Nepal) on DRR focusing on earthquake École Polytechnique Federale de Lausanne (EPFL) offered certificate of advanced studies in DRR	UNESCO affiliated universities and institutions offer master and doctoral programmes and certificate courses on general DRM and subject specific courses such as water related and geo-hazards.	Master/Doctoral degree and certificate
United Nations University (UNU)	Joint Masters (M.Sc.) Geography of Environmental Risks and Human Security with the University of Bonn	The two-year programme offers an in-depth introduction to problem-oriented research methods, theories and concepts in vulnerability assessment, resilience analysis, risk management and adaptation strategies, and environmentally induced internal displacement and transboundary migration.	Internationally accredited M.Sc. Certificate from UNU-EHS and the University of Bonn
	Doctoral Programme	Offered by the UNU-EHS in collaboration with a wide range of international universities, PhD students are usually integrated in ongoing research projects at UNU-EHS and are free to select a corresponding participating international university.	Upon graduation, students are awarded a doctoral degree by their supporting international university.
	Affiliated Degree Programme	Several distinguished universities around the world have incorporated United Nations University (UNU) teaching and training components into their master's and doctoral degree programmes.	Upon successful completion of the UNU component, students will receive the relevant degree from the affiliated university.

	Non-degree courses such as the Intensive Summer Course: Advancing Disaster Risk Reduction to Enhance Sustainable Development in a Changing World from the Institute for Environment and Human Security (UNU-EHS)	To increase awareness of academics and practitioners working in related fields, regarding the complexity and importance of vulnerability and resilience in the field of DRR and CCA.	Non-formal - Certificate of participation
	E-learning	UNU-EHS conceptualizes and generates eLearning materials in relation to the core competencies of the institute.	
The University of Manchester (UK): Humanitarian and Conflict Research Institute (HCRI)	Six postgraduate programmes and postgraduate Certificates	Masters programmes: Humanitarianism and Conflict Response; International Disaster Management; Peace and Conflict Studies; Disaster Management- Resilience, Response and Relief (Online); Global Health (Online). Online PG Certificates: Global Health PG Diploma in Global Health	Upon graduation, students are awarded an MA, MSc or PG Certificates, depending on the programme.
	Two undergraduate programmes	Undergraduate programmes in: International Disaster Management and Humanitarian Response; Global Health.	Upon graduation, students are awarded a BSc degree
	Doctoral programme	Designed by the student on a topic of their choice across disaster management, humanitarianism and global health.	Upon graduation, students are awarded a PhD degree
The University of the South Pacific	European Union Global Climate Change Alliance Project (USP-EU GCCA)	Elective course on DRM in the Post-Graduate Diploma on climate change. MSc and PHD on climate change with topics linking DRM and climate change.	Non-formal – Certificate of participation
		Post Graduate Diploma in Climate Change	PGDip CC awarded by USP
		Master of Science in Climate Change	MSc CC awarded by USP
		PhD in Climate Change	PhD CC awarded by USP
World Association for Disaster and Emergency Medicine (WADEM)		Facilitation of academic and research-based education and training.	



Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.