Proceedings of
UNESCO Chair Programme on Cultural Heritage and Risk Management

INTERNATIONAL TRAINING COURSE (ITC) on DISASTER RISK MANAGEMENT of CULTURAL HERITAGE, Ritsumeikan University, and International Symposium "Working Internationally Toward the Integrated Protection of Cultural Heritage from Disasters"

2017, 12th year
28th August to 16th September 2017
At Kyoto, Kumano and Kobe, Japan

Co-Organized by Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University (R-DMUCH), Kyoto, Japan, and the National Institutes for Cultural Heritage (NICH), Japan
In Cooperation with UNESCO, ICCROM, ICOM, ICOMOS / ICORP

A cover photo: Nachi waterfall at Kumano Nachi Shrines, one of the important Shinto shrine of the world heritage "Sacred Sites and Pilgrimage Routes in the Kii Mountain Range" , which was damaged by typhoon Talas in 2011.

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Authors: Participants of ITC2017 and former participants of ITC

Coordinated by: Rohit JIGYASU, UNESCO Chair Holder, Professor
Dowon KIM, Associate Professor

Edited by: Rohit JIGYASU, UNESCO Chair Holder, Professor
Dowon KIM, Associate Professor
Mingji CUI, Senior Researcher
Rui BANNO, Administrative Staff of R-DMUCH

Layout by: Nami HAYASHIDA,
Graduate Student, Graduate School of Science and Engineering, Ritsumeikan University
1-1-1 Noji Higashi, Kusatsu-shi, Shiga Pref. 525-8577 Japan

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Preface

The “Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University (R-DMUCH)” was established as a permanent research institution in 2013 and has handed over activities from former organization as “Research Center for Disaster Mitigation of Urban Cultural Heritage” which was started by Prof. Kenzo TOKI from 2003.

The “UNESCO Chair International Training Course on Disaster Risk Management of Cultural Heritage” started from 2006 as one of our important educational activities, and fortunately we can continue it up to this year supported by UNESCO, ICCROM, ICOM, ICOMOS/ICORP, Ritsumeikan University and many national and international organizations. And we are very much fortunate for that NICH (the Independent Administrative Institution National Institutes for Cultural Heritage in Japan) has been a co-organization by this chair program from 2017. I would like to thank these colleagues for supporting us and participants from all over the world. The purposes of this training course are education of practical experts in each field of cultural heritage conservation and disaster risk management, and development of draft plan for disaster risk management to secure the safety of people and cultural value in each cultural heritage site and historical city. I hope these plans to be actual projects in each country and contribute to cultural advancement in the world.

Through the ITC in 2017 with theme as “Integrated Protection of Immovable and Movable Cultural Heritage from Disasters”, most of participants thought about developing their case project toward multiple and simultaneous disaster risk, and for both of immovable and movable heritage. The outcomes were fantastic although the training is limited in short period, and some of participants already begin their project in their actual site.
And International Symposium of “the Working Internationally toward the Integrated Protection of Cultural Heritage from Disasters” was held in the last day of ITC. In this opportunity, selected three of ITC 2017 participants made a wonderful presentation. And all the speakers, audiences and staffs who are the important participants on this symposium, could share the lessons and experiences of past disaster response, preparedness and recovery, and we could constructively discuss about future goals.

Thank you all again for supporting this activity, and please keep in touch with us for inheriting cultural heritages for next generation.

Takeyuki OKUBO
Director, R-DMUCH
Professor, Department of Civil Engineering, Ritsumeikan University

Preface

Each year disasters caused by natural and human induced hazards cause enormous damage to cultural heritage, which include historic buildings, urban areas, museums, libraries and archives depriving communities of their irreplaceable cultural assets. Moreover, damages to cultural landscapes and local flora and fauna in general cause loss of valued ecosystem services thereby putting sustainability of local communities at risk. Often disasters also affect the intangible cultural heritage of traditional knowledge, practices, skills and crafts that ensure cultural continuity, as well as the means for its protection and maintenance.

There are many global examples that demonstrate the impact of disasters on cultural heritage properties. Damages to heritage worldwide due to disasters include Historic Settlements in Central Italy and Bagan Archaeological Site in Myanmar due to earthquakes in 2016, World Heritage Monument Zones of Kathmandu Valley due to 2015 earthquakes in Nepal; Fires in the World Heritage Town of Lijiang in China in 2013 and 2014; and the Old Town of Edinburgh in the United Kingdom in 2002. In Korea, arson damaged the Sunraemon Gate in 2008, which is designated as cultural property number one. Cultural heritage sites have also suffered enormous damages due to human induced hazards like conflicts and vandalism, such as in the case of Aleppo and Palmyra in Syria and Timbuktu Shrines in Mali and Bamiyan Buddhas in Afghanistan.

Climate change is increasing the number of disasters and their devastating impacts. From 1988 to 2007, 76 per cent of all disaster events were hydrological, meteorological or climatological in nature. These hazards are adversely impacting on natural and cultural heritage. Take for example the case of forest fires in Eastern Europe in 2008, which posed a high risk to the archaeological site of Olympia in Greece. Flash floods due to unprecedented heavy rains in India's Uttarakhand State in 2013 destroyed many heritage structures in the region, while storms in Western Europe in 2010 flooded many historic town centres such as Rome. Also heavy rains in Thailand caused the World Heritage Site of Ayutthaya to remain submerged in water thereby causing insurmountable loss to the foundations of historic built structures. The likelihood of increased weather extremes in future therefore gives great concern that the number or scale of weather-related disasters will also increase thereby dramatically increasing their impact on heritage in not too distant future.

Needless to say, disasters not only cause material damage but also put the lives of visitors, staff and local communities in and around Cultural heritage Properties at risk. These also affect the livelihoods linked to heritage and the revenues generated by the local government and the private sector through tourism. Finally, the psychological impact on communities due to loss of heritage to which they are closely associated cannot be underestimated.

Considering the above mentioned challenges, disaster risk management of cultural heritage is need of the hour. On one hand, this would necessitate each heritage site and museum to have its own disaster risk management plan that is tailored to its specific characteristics. On the other hand, cultural heritage needs to be well integrated into overall disaster risk management policies and plans at national, regional and local levels.

Moreover heritage sites and museums should undergo integrated risk assessment that takes into account multiple hazards / threats, multiple physical, social, economic, institutional and attitudinal vulnerabilities and exposure and consequent potential impact on heritage attributes and the associated values, people's safety, economy and livelihoods and on the social structure. Various components of disaster risk management plan of cultural heritage before, during after disaster would include prevention, mitigation

and preparedness measures, emergency response procedures, and recovery and rehabilitation process. However investing in disaster risk reduction through mitigation and preparedness makes much more economic sense than investing heavily on response and recovery as previous experience in Nepal, Myanmar and Italy have aptly demonstrated. Going by the widely accepted principle of 'Building Back Better', recovery and rehabilitation process should incorporate mitigation of risks for future disasters.

Need for close coordination and public awareness:

In order to undertake effective measures for disaster risk reduction, there needs to be greater cooperation between agencies and professionals from heritage and disaster management fields. For emergency response, heritage professionals and agencies should work closely with civic defence organizations. Sendai Framework on Disaster Risk Reduction adopted in 2015 has clearly advocated reducing risks to cultural heritage in the national policies on disaster risk management. Moreover DRM for cultural heritage should be integrated into various development sectors such as sanitation, water supply, housing, environment, infrastructure and services. This would also require capacity building initiatives at various levels.

Need for Capacity Building:

This necessitates building the capacity of site managers, civic defence agencies as well as decision makers from heritage as well as disaster management fields on reducing disaster risks to cultural heritage. The International Training Course on Disaster Risk Management of Cultural Heritage organized by the Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University as part of the UNESCO Chair Programme on Cultural Heritage and Risk Management has been successfully achieving this since its inception in 2006. The course organised in close cooperation with ICCROM, ICOMOS-ICORP and UNESCO World Heritage Centre is now in its 13th year and has so far trained 127 experts from 56 countries. These include representatives from government institutions, departments, universities NGOs and private consultants from cultural heritage as well as relevant disaster management fields.

ITC 2017 and its proceedings

I am pleased to present the proceedings of the 12th International Training Course which was attended by 11 participants from 11 countries in Europe, Africa, Latin America and Asia Pacific. The theme of the course was "Towards Integrated Protection of Immovable and Movable Cultural Heritage from Disasters". During the course, the trainees deepened their understanding on various aspects of disaster risk management of cultural heritage in Japan and the World. All the lectures, site visits, exercises and workshops were performed by the international and Japanese team of experts in Kyoto, Kobe and Kumano.

From this year, Ritsumeikan University also started cooperation with the Japanese National Institutes for Cultural Heritage (NICH) so that trainees could learn risk management for both immovable and movable cultural heritage. Special lectures and practical exercises related to disaster risk management of movable heritage were conducted by the renowned museum experts at Kyoto National Museum, ICCROM and the Smithsonian Institution. International Symposium "Working Internationally toward the Integrated Protection of Cultural Heritage from Disasters" was held on the final day of the course and it was attended by approximately 75 Japanese and international experts and public. A brief report on the Symposium is also included in the proceedings.

The proceedings also contain brief reports on disaster risk management plans for case study sites from the home countries of the participants based on the outlines prepared by them during the course. Hope this year's proceedings will serve as a good resource for disseminating the knowledge in this important area.

Rohit JIGYASU
UNESCO Chair Holder, Professor,
Institute of Disaster Mitigation for Urban Cultural Heritage Ritsumeikan University, Kyoto

Preface

First of all, I would like to express my sincere appreciation to the Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University (R-DMUCH), which has regularly held the International Training Course (ITC) on Disaster Risk Management of Cultural Heritage since establishing its UNESCO Chair in 2006.

In July 2014, the National Institutes for Cultural Heritage (NICH) established the National Task Force for the Japanese Cultural Heritage Disaster Risk Mitigation (CH-DRM) Network Headquarters with the aim of developing a network for disaster risk management and mitigation as it relates to cultural heritage. This was triggered by the salvage operations for disaster-affected cultural property following the March 2011 Great East Japan Earthquake, which caused serious damage to heritage in the region. Based on this experience the seven institutions of NICH, including national museums and national cultural property research institutes, are currently working together on various CH-DRM projects. Over the past three years, we have strived to expand and strengthen our network with support and cooperation from various sectors including museums, local governments, private volunteer groups, and others.

As part of the activities of the CH-DRM Network, I am very pleased that we were able to participate in this meaningful training course. In past years, the ITC has covered various issues related to emergency management and disaster risk mitigation with a focus on architecture and monuments, such as buildings and townscapes. This year, with cooperation from ICOM, it dealt with movable cultural heritage such as art objects, as well as intangible cultural heritage, such as festivals, offering the chance to consider disaster risk mitigation of cultural heritage from a more comprehensive perspective. I hope this new initiative helped participants deepen their understanding of Japan and the world's cultural heritage preservation and disaster risk mitigation.

Another important aspect of this training is that it brings together professionals in a range of specialties from around the world. This in itself allows them to deepen their friendships and networks, thereby contributing to the revitalization of international exchange in the cultural heritage sector. We hope that the knowledge gained from this training will be applied to future cultural heritage disaster prevention efforts and look forward to the further development of this training.

Finally, I would like to express my sincere gratitude to D-MUCH and everyone else who helped organize the ITC for providing such a wonderful opportunity.

Jōhei SASAKI
Executive Director, Kyoto National Museum
National Institutes for Cultural Heritage

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1 Introduction

1.1 Background and Objectives of the 12th International Training Course 2017

Disasters and Cultural Heritage

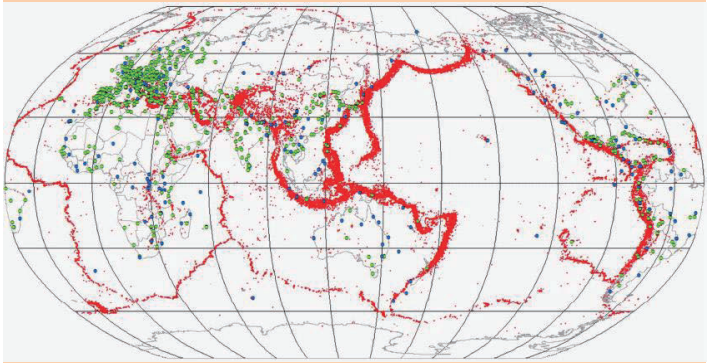
Recent disasters such as Myanmar/Italy earthquake in 2016, Nepal earthquakes in April and May 2015, earthquake and cyclones in Philippines in 2014, fires in Lijiang, China in 2013 and 2014, the devastating tsunami in North East of Japan in 2011 and as well as earthquakes that hit Christchurch, New Zealand in 2010 and 2011, Haiti and Chile in 2010 have caused enormous loss of life, property and cultural heritage. This disaster has once again shown that cultural heritage is highly vulnerable to natural disasters such as earthquake, the Tsunami, fire, floods and cyclones.

Therefore it is important to undertake proactive measures that can reduce risks to cultural heritage from these catastrophic events through adequate mitigation and preparedness. In the post disaster phase, the challenge is how to salvage heritage properties, which are at risk of demolition and to assess their damage. The long term challenge during recovery phase is how to repair and retrofit them and undertake reconstruction that respects tangible as well as intangible heritage values.

In the light of these challenges, comprehensive risk management is essential for the protection of cultural heritage from disasters. Therefore Cultural Heritage and Risk Management project of Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University (R-DMUCH) aims to organize the International Training Programme to build the institutional capacity needed to formulate comprehensive risk management plans that are based on the characteristics of cultural heritage and nature of hazards in the regional context.

One of the main reasons for extensive damage to cultural heritage is due to floods, typhoons, cyclones and other climate related hazards, whose frequency and intensity is increasing due to the impacts of climate change. These may also cause secondary hazards such as landslides and thereby exacerbating the damage. Considering these issues, the 12th International Training Course on Disaster Risk Management of Cultural Heritage will specifically focus on **"Integrated Protection of Immovable and Movable Cultural Heritage from Disasters"**.

World Heritage Sites Located in the Earthquake Zones 2008



(●:Earthquake, ●: Cultural and Mixed Heritage, ●: Natural Heritage)

By Research Center for Disaster Mitigation of Urban Cultural Heritage,
Ritsumeikan University, Kyoto Japan, 2008

Regional Distribution of World Heritage sites located on the Earthquake Zones

Region	0-100 km	100-200 km	Within 200km		Over 200km		Total
Cultural/Mix	100	91	191	27%	513	73%	704
Australia/New Zealand		1	1	14%	6	86%	7
Caribbean	2	3	5	45%	6	55%	11
Central America	10	10	20	59%	14	41%	34
Central Asia	2		2	22%	7	78%	9
Eastern Africa	2	1	3	14%	18	86%	21
Eastern Asia	10	11	21	42%	29	58%	50
Eastern Europe		1	1	2%	56	98%	57
European Russia			0	0%	14	100%	14
Melanesia	1	1	2	100%		0%	2
Middle Africa		1	1	100%		0%	1
Northern Africa	3	4	7	21%	27	79%	34
Northern America	1		1	7%	13	93%	14
Northern Europe	1		1	2%	49	98%	50
South America	8	16	24	57%	18	43%	42
Southeastern Asia	6	1	7	39%	11	61%	18
Sothern Africa			0	0%	7	100%	7
Southern Asia	6	8	14	29%	34	71%	48
Southern Europe	35	23	58	45%	70	55%	128
Western Africa			0	0%	16	100%	16
Western Asia	13	8	21	40%	31	60%	52
Western Europe		2	2	2%	87	98%	89
Natural	36	18	54	31%	120	69%	174
Total	136	109	245	28%	633	72%	878

Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University and Its Training Course

The International Training Course on Disaster Risk Management of Cultural Heritage is a follow-up of the recommendations adopted at the Special Thematic Session on Risk Management for Cultural Heritage held at UN-WCDR (World Conference on Disaster Reduction) in January 2005 in Kobe, Hyogo, Japan. One of these recommendations advocated the need for the academic community to develop scientific research, education and training programs incorporating cultural heritage in both its tangible and intangible manifestations, into risk management and disaster recovery. The importance of strengthening knowledge, innovation and education to build a culture of disaster prevention at WH properties was reiterated also by the World Heritage Committee at its 30th session (Vilnius, Lithuania, July 2006).

Furthermore, the "Declaration", adopted at the International Disaster Reduction Conference (IDRC) of Davos (August 2006) confirmed that "concern for heritage, both tangible and intangible, should be incorporated into disaster risk reduction strategies and plans, which are strengthened through attention to cultural attributes and traditional knowledge." The Sendai Framework on Disaster Risk Reduction recently adopted at the World Conference on Disaster Risk Reduction in Sendai, Japan has further highlighted the importance of protecting cultural heritage from disasters. Cultural heritage has also been included one of the sectors in the new ten essentials that have been adopted by UNISDR's resilient city campaign.

In response to these recommendations by the international community, the Institute of Disaster Mitigation for Urban Cultural Heritage at Ritsumeikan University (R-DMUCH) has been acting as a focal point for organizing international research, training and information network in the field of cultural heritage risk management and disaster mitigation. Besides R-DMUCH has also functioned as the international secretariat for ICOMOS-International Scientific Committee on Risk Preparedness (ICORP) from 2011 to 2016 and many of its faculty are expert members of the Scientific Committee.

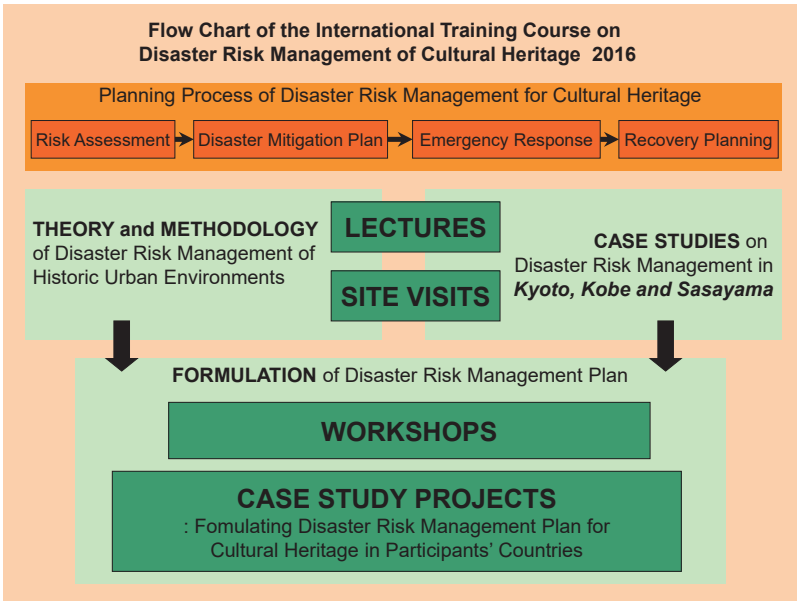
The past training courses has been participated by 116 participants in total from 54countries; East Asia (Indonesia, South Korea, China, Philippines, Malaysia, Myanmar and Thailand), South Asia (India, Pakistan, Bangladesh, Nepal, Bhutan, Sri Lanka and Maldives), Oceania (Palau, Fiji, New Zealand and Australia), Central and South America (Peru, Jamaica, Colombia, Mexico, Ecuador, Honduras, Brazil and Panama), Europe (Serbia, Moldova, Italy, Albania, Croatia, Bosnia and Herzegovina, Spain and Romania), Middle East (Iran, Turkey, Afghanistan, Syria, Iraq and Jordan), Africa (Kenya, Uganda, Nigeria, Tanzania, Egypt and Morocco).

Objectives and Methodology of the Training Course

The main objective of the course is to provide an overview of the various aspects of disaster risk management of cultural heritage. In particular, the course provides interdisciplinary training to:

- ✓ Undertake an integrated risk assessment of tangible and intangible, immovable and movable cultural heritage by analyzing their vulnerability to disasters caused by natural and human induced hazards;
- ✓ Build an integrated system for disaster risk management of cultural heritage, incorporating prevention/mitigation, preparedness, response and recovery measures;
- ✓ Formulate disaster risk management plans for cultural heritage that correspond to the local / urban and regional disaster management and development plans and policies and humanitarian response and recovery mechanisms;
- ✓ To learn practical tools, methodologies and skills for disaster risk management of cultural heritage such as cost benefit analysis, value assessment, budgeting and communication methods with decision makers such as mayors; and
- ✓ Reinforce the international scientific support network in order to build the institutional capacity needed to formulate comprehensive disaster risk management plans that are based on the characteristics of cultural heritage and nature of hazards in the national and regional context.

The course comprises lectures, site visits, workshops, discussions, team projects and individual/group presentations. Participants are expected to actively participate throughout the course. The course aims at promoting the development of collaborations and network building among scholars and professionals in cultural heritage protection. This course is provided scientific support by UNESCO and the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM).



Based on the information obtained from lectures and site visits, and exercises through workshops, the training course also sets the goal of raising planning skills in cultural heritage disaster prevention, by having each participant make a plan during a team project for the prevention of disaster to his/her country's cultural heritage, in line with each country's respective social and economic situation. In order to do so, the Institute has asked the participants to prepare the relevant materials before coming to Japan, so that the two participants from each country could learn from each other's experience through this process.

Sub Theme of 2017 International Training Programme:

Towards Integrated Protection of Immovable and Movable Cultural Heritage from Disasters

Cultural heritage is increasingly exposed to disasters caused by natural and human induced hazards such as earthquakes, floods, fires, terrorism etc. Recent examples include Earthquakes in Central Italy and Myanmar in 2016, Nepal earthquake in 2015, Balkan floods in 2014 and ongoing conflicts in Syria and Yemen. These disasters not only effect the immovable heritage components such as monuments, archaeological sites and historic urban areas but also cause damage to the movable components that include museum collections and heritage objects that are in active use such as religious and other artefacts of significance to the local community. Both these movable and immovable components are exposed to various hazards that necessitate appropriate measures to reduce disaster risks. Also in the aftermath of a disaster many architectural fragments of damaged or collapsed buildings need documentation, handling and storage similar to movable heritage collections.

Therefore, an integrated approach for movable and immovable heritage is needed for risk assessment of heritage sites as well as museums and its collections before, during and after a disaster situation. Limited availability of human and financial resources also calls for closer coordination between professionals and institutions dealing with heritage sites, museums and the external agencies.

Moreover, integrated disaster risk management involves appropriate mitigation and adaptation strategies to reduce various risks to movable and immovable heritage components by taking into consideration their heritage values that are often interdependent. It is also important to recognize many examples of traditional knowledge evolved by communities through series of trials and errors that demonstrate that movable and immovable cultural heritage can be an effective source of resilience against disaster risks and integrate these in larger disaster risk management strategies.

Considering these issues and challenges, the 12th International Training Course will give special focus on the **"Integrated Protection of Immovable and Movable Cultural Heritage from Disasters"**.

Flash floods in Himalayan Region, 2014


Cloudburst in Leh region, India, 2010


World Heritage Site of Ayutthaya in Thailand got inundated for weeks due to 2011 Floods


Unprecedented heavy rainfall in Balkans in 2014 flooded many historic towns and villages

Previous International Training Courses (2006-2016)

ITC 2006

In 2006, which was the first year for this course, eight participants from four countries were invited; namely India and Pakistan, which were struck by a great earthquake in 2005 in Kashmir; Indonesia, which suffered the Indian Ocean Tsunami triggered by the Sumatra Earthquake in 2004 and the Earthquake on the Javanese Island in 2004; and Korea, which had suffered a big forest fire.

ITC 2007

In 2007, R-DMUCH exchanged MOU with ICCROM and established a criterion for choosing participants with the support of ICCROM. As a result, eight trainees from Bangladesh, China, Peru and Philippines were invited for the training course.

Based on the experience of 2006 training course, it was decided to make closer relation between the lectures, site visits and workshops. Therefore in 2007, several related sets of lectures were held in the mornings and workshops in the afternoons. Based on these, discussions were facilitated by the instructors so that the trainees were able to reflect more effectively on the challenges for cultural heritage disaster management within their own context.

ITC 2008

The 2008 training course actively built upon the rich experience gathered during the courses held in the previous two years. This year had participants from five countries from Asia and Europe, namely Nepal,

Bhutan, Iran, Serbia and Chinese Taipei. Effort was made to make this year's course, more field-based by drawing upon the unique opportunity offered by the location of important World Heritage Sites in Kyoto such as Kiyomizu-dera and Ninna-ji temples. Most of the workshops were, therefore, based on field work undertaken by the participants in these sites. This year's course also put greater emphasis on exposing the participants to the **methodology for undertaking disaster risk assessment for cultural heritage sites.**

ITC 2009

The 2009 training course further evolved on the basis of rich feedback provided by the participants of the training courses from previous years. In response to the need for making the course more relevant to specific requirements and constraints of the developing countries, it was decided to organize the course partly in Japan and partly in Nepal.

Moreover, for the first time, the training course had a specific theme, namely **"Earthquake risk management of Historic Urban Areas."** For this purpose, Kyoto and Kathmandu; two historic cities with rich cultural heritage but extremely vulnerable to earthquakes, were chosen as the case study sites for undertaking field exercises during the training course.

The first week of the course was organized in Japan and it focused on familiarizing the participants with the basic methodology for risk assessment and management for cultural heritage properties. The participants were shown various disaster prevention facilities developed for numerous cultural heritage sites in Kyoto. Second week in Kathmandu focused on the earthquake vulnerability and capacity of the World Heritage Monument Zone of Patan and its surrounding historic urban area, both at building and area levels.

The UNESCO Chair programme intends to build upon the four years of very rich experience gained through very active participation of lecturers from Japan and abroad, as well as the international participants from various countries from Asia, Europe and the Caribbean and further enrich the contents of the training course in subsequent years.

ITC 2010

Fifth UNESCO Chair International Training Course on Disaster Risk Management of Cultural Heritage 2010 was held from 13 to 26 September 2010 in Kyoto, Kobe and Sasayama, Japan. In the light of destructive Haiti earthquake on January 2010, this fifth International Training Course especially focused on **emergency response and long term recovery of wooden and masonry composite Cultural Heritage from disasters**. It was attended by 11 participants from 5 countries; Bhutan, Palau, Peru, Serbia and Turkey.

On the final day of the course, the international symposium titled "How to protect Cultural Heritage from Disaster; Risk Preparedness and Post Disaster Recovery" was organized by Ritsumeikan University and the ICOMOS International Committee on Risk Preparedness (ICORP). In the symposium, the current challenges for protection of cultural heritages taking into account the context of post disaster recovery was discussed in great depth with international experts from UNESCO, ICOMOS, ICORP and a representative of Kyo-o-Gokoku-ji Temple; World Cultural Heritage site in Kyoto.

ITC 2011

Sixth UNESCO Chair International Training Course on Disaster Risk Management of Cultural Heritage was held from 10 to 24 September 2011 in Kyoto, Kobe and Tohoku area of East Japan. In the light of

increasing vulnerability of rapidly urbanizing settlements, the course focused on **"Integrated Approach for Disaster Risk Mitigation of Historic Cities"**. The course was attended by 11 participants from 8 countries; Columbia, Jamaica, Kenya, Uganda, China, Mexico, India and Bangladesh.

ITC 2012

Seventh International Training Course on Disaster Risk Management of Cultural Heritage held during September 2012 in Kyoto, Kobe and Tohoku area of East Japan focused on sustainable recovery of cultural heritage. Accordingly the theme of the course was **"From Recovery to Risk Reduction for Sustainability of Historic Areas"**.

ITC 2013

The theme of the 8th UNESCO Chair International Training Course on Disaster Risk Management of Cultural Heritage was **"Reducing Disaster Risks to Historic Urban Areas and Their Territorial Settings through Mitigation"**. The course focused on policies and planning measures for mitigating risks to cultural heritage from multiple hazards such as earthquakes, floods, landslides and fires, especially in rapidly urbanizing context of developing countries. Special techniques for mitigating risks from earthquakes and fires were also highlighted besides policies, planning and design interventions for long term restoration and rehabilitation of cultural heritage following disaster through a special workshop in the area affected by the Great East Japan Disaster in 2011.

ITC 2014

One of the main reasons for extensive damage to cultural heritage is due to fires resulting from natural (bush/forest fires) or human induced causes (arson, chemical or bomb explosion, poor electric wiring or during renovation works). Also fires can result from earthquakes as was the case during 1995 Great Hanshin Awaji earthquake in Japan. Considering these issues, the 9th UNESCO Chair International Training Course on Disaster Risk Management of Cultural Heritage focused on **"Protecting living cultural heritage from disaster risks due to fire"**. Policies and planning measures for reducing fire risks to cultural heritage especially in rapidly urbanizing context of developing countries, special techniques for fire prevention and mitigation, emergency response as well as interventions for long term restoration and rehabilitation of cultural heritage following disaster were discussed during 2014 course.

ITC 2015

Earthquakes and floods cause immense damage to cultural heritage. Recently devastating earthquakes in Nepal in 2015, 2013 earthquake in Philippines, North Italy earthquake of 2012 caused vast damage to cultural heritage. Moreover 2014 floods in Balkan region, 2011 floods in Thailand and 2010 floods in Pakistan also caused damage to historic towns and archaeological sites such as Ayutthaya. While vulnerability of cultural heritage to earthquake and floods is increasing more than ever before, there are many examples of traditional knowledge systems developed by communities for mitigating against earthquakes and floods. Considering these issues and challenges the 10th International Training Course focused on **the protection of cultural heritage from earthquakes and floods, and other associated hazards**.

ITC 2016

Climate change is increasing the frequency of disasters caused by hydro-meteorological events such as heavy rainfall, flash floods, cyclones, typhoons and storm surges. As a result, many heritage sites located in global hot spots such as coastal areas especially below sea level are exposed to risks of inundation greater than ever before. Also, there might be low frequency high intensity incidents of flooding that may trigger landslides along mountain slopes. Moreover, climate change is resulting in higher temperatures are also resulting increased incidents of wild fires putting cultural heritage located in forested areas to greater risk than ever before. The 11th International Training Course specially focused on the protecting cultural heritage from risks of natural disasters including those induced by climate change.

Organizers and Participants

The training course is organized from the cooperation with the UNESCO, ICCROM, ICOM, ICOMOS/ ICORP, and relevant institutions of the government of Japan. Since 2017, Independent Administrative Institution National Institutes for Cultural Heritage has co-organized and supported the training course by providing the budget and human resources. Participants will include managers of cultural heritage, disaster risk management experts, decision makers and government officials involved in cultural properties or disaster management.

Participants List of the Previous Training Courses

ITC 2006, the 1st year

No	Name	Country	Work Position and Affiliation	DRM Plans of Cultural Heritage Formulated by the Participants
1	Poonacha KODIRA	INDIA	Director (Conservation), Ministry of Tourism and Culture Archaeological Survey of India	Qutb Minar and its Monuments, Delhi, WHS
2	Anup KARANTH	INDIA	Project Coordinator, Urban Earthquake Vulnerability Reduction Project, United Nations Development Programme (UNDP) India	
3	Sektiadi	INDONSESIA	Lecturer, Dept. of Archaeology, Faculty of Culture Sciences, Gadjah Mada University	Prambanan Temple Compounds, WHS and its Surrounding Environment
4	Manggar AYUATI	INDONESIA	Supervisor of Rescue on Preservation Division, Dept. of Cultural and Tourism, Center for Preservation of Cultural Heritage of Yogyakarta Province	

5	Fauzia QURESHI	PAKISTAN	Head of the Department of Architecture, National College of Arts, Lahore	Rohtas Fort, WHS
6	Hussain KHADIM	PAKISTAN	Coordinator, Disaster Management Desk RDPI, Rural Development Policy Institute	
7	Seok JEONG	KOREA	Government employee of Modern Construction Field, Tangible Cultural Heritage Bureau, Cultural Heritage Administration, Republic of Korea	Historic Villages of Korea: Hahoe, WHS in Andong City
8	Woongju SHIN	KOREA	Concurrent Professor, Dept. Interior Architecture, Chosun College of Science and Technology	

ITC 2007, the 2nd year

No	Name	Country	Work Position and Affiliation	DRM Plans of Cultural Heritage Formulated by the Participants
1	A.K.M. Monowar Hossain AKHAND	BANGLADESH	Deputy Secretary, Ministry of Home Affairs, GOVT. of Bangladesh	Lal Bagh Fort, Dhaka, Bangladesh
2	Md. Rafiqul ALAM	BANGLADESH	Executive Director, DWIP UNNAYAN SONGTHA (DUS)	
3	Shijun HE	P. R. CHINA	Protection and Management Bureau of World Cultural Heritage Site - the Old Town of Lijiang	Old Town of Lijiang , WHS
4	Cuiyu HE	P. R. CHINA	Protection and Management Bureau of World Cultural Heritage Site - the Old Town of Lijiang	
5	Maria Del Carmen CORRALES PEREZ	PERU	Instituto Nacional De Cultura Architect of the conservation and Restoration Sub Direction	Historic Centre of Lima, WHS
6	Partricia Isabel GIBU YAGUE	PERU	Chief of Laboratory of Structures, Japan-Peru Center for Earthquake Engineering Research and Disaster Mitigation	

7	Glen CONCEPCION	PHILIPPINES	City Disaster Action Officer and City Environment & Natural Resources Officer, City Government of Vigan	Historic Town of Vigan, WHS
8	Eric QUADRA	PHILIPPINES	Architect, LGU-Vigan City	

ITC 2008, the 3rd year

No	Name	Country	Work Position and Affiliation	DRM Plans of Cultural Heritage Formulated by the Participants
1	Choening DORJI	BHUTAN	Architect, Division for Conservation of Heritage Sites, Department of Culture, Ministry of Home & Cultural Affairs Royal Government of Bhutan	Tashichho Dzong
2	Karma TENZIN	BHUTAN	Civil Engineer, Tashichhodzong Maintenance Division, Dzongkhag Administration	
3	Mahmoud NEJATI	IRAN	Deputy of Research & Technical Consultant, Recovery Project of Bam's Cultural Heritage	Bam and its Cultural Landscape, WHS
4	Fatemeh MEHDIZADEH SARADJ	IRAN	Assistant Professor, Department of Conservation, Iran University of Science and Technology	
5	Kai Ube Prasad WEISE	NEPAL	Architect, Planners' Alliance for the Himalayan & Allied Regions	Patan Durbar Square Monument Zone in Kathmandu Valley, WHS
6	Suman Narsingh RAJBHANDARI	NEPAL	Assistant Professor, Nepal Engineering College	
7	Ivana FILIPOVIC	SERBIA	Architect Conservationist, Cultural Heritage Preservation Institute of Belgrade	Lower Town in Belgrade Fortress
8	Shang Chia CHIOU	TAIWAN	Professor, Department of Architecture and Interior Design, National Yunlin University of Science & Technology	Fort San Domingo in Tamsui and Surround Historical Buildings
9	Shen Wen CHIEN	TAIWAN	Associate Professor, Department of Fire Science, Central Police University	

ITC 2009, the 4th year

No	Name	Country	Work Position and Affiliation	DRM Plans of Cultural Heritage Formulated by the Participants
1	Rong YU	P. R. CHINA	Lecturer, Wenhua College, Huazhong University of Science and Technology	Dujiangyan, WHS
2	Yuan DING	P.R.CHINA	Researcher, Tongji University, National Historic Cities Research Center	
3	Ramesh THAPALIYA	NEPAL	Architect, World Heritage Conservation Section/Ministry of Culture and State Restructuring, Department of Archaeology	Patan Durbar Square Monument Zone in Kathmandu Valley, WHS
4	Suresh Suras SHRESTHA	NEPAL	Archaeological Officer, Ministry of Culture and state Restructuring, Department of Archaeology	
5	Pauline BROWN	JAMAICA	Senior Director, Office of Disaster Preparedness and Emergency Management	Port Royal City
6	Audene BROOKS	JAMAICA	Senior Archaeologist, Jamaica National Heritage Trust	
7	Sergius CIOCANU	MOLDOVA	Head Scientific Researcher, Institute of Cultural Heritage of the Academy of Science of Moldova	National Museum of Fine Arts (Buildings and Collection)
8	Valeria SURUCEANU	MOLDOVA	Curator, National art Museum of Moldova	

Observers in the Kathmandu Part of the ITC 2009

No	Name	Country	Work Position and Affiliation
1	Keshab P. SHRESTHA	NEPAL	Chief, National History Museum
2	Punya Sagar MARAHATTA	NEPAL	Lecturer, IoE, tribhuvan University
3	Ajay LAL CHANDRA	NEPAL	Assistant Professor, Department of Architecture and Urban Planning, IoE
4	Gyanin RAI	NEPAL	Chief (Administration, Information & Public Relation Section), Lumbini Development Trust

5	Inu PRADHAN SALIKE	NEPAL	Lecturer, Khwopa Engineering College
6	Saubhagya PRADHNANGA	NEPAL	Head of Culture and Archaeology Unit, Lalitpur Sub Metropolitan City Office
7	Chandra Shova SHAKYA	NEPAL	Head of Heritage Section, Lalitpur Sub Metropolitan City Office
8	Prabin SHRESTHA	NEPAL	Head of Urban Development Division, Lalitpur Sub Metropolitan City Office
9	Ashok SHRESTHA	NEPAL	Head of Administration Division, Lalitpur Sub Metropolitan City Office
10	Sainik Raj SINGH	NEPAL	Head of Earthquake Safety Section, Lalitpur Sub Metropolitan City Office

ITC 2010, the 5th year

No	Name	Country	Work Position and Affiliation	DRM Plans of Cultural Heritage Formulated by the Participants
1	Dechen TSHERING	BHUTAN	Structural Engineer, Division for Conservation of Heritage Sites, Department of Culture, Ministry of Home & Cultural Affairs, Royal Government of Bhutan	Wangduephodrang Dzong
2	Junko MUKAI	BHUTAN	Deputy Chief Conservation Architect, Division for Conservation of Heritage Sites, Department of Culture, Ministry of Home and Cultural Affairs, Royal Government of Bhutan	
3	Alexander G DWIGHT	PALAU	Director, Historical Preservation Officer, Bureau of Arts & Culture, Ministry of Community & Cultural Affairs	Bai: Traditional Meeting House
4	Sunny NGIRMANG	PALAU	Palau National Registrar, Bureau of Arts & Culture, Palau Historic Preservation Office	
5	Teresa VILCAPOMA HUAPAYA	PERU	Professor, Sagrado Corazon University	City of Cuzco, WHS
6	Olga Keiko MENDOZA SHIMADA	PERU	JSPS Research Fellow, Graduate School of Science & Engineering, Ritsumeikan University	
7	Marilene TERRONES DIAZ	PERU	Professor, Sagrado Corazon University	

8	Milica GROZDANIC	SERBIA	Director, Cultural Heritage Preservation Institute of Belgrade	Kosancicev Venac, Belgrade
9	Svetlana Dimitrijevic MARKOVIC	SERBIA	Architect - Conservator - Senior Associate, Cultural Heritage Preservation Institute of Belgrade	
10	Zeynep GUL UNAL	TURKEY	Assistant Professor, Dr. Yildiz Technical University, Faculty of Architecture, Restoration Department	Eskigediz Heritage Site
11	Meltem VATAN KAPTAN	TURKEY	Research Assistant, PhD Student, Yildiz Technical University, Faculty of Architecture, Structural Systems Division	

ITC 2011, the 6th year

No	Name	Country	Work Position and Affiliation	DRM Plans of Cultural Heritage Formulated by the Participants
1	Celina RINCON	COLOMBIA	Assessor for the Heritage Director Office, Ministry of Culture	History center of Santa Cruz de Mompox, WHS
2	Cheryl NICHOLS	JAMAICA	Training Manager, Office of Disaster Preparedness and Emergency Management	The Holy Trinity Cathedral
3	Jose Ramon PEREZ OCEJO	MEXICO	Part-time Teacher, Universidad de las Américas (Puebla, MEXICO)	Colonial City Centre of Puebla, WHS
4	Julius MWAHUNGA	KENYA	Senior Cultural Officer, Ministry of State for National Heritage and Culture, Department of Culture	Lamu Old Town, WHS
5	Remigius KIGONGO	UGANDA	Conservator Sites and Monuments/ Site Manager, Department of Museums and Monuments	Kasubi Tombs, WHS
6	Janhwij SHARMA	INDIA	Director (Conservation and World Heritage), Archaeological Survey of India, Ministry of Culture	Taj Mahal, WHS
7	Md. Aamir Hussain SHIKDER	BANGLADESH	Urban Local Body Coordinator, Bangladesh Municipal Development Fund (BMDF)	Historic Mosque City of Bagerhat, WHS

8	Qing WEI	P. R. CHINA	Deputy Director, Cultural Heritage Conservation Center, THAD	Kulangsu
9	Yu WANG	P. R. CHINA	PhD Candidate, Urban Design and Planning Department, Norwegian University of Science and Technology (NTNU)	Taoping Qiang Village

ITC 2012, the 7th year

No	Name	Country	Work Position and Affiliation	DRM Plans of Cultural Heritage Formulated by the Participants
1	Suzie YEE SHOW	FIJI	Secretary General, ICOMOS PASIFIKA	Levuka Town, WHS
2	Vikas LAKHANI	INDIA	Sector Manager, Gujarat State Disaster Management Authority	Champaner - Pavagadh Archaeological Park, Panchamahal District, Gujarat, WHS
3	Sang sun JO	KOREA	Research Associate and Curator, Heritage Repair Division, Cultural Heritage Administration of KOREA	Jongmyo Shrine, WHS
4	Rosli BIN HAJI NOR	MALAYSIA	Head of Melaka World Heritage Office, Melaka World Heritage Office	Historic City of Melaka, WHS
5	Ni LEI WIN	MYANMAR	Communications Officer at World Concern Myanmar, Relief, Recovery and Development Project in Myanma	Bagan located in Manadalay Division, Myanmar
6	Helen McCRACKEN	NEW ZEALAND	Policy Adviser - Heritage, Ministry for Culture and Heritage	Cuba Street Historic Area, Wellington
7	Usman SHAMIM	PAKISTAN	Programme Officer, Kuchlak Welfare Society (KWS)	Mehrgarh, lies on the "Kachi plain" of now Balochistan, Pakistan
8	Poorna YAHAMPATH	SRI LANKA	Consultant - External Resource Person, Disaster Risk Management & Climate Change for GIZ	Sacred City of Kandy, Sri Lanka, WHS
9	Sibel YILDIRIM ESEN	TURKEY	Conservation Architect, Ministry of Culture and Tourism	Agora Archeological Site in the Historic City of Izmir

Observers

No	Name	Country	Work Position and Affiliation
1	Dong Seok KANG	KOREA	A Section Chief of GIS, Cultural Heritage Administration
2	Thi My Thi TONG	VIET NAM	PhD Student, International Environmental and Disaster Management Laboratory, Graduate School of Global Environmental Studies, Kyoto University

ITC 2013, the 8th year

No	Name	Country	Work Position and Affiliation	DRM Plans of Cultural Heritage Formulated by the Participants
1	Saleh Mohammad SAMIT	AFGHANISTAN	National Manager, Community Development Programme, Aga Khan Foundation- Afghanistan	Cultural Landscape and Archaeological Remains of the Bamiyan Valley, WHS
2	Dian LAKSHMI PRATIWI	INDONESIA	Head of Archaeological Section, Division of History, Archaeological and Museum, Cultural Service Office, Government of Yogyakarta Special Territory	Kotagede Heritage Area, Yogyakarta Historic City
3	Kambod AMINI HOSSEINI	IRAN	Director, Risk Management Research Center (Associate Professor) Risk Management Research Center, International Institute of Earthquake Engineering and Seismology	Golestan Palace, Tehran Bazaar and their surrounding old urban fabrics, Tehran
4	Barbara CARANZA	ITALY	MEC srl Italian Army "LIGURIA" ARMY MILITARY COMMAND	Monumental Cemetery of Staglieno, Genoa
5	Paola MUSSINI	ITALY	Researcher, SiTI-Instituto Superiore sui Sistemi Territoriali per l'Innovazione	Portovenere, Cinque Terre, and the Islands (Palmaria,Tino and Tinetto), WHS
6	Zaha AHMED	MALDIVES	Assistant Architect, Heritage Department, Male' Republic of Maldives	Laamu atoll Isdhoo Old Friday mosque in Maldives

7	Arjun KOIRALA	NEPAL	Advisor, Urban Planning and Infrastructure Development, GFA Consulting Group (Nepal Office), on behalf of GIZ/Nepal Municipal Support Team, Ministry of Urban Development, Department of Urban Development and Building Construction	The city core area of Tansen Municipality
8	Kenechukwu Chudi ONUKWUBE	NIGERIA	Director of Programs, Development Education and Advocacy Resources Initiative for Africa (DEAR Africa)	Sukur Cultural Landscape, WHS
9	Muhammad Juma MUHAMMAD	TANZANIA	Director, Urban and Rural Planning Department of Urban and Rural Planning	Stone Town of Zanzibar, WHS
10	Hatthaya SIRIPHATTHANAKUN	THAILAND	Landscape Architect Ministry of Culture, Fine Arts Department, Office of Architecture	Historic City of Ayutthaya, WHS

ITC 2014, the 9th year

No	Name	Country	Work Position and Affiliation	DRM Plans of Cultural Heritage Formulated by the Participants
1	Elena MAMANI	ALBANIA	Project Manager, Deputy Head of Office, Cultural Heritage without Borders (CHwB)	Gjirokastra, WHS
2	Catherine FORBES	AUSTRALIA	Built Heritage Advisor, GML Heritage; Australia Institute of Architects, Australia ICOMOS	The Rocks Historic Urban Precinct
3	Sasa TKALEC	CROATIA	Head of Office of Director, Croatian Conservation Institute	Castle Batthany in Ludbreg
4	Juan Diego BADILLO REYES	ECUADOR	Architect Conservator freelance, Volunteer South America Coordinator	San Antonio del Cerro Rico de Zaruma
5	Abdelhamid SAYED	EGYPT	Chairman, Conservator in the Ministry of Antiquities, Egyptian Heritage Rescue Foundation (EHRF); Training & Capacity Building Unit Manager, Egyptian Earth Construction Association (EECA)	Bab El-Wazir, El-Darb Al-Ahmar District, Historic Cairo, WHS

6	Anaseini KALOUGATA	THE FIJI ISLANDS	Senior Project Officer Levuka, Department of National Heritage, Culture and Arts	Historical Port Town of Levuka, WHS
7	Cinthia CABALLERO	HONDURAS	Urban control and planification unit, Alcaldia Municipal Del Distrito Central (Gerencia Del Centro Historico)	Central District Historic Area
8	Jyoti PANDEY SHARMA	INDIA	Professor, Department of Architecture, Deenbandhu Chhotu Ram University of Science & Technology	Fatehpur Sikri, Agra District, Uttar Pradesh, WHS
9	Saut SAGALA	INDONESIA	Senior Fellow, Resilience Development Initiative	Gedung Sate Building, Governor office of West Java Province
10	Alaa HAMDON	IRAQ	University Lecturer, Researcher and Earthquake Expert, Remote Sensing Center, Mosul University	Al-Hadba Minaret and Nirgal Gate / Mosul City
11	Richard NESTER	NEW ZEALAND	Technical Advisor – Historic, Department of Conservation	Government Buildings Historic Reserve
12	Zafar SHAH	PAKISTAN	Regional Emergency Officer (South Punjab), Punjab Emergency Service (rescue1122), Emergency Services Academy	Lahore Fort, WHS
13	Hussain SALEH	SYRIA	Head of the scientific research commissions department, Higher Commission for Scientific Research	Crac des Chevaliers (in Arabic: Castle Alhsn), WHS
14	Kaichard RUTTANAWONGCHAI	THAILAND	Captain assistant, Klongtoey fire station, second operation, fire department, Bangkok metropolitan	Vimanmek Palace, WHS

ITC 2015, the 10th year

No	Name	Country	Work Position and Affiliation	DRM Plans of Cultural Heritage Formulated by the Participants
1	Marcela HURTADO SALDIAS	CHILE	Assistant professor, Departamento de Arquitectura, Universidad Técnica Federico Santa María	Historic Centre of Valparaíso
2	Benjamin Kofi AFAGBEGEE	GHANA	Assistant Conservator of Monuments, Ghana Museums and Monuments Board	Asante Traditional Buildings

3	Stephan DONA	HAITI	Disaster Risk Reduction Advisor, Plan Consult	Citadelle, Sans Souci, Ramiers
4	Mohamad Faruk MUSTHAFA	INDIA	Chief Executive Officer, RAPID RESPONSE	Mahabalipuram
5	Mohammad RAVANKHAH	IRAN	Teaching/research assistant in Department of Environmental Planning, Ph.D. Candidate in International Graduate School: Heritage Studies, Brandenburg University of Technology Cottbus	Bam and its Cultural landscape
6	Aurelio DUGONI	ITALY	Regional Director of ANPAS Sicily Committee, National Association for Public Assistance (ANPAS)	Archaeological Area of Agrigento
7	Hisila MANANDHAR	NEPAL	Urban planner, Kathmandu Valley Development Authority	Patan Durbar Square
8	Sonam LAMA	NEPAL	Assistant professor, Nepal Enginnering College	Boudhanath Stupa and surrounding area
9	Ilse Anne Elisabeth DE VENT	NETHERLANDS	Senior inspector, Geo-Engineering, the Dutch State Supervision of Mines	Hogeland, Groningen, the Netherlands
10	Bashar Ibrahim HUSSEINI	PALESTINE	Senior Project Architect & Fast Track Coordinator, Welfare Association – Old City of Jerusalem Revitalization Program "OCJRP"	Old City of Jerusalem
11	Gerald Vallo PARAGAS	PHILIPPINES	Urban and Environmental Planner (Licensed), City Government of Tacloban	The Sto. Niño Shrine and Heritage Museum, and the People's Center and Library
12	Marko ALEKSIĆ	SERBIA	Associate, Central Institute for Conservation in Belgrade	Serbian Orthodox Monastery Žiča
13	Pamela Jane MAC QUILKAN	SOUTH AFRICA	Programme Officer, The African World Heritage Fund (AWHF)	Robben Island
14	Witiya PITTUNGNAPOO	THAILAND	Lecturer, Faculty of Architecture, Naresuan University	Ban Pak Klong Village, Bangrakham, Phitsanulok Province, Thailand
15	Ngoc Phu PHAM	VIETNAM	Vice Director, Hoi An center for Cultural Heritage Management and Conservation	Hoi An Ancient Town, Vietnam

ITC 2016, the 11th year

No	Name	Country	Work Position and Affiliation	DRM Plans of Cultural Heritage Formulated by the Participants
1	Maria Cristina Vereza LODI	BRAZIL	Architect Preservationist, Rio de Janeiro Municipal Government / Rio World Heritage Institute	Carioca Landscapes Between the Mountain and the Sea
2	Fatma Saidi TWAHIR	KENYA	Architect, Sites and Monuments; & Mombasa Old Town Conservation Office, National Museums of Kenya	Mombasa Old Town Conservation Area
3	Muhammad Fathi Hasan AL-ABSI	JORDAN	Associate conservator Architect, Engineering and conservation department/ Department of Antiquities (DOA)	Petra or Karak castle
4	Dulce Maria GRIMALDI SIERRA	MEXICO	Senior conservator for conservation and research of decorative elements at archaeological sites, Coordinación Nacional de Conservación del Patrimonio Cultural (CNCPC), Instituto Nacional de Antropología e Historia (INAH)	Zona Arqueológica de El Tajín, Veracruz (Tajín Archaeological Site)
5	Barbara MINGUEZ GARCIA	SPAIN	Consultant, The World Bank	Antigua Guatemala
6	Vanessa Anne TANNER	NEW ZEALAND	Senior Heritage Advisor, Wellington City Council,	Newtown Shopping Centre Heritage Area
7	Nermina KATKIĆ	BOSNIA AND HERZEGOVINA	Associate for archaeology, Commission to Preserve National Monuments of Bosnia and Herzegovina	Old Bridge Area of the Old City of Mostar
8	Mihaela HĂRMĂNESCU	ROMANIA	Lecturer, PhD Architect, 'Ion Mincu' University of Architecture and Urbanism, Faculty of Urbanism	(Part of) Delta Dunarii, Romania – Tulcea city and surroundings proximity
9	Alberto Enrique PASCUAL	PANAMA	Director, Fundation CoMunidad	Fortifications on the Caribbean Side of Panama: Portobelo – San Lorenzo
10	Sherwynne Bagaoisan AGUB	PHILIPPINES	Legislative Staff Officer IV, Senate Economic Planning and Policy Office, Senate of the Philippines	Historic Town of Vigan

11	Mohamed ROUAI	MOROCCO	Professor – researcher, Earth Sciences Department, Faculty of Sciences, University Moulay Ismail, Meknes, Morocco.	Volubilis Archaeological Site (Morocco)
12	Navneet YADAV	INDIA	Associate Director, Disaster Risk Management	Shimla City, Himachal Pradesh
13	Claudia Cecilia GONZÁLEZ MUZZIO	CHILE	Partner at Ambito Consultores, Ambito Consultores Ltda.	Qhapaq Ñan, Andean Road System
14	Amna SHUJA	PAKISTAN	Assistant Director -Recovery & Rehabilitation, National Disaster Management Authority,	Mohenjo-Daro archeological sites
15	Maria Elena ALMESTAR URTEAGA	PERU	Senior Auditor – Specialist in Culture Management and Cultural Heritage, Contraloria General de la Republica	Chan – Chan Archaeological Zone. (La Libertad, northern coast of Peru).

1.2 Timetable of International Training Course (ITC) on Disaster Risk Management

	8/27 Sun	8/28 Mon	8/29 Tue	8/30 Wed	8/31 Thu	9/1 Fri	9/2 Sat	9/3 Sun	9/4 Mon	9/5 Tue	9/6 Wed
THEME	Arrival	Introduction and Participants` Presentation	Core Principles and Value Assessment	Risk Analysis at Site and Museum Level, and Key Terminology	Case Study Project Work	Urban Disaster Risk Reduction and Integrated Risk Assessment	Prevention and Mitigation Techniques	Disaster Imagination Game	Risk Prevention, Mitigation and Emergency Preparedness	Emergency Response	Coping Method f Movable Heritag and Middle Presentat
Venue		DMUCH	DMUCH	Kiyomizu-District	DMUCH	DMUCH	DMUCH	Ponto-cho	Museum and Tofuku-ji	Kyoto Museum	DMUCH
9:00			Recap	to Kiyomizu-Dera	Case Study Project Work	Recap	Recap	Recap	Lecture 17-1 DRM system in Kyoto National Museum (J. FUJIHATA)	Lecture 20 Introduction of First Aid (A. TANDON)	Recap
		Registration	Lecture 2 Disaster Risk Management of Cultural Heritage - Significance and Core Principles (R.JIGYASU)	Lecture 6 Introduction to the Context of Japanese Wooden Cultural Heritage (A.KOMIYA, Kyoto Pref.)		Lecture 8 Multiple Hazards and Urban Areas : Urban planning and DRM, or Urban planning for DRM? (K.CHMUTINA)	Lecture 11 Quantifying Disaster Risk to Cultural Heritage Assets (R. GUNASEKERA)	Lecture 16 Disaster Imagination Game and Environmental Water Supply System in Kiyomizu Area (T.OKUBO)	Site Visit 4-1 Kyoto National Museum		Lecture 21 Rescue, Conservat and Preparedness Movable Heritag (Y. KOHDZUMA, Na NRICP)
10:00		Opening Address Orientation of the Course (R.JIGYASU)						to Ponto-cho	Lecture 17-2 Introductory Case Studies of Japanese Cultural Properties (Y.SUZUKI, Kyoto Museum)	Exercise and Workshop/ Simulation Emergency Preparedness and Response: First Aid to Cultural Heritage "Situation Analysis, Site damage and Risk Assessment, and Debrief and Prepare" (A. TANDON and C. WEGENER)	
11:00		Lecture 1 The Need for Disaster Risk Management for Cultural Heritage in Historic Cities: The Case of Kyoto (K.TOKI)	Lecture 3 Assessing the Values of Cultural Heritage (R.JIGYASU)	Lecture 7 Landslide Assessment (M. FUJIMOTO) Site Visit 1-1 Observations of Risks at Kiyomizu-Dera World Heritage Site (A.KOMIYA, Kyoto Pref.)		Lecture 9 Disaster Risk Reduction and Integrated Risk Management of Historic Cities: Who is Responsible? (K.CHMUTINA)	Lecture 12 Landslide Prevention and Mitigation Techniques (R.FUKAGAWA)	Site Visit 3 and Field Work Ponto-cho Townscape Improvement Area (T.OKUBO and D.KIM)	Lecture 18-1 Developing DRM Plans for Museums (C. WEGENER)		Lecture 22 Blue Shield and Hague Convention (C. WEGENER)
12:00		Lunch	Lunch	Site Visit 1-2 Landslide Damaged Area (M. FUJIMOTO)	Self Study	Lunch	Lunch	Lunch	Lunch Site Visit 4-2 Exhibition Rooms of Kyoto National Museum	Lunch	Case Study Proje Work
13:00		The First Presentations and Discussion by the Training Participants/ Cultural Heritage and Disaster	Workshop 1 Assessing the Values (R.JIGYASU)	Field Investigation for WS 2 Lunch		Workshop 3 Applying Integrated Risk Management Process (K.CHMUTINA)	Lecture 13 Climate Change and Risk Prevention (Y.SATOFUKA)	Site Visit 3 and Field Work Ponto-cho Townscape Improvement Area (T.OKUBO and D.KIM)	Lecture 18-2 and Workshop 6 Vulnerability and Risk Assessment Exercise (A. TANDON and C. WEGENER)		Lunch
14:00			Lecture 4 Introduction to the Context of Historic City of Kyoto (N.ITAYA)	to Sannei-zaka Site Visit 2 and Field Work Sannei-Zaka Important Preservation District (T.OKUBO)			Lecture 14 Flood Prevention and Mitigation Techniques (K.SAWAI)	to DMUCH	to Tofuku-ji	Exercise and Workshop/ Simulation Emergency Preparedness and Response: First Aid to Cultural Heritage "Salvage" (A. TANDON and C. WEGENER)	Case Study Proje Work
15:00			Lecture 5 The Value of Movable Heritage in the Historical Context of Built Heritage (T. MIYAKAWA, Kyoto National Museum)	to DMUCH		Lecture 10 Introduction to the Integrated Methodology for Assessing Risks (R.JIGYASU)	Lecture 15 GIS for Disaster Management (K.HANAOKA)	Workshop 5 Risk Assessment and Scenarios Exercise: Discussion and Presentation on Disaster Imagination Game (DIG) (T.OKUBO and D.KIM)	Lecture 19-1, 2 Disaster Prevention for Cultural Heritage in Kyoto (K. MEKATA and A. NATANI, Kyoto City FD)		The Middle Presentations by the Training Participants
16:00							Workshop 4 GIS for Disaster Management of Historical Cities and Cultural Heritage (K.HANAOKA)		Lecture 19-3, Site Visit 5 Fire Prevention Facilities at Tofuku-ji (N. TSURUOKA, Kyoto Pref.)		
17:00			Case Study Project Work	Workshop 2 Impact of Disaster on Cultural Heritage/ in Case of Kiyomizu-Dera Temple, Introduction to Key Terminology on Disasters (R.JIGYASU)		Case Study Project Work			to DMUCH	to DMUCH	
18:00		Welcome Dinner		Case Study Project Work			Case Study Project Work	Case Study Project Work	Discussion and Case Study Project Work		Case Study Proje Work
19:00											
Accommodation	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto

# of Cultural Heritage 2017, 12th year, Ritsumeikan University

	9/7 Thu	9/8 Fri	9/9 Sat	9/10 Sun	9/11 Mon	9/12 Tue	9/13 Wed	9/14 Thu	9/15 Fri	9/16 Sat	
	Post Disaster Recovery on Cultural Landscape	Visit to World Heritage Areas Affected by Typhoon	Planning for Recovery: Lessons from Kobe	Case Study Project Work	From Response to Recovery: Great East Japan Disaster	Recovery of Cultural Heritage	International Frameworks for DRM and Site Management Systems	National Policies and Practices	The Last Presentation	International Symposium	THEME
	Kumano	Kumano	Kobe	Kyoto	DMUCH	DMUCH	DMUCH	DMUCH	DMUCH	Kinugasa Campus Soshi-kan	Venue
9:00	At 7:30 to Kumano	Lecture 24 Disaster Mitigation and Awareness Raising for Tourists (Y. ISHIDA)			Recap	Recap	Recap	Recap	Preparation for the Last Presentation		
10:00		to Nachi-Shrine	Exhibition of Disaster Reduction and Human Renovation Institution	Case Study Project Work	Lecture 26 Principle for Sustainable Recovery of Cultural Heritage (R. RANJITKAR)	Workshop and Discussion 7-2 Group Work for Designing the Recovery Process (W.CHEEK, L.BOSHER, Y.HIRAOKA, N. ITAYA and G.TANIBATA)	Lecture 32 Dynamic Analysis of Earthquakes and Seismic Performance of Japanese Historical Structures (S.YOSHITOMI)	Lecture 37 Cultural Heritage: A Review of Grants and Partnerships (E. KIRBY, Smithsonian Institution)			
11:00		Site Visit 6-2 Post Disaster Recovery of from Typhoon and Land Slide: Nachi-Shrine (M. FUJIMOTO and Y. ISHIDA)	Lecture 25 Planning for Disaster Mitigation of Cultural Heritage Training of Heritage Manager (Y.MURAKAMI, Hyogo Pref.)		Lecture 27 Thinking About Disaster Through a Social Science Lens (W.CHEEK)		Lecture 33 Engaging Community for Disaster Risk Reduction (S. RAJIB)	Lecture 38 Governmental Policies of Disaster Risk Management for Cultural Properties under the Legislative Protection in Japan (S. TANAKA, ACA Japan)			
12:00	Site Visit 6-1 Post Disaster Recovery from Typhoon and Land Slide: Yokogaki-Ridge (M. FUJIMOTO and Y. ISHIDA)		Lunch at JICA	Self study	Lunch	Lunch	Lunch	Lunch	Lunch		
13:00		Lunch								Introduction of Program	
14:00	Lunch	To Kobe	Site Visit 7 After the Kobe Earthquake Site		Workshop 7-1 Group Work for Designing the Recovery Process (W.CHEEK)	Lecture 30 Lessons from Post-Disaster Responses and Recovery in Nepal and Myanmar (K. WEISE)	Lecture 34 The Roll of Intangible Cultural Heritage on DRM (H. KUBOTA, Tokyo NRICP)	Case Study Project Work	The Last Presentation	International Symposium	
15:00	To WSRE Institute				Lecture 28 Post Disaster and Recovery Process by the Government and Community in Case of Minami Sanriku Cho (Y.HIRAOKA)	Lecture 31 PDNA and Post Disaster Recovery Frame Work (E. SELTER, UNESCO and K. WEISE)	Lecture 35 Recent Development and Emergency Response to Cultural Heritage in Crisis Situations (E. SELTER, G.BOCCARDI, UNESCO)				
16:00	Lecture 23 2011 Typhoon and Landslide on Ki Area, Nachi-shrine and Historical Disaster of Kumanohongu-shirine (M. FUJIMOTO)				Lecture 29 Lessons from Post Disaster Recovery of Intangible Heritage (G.TANIBATA and N.ITAYA)	Case Study Project Work	Lecture 36 Management Systems and Management Planning for Heritage Sites (J.KING, ICCROM)				
17:00					Case Study Project Work		Case Study Project Work				
18:00			To Kyoto							Farewell Party	
19:00											
	Kumano	Kobe	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	

Co-organized by Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University, Kyoto, Japan and Independent Administrative Institution National Institutes for Cultural Heritage

In Cooperation with UNESCO, ICCROM, ICOM and ICOMOS/ICORP

2 Outline of Disaster Risk Management Plans for Case Study Projects by ITC 2017 Participants

2.1 Ta Dzong National Museum of Bhutan, Paro

Dorji Wangchuk
Conservator, National Museum of Bhutan, Bhutan

1. Introduction of Ta Dzong National Museum

Fig.1 Photo of Ta Dzong

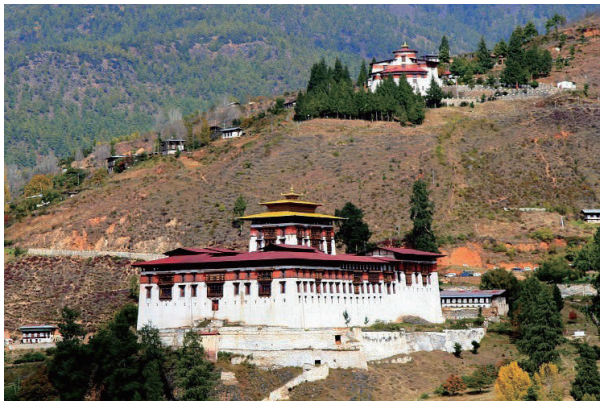


Fig.2 The location of Ta Dzong

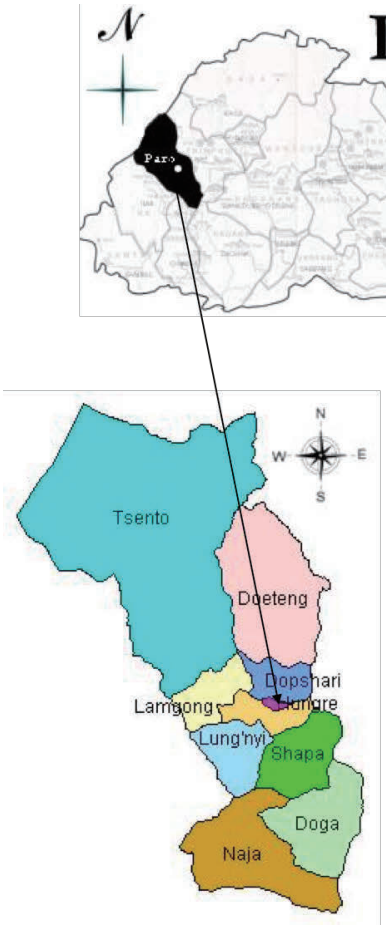


Fig.3 Map for location of Paro

<Vision of the National Museum>

Preservation and promotion of extent art and artifacts through research, symposium and exhibition

<Mission statement of the National Museum>

1. To act as the main stakeholder for preservation and promotion of Bhutan's cultural heritage
2. To acquire arts and artifacts for interpretation of history and culture through exhibition for posterity
3. Research and documentation of art objects to study our history and educate future generation
4. Educate and disseminate information on history and culture through exhibition within and outside the country
5. Conduct symposium and seminars on tangible and intangible culture by inviting researchers and scholars

< Attributes of the National Museum of Bhutan>

S. No.	Attributes of your site/museum and their location	Type of attribute (movable/immovable, tangible/intangible, natural/cultural/mixed)	Associated Values (in bullets	Stake holders these values	Scores for each Value 1 (Low) 2 (Medium) 3 (High)
1	Tshogzhing Lhakhang (Temple of four schools of Buddhism)	Immovable/Movable Tangible/Intangible Cultural	• Spiritual value • Artistic value • Historical value	• Bhutanese • Locals • Buddhism practitioners • Visitors	3 3 3 2
2	Namse Lhakhang (Temple of Kubera) Lord of Wealth)	Immovable/Movable Tangible/Intangible Cultural	• Spiritual value • Artistic value • Historical value	• Bhutanese • Locals • Buddhism practitioners • Visitors	3 3 3 2
3	Fourth floor (Mandala of Zhithro Lhatshog)	Immovable	• Spiritual vale • Intangible cultural value • Artistic value	• Buddhist/ Bhutanese • Visitors • Scholars	3 3 3

< Evaluation of Existing Site Management>

Fig.4 Key attributes 1 Tshogzhing Lhakhang 6th Floor

Although a legislation for the protection of such heritage site is still under deliberation of the legislative arm of the government, these national heritage sites are accorded high priority of the relevant agencies and protected and preserved, and if need the arises. These heritage sites (structure) are renovated by synchronizing the old age tradition with modern structural amenities together as to preserve the authenticity of the building, and at the same time to strengthen to prevent further risk and hazards.

Headed by a director, the museum is supported and run by a team of 29 staff comprising of administrative, curatorial, conservation, and support staff.

< Existing management systems for disasters at Ta Dzong>

1. Better storage facility with modern amenities
2. Improved show cases with lighting control, and integrated pest management
3. Coordinated flow of visitors with signage and emergency exit incorporated n the 2nd floor of the Ta Dzong
4. Improved drainage systems around the Ta Dzong
5. Fire alarm detectors installed
6. Installed fire hydrant and constructed a water reservoir with the capacity of 15000 litres
7. Acquired fire extinguishers of appropriate usages and installed them at strategic locations in and around the museum

8. Training of museum staff in fire fighting with collaboration of Fire Fighting Unit of the Royal Bhutan Police, Paro Division
9. Installed PA system in the museum
10. Medical kit with emergency fire and medical personnel's telephone numbers
11. Emergency evacuation plan incorporated during the renovation
12. Installation of CCTV
13. Power back (Diesel generator installed)

2. Risk Analysis of Ta Dzong

< Past history of disasters>

September 2011 at 6.40PM caused extensive damage to the 368 years old Ta-Dzong building which houses the National Museum. The six stories building was damaged in the following areas:

Outer portion

The tremor dislodged the stone walls of the building in two places on the left side of the entrance to the museum. As is evident from the pictures, the windows of the same portion got tilted, displaced and even a slight tremor can bring down the window structure at any time. The portion above the Namse Lhakhang facing the palace also got dislodged and falling stones fell on the roof of the third floor and adjoin reference library. This damage had caused the roof to leak, and requires immediate attention. Due to the impact of the tremor dislodging the stone walls, the main door and it's adjoin portions are also damaged. These are evident from the inability to open the main entrance door fully and huge stone slabs cracked at various places. (Please refer pictures).

The previous bulge caused by the tremor of 2003 also has bulged furthermore and the cracks have widened further.

Inner portion.

The tremor also caused the main structure of Tshogshing to tilt and in the process many clay statues fell off broke to pieces. Our preliminary inspection of the TsogshingLhakhang, we estimated that around 7 clay statues were damaged due to the impact of the tremor.

On the closer scrutiny of the 5th floor gallery from the inner side, it was noticed that window structures were tilting toward outside and inner side. The stair leading to the fifth floor also got shifted.

The cracks in the 3rd floor which appeared after the tremor of 2003 also got widened markedly. There is evidence of shaking in the 2nd floor and the ground floor too. Many exhibits have also fallen although damage is minimal at this moment, with the exception of the statues in the TshogshingLhakhang. The windows on the 3rd floor have also tilted excessively causing great concern of the safety of the museum.

< Slow and catastrophic hazards>

Since the Ta Dzong is situated on a hillock overlooking the Rinpung (Paro) Dzong and the Paro valley, it is prone to landslide which may be triggered by an earthquake in the coming years. This may lead to the total collapse of the Ta Dzong destroying many cultural heritage objects along with it. Fire is another imminent threat to the Ta Dzong from the adjoin village and from within the museum campus. Anticipating such disaster, we shifted the temporary huts housing the security guards to a distance from

the museum and we plan to shift the conservation laboratory as well from the close proximity of the Ta Dzong. Vegetation is another issue near the Ta Dzong, fortunately, these plants are just shrubs (flowering plants) and do not pose real threat to the heritage site. As for the cultural heritage objects housed in the museum, deterioration is a slow but inevitable process, which cannot be stopped altogether and such process is going to continue into posterity.

< List of threats and hazards>

1. Land slide risk due to the sloppy location
2. Vulnerable to fire from the adjoining hamlet as they use fire wood for heating their homes in winter
3. Risk of fire since the structural is of wooden
4. Risk of fire from lighting of butter lamps and burning incense
5. Bio-deterioration (decaying of wooden parts) due to excessive humidity
6. Slow and steady deterioration of both ethnographical and contemporary objects in the museum owing various deteriorating agencies

< Risk analysis of the museum and its collection>

Many of the traditional vernacular buildings in Bhutan are constructed from the locally available materials such as wood, stone and mud, and one cannot find any traces of nails or iron used in these houses or buildings. One of the salient features of traditional construction methodologies applied by our forefathers using what is available locally.

#	Category of collection/ Structure	Vulnerability	Risk
1	Ta Dzong (Building)	Fire/earthquake/landslide/windstorm	Total collapse causing collateral damage both to the structure and collection
2	Tshogshing Lhakhang (Clay statues) depicting Tree of Four Schools of Buddhism	Earthquake/Soot/Smoke/dust/theft	Damage, deterioration, loss of cultural property
3	Namse Lhakhang (Clay, metal and wooden statues	Earthquake/Soot/Smoke/dust/theft/excess humidity	Damage, deterioration, loss of cultural property
4	Thangka painting collection	Soot, smoke, humidity, fire, pest infestation/theft	Bio-deterioration Pest infestation Rodent attacks Theft and vandalism
5	Textile collection	Humidity, fire, pest	Bio-deterioration Pest infestation Rodent attacks Theft and vandalism
6	Animal specimen	Damage, burglary, excessive humidity	Bio-deterioration Pest infestation Rodent attacks Theft and vandalism
7	Ethnographic collection (Utensils, household items, farm implements	Damage, burglary, excessive humidity	Bio-deterioration Pest infestation Rodent attacks Theft and vandalism

< Negative impacts>

Safety of the visitors/staff and the local communities are on the top most priority list of the museum management. The above hazards and vulnerabilities will have various negative impacts on the people while they are in the museum or its surrounding. If an earthquake were to occur, during the day time, visitors and staff would be at great risk of being buried under the debris, and which may result in injury or casualty. In case of a fire outbreak from or within the museum, or even from one of the attributes within the museum could have catastrophic affects on the heritage, people living in the vicinity of the museum. Winter season is the driest and the coldest season, and the cold makes people to warm themselves employing various heating methods. Accidents may arise due to various reasons, which may result in devastating fire and burning down the museum and its attributes.

< Most plausible disaster>

Drawing on the lines from the risk analysis of my case study site (Ta Dzong), earthquake is the most plausible disaster risk that may occur, as there is a history of earthquakes damaging the Ta Dzong. Moreover, by the virtue of being on the seismic zone, we are vulnerable to earthquakes, and it has happened many times in the past.

3. Disaster Risk Management (DRM) Plan

National Museum Disaster Management Committee (NMDMC)

Composition of NMDMC

a) The Director, ex-officio Chairperson
b) Superintendant of Police or Officer-in-charge, Royal Bhutan Police
c) The Curator, Chief of Museum Security and second in command
d) The Sr. Chemist, Conservation Section, National Museum
e) The Dy. Chief Accountant, National Museum

Function of NMDMC

a) The NMDMC shall be responsible for coordinating and managing any disaster management operations in the museum premises under the direction and supervision of the National Disaster Management Authority
b) The NMDMC shall:
   - Prepare, review, update and implement the National Museum Disaster Management and Contingency Plan
   - Monitor and evaluate measures taken for prevention, mitigation, preparedness, response and capacity building.
   - Ensure establishment and functioning of Critical Disaster Management Facility;
   - Ensure mainstreaming of disaster risk reduction into development plan, policy, programme and project;
   - Ensure compliance of the approved hazard zonation and vulnerability map
   - Ensure the enforcement of structural and non-structural measures;
   - Ensure that information about the event or a disaster is promptly communicated to, Dzongkhag Disaster Management Committee, NDMA, Department of Disaster Management, RBP and all stake holders

- Ensure that detailed reports and regulars updates on the disaster event is provided to the Dzongkhag Disaster Management Committee and the Department of Disaster Management upon completion of field assessment of the situation;
- With the support of the Department of Disaster Management promote education, awareness, capacity building and staff training on hazard, risk, vulnerability and measure to be taken by the museum staff to prevent, mitigate and respond to disaster;
- Conduct regular mock drill
- Report on quarterly basis to the DDMC and NDMA on the progress of implementation of the Disaster Management and Contingency Plan

c) In case of a disaster, the Chairperson of the NMDMC may exercise all or any of the functions of the NMDMC, subject to ex post facto ratification of the committee.

d) The NMDMC may frame rules and regulations concerning the conduct of its meetings.

Function of Chairperson

a) Regularly review and assess the effectiveness of the Disaster Management and Contingency Plan of the Museum

b) Ensure decision and policy formulated by the NMDMC is implemented

c) Ensure that disaster risk reduction and disaster management activities are consistent with Disaster Management Strategic Policy Framework

d) Provide prompt information on a disaster or an impending disaster situation to the Dzongkhag Disaster Management Committee and the Department of Disaster Management

Core Planning Team

As the core planning team, this group is entrusted with the following in case of an emergency and it consists of:

1. The Director
2. Fire Brigade In-Charge, Royal Bhutan Police
3. The Dy. Chief Curator
4. The Dy. Chief Chemist
5. Museum disaster focal person
6. The Administrator

4. Applicability of the knowledge gained from ITC 2017 – Disaster Risk Management of Cultural Heritage

As the saying goes 'Prevention is better than cure' this international training course on Disaster Risk Management of Cultural Heritage is very useful and timely. Useful, because it equips one with necessary skills and technique and to deal with such eventuality in a holistic approach. The integrated three steps of disaster risk management of cultural heritage are as follows:

Before disaster

Risk assessment, risk prevention, preparedness (mitigation)

During disaster

How to respond to a disaster with the above points and skills in mind

After disaster

Carry out damage assessment, treatment and recovery and rehabilitation.

Developing Prevention and Mitigation strategies

Components and attributes of the Ta Dzong

#	Name of the component	Expected impact	Location	Characteristics/ Significance
1	Tshogzhing Lhakhang (Tree of Wisdom in the field of Buddhas depicting the four schools of Vajrayana Buddhism) Clay statues	Fall off the lotus pedestal and break into pieces in case of an earthquake	6th Floor of the Ta Dzong	Sentiment and intangible
2	Namse Lhakhang (Temple of Lord of Wealth) Kubera Consist of metal and clay statues	Fall off the lotus pedestal and break into pieces in case of an earthquake	5th floor	Sentiment and intangible
3	Thangka collections Consist of painting, textile, wood and metal	Burn due to fire, bio-deterioration due to excessive humidity. Accumulation of soot and grime	5th and 4th floor storage	Object of veneration and worship
4	Textile and costume collection	Burn due to fire, bio-deterioration due to excessive humidity. Accumulation of soot and grime	Storage and 3rd floor	Tangible and costume/ folklife
5	Ethnographic collection (Utensils, household items, farm implements	Damage, burglary, excessive humidity	Second and first floor	Folklife

Preventing and mitigating risk

Prevention is better than cure as the saying goes. Although natural disasters cannot be avoided, but can be tackled effectively with prevention, mitigation and having total preparedness. Various risk prevention, mitigation and preparedness have been developed and put to practice in times of disaster.

Avoiding hazards

Avoiding hazards had always been a challenge to the museum management, as such risks persists within the museum and its vicinity. One of the measures is to slash and burn the vegetation around the museum periphery. Carry out periodical inspection for any leakages from the roofs and pest infestations. Install weather proof showcases with temperature and humidity control.

Blocking hazards

One of the persistent hazards is the strong winds in the spring season, which sometimes blow away the roof of the museum, causing the roofs to leak and bring in rain which turn cause damage to the objects. Retrofitting of the stronger roof solves the problem of roofs being blown away by strong winds. Fire

has always been a concern for worry, and in order to counter such eventualities, we have installed fire hydrants at strategic locations in the museum compound besides having fire extinguishers in each gallery and alley of the museum.

Detection of hazards

Deterioration of objects by bio-deteriorating agents is a continuous process, which cannot be stopped altogether, but can be slowed down up to some extent by means of application of scientific methods. Since the objects housed in the museum are the core of the cultural heritage, besides the setting up of a conservation laboratory, the museum has installed thermometers with graphs in various parts of the museum to monitor and temperature and humidity. Fire detectors in the museum galleries have been installed to detect any fire outbreak. To prevent theft, the museum management have installed metal detectors at the entry and exit points of the museum, CCTVS and manual checking by the security guards.

Reducing hazards

Reduction of hazards is one of the most pertinent issues, which need to be looked at from various perspectives. For my museum reducing risk means employing more security personnel to man the museum and its attributes day and night. The security guards are expected to be on guard 24X7, so that they can keep watch, prevent any disaster from theft to fire outbreak etc. We cannot afford to be complacent on the issue of reducing risk to the museum and its attributes, since hazards can from any source. In order to reduce the hazard of fire outbreak, we have minimized the lighting of butter lamps and incense burning in the two temples of the Ta Dzong. But the end users (worshippers) were adamant that they may be allowed to continue the worshipping, so we had to compromise on having a place where these people can lit butter lamps and burn incense a little far away from the Ta Dzong. We also make sure that the butter lamps are put off in the evening by the museum assistants. We have also put up signboards warning people not to smoke in the vicinity of the museum, which is having good impact.

Adaptive capacities

One of the guiding policies of the developmental policy of the government is the preservation and promotion of our history, tradition and culture, and these has been accorded highest priority in every 5 years plans. The government places much importance to the preservation and promotion of our tangible and intangible culture. The policy makers have always supported our initiatives and endeavored to make our dreams come true. From the highest authority to the lowest rung actors, the support has been impressive and encouraging and will continue to be so. Our policy makers very well know that without culture, there is no people and country.

Retrofitting

As the fire is one of the most imminent hazards to the museum and its collection, during the process of re-electrification, safety lines have been included in the system along with fire detector alarms. In order to minimize the collapse of the walls, concrete reinforcement has been given from the inner portion of the walls, which were reconstructed. But these reinforcement or addition needs to be relooked from the perspective of disaster risk management expertise. Whether we can term it as retrofitting or vulnerability.

Development of mitigation measures

After this much desired and important course, I intend to develop a mitigation measures, and in fact, I have been working on it a few months back, and formed a National Museum Disaster Management Committee (NMDMC) a few years back. But the committee is now stagnant owing to the non-existence of skills and equipment. In close consultation of my director and given the required budget, the museum management shall be implementing the mitigation measures, albeit in a modest manner. The mitigation measure will begin by training the museum staff, which is the on the forefront of any disaster that may strike the museum. We will be seeking the assistance of the fire brigade of the Royal Bhutan Police in training our staff and advising us on the procurement of necessary equipment.

Expenses for the mitigation plan

It is totally out of my reach to project the expenses that may be required to develop, implement and maintain the mitigation measures in my museum. Nevertheless, once I along with my colleagues carry out the risk assessment, prevention and mitigation, we can only propose the requirement of the development of mitigation measure, equipment, training to the ministry. The ministry in turn deputes an expert to carry out the feasibility study based on the urgency. I am very optimistic that the required budget will be promptly approved by the ministry bearing in mind the urgency and importance of the disaster mitigation plan proposed by the museum management.

Emergency preparedness and response procedures

Safety of the visitors, staff and collection is of utmost importance and hugest priority must be accorded to the safe evacuation in case of a disaster. As a precautionary measure and to guide people out of the museum, a floor map of each floor in large format will be displayed at a strategic location in the respective floor with exit signage. This maps along with list of attributes, location of fire extinguishers, fire hydrants will be shared with the fire brigade and other stake holders such as the division for cultural properties in format as prescribed in the disaster preparedness form.

Evacuation route

Owing to the sloppy location of the museum, we have very limited empty space near the museum, but we have ample space just below the museum gate and it can be used as an immediate refuge for people. The objects can be moved to the new exhibition hall and vice versa n case of disaster.

Prioritization of objects

Our institution being the National Museum of the country, houses many art objects, costumes, and ethnographic collection, and all these artifacts are valuable and we cannot value each of them. All these artifacts are important and needs to be evacuated as far as possible.

During the course of renovating the Ta Dzong, we have proposed that emergency equipment must be allocated strategic locations in the museum, such as fire alarms, hydrants, CCTVs, which the renovation team took it very seriously and allocated such measures.

5. Planning for Emergency Response Team

National Museum Disaster Management Committee (NMDMC)

Composition of team

a) The Director, ex-officio Chairperson
b) Superintendent of Police or Officer-in-charge, Royal Bhutan Police
c) The Curator/Chief of Museum Security
d) The Sr. Chemist, Conservation Section, National Museum
e) Conservators
f) Museum Assistants

Salvaging heritage collection

Step-by-step salvaging operation

1. Damage assessment of the heritage building
2. Stabilize any attributes of the heritage
3. Assess the heritage collection
4. Document – Photographic and sketch as far as possible
5. Have supplies and stationaries
6. Barricade the collapsed heritage to prevent any intrusion or theft
7. Delegate responsibilities to the salvage team members
8. Identify a safe area for evacuation of the collection
9. Prepare or mark the area by a grid, for easy inventorying later on
10. Salvage the undamaged artifacts followed by the broken or damaged ones
11. Stabilize, clean and wrap them in acid free paper or cloth and have these artifacts transported to the identified safe place. Allocate temporary inventory numbering
12. Clean, number and pack them for transportation to the place (storage) for safe keeping

Museums must have specific outline for clean-up and salvage procedures for both the collections and the buildings. These procedures should be prioritized so that staff and emergency suppliers can use their time wisely and effectively. It is important to consider long-term restoration treatment procedures and list any suppliers that may be involved if any professional cleaning, drying or repair is needed.

6. Recovery plan

Post Disaster Needs Assessment

Documentation of the heritage/collection

Take on board the stake holders with HI/HP

Prioritizing emergency needs of the heritage + Determine the recovery window

Look for recovery solutions + sequence

2.2 Protecting the Indigenous Batad Rice Terraces from Risks of Disasters

Abner O. Lawangen
Disaster Risk Reduction and Management Center, Tublay, Philippines

1. Introduction

The Batad Rice Terraces is a part of the Ifugao rice terraces in the Cordillera Administrative Region (CAR) in the Philippines, which are referred as the 8th Wonder of the World (National Statistics Office, 1999). It is a symbol of indigenous ingenuity and engineering skills of the Ifugaos. It consists of aesthetically carved indigenous rice terraces along the slopes of towering mountains as high as 2,000 meters above sea level and a well supported hydrologic system that nourish the traditional rice and crops of these people (Figure 1). More importantly, these terraces are intertwined to cultural practices and stories of these people, which transmitted orally from generations to generations. These magnificent terrace landscapes are living witness of the harmonious and sustainable coexistence of nature and man.

This world famous terrace landscapes has been declared as UNESCO "World Heritage Site" in 1995 recognizing the sustainable socio-culturally based management by this indigenous people that resulted to its decades of existence. Further, this landscapes which are sustainable showcase of one humanity's greatest human – nature interrelationships demonstrating a sustained socio-ecological flow for hundreds of years are now part of the Globally-Important Agricultural Heritage System (GIAHS) (Gomez, 2013).

Fig.1 Perspective of the Batad Rice Terraces

However, the attributes and values have reportedly been fast deteriorating due to various factors that need utmost attention. Further, the rate of deterioration is aggravated by climate disasters suggesting the need to come up with holistic and futuristic strategies to countermeasure these climate risks.

2. Sustainability and Existing Values and Attributes

This world heritage is a showcase of interrelated attributes and values that contributes to its sustainability (Table 1). It consists of biophysical, socio-economic and cultural attributes that offered a compensatory and support system to each other enabling its existence for years (Figure 2). The Batad heritage site is a package of interacting but balance social, economic and ecological factors. It offers economic opportunities in an environment friendly system with application of traditional knowledge and practise. This terrace

Attributes	Values
Indigenous Rice Terraces	Cultural, historical, aesthetics, ecological and associational
Traditional Rice Production and Management	Cultural, historical, associational
Muyong (Microforest) and Indigenous water facilities	Ecological, health, economical, cultural
Heirloom Rice	Cultural, associational, economic
Biodiversity	Ecological
Tourism	Economic
Cultural belief and traditions	Cultural, associational, historical
Water	Ecological, health, associational

Table 1 Existing attributes and values of the Batad Rice Terraces

ecosystem is characterized by its amphitheatre like rice terraces, a clump of traditional residential areas and traditional rice granaries, a micro forest (muyong) that surrounds and provide the water needs of the rice terraces and swidden farms (Figure 3). This rice terraces have sustained these people by providing heirloom rice and other indigenous crops for centuries, making it an important part of their cultural and historical stories. Further, these traditional rice terraces are closely attached to these people and put so much value on its basic resources like soil, water and forests. On the one hand, the beautiful scenery of the area makes it also favourite tourist destination in the region augmenting economic activities of the local populace.

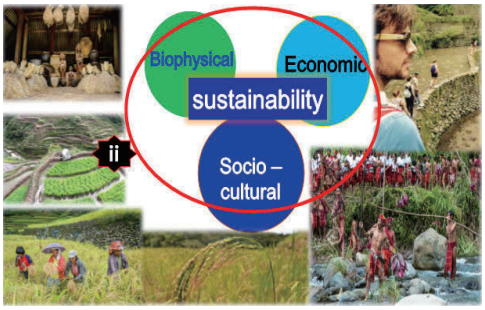


Fig. 2 The sustainable development model of the Batad Rice Terraces.

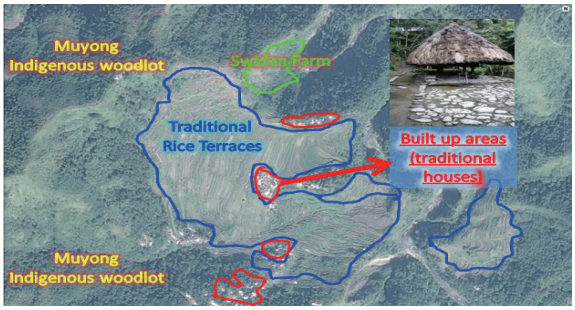


Fig. 3 Diagrammatic illustration of the Batad Rice Terraces, showing the different attributes.

3. Vulnerabilities and Existing Threats

The sustainability of the Batad Rice Terraces is being undermined by weakening of physical and socio-cultural components (Figure 4). Natural deterioration of physical resources such as soil and rock materials contribute to natural decay of the rice paddy ponds and walls and the increasing external pressure such as the intrusion of chemical and high yielding varieties in the traditional rice ecosystem brought tremendous alteration in the once sustainable rice based ecosystem. On the one hand, weak policy and regulation and unsustainable site management are critical threats that have direct contribution in the deterioration and non-protection of this ecosystem. The lack of long term development blue print for the site and the absence of policies that promotes sustainable use and protection from climate hazards of this heritage site make it vulnerable. Lastly, the distortion of the inter-generational knowledge and skills transfer as result of the declining economic opportunities in the traditional rice terraces, as a result of the continuing climate pressure, accelerates its deterioration. Young people are moving to other areas, to find other economic activities, leaving the rice terraces to older population, who are normally on their less productive years, thereby, distorting the sustainable traditional operation of these landscapes (Dizon et al., 2012).

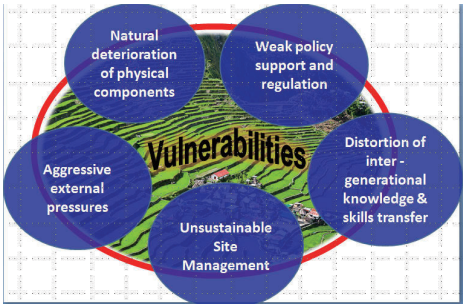
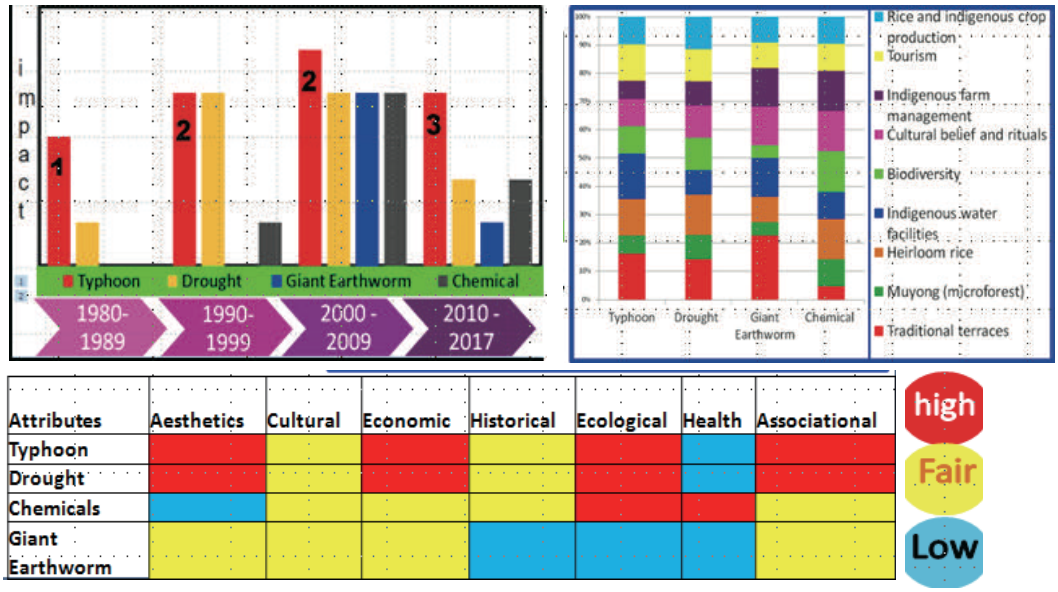


Fig. 4 Existing threats of the Batad Rice Terraces

4. Disaster Impact to Cultural Heritage and Vulnerability of Attributes and Values

A historical profile of disasters in the Batad Rice Terraces since 1980 showed four (4) major hazards – typhoon, drought, giant earthworms and chemicals (Figure 5). Analysis of these disasters showed direct impacts to the different attributes and values. Evidently, traditional terraces and cultural belief and rituals are the most impacted attributes by these hazards, while muyong is the least affected; this is due to its resilient nature that resulted from abundant vegetation (Chen and Qiu, 2012). On the contrary, typhoon and drought brought significant unfavourable impacts (red-high) to aesthetic, economic, ecological and associational values of the traditional rice terraces (Cordillera Regional Disaster Risk Reduction and Management Council, 2014).



Attributes	Aesthetics	Cultural	Economic	Historical	Ecological	Health	Associational
Typhoon							
Drought							
Chemicals							
Giant Earthworm							

high
Fair
Low

Fig. 5 Disaster history (upper left) in the traditional rice ecosystem, impact of hazards to attributes (upper right) and to heritage values (down)

This analysis demonstrated further that typhoons and drought are the more serious hazards faced by the Batad rice terraces, and the traditional terraces and the socio-cultural components are the most affected attributes while the most impacted values is aesthetics, economic, ecological and associational.

5. Prevention and Mitigation Strategies

The hazards, risks and vulnerability of the Batad Rice Terraces heritage suggest a comprehensive intervention in order to address the complex challenges. These strategies include strategic level planning, physical planning, technical level, management system and capacity building (Figure 6). Specifically, strategic level includes crafting of policies and regulation supporting sustainable use, protection and conservation of the traditional rice terraces. It can also include risk insurance and documentation of indigenous knowledge system and practices. On the other hand, centers on the development of sound land use and zoning in the heritage site, community based disaster and climate resiliency planning and entrepreneurial planning. Technical level intervention addresses the degrading components of the rice terraces such as application of riprap to reinforce walls and ponds, strict use of indigenous materials and farms implements and reconstruction of degraded rice paddies. On the one hand, the management system promotes the development of a long term site development, vulnerability assessment, andregular

monitoring of the heritage site. Lastly, capacity building among the different stakeholder is critical. Establishment of an indigenous knowledge training system and center and integration of the indigenous knowledge and practices of rice terraces management to school curricula is anticipated to give positive result in overhauling the dying interest of young generation to traditional rice farming.

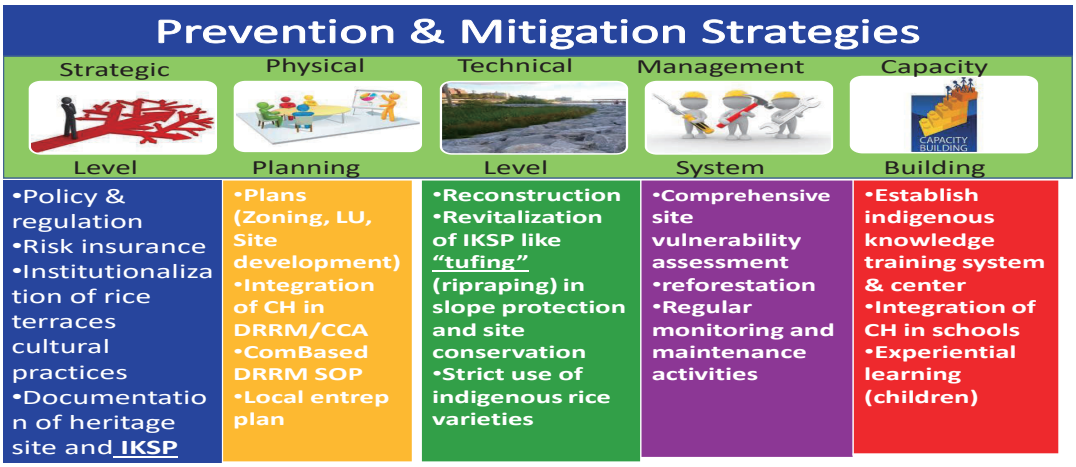


Fig. 6 Prevention and mitigation strategies

6. Looking for the Future

Pilot Study: Cultural Rice Terrace Resiliency: Securing Food, Preserving Heritage

The complex challenges in the Batad traditional rice terraces resulted in the identification of comprehensive program but sta––––rting from a small activity that has direct relationship to the basic need of the people that is food is anticipated to propel the effort of building resiliency on this traditional rice landscape. This pilot study goal is to strengthening of resiliency of the traditional rice terrace while ensuring food security and heritage preservation through active community – government partnership. It has four components; 1) establish community based training and experiential learning among youths an children to ensure continuity of indigenous rice terrace management, 2) institutionalize the integration of cultural heritage to local resiliency program, 3) ensure continuity and integrity of cultural heritage through sustainable ecotourism and entrepreneurial activities, and 4) capitalize on existing indigenous practices and technologies in furthering rice terrace ecosystem sustainability. This program shall encourage participation of the different stakeholders specifically local community, local government, non-government organization, academia, and others. Activities include public consultations, site visits, training of core team and leaders, cultural heritage and DRRM planning and field surveys and documentations.

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2.3 Gallipoli Historical Site

Hamit BIRTANE
Technical Expert, Directorate of Gallipoli Historical Site, Turkey

1. Site

Gallipoli is a peninsula in northwest part of Turkey. It is nationally protected area, covers 33.000 hectares (330 km^2) at the southern end of the Gallipoli Peninsula on the European side of the Dardanelles. Gallipoli Historical Site is the place where the Gallipoli Campaign took place in The First World War. It is one of the best preserved battlefield area from the 1.st WW. and therefore it has been accepted to the World Heritage Tentative List at 2014. There are one city (Eceabat) and 8 village settlements in the Historical Site that have about 10.000 populations in total.

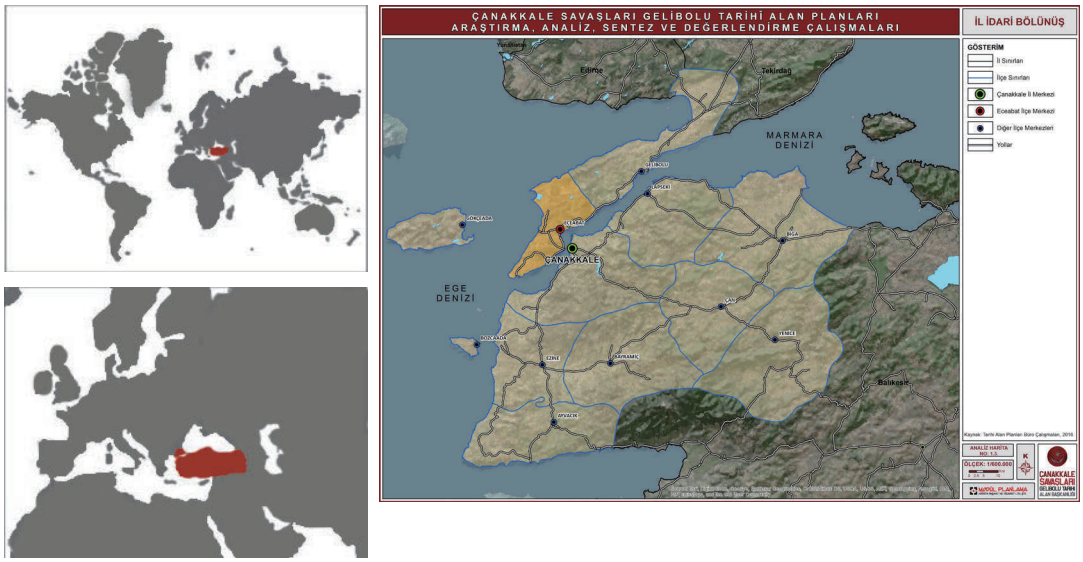

Fig.1 Photograph: World, Turkey, Gallipoli Peninsula

Gallipoli Peninsula has been a settlement area since 12.000 BC. This is an area where the majestic civilizations have been inhabited by different cultural formations and hybridizations for centuries. So it contains important archaeological sites. There are 32 ancient settlements and hill towns/tumulus in Historical Site;

Kilisetepe-Maydatos (3.400 BC), Sestos (650 BC), Elaeus (8600 BC), Protesilaos (5.000 BC), Alopekonnesos (700 BC), Araplos (600 BC) and Bigalı (5.000-4.000 BC) are some of those ancient settlements.

Gallipoli Peninsula is both an encounter and a border zone between Asia and Europe and its civilizations. So it has a very strategical status. Being a region through which different cultures pass and in which others meet and interact, it has witnessed important events;

Trojan Wars (1.250 BC)
Ionian colonization (750-330 BC)
Persian invasion (they passed the Dardanelles at Sestos at 5th century BC)
Alexander the Great passed sea from Elaeus (4th century BC)
Roman times (133 BC-396 AC)

Byzantine Empire Period (4th century BC - 14th century AC)
Ottoman Empire Period (14th century – 20th century)
The Fist World War (1914-1918)

The Historical Site have fortress from Ottoman Empire, many defense structure remains, graveyards and cemeteries of both side of war, monuments in memory of soldiers, shield/trench, tunnels, blast holes, redoubts, cannons and many other weapons from the First World War.

Gallipoli peninsula also has many natural assets. Peninsula's one side looks over Aegean Sea and other to Dardanelles. There are many coves ad beaches in the site. The Salt Lake is a candidate for wetlands status. There is spectacular geological formations; Büyükkemikli, Küçükkemikli, Sfenks. % 54 percent of the site is forestland and it contains much kind of trees and plants. % 35 percentage of the site is agricultural land and eight villages in the site are economically based on agriculture.

We are trying to reveal, restore and protect all the values in the site. But also there are 10 thousand inhabitants and annual 2 million visitors that use the site. And we want to design the all site as an outdoor museum with its all assets. While doing this we are trying to achieve a balance between protection and usages. The protection should not restrict meeting the needs of inhabitants and visitors. And the usage should not harm the values.

Table1 List of Attributes and their values

Attributes		Numbers	Values
Memorials and Martyrs' Cemeteries	Ottoman Empire	77	Authentic, Historical, Artistic, Associational
	Allied State	32	Authentic, Historical, Artistic, Associational
Ancient Settlements		29	Archeological, Historical
Sites	Urban	95 % of the site	Historical, Archeological, Natural
	Historic		
	Archeological		
	Natural		
Bastions-cannons		10	Historical
Wrecks		22	Historical
Museums		3	Historical, Artistic
Objects in museums		≈ 5000	Artistic, Historical, Archeological
Castles/fortress		5	Archeological, Historical, Authentic and Artistic
Trenches/shields lines		193 km	Historical, Archeological
Landing Beaches		7	Historical, Associational
Geological/Topographic Formations		5	Natural, Historical, Associational
Civil Architectural structures/buildings		38	Architectural

2. Risks and Disasters

Because of its geological, techtonical and topographical structure Gallipoli Historical Site faces with various kinds of hazards.

The entire peninsula is at the first degree earthquake zone. There have been 33 earthquakes that directly affect the Gallipoli Historical Site from 1912 until 2015. Eight of them are above the magnitude "6".

54 percent of the site is forestland and it has the high risk of fire. Between the dates of 1969-2012, there are 132 forest fires in the Historical Site. 13 of them were serious and burnt totally 14.742 ha forest areas.

Landslide, floods and erosion are other risks for the site.

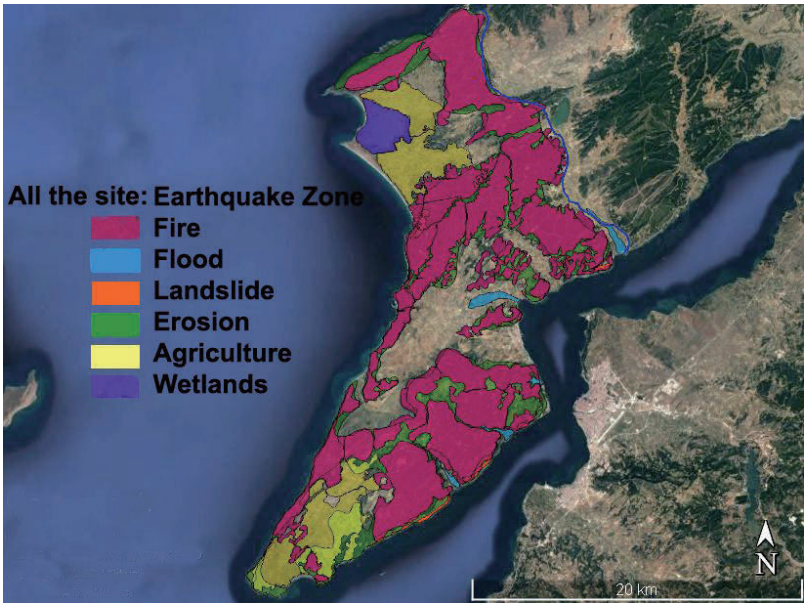

Fig. 2 Risk map

3. Vulnerability Assessment

After specifying the attributes and the risks the site faced with, the vulnerabilities are defined. They had been considered to link the attributes with different type of hazards.

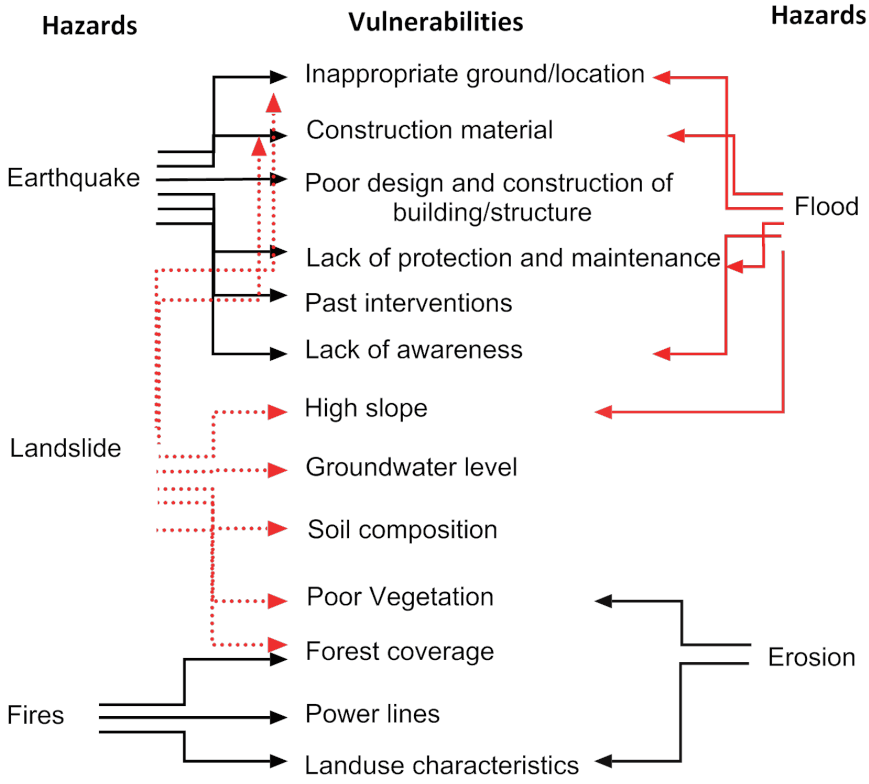

Fig. 3

3.1 Risk Assessment

By consideration of vulnerabilities the possible negative impacts of hazards on the heritage attributes had been listed.

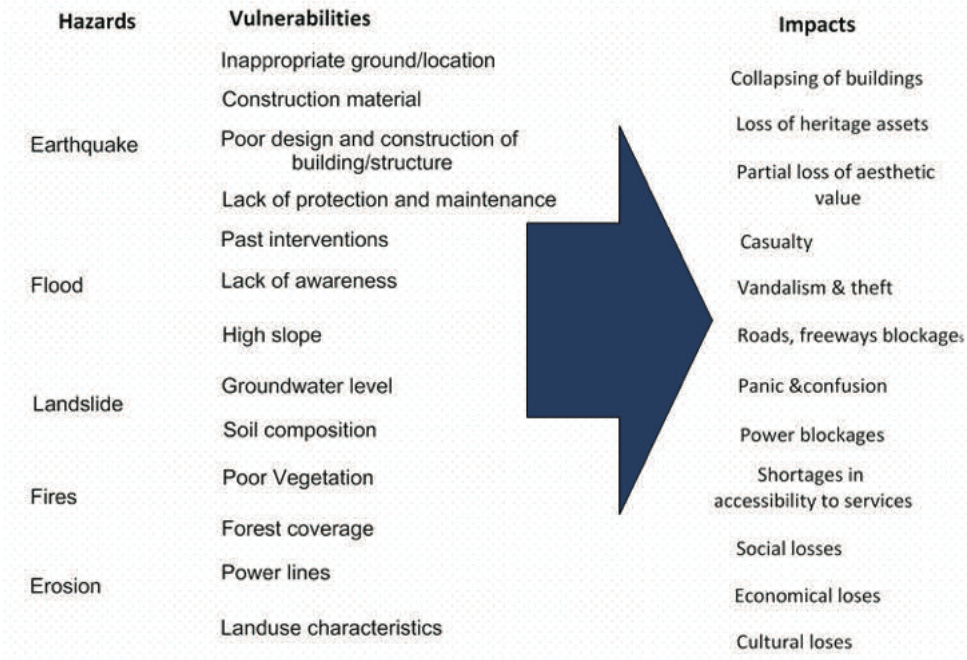

Fig. 4

3.2 Scenario

For the worst scenario an earthquake and by it's trigger fire and landslide will be occurred.

- Settlements will be damaged/affected
- Late for first response/aid
- Monuments, martyrdoms and cemeteries are destroyed
- Castles and another defense structures will be damaged
- Museums and it's objects will be damaged or destroyed
- The network of facilities and services destroy
- Casualties of residents and visitors

3.3 Risk Reduction and Preparedness

Table 2

Attribute	Impact	Mitigation	Responsibility
Castle	Damage	Maintenance, Retrofitting	DGHS, Museum
Memorials and Martyrs' Cemeteries	Damage	Retrofitting, relocating, fire preservation systems, Cleaning the surrounding trees/ bush/grass, drainage system, non frame method,	DGHS,CWGC, Fire Fighting Office, Forestry Affairs Office
Urban Site	Damage	Maintenance, Retrofitting, drainage system, fire preservation systems	DGHS, Local Government, Fire Fighting Office

Ancient Settlement	Damage	archaeological excavation plan, land use planning	DGHS, Museum, University
Civil Architectural structures/buildings (17)	Damage, Collapse, Partial loss	Warning systems, Retrofitting, maintenance, monitoring, drainage method, retaining wall method, fire prevention system	DGHS, Local Government, Fire Fighting Office
Landing Beaches	Damage to landscape and ruins of the war	Non frame method for landslide, land use planning	DGHS, Urbanization and Environment Ministry, Coastal Safety Agency
Bastions-cannons (2)	Damage	Maintenance	DGHS

3.4 Response and Evacuation

- Emergency Response Plan
- Emergency Resp¬onse Procedure
- Coordination with other agencies/institutions
- Emergency Response Teams
- Training and Practies
- Inventories, maps, assessment forms
- Logistic/Emergency equipments
- Post event damage and risk assessment, evacuation, storage etc

Fig. 5 Evacuation Plan

3.5 Recovery

Post-Disaster Need Assessment

Policy and Strategy Setting

Institutional Framework

Finance

Implementation and Monitorig

3.6 Pilot Project

Building water reservoir

Goal; protecting the heritage assets against the fire.

Objectives; to obtain water source for fire intervention and to minimize the damage because of the fire.

Undertaken activities; Project design, Location selection

Involving; Technical experts, Fire fighter office, Local Government, Forestry and water affair office.

Duration; 9-12 months.

Resource; DGHS and Local Government budget.

Stakeholders; Trying to convince them of the importance of cultural heritage asset for national memory and showing the results of economic, social and cultural loss in case of damage.

Showing the possibility of being affected by the event in case of failing to control.

2.4 Disaster Risk Management Of Cultural Heritage: The Case Of Museum of Malawi

Innocent Hudson Mankhwala
Archivist, Department of Culture, Malawi

1. Introduction

Malawi is a landlocked country in south eastern Africa, bordered by Zambia to the northwest, Tanzania to the northeast and Mozambique to the south, southwest and southeast. It lies between latitudes 9 ° and 18° S, and longitudes 32° and 36° E. Malawi territory spreads over 118,480 square kilometers, 79% is land with 21% of the total area consisting of bodies of water. The Great Rift Valley runs through the country from north to south, and to the east of the valley lies Lake Malawi (also called Lake Nyasa), making up over three-quarters of Malawi's eastern boundary. Lake Malawi is 587 kilometres (365 mi) long and 84 kilometres (52 mi) wide. Malawi's economy is highly reliant on agriculture, which accounts for approximately 90% of its export earnings and 45% of its gross domestic product (Office of the President and Cabinet, 2005)

2. The Case Study Project Area

Fig.1 A picture of Museum of Malawi

The Museum of Malawi is the main museum in Malawi. It has been chosen because it has a rich collection of the countries cultural heritage. It is where the earliest clothing before civilization is held, in addition, it also houses old costumes of early traditional dances, earliest hunting weapons and traditional medicines. These are just but few items which are exhibited that portray the culture of Malawi. However, this important cultural heritage site is in danger of losing its important collection because it does not have a disaster mitigation plan. Furthermore, the building is not purposely built to protect the items in its holdings from the common disasters in Malawi which are floods and fire.

As a background to the establishment of the museum of Malawi, is must be noted that this museum was previously known as the Nyasaland Museum and was established by the Museum Ordinance which was enacted in May 1957. The establishment of a Museum in Malawi was largely due to the interest shown by the Nyasaland Society (now the Society of Malawi). The Society of Malawi exerted its influence on the Government, which in turn passed legislation in 1957, to establishment of a Board of Trustees to administer the Museum. The initial collections consisted of ethnographic and historical objects mostly donated by the Society of Malawi and other interested individuals and organizations. The first exhibitions

were organized on a general theme based on displays of natural history, ethnography, history and archaeology. The museum was opened to the public in July 1960.

In March 1981, the Museum Dissolution Bill was passed in Parliament to dissolve the Museum Board of Trustees and revert the administration of the Museums of Malawi to Central Government. Thus, the Museums of Malawi became a Government Department.

3. Attributes And Values

The museum of Malawi has several attributes which carries with them different values. Few attributes have been selected for the purposes of this study. The basis of the selection is that these attributes have a significant cultural connection with the people of Malawi. Secondly, these attributes have never been removed from the galleries since they were collected while other displays and removed from time to time. The first attribute is the Nyasaland Transport, this was the first passenger bus in Malawi and it provides basis of the history of the transportation system in Malawi. The second attribute is the Traditional Iron Weapons. This attribute carries both historical and technological values; it provides information on the kind of weapons that were used before civilisation during the Iron Age period. The third attribute are the Domestic Appliances, these appliances provide the cultural and historical values. They provide information on the kind of home appliances that were used especially in the kitchen. It must be noted that some of these appliances are still in use up to this present time. The forth attribute is the Slave Trade (Model), this carries both the historical and cultural values. It shows how Africans were being shipped to the coastal regions to be sold as slaves during the Atlantic Slave Trade. Other attributes are the Water Pumping Machine and the Traditional Hut.

Fig.2 Nyasaland Transport

Fig.3 Slave Trade

Fig.4 Domestic Appliances

Fig.5 Iron Weapons

ATTRIBUTES OF THE SITE

S/N	ATTRIBUTES	TYPE OF ATTRIBUTE	ASSOCIATED VALUE	STAKEHOLDERS	SCORES OF VALUE
1	Nyasaland Transport	Movable , Tangible	Historical, Technological	Ministry of Transport, Museum Department	Historical (3), Technological (2)
2	Traditonal Iron Weapons	Movable , Tangible	Historical, Technological	Heritage Foundations, Museum Department	Historical (3), Technological (1)
3	Domestic Appliances	Movable , Tangible	Cultural, Historical	Department of Culture, Museum Department	Cultural (2), Historical (2)
4	Slave Trade (Model)	Movable , Tangible	Historical, Cultural	Universities, Department of Culture, Museum Department	Historical (3), Cultural (2)
5	Water Pumping Machine	Movable , Tangible	Historical, Technological	Universities, Museum Department	Historical (2), Technological (2)
6	Traditional Hut	Movable , Tangible	Historical, Cultural	Heritage Foundations, Museum Department	Historical (3), Cultural (3)

Fig.6

4. Risk Analysis

Malawi has experienced various kinds of disasters that are both natural and human induced disasters. Some of these disasters are earthquakes, landslides, Fire and floods. This study focused on the floods because of their frequency. Over the past few years, the country has been experiencing heavy rainfalls that results in disastrous floods and cause serious damages to property, lives and the cultural heritage. Therefore, the disaster management plan is meant to prepare for all forms of disaster more especially floods. The risk analysis therefore focuses on the floods as the main hazard. For the museum of Malawi, factors that will increase the vulnerabilities are poor drainage system, absence of routine maintenance of the roof and the building, Presence of old and long trees and wooden fittings for displaying the museum collection and the wooden floor. In a situation, the disaster will have an impact on the community, the heritage and the safety of visitors and staff.

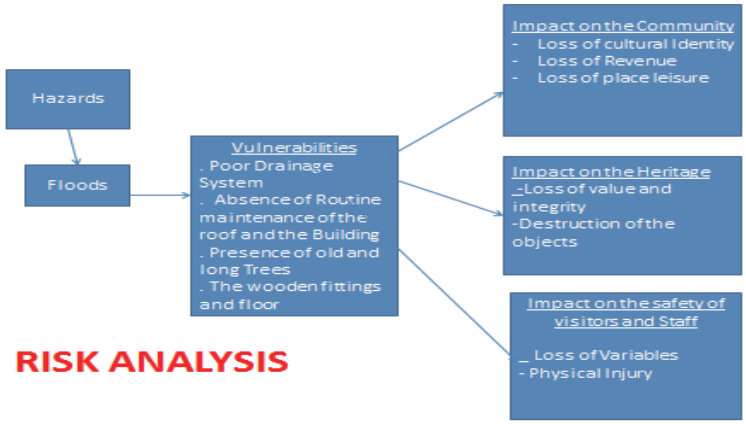

Fig.7

5. Mitigation

This is about the capacity of the museum of Malawi and its coping mechanism in times of disasters. The disaster management plan will build on these available factors below.

1. Documentation and inventory of the museum collection (onsite and offsite)
2. The location of the storage area located in a different
3. The Museum objects are displayed in a glass which is raised above knee level
4. Procedure for Handling Objects Manual Available
5. Availability of the First Aid Kit

Priority of Mitigation			
short to medium	long term	Implimenting Agency	
training of staff on rescue operation	Employment of more staff	Museum Department	Mother Ministry
engaging stakeholders	signing of MoU with the department of disaster	Mother Ministry	
Improving the drainange system	Ammend the Act to include disaster management of the museum collections	Law commission	
routine inspection and maintelnance of the building	Development of a policy and guildelines manual for disaster preparedness and response of	Museum Department/ Mother Ministry	
Evacualation Plan	Insuring of assets and the building	Museum Department	
	Fire Resistant Paint on the walls	Museum Department	
	Installation of hydrants	Museum Department/ Fire Department	
	Museum Department		
	Law Commission		
	Ministry of Civic Education, Culture and Community Development		

Fig.8

6. Response And Recovery

For the museum collection to be successfully salvaged in times of disaster; there is need to have a proper response team and involvement of various stakeholders for immediate, medium and long term plans. Some of the key stakeholders involved which are of high power and high interest are the museum management, cultural heritage groups, the department of culture.

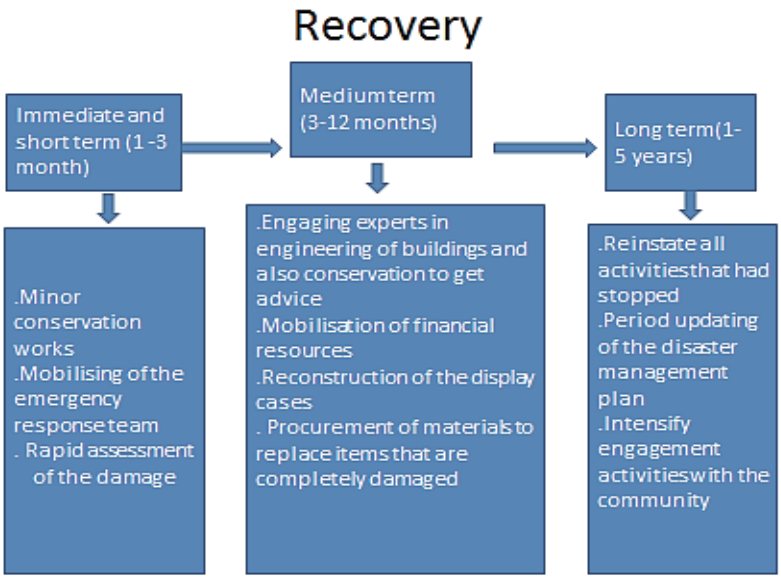

Fig.9

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2.5 Disaster Risk Reduction for George Town UNESCO Word Heritage Site

Ang Ming Chee
George Town World Heritage Incorporated, Malaysia

1. Introduction

George Town, which is located at the State of Penang of the northern peninsula of Malaysia, was inscribed as a UNESCO World Heritage Site in 2008 for three outstanding universal values: multicultural trading town (criterion II), living heritage (criterion III), and a unique architecture, culture and townscape (criterion IV) together with the city of Malacca. Both cities was the historic seaway that has played a crucial role in regional and global trade for at least a millennium, and they are now one of the most popular tourist destination in Malaysia.

Fig.1 George Town UNESCO World Heritage Site, Source: George Town Special Area Plan (2016)

George Town in particular, has risen to be one of the most influential secondary city in Malaysia. This city hosted the administrative, cultural and political centre for the State of Penang, and has been committed to the Millennium Development Goals. To promote sustainable development for George Town UNESCO World Heritage Site, George Town World Heritage Incorporated was founded on 21 April 2010 as the heritage agency for the State Government of Penang to manage, monitor, and promote the site, and support the Penang State Government on heritage matters. With collaboration from local and international stakeholders, most of the 3,500 pre-war shophouses and monuments have been restored and conserved, with parallel efforts in safeguarding the living heritage of the multicultural heritage of the people.

2. Cultural Heritage and Disaster Risk Reduction

George Town larger city, and the world heritage site in particular, has faced very few natural hazards since the port city was established by Francis Light in 1876. Unfortunately, urbanization, globalization and global warming have increased the disaster risks for this historic city. Potential hazards in particular fire and flood, may have large impact to the city if the people remain distance from preparedness to disaster risk reduction.

George Town and its sister city Melaka are one of three pilot sites for the UNESCO project entitled **"Capacity Building for Disaster Risk Reduction of Heritage Cities in Southeast Asia and Small Island Developing Sates in the Pacific"** along with Old Town Jakarta and Levuka Historical Port. It aims to implement the Sendai Framework for Disaster Reduction 2015-2030 in the Asia-Pacific region by building the capacity of heritage practitioners, disaster managers, government officials, the community and any other stakeholder in heritage cities. As a part of this project, George Town has been tasked with developing a Disaster Risk Reduction program that can be implemented within a year, as well as longer term management plan and strategies to integrate into the overall heritage management of George Town.

George Town World Heritage site in particular, have important attributes, that needs cater made disaster risk reduction strategies for each of them as summarized in the following table:

Table.1 The Attributes, Threats and Vulnerabilities of George Town UNESCO World Heritage Site

Attributes	Threats	Vulnerabilities
Multi-cultural trading towns, forged from the mercantile and exchanges of Malay, Chinese, and Indian cultures and three successive European colonial powers for almost 500 years, imprints on the architecture and urban form, technology and monumental art	• Globalization • Modernization • Homogeneity of trades	• Irrelevant to contemporary daily needs. • Unable to adapt new changes • Competition from new businesses. • Lack of support from local community
Living testimony to the multi-cultural heritage and tradition of Asia, and European colonial influences, which include multi-cultural tangible and intangible heritage is expressed in the great variety of religious buildings of different faiths, ethnic quarters, the many languages, worship and religious festivals, dances, costumes, art and music, food, and daily life.	• Urbanization • Lifestyle changes • Lack of committed individuals to inherit cultural heritage	• Taking for granted attitude • Lack of systematic documentation • Passive participation from the community
Unique architecture, culture and townscape, with exceptional range of shophouses and townhouses. These buildings show many different types and stages of development of the building type.	• Fire • Flood • Deterioration • Termites • Thief	• Density of city narrow • Water flow submit to sea level • Fabric (wooden structure) • Underestimated the extent of risk • Lack of maintenance • Frequency of festival using fire (symbolic meaning)

3. Disaster Management System for George Town

Despite the fact that Malaysia is a country that faced very little disaster, there are still threats of flood from the monssons, fire and landslides. The National Disaster Management Agency is the Lead Agency of the National Disaster Management in Malaysia. Operation of disaster management depends on the scale of the disaster and is operated either at the National, State and district levels with reference to the Directive No. 20 which details the definition, operation, roles, responsibilities and processes during any disaster.

While the documentation of disaster management in Malaysia is seemingly prepared and complete, professional needs on disaster management for cultural heritage remain limited. This is due to the concept remain relatively new, and there are little trained expects in the disaster risk management on cultural heritage in Malaysia.

Therefore, by placing George Town UNESCO World Heritage Site as a case study, and by working with UNESCO Jakarta on the project of "Development of Draft DRR Strategy of Heritage Cities for George Town World Heritage Site", this effort will streamlined and popularized the concept of disaster risk reduction for the World Heritage Site, as well as other important buildings outside the site.

The project that is scheduled to commence in March 2018 will be led by George Town World Heritage Incorporated, together with key stakeholders for the pilot project. Together, the project will identify the gap of current disaster management in the George Town and propose the most possible solution to the Federal Government. The Development of draft Disaster Risk Reduction Strategy and Relevant Action Plan shall also be useful in the education for the wider public. This is in particular to the other heritage cities in Malaysia which have always referred to George Town as the city of reference.

More importantly, after the big flood that hit Penang in 5 November 2017, disaster is no longer a term foreign to the general public in Penang. Almost 80 percent of Penang were submerged in water during that fateful morning. The threat of global warming has finally arrived in Penang yet almost 99 percent of the population are unprepared. Having such real threat in relevant to the larger population needs, it is a ripe moment to mainstreaming disaster risk reduction concept for the Penang people.

One community consultation workshop with the local community living in and around the site with the aims to collect data, identify vulnerabilities/risks to the structural and non-structural assets have already conducted in October 2017. The Penang State Museum has agreed to adopt disaster risk reduction for cultural heritage for their restoration project on the 100 years old State Museum. A national workshop is also scheduled in March 2018 with the local government and agencies, heritage site managers, national/provincial disaster risk management agency, international and local experts, community members, and property owners to receive advice and input, obtain necessary documents, and check feasibility.

4. Way Forward

Disaster risk reduction training will be useful for cultural heritage and general living needs. Therefore, George Town World Heritage Incorporated will continue to educate the public on this concept, thus incorporate the concepts through partnership with the professional, public and private. It is only with collective action that important valuables can be safeguarded and public are more prepared from disaster.

2.6 Fostering Resilience of Cultural Heritage Site of São Luiz do Paraitinga, Brazil

Victor Marchezini
CEMADEN, National Early and Monitoring Centre for Natural Disasters, Brazil

1. Introduction

Cultural heritage can be defined as a broader array of places such as historic cities, living cultural landscapes, gardens or sacred forests and mountains, technological or industrial achievements in the recent past and even sites associated with painful memories and war. Collections of movable and immoveable items within sites, museums, historic properties and archives have also increased significantly in scope, "testifying not only to the lifestyles of royalty and the achievements of great artists, but also to the everyday lives of ordinary people. At the same time intangibles such as knowledge, beliefs and value systems are fundamental aspects of heritage that have a powerful influence on people's daily choices and behaviors"(Jigyasu et al 2013, p.13). Cultural heritage is becoming at increasing risk due to extreme events and the progression of vulnerability.

Today, awareness about disaster risks concerning cultural and natural heritage sites is increasing in several sectors (academy, practitioners, policymakers etc.). The Hyogo Framework for Action (2005-2015) briefly mentioned the agenda of cultural heritage. One of the priorities for action pointed out that knowledge, innovation and education should be used to "build a culture of safety and resilience at all levels", and the "information should incorporate relevant traditional and indigenous knowledge and culture heritage and be tailored to different target audiences, taking into account cultural and social factors" (UNISDR 2005, p.9). The Sendai Framework for Action (2015-2030) addressed the issue of natural and cultural heritage in disaster risk reduction and resilience agenda: "It is urgent and critical to anticipate, plan for and reduce disaster risk in order to more effectively protect persons, communities and countries, their livelihoods, health, cultural heritage, socioeconomic assets and ecosystems, and thus strengthen their resilience" (UNISDR 2015, p.10-19).

The importance of cultural and natural heritage was also reinforced in the New Urban Agenda – Habitat III, adopted in Quito, Ecuador, in October, 2016. Habitat III added new considerations and roles of the cultural and natural heritage, as well as exposed some dimensions of vulnerability that involved them. One of the first statements declares that natural and cultural heritage, both tangible and intangible, will be integrated in urban and territorial policies and adequate investments will be provided to "safeguard and promote cultural infrastructures and sites, museums, indigenous cultures and languages, as well as traditional knowledge and the arts, highlighting the role that these play in the rehabilitation and revitalization of urban areas, and as a way to strengthen social participation and the exercise of citizenship" (UN-HABITAT 2016, p.8-17). The Quito Declaration stated the urban extensions need to be planned, avoiding spatial and socio-economic segregation and gentrification, providing high-quality buildings and public spaces, while preserving cultural heritage and preventing and containing urban sprawl. The document also stressed planning instruments, including master plans, zoning guidelines, building codes, coastal management policies, and strategic development policies as key elements to protect tangible and intangible cultural heritage and landscapes from potential disruptive impacts of urban development and other types of

natural and technological hazards.

Brazil has 5,570 municipalities, only 957 of them have risk mapping and are monitored by National Early Warning and Monitoring Centre for Natural Disasters (Cemaden). Among the municipalities monitored by Cemaden, 127 towns are listed by the National Institute of Historic and Artistic Heritage (IPHAN), containing 830 (66%) of the 1257 tangible cultural assets in Brazil. Two towns alone, Rio de Janeiro (145 assets) and Salvador (102 assets) have many tangible and intangible cultural heritage assets and both of them are built in risk-prone areas, exposed to floods, landslides, storms, coastal floods. Although they have state and municipal civil defence, the cultural heritage sectors are not involved in disaster risk management issues. São Luiz do Paraiatinga town is one of the cultural heritage site that was damaged during disasters. Some of its assets were listed in 1982 as cultural heritage by CONDEPHAAT – Sao Paulo State Council of Historical, Archaeological, Artistic and Touristic Heritage Defense. In January 4, 2010, the city experienced an extreme flood. The Paraitinga River reached 12 meters above its normal level, submerging nearly eighty percent of the urban area, several neighborhoods and the entire historical center, where churches, schools and 19th century housing structures were located. Half of the population became homeless (5,000 persons), including members of civil society and local government, as well as tourists. The township had to implement not only material reconstruction, but also a long-term social recovery process (Marchezini, 2015a; 2015b), a crucial issue that received little emphasis in the literature and studies about disasters. Another topic quite recently addressed is disaster risk management plans for cultural heritage sites. Our project aims to contribute to this debate. The Brazilian Plan for Risk Management and Disaster Response was launched in 2012, but Iphan was not involved in its formulation. UNESCO's resource manual Managing Disaster Risk for Cultural Heritage published in 2010 was only translated into Portuguese in 2015. There is an urgent need to build an integrated approach to foster resilience and EWS in cities that have intangible and tangible cultural heritage assets. Many challenges remain. Cemaden and Iphan need to strengthen their articulation to formulate and implement a Brazilian strategy for resilience of cities of art. São Luiz do Paraiting is a good living lab to this endeavor.

2. The Cultural Heritage Site

CONDEPHAAT listed São Luiz do Paraitinga as heritage site since 1982. However, it was only in 2012, after the 2010 flood, that the National Institute of Historical and Artistic Heritage – IPHAN recognized the state of emergency and then listed the town as national heritage in order to contribute for the restauration. The delimitation of the area of the listed urban complex covers more than 450 buildings and the visual preservation of the surroundings, with different types of attributes, associated values, vulnerabilities and risks (Figure 1). The urban and architectural landmarks in the perimeter of the urban area have public protection and encompass the Paraitinga river, streets and areas seriously affected by the flood. Before the 2010 flood, the colonial historical center held catholic churches that were traditionally endowed with deep cultural meanings as the space for religious rites (baptisms, confirmations, weddings) and festivals. The over two hundred houses built in the 19th century denote colonial and imperial periods architectural style and express the prosperity of the Brazilian coffee economy between 1840's and1930's. Many of these properties are situated in risk-prone areas (Figure 2). Intangible cultural heritage are also vulnerable to disasters, but it can also foster the coping strategies and resilience of people who make the city (Agier 2011). In 2010, local people showed diverse expressions of cultural resistance (Marchezini, 2015b). This social capital can also be used to strengthen local capacity in order to reduce risks posed to cultural

heritage. It is very important to develop a participatory approach to build disaster risk management plans that protect the tangible and intangible cultural heritage. Our approach is based in previous approach and efforts developed in our case study (see Marchezini and Trajber, 2016; Marchezini et al, 2017).

Attributes	Type of attribute	Type of material	Associated values	Vulnerability	Hazard/ threat	Risks	Stakeholders
Matriz Catholic Church (Point 1 in the map)	Immovable Tangible Cultural	Organic and inorganic	Religious Architectural	Social (Tourists, elderly people, youth) Institutional (lack of plan)	Flood	Damages to collection, tourists and local community	Regional Religious Authority Local Community Condephaat Iphan Tourists
Mercês Chapel (Point 2)	Immovable Movable Tangible	Organic and inorganic	Religious Architectural	Lack of contingency plan	Flood Lanslide	Damages to collections	Local Community Condephaat Iphan
Elpidio dos Santos' museum and its collections (Point 3)	Immovable Movable Tangible Intangible Cultural	Organic and inorganic	Cultural Architectural	Physical (houses with clay bricks around the museum) Objects	Flood Fire	Damages to collections	Local Community Tourists NGO Ami SãoLuiz Iphan
200 houses in Matriz Plaza (Point 4)	Immovable Tangible Cultural	Organic and inorganic	Cultural Architectural	Physical (clay bricks) Social (elderly); economic	Flood	Damages to buildings and inhabitants	Condephaat Local Community Iphan
Carnival (Point 5)	Movable Intangible Cultural	Organic and inorganic	Cultural Artistic	Social (elderly, youth); tourists economic	Flood	Economic and social (rental houses)	Tourists Local Community Private sector
Divine Festival (Point 6)	Movable Intangible Cultural	Organic and inorganic	Religious Cultural	Social (urban and rural Community)	Flood	Economic and social	Local Community Tourists

Fig.1 Attributes of the site

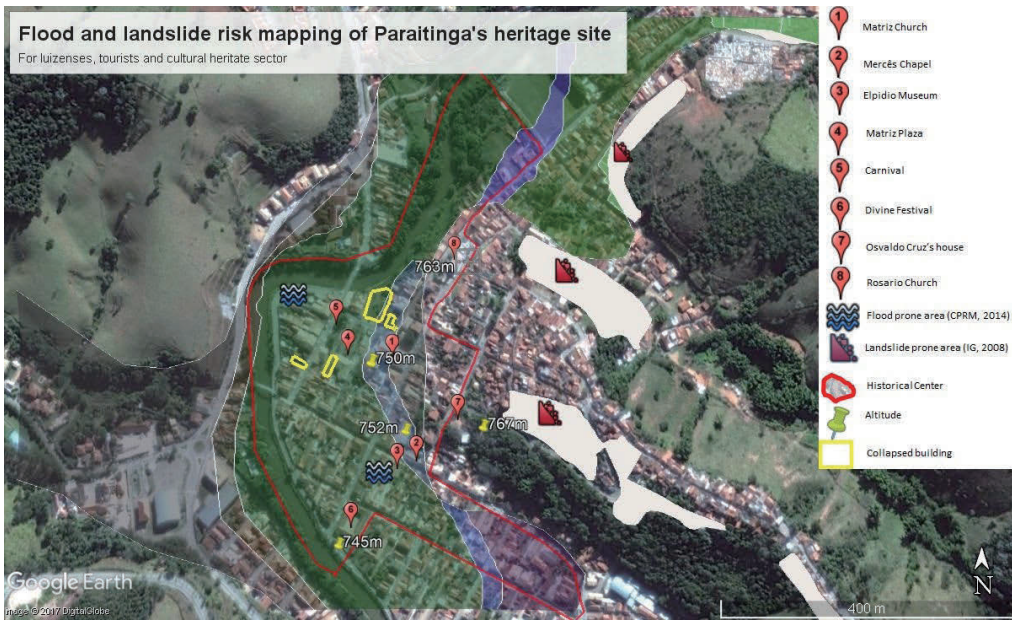

Fig.2 Flood and landslide risk mapping of Paraitinga's heritage site.

3. Disaster Risk Management Plans For Cultural Heritage Site Of São Luiz do Paraitinga

There are some dynamic pressures that can amplify the disaster risk scenarios of this important cultural heritage site. Land use changes in the Paraitinga watershed drived by eucalyptus oil production and its high prices in the global market can arise the erosion and degradation of the watershed, reducing the infiltration of water during heavy rains increasing the flood-prone areas. Heavy rains for a long period due to El Niño effects trigger floods, landslides and debris floods in the watershed, breaking smalls dams in rural areas and amplyfing the floods above to 12 meters, damaging Matriz Church and collapsing heritage buildings built with clay bricks, causing deaths and long term effects that impede people to restablish intangible heritage assets (Divine Festival, Carnival etc.). In order to reduce the disaster risks for cultural heritage it is very important to build structural and non-structural measures. Some non-structural measures include early warning system (EWS) and disaster risk management plans. In our case study, we developed a participatory methodology for building DRM plans in cultural heritage sector and other guidelines to improve people-centered EWS. For each cultural heritage asset (Figure 3 and 4), we identified some key stakeholders and mitigation actions that can be developed, such as participatory contingency plan, educational campaigns and other tools that can help to build evacuation routes (Figure 5), such as Disaster Imagination Game (DIG).

Attribute	Type	Material	Values	Vulnerability	Hazard	Risks	Stakeholders	Mitigation Actions
Matriz Catholic Church (1)	Immovable Tangible Cultural	Organic and inorganic	Religious Architectural	Social (Tourists, elderly people, youth) Institutional (lack of plan)	Flood	Damages to collection, tourists and local community	Priest Community Condephaat Iphan Tourists	-Build a participatory contingency plan -Disater Imagination Game (DIG) and educational campaings on DRR
Mercês Chapel (2)	Immovable Movable Tangible	Organic and inorganic	Religious Architectural	Lack of contingency plan	Flood Lanslide	Damages to collections	Community Condephaat Iphan	-Build a participatory contingency plan -DIG and educational campaings
Elpidio dos Santos' museum and its collections (3)	Immovable Movable Tangible Intangible Cultural	Organic and inorganic	Cultural Architectural	Physical (houses with clay bricks around the museum) Objects	Flood Fire	Damages to collections	Community Tourists NGO Ami Iphan	-Build a participatory contingency plan -DIG and educational campaings
200 houses in Matriz Plaza (4)	Immovable Tangible Cultural	Organic and inorganic	Cultural Architectural	Physical (clay bricks) Social (elderly); economic	Flood	Damages to buildings and inhabitants	Condephaat Community Iphan	-Detailed risk assessment; -Build a participatory DRM plan; -Retrofitting the houses -DIG and educational campaings

Fig.3 Disaster risk management plans for cultural heritage assets

RISK ASSESSMENT OF CULTURAL HERITAGE

Matriz Church (Latitude: 23° 13'20.48"S; Longitude: 45° 18'36.85"O)

Type of attribute	Type of material	Associated values	Vulnerability	Hazard/ threat	Risks
Immovable Tangible Cultural	Organic and inorganic	Religious Architectural	Social (Tourists, elderly people, youth) Institutional (lack of plan) Physical (objects)	Flood	Damages to collection, tourists and local community

Matriz, 4 years after the flood

Mitigation Measures	Short-term	Mid-term	Long-Term	Stakeholders
Build a participatory contingency plan - Early warning system - Inventory; Evacuation of movable objects to 2nd floor and, if necessary, to 3rd - Rafting team support (above 12 meters);	X	X	X	Regional Religious Authority Civil Protection Rafting Angels Local Community Condephaat Iphan Tourists University, Cemaden
Portable flood barriers			X	Condephaat, Iphan Civil Protection
Disaster imagination game and educational campaings on DRR (including drills)	X	X	X	Priest Civil Protection Rafting Angels Local Community Tourists University, Cemaden

Fig.4 Disaster risk management plan of Matriz Church

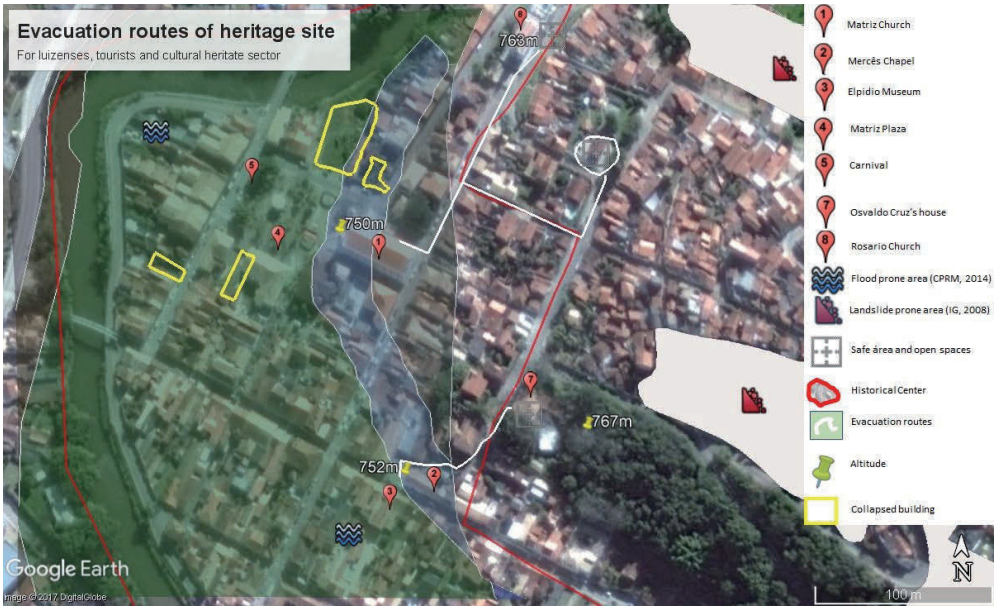

Fig.5 Evacuation routes for cultural heritage sites during floods.

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2.7 Disaster Risk Analysis in Town of Luang Prabang World Heritage Site, Lao PDR

Virasith PHOMSOUVANH
Remote Sensing and Information Division, Natural Resources and Environment Research Institute, Ministry of Natural Resources and Environment, Lao PDR

1. Introduction

Luang Prabang is the ancient capital of Lan Xang ("one million elephants") and is one of the oldest cities in Laos, founded approximately 1,200 years ago. Muang Sua was the old name of Luang Prabang following its conquest in 698 CE. Its capital was Lane Xang Kingdom during the 13th to 16th centuries. The history of Lao cultural heritage initiated in era of Lan Xang Kingdom in the thirteenth century. Lao cultural heritage was divided into fourth periods: The original Lao cultural heritage as architecture of Lane Xang Kingdom (1353 – 1695) established in the 14th century. In this period, Lao cultural heritage were influenced by natural environmental and social culture; French colonial architecture (1983-1953) is the first phase for changing Lao traditions, especially traditional architecture and life style. In this period, Lao cultural heritage as traditional architecture and social culture have an influence from French style. In the second phase of Lao cultural heritage (1953-1995), some traditional architecture has changing pattern influenced by Soviet, China and American in this period. In the period (1995-present), the advent of Chinatanakhan Mai (New Imagination) and the New Economic Mechanism (NEM), new office and apartments appeared throughout the main city of Lao PDR.

Fig.1 View of the Luang Prabang World Heritage Site

At the same time, Luang Prabang is listed since 1995 by UNESCO as a World Heritage Site for unique architectural, religious and cultural heritage, a blend of the rural and urban developments over several centuries, including the French colonial influences during the 19th and 20th centuries. The popularity of

the ubiquitous 'Greco-Roman Ranch' style building is high influenced by neighboring, especially Thailand. This popularity has affected the construction of Lao cultural heritage decreased steadily in major urban centers.

With the Heritage Preservation and Development Master Plan (PSMV) regulation system, Luang Prabang World Heritage site was divided into four main zones as shown in (Fig.2) including Safeguarded Zone (Secteur sauvegardé – ZPP-Ua, 67.12 ha); Protected Zone (Secteur protégé – ZPP-Ub, 151.32 ha); Natural and Landscape Zone (Secteur natural et paysager – ZPP-N, 545.66 ha); and Monasteries (Secteur des Monastères – ZPP-M, 16.43 ha). The site has a total of 611 buildings, 26 villages and 183 protected wetlands were lists on the list of UNESCO heritage, consisting Lao traditional houses, major Buddhist temples, French-influenced administration buildings, and Chinese-style shop houses.

Fig.2 View of the ZPP-Ua Zone

The ZPP–Ub is located in the south of preserved zone, on the right banks of Nam Khane and Mekong rivers. In the heritage protection zone, as the revision of Urban Regulation, the PSMV applies to different areas and notably to ZPP-Ub: Protected zone, established in one part of the town where monumental and vernacular heritage is highly present. This revision of the Urban Regulation relates to the drawing of perimeter and regulatory provisions relating particularly to the ZPP-Ub. The ZPP-Ub is a residential zone where equipment, commerce and service activities can be found along principal roads and some secondary roads. The goal of the PSMV is to accompany evolution of this part of the town for its harmonious development by improving its heritage buildings.

2. Outstanding Universal Value

Luang Prabang is an ancient town of Lao PDR, which are resourceful, intangible and tangible values. The various remarkable values comprise colonial and traditional architecture, urban and natural landscape with mountain, ponds and rivers. Furthermore, the city has numerous traditional customs, culture arts and handicrafts, language, food, rituals, festivals etc. According to these reasons, it was assigned in 1995 as the first World Heritage City of Laos. The town of Luang Prabang was entered onto the UNESCO World Heritage registry on the basis of three of the ten criteria for selecting cultural sites. The OUV criteria for Luang Prabang World Heritage site is as following:

" ii) to exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design.

iv) to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history.

vi) to be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change".

3. Attributes and Values

According to ICOMOS, 1995 stated that: "Luang Prabang is outstanding by virtue of both its rich architectural and artistic heritage and also its special urban development, first on traditional oriental lines and then in conjunction with European colonial influences. This is uniquely expressed in the overall urban fabric of the town. It may therefore be considered to be a unique combination of a diversity of communities – rural and urban, royal and religious – within a defined geographical area".

Here are some attributes and values of major place in the Luang Prabang World Heritage site based on the Heritage Preservation and Development Master Plan under UNESCO's OUV criteria as shown in Fig.3 below.

Royall Palace Museum	Wat Mai Suwannaphaham	That Mak Mo Wat Visounnarath	Phu Si	Wat Xieng Thong
				
– French Beaux-Arts style building – Royal religious objects, e.g. weapons, statues, screens and paintings from centuries pas – Crown jewels – Lao life's murals depicting in 1930s. – New pavilion houses the 2,000 year-old, with 83-centimetre Prabang Buddha – king's five-piece Royal Palace Car Collection: two 1960s Lincoln Continentals, a rare wing-edged 1958 Edsel Citation and a dilapidated Citroën DS – wooden speedboat	– Traditional building – Buddhist statue – Stone wall with decoration – Several small stupa – Traditional mural painting – The building is decorated with beautiful stucco and brick carvings and golden stencil paintings on a black background on the interior walls – Many small pagoda	– The oldest temple – Wooden doors, with original early 16th century structure – The delicate gilded carvings on the doors depict the Hindu God Vishnu – The building is decorated with beautiful stucco and brick carvings and golden stencil paintings on a black background on the interior walls – "Dok Soy Saa", an ornamental element consisting of 17 miniature stupa covered by parasols. – Many small pagoda	– Pagoda – Buddhist statue – Several small temples and Buddhist shrines – That Chomsi, a white and gold stupa crowned by seven royal parasols – Sacred footprint (Pra Bat) of Buddha	– Traditional Temple – Buddhist statue – The building is decorated with beautiful stucco and brick carvings and golden stencil paintings on a black background on the interior walls – Traditional mural painting – Stone wall with decoration – Many small pagoda

Fig.3 Summarizes the involvement between these attributes, their values

4. Hazards and Vulnerabilities

Luang Prabang has a historical background of hazards with respect to earthquakes and might fires in this region. As the location is nearby happening earthquake, so it is vulnerable in its natural and is able simply to be affected due to shaking of the land. The earthquake is main cause of the fire in this area. The fire risk in the site is also a treat due to the density of traditional house and building in ZPP-Ua zone of Luang Prabang World heritage site as following.

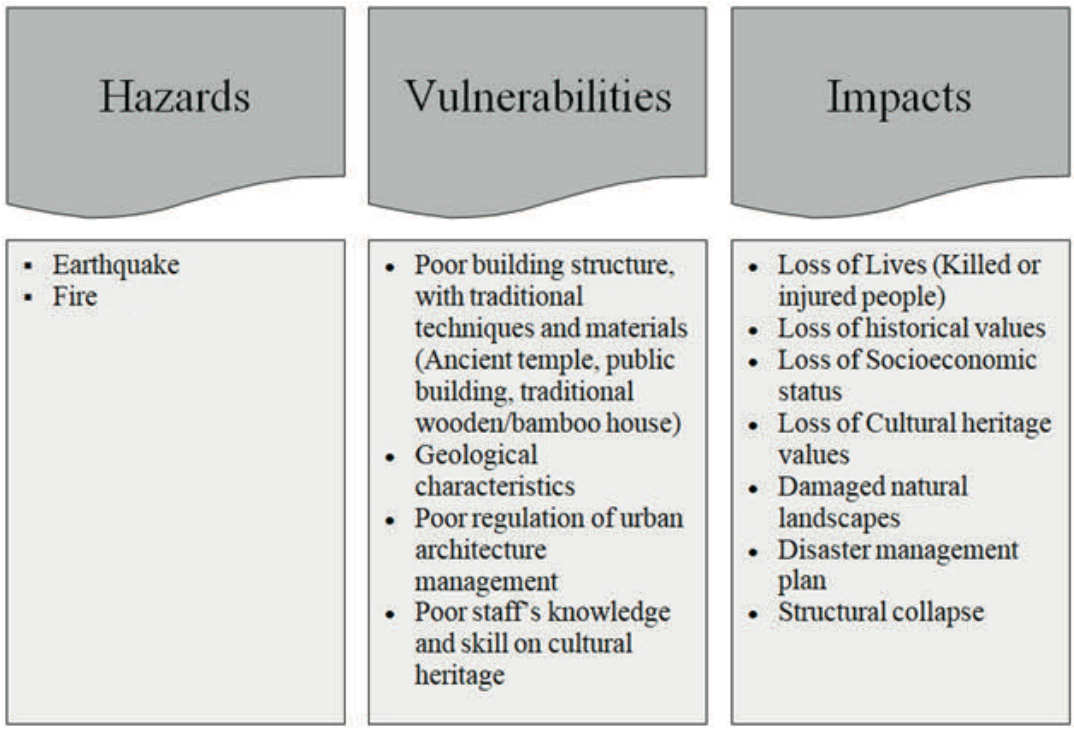

Fig.4 Hazards, Vulnerabilities and their Impacts

4.1 Earthquake

The most expected hazard is earthquake, so the region is sited near an earthquake zone. Even if the frequency of earthquakes in this region, a significant seismic activity has been observed as a reported on "https://earthquaketrack.com/p/laos/louangphabang/recent" based on the website on Earthquake Track as shown in Fig.5, Therefore, the Town of Luang Prabang has an influence of the earthquake risk in the future.

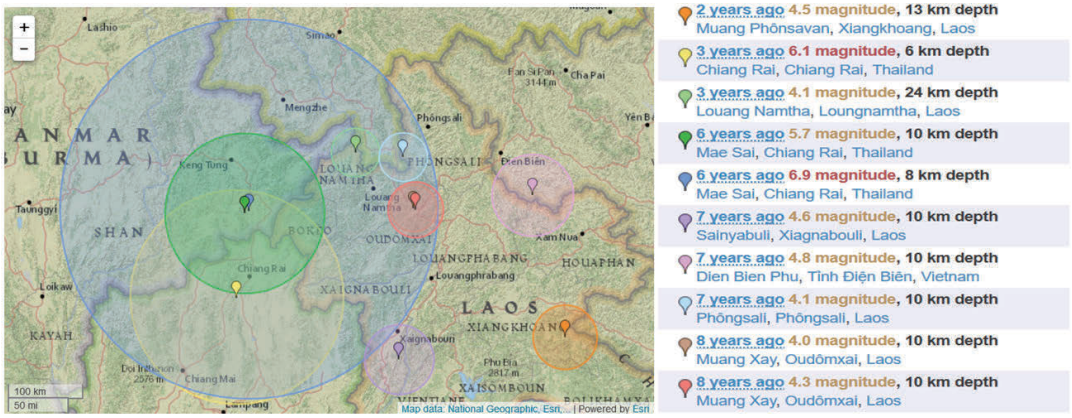

Fig.5 Statistics on Earthquake Risk surround the Town of Luang Prabang.

4.2 Fire

The history refers to the number of fires initiated within an area in the past as reported "http://www.adpc.net/v2007/Programs/UDRM/INFORMATION%20RESOURCES/AUDMP/Default.asp". The site, where are known to have been particularly prone to outbreaks of fire due to natural or manmade causes, have been considered in mapping as having high degree of Fire hazard as shown in Fig.6

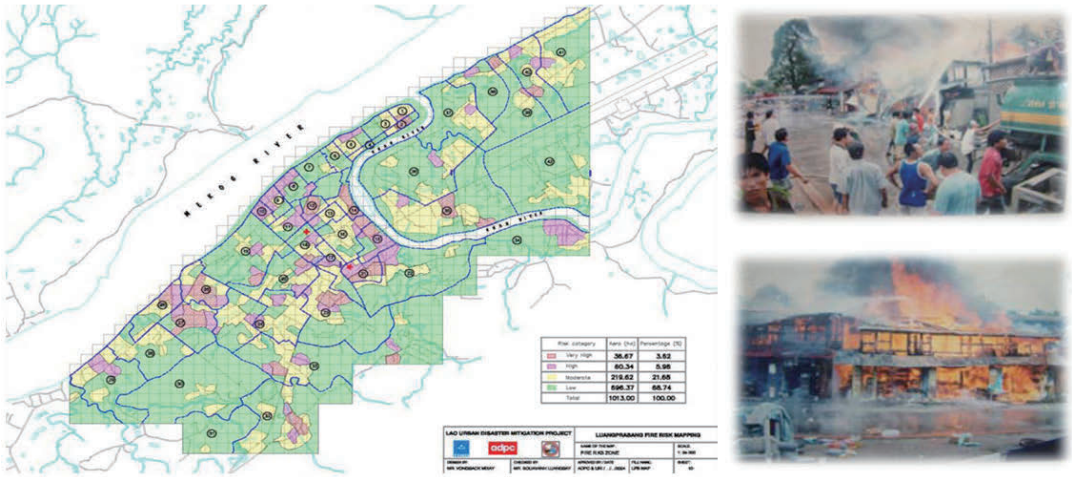

Fig.6 Fire Risk Map in the Town of Luang Prabang.

5. Earthquake Scenario

In earthquake scenario, the shaking land has occurred somewhere near the Town of Luang Prabang in early morning due to its geographical location has some history with more than magnitude 6. There is not any prediction by the Department of Meteorology and Hydrology. So, local residents and visitors are sleeping, earthquakes with more than magnitude 6 happened nearing the city center. With a majority of location exposed to high risks affiliated with collapsing in core zone of cultural heritage with a lot of damage from collapsing buildings and traditional houses as shown in Fig.7. The earthquake's event is major cause of fire occurrence along the Town of Luang Prabang extremely vulnerable and affecting the attribute and value of cultural heritage, for instance the Buddhist Stupa including artifacts inside temples, building of National Museum and also public building and traditional house.

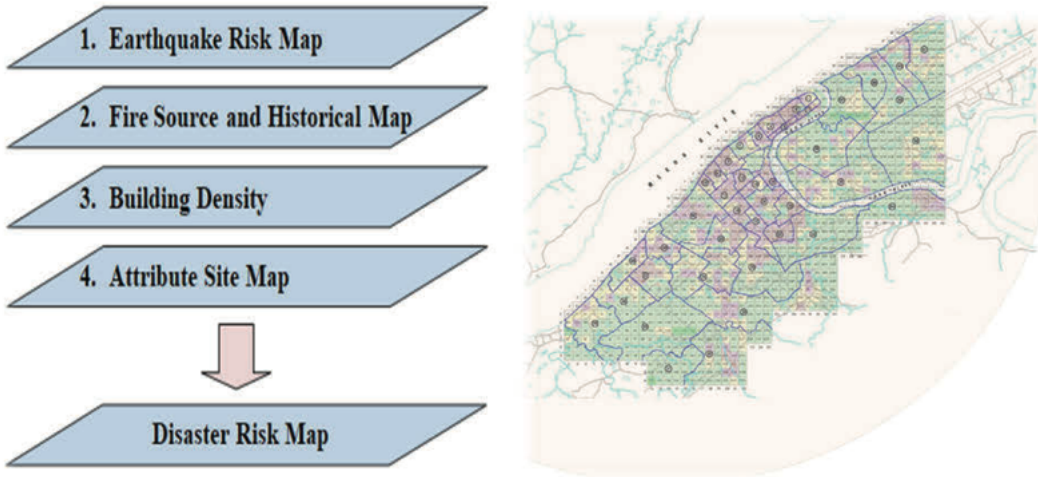

Fig.7 Schematic Diagram with Disaster Risk Map

6. Preparedness and Response

The National risk profile for Lao PDR (ADPC, 2010) states that the country is prone to multiple hazards mainly floods, drought, storms, landslides, earthquakes and epidemics with specific degrees of severity in different regions. Amongst those hazards, flooding from storms has been the main natural hazard and has led to both economic and social losses. The natural hazards have brought negative impacts to vulnerable people living in hazard prone areas, particularly those affected by poverty. Hazards have also resulted in damage to houses, irrigation systems, bridges, roads, agricultural areas, etc. According to declared by Lao National Assessment that disaster risk reduction in 2012 is the key output of the implementation of the project "Strengthen Institutional Capacity for Development of Lao National Assessment Report (LAR-2012) on Disaster Risk Reduction in Lao PDR". Additional to the Disaster Prevention and Control Committees (DPCCs) at national, provincial, district and villages have been established under the Prime Minister Decree No. 220/PM, dated 28 August 2013 to look after DRM issues in Lao PDR. As the mentioned above, the preparedness and response are following methods:

- Create District Disaster Management Committee (DDMC) at all districts and future at villages (Village Protection Unit- VPU).
- Carry on training program for PDMC, DDMC and VPU with identifying the role and responsibility along with plan of those Organizations.
- Improve and establish information network and data bank of disaster involved resources of Labor and Social Welfare, Agriculture and Forestry, Public Health, Transport, Education, Lao Red Cross Society and others with Information Unit of NDMO as Contact Point.
- Improve synoptic weather forecasting of disasters, generating information dissemination network to community via media and other means with Department of Hydrology- Meteorology Dept and NDMO are as Organizers.
- Develop as required specialized teams, for instance search and rescue, relief with using resources of military, police, school and Lao Red Cross Society Volunteer in whole provinces.
- Work together with provinces and sectors related finding place for future building an emergency storage which accordant with existing capability, NDMO is responsible for looking for land plot,

MLSW is responsible for establishing plan.

- Started up projects on integrating DM concept and environmental protection into primary school curricular by Ministry of Education as the lead shepherd.
- Work together with sectors as agriculture, health, education and rural development on DM activities in high risk to disaster region.
- Effectively employ government distributed budget with expanding mobilization of resource assistance from charity, internal country and outside for emergency assistance and relief for disaster victims.
- Create information network and units, develop disaster risk map of Lao PDR.
- Further use man power and resources of national defense, public security for search and rescue work in countrywide with collaboration of locals and involved agencies, finding further cooperation with ASEAN partners and region.
- Establishing public awareness, education campaign and program on DM though public media.

7. Recovering Planning

As it declared in Strategic Plan on Disaster Risk Management in Lao PDR 2020, some factors are required to international community for having new approach and methods to deal with pre-disaster, minimize damages and losses, especially recovery post-disaster as well. Parallel with that, the government of Lao PDR is also build up its strategy on disaster management with the selected implementation approaches based on short and long term redevelopment as follow:

- Continue building a Disaster Management Institution from centre to village levels based on the Government Decree N. 158/PM dated 23 August 1999.
- Establish focal points and build DRM coordination procedures to unity working toward government plan on socio-economic development.
- Building and improve codes and regulations on DRM.
- Building early warning systems, system for effective information collection throughout country, granting for community to timely receiving basic needed information and be able to effectively taking appropriate measures in dealing with disaster when it strike.
- Build stockpiling system with basic needed goods within country in 3 parts and provinces for effectively providing relief to the victims and mitigation in post disaster period.
- Organizing public education activities for community with explaining real courses of disasters and it impact.
- Organizing wider training work for governments and privates on DRM by Lao trainers and outside experts.

8. Conclusion

The study on Natural Disaster Impact on Cultural Heritage in Town of Luang Prabang World Heritage site, Lao PDR illustrates that disaster risk assessment is most important for cultural heritage, especially along the site attributes and values. The disaster risk management plan has to be organized and implemented urgently. In Luang Prabang World Heritage site, it is significant to establish line agencies, for instance Disaster Prevention and Control Committee (DPCC) for disaster risk management based on improving regulations and methodologies for disaster risk reduction and strengthen cooperation among

organizations. Every interested party requires to be related to generation of Disaster Risk Management Plan for the Luang Prabang World Heritage site by forget local communities and their significance and role in maintenance of cultural heritage.

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2.8 Sri Pratap Singh Museum, Lal Mandi, India

Sayma Iqbal
INTACH, Kashmir Chapter, India

1. Introduction

Fig.1 Photo from the 1905-06 showing SPS museum building standing proud within its own premise with no development around source: 'The romantic East Burma, Assam, & Kashmir' (1906) by Walter Del Mar)

Kashmir has been historically known as one of the oldest habitations in Asia, having the distinction of a recorded and documented history of 5000 years. However, it was only towards the end of the 19th century that historical sites, habitations and artifacts came to be recognised as the representative cultural treasures of this civilization. During the later part of 19th Century, that a memorandum was submitted to the then Dogra ruler of the Jammu & Kashmir State, Mahraja Pratap Singh, for setting up of a museum in Srinagar that would house exhibits and artifacts covering the region of Jammu, Kashmir, Baltistan and Gilgit. The memorandum was submitted in March, 1898, to the Mahraja by his younger brother General Raja Sir Amar Singh and a European scholar Captain S.H Godmerry and a museum was set up in an existing building belonging to the state at Lal Mandi, Srinagar on the left bank of the river Jhelum.

2. Location and Context

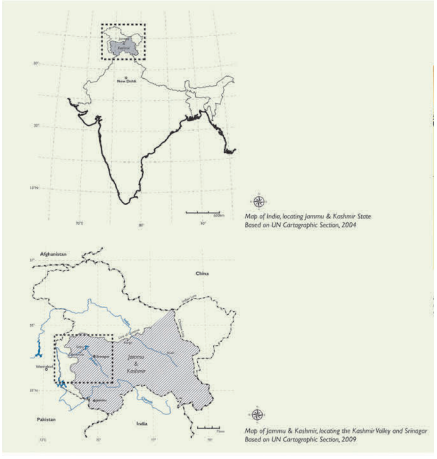


Fig.2 Map of Jammu and Kashmir, locating Kashmir Valley and Srinagar (source: Aertgeert, Koen)

The case study SPS Museum building is located at Lal Mandi on the left bank of the Jhelum River. The building lies in the heart of Srinagar city. A suspension bridge provides easy access for pedestrians who want to reach the Lal Mandi- Raj Bagh area from Lal Chowk – the main commercial centre of Srinagar, across the river on the right bank. Set within a sprawling garden which also houses many mature chinar trees, the building was earlier accessed from a small gate on the north-western corner which opened onto a pavement. Within the same premises a substantial new museum building has also been recently constructed and the present entry is common to both the recently constructed new museum and the old SPS museum.

Srinagar city, where the case study site is located is part of the Kashmir Valley which is enfolded by the lofty mountain ranges of the Inner Himalayas, delineating in the southeast-northwest direction; that makes it a transverse, oval-shaped valley. The length of the Valley is about 84 miles and the breadth is about 25 miles (in its centre), encompassing an area of 1900 sq.miles. The average altitude of the Valley is about

5200ft and it is majorly drained by the River Jhelum and its various tributaries. Surrounded by an almost unbroken chain of mountains – highest of which attain an elevation of more than 18000ft, the region affords only one exit to River Jhelum – its principal feeder – in Baramulla located northwest of the Valley. The topography of Kashmir Valley is defined by three physiographic divisions – the mountainous region of Pir Panjal and Great Himalayas, the lacustrine deposits of karewa[1], and the Jhelum Valley Floor (Taali, 2011). The flat tract of the region, which is geologically termed as the "Jhelum Valley Floor" is part of the Upper Jhelum Catchment.

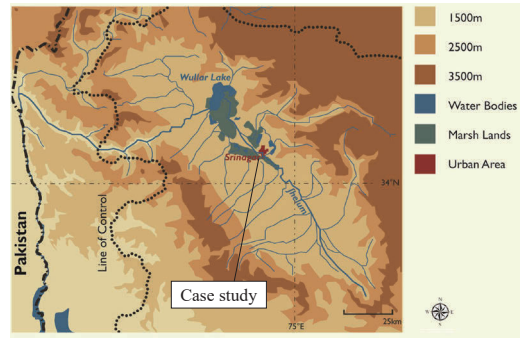


Fig.3 Map of Kashmir Valley, locating Srinagar and the Jhelum River (source: Aertgeert, Koen)

Fig. 4 Overall site situation of the old SPS Museum and other development around it (source: Google Maps).

3. Attributes

3.1 Building


Fig. 5 Proposed views after restoration of the Museum (source: Intach, Kashmir)


Fig. 6 Present state of the Museum building

[1] The word Karewa in Kashmiri dialect means, "elevated table-land." This term was first used by Godwin-Austin (1859) and later by Lydekker (1878) for an unconsolidated to semi – consolidated sand-clay-conglomerate sequence (http://www.dghindia.org/)

The SPS museum building with its cuboidal building volume and gently rising stepped pyramidal roof having a square pavilion at the centre is suggestive of the local Kashmiri shrine architecture. The spatial layout of the museum building is based on a square plan, with linear galleries serving as extended porches on all four sides. This basic almost square layout is in turn divided into nine bays with a large central square bay measuring 91ft x 82 ft surrounded by linear outer bays around 20ft wide. These linear bays or galleries which formerly served as open wooden arcaded porticos are juxtaposed with square rooms at the corners that were originally designed as two storey blocks. These galleries have now been incorporated within the building to provide extra display space.

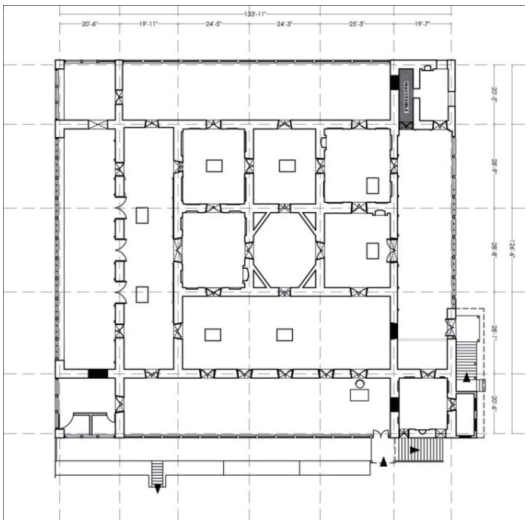


Fig. 7 Present state of the Museum building

3.2 Decorative Architectural Elements: Papier mache ceiling and wall murals

1. The internal walls of the main bay of the museum building are covered with decorative painted frescos and plaster frescos. The building ceiling also comprises beautiful papier mache panels. No step has been taken for the preservation of these decorative architectural features so far.
2. The building ceiling comprises decorative papier mache ceiling panels in most of the rooms.
3. The panels in the central portion of the building on the other hand depict some of the best ceiling design based on the shawl tarah (paisley motif).
4. The mellowed luster of these panels is highly alluring for the viewer even today, after a passage of more than a hundred years.

ATTRIBUTE	AESTHETIC	HISTORICAL	ASSOCIATIONAL	SCIENTIFIC	ARTISTIC	ARCHAEOLOGICAL
Sculptures	3	3				3
Textiles	3	3		2	3	
Natural History		3		3		3
Paintings and Miniatures	3	3	2		2	
Numismatics	3	3	3			2

3.3 Decorative Arts

While most of the museum collections have been moved to the new museum, built within the same premises, the old museum still consists of the following collections. The remaining collections are both organic and inorganic in nature:

-- Sculptures – stone, metal artifacts (bronze), terracotta tiles and clay.

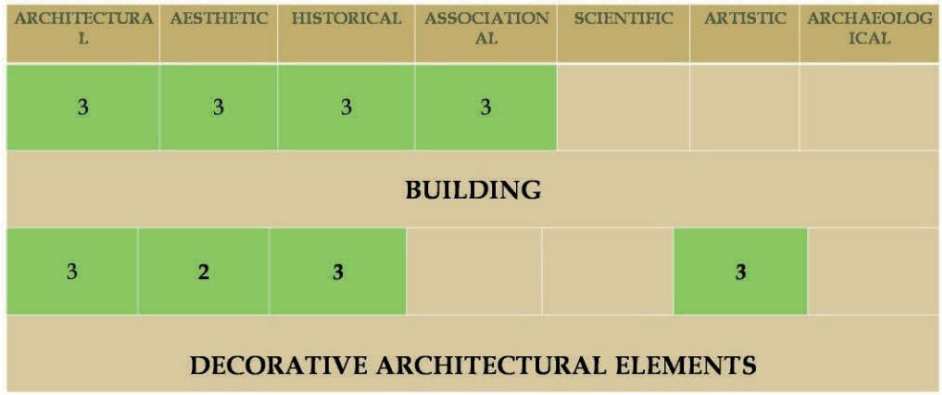
-- Painting Gallery – miniature and oil painting.

-- Textile Gallery – Shawls and some carpets.

-- Anthropology/Natural History – Birds, Animals and insects stuffed.

-- Numismatic – Gallery-Gold, Silver and Copper coins.

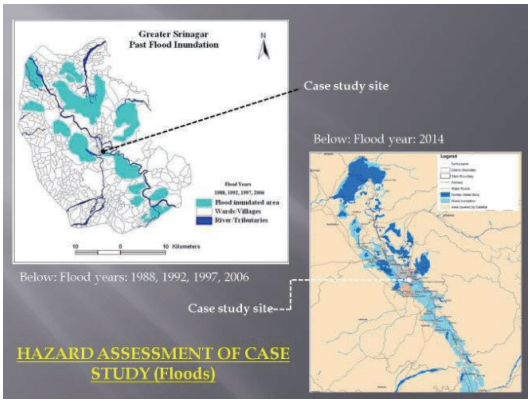
-- Mineral Gallery – Stone, minerals and clay models.

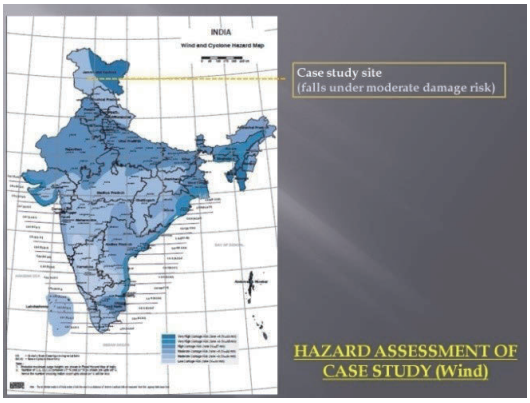


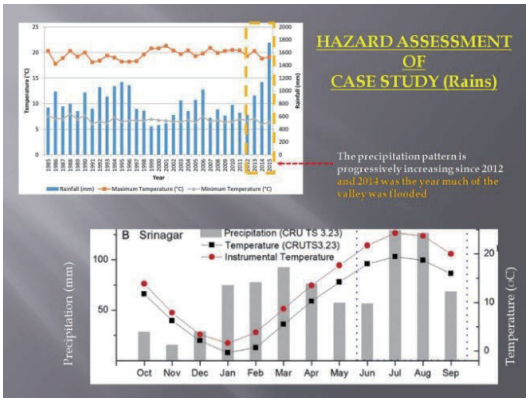
4. Hazard Map Assessment of Case Study

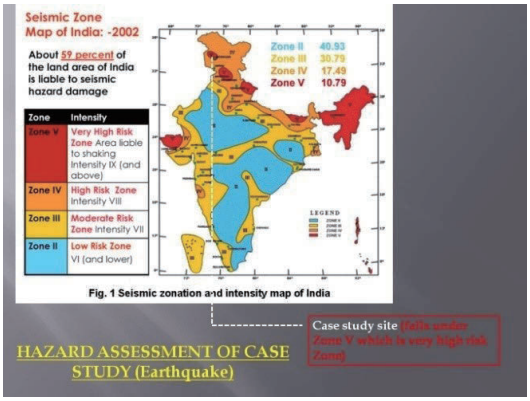
4.1 History of Floods and Fires in Kashmir

No.	Ruler	Political Period	Extent of Damage
1.	King Sundersen	2082 – 2041 BC	Flooding caused by the consequence of an earthquake which created a fissure, from which water escaped and flooded the
2.	King Durlabhawardhan	7th century AD	Srinagar flooded due to heavy rains.
3.	King Lalitaditya	8th century AD	Srinagar flooded due to heavy rains.
4.	King Awantivarman	9th century AD	Flood due to heavy rains followed by a great famine. Steps were taken during this time to deepen the Jhelum near *Khadanyar* in order to accelerate the flow of the river. This measure had the effect of minimising the chances of flood.
5.	King Partha	917 ADl;	Flooding was caused in much of Srinagar city, crop was destroyed elsewhere and great shortage of food followed.
6.	King Harsha	1122 AD	Crop was destroyed rive.
7.	Sultan Shahab-ud-Din	1379 AD	Almost 20,000 houses were destroyed by floods.
8.	Sultan Ali Shah Chak	1574 AD	Many houses were destroyed by monsoonal rainfall
9.	Ibrahim Khan	1668 AD	Many houses destroyed by heavy flooding in the Valley.
10.	Nawazish Khan	1730 AD	Houses and crops destroyed.
11.	Dil Dialer Khan	1735 AD	Thousands of houses lost and immense loss to property.
12.	Afrasiyab Khan	1747 AD	Buildings and bridges over River Jhelum etc, destroyed by severe floods.
13.	Amir Khan Jawansher	1770 AD	Many areas flooded and loss of many bridges.
14.	Juma Khan	1787 AD	Dal Gate gave way and all the eastern portion of the city of Srinagar was submerged.
15.	Abdullah Khan	1799 – 1800 AD	Flood due to Jhelum overflow.
16.	Col. Miyan Singh	1836 AD	Severe floods in Kashmir. Khanabal, Bijbehara, Pampore and Amira Kadal bridges swept away
17.	Sheikh Ghulam Mohi-ud-Din	1841 AD	Incessant rains for seven days continuous days led Jhelum to overflow the Dal Bund and submerged the whole Khanyar and Rainawari. Six bridges from Fateh Kadal to Sumbal were swept away.









Major Outbreaks of fire in the City of Srinagar

S. No	YEAR	POLITICAL PERIOD	AREAS AFFECTED
1.	550 AD	Parvarsena	To the north of Koh-i-Maran, around half of the City got burnt down
2.	695 AD	Lalitaditya	Half of the City is said to have been destroyed and many temples abandoned
3.	960 AD	Abhimanyu	Many wards of the City were engulfed in flames
4.	1322 AD	Sahdeva	Whole of the city is said to have been burnt due to the invasion of Zulkader Khan
5.	1495 AD	Sultan Mohd. Shah and Sultan Fateh Khan	The outskirts of the city were destroyed during a period of political disturbances.
6.	1480 AD	Sultan Hasan Shah	From the ward of Sikanderpora till Alauddinpora, including the Khanqah -i-Moulla and Jamia masjid a large number of houses were burnt down.
7.	1620 AD	Dilawer Khan	From the wards of Sikanderpora to Rajouri and Saraf Kadal. The entire area including the Jamia masjid were burnt down.
8.	1675 AD	Iftikhar Khan	From Kawdara till Jamia Masjid, including the mosque the whole area was burnt down.
9.	1711 AD	Niyabat Khan	From Saraf Kadal till Malchinar. Many houses were burnt down
10.	1737 AD	Abu Barkat Khan	Half of the City was burnt down in political upheavals.
11.	1739 AD	Atit Ullah Khan	Half of the City was burnt down in political upheavals.
12.	1745 AD	Mansoor Khan	Half the city was burnt down in political upheavals.
13.	1744 AD	Afrasyab Khan	Areas around Zaina Kadal were burnt during political disturbances
14.	1765 AD	Azad Khan	The ward around Tankipora and adjoining area got burnt down
15.	1800 AD	Abdullah Khan	Areas in the ward of Saraf Kadal were burnt down
16.	1850 AD	Maharaja Gulab Singh	A number of houses from Tankipora uptill Zaindar Sahib were burnt down
17.	1875 AD	Maharaja Ranbir Singh	A number of houses in Tankipora area were burnt down
18.	1878 AD	Maharaja Ranbir Singh	A large number of houses were burnt down during the time when the area suffered from a severe drought.
19.	1935 AD		Houses in and around Habba Kadal were very severly burnt down

Fig. 8 Table illustrating the history of floods in Kashmir (source: Intach, Kashmir)

While the presence of timber within the structural and non-structural system of Kashmiri buildings proved effective during earthquakes, the same material put the buildings at severe risk during incidents of fire. Between 550 and 1935 AD, there have been at least 19 recorded outbreaks of fire in Srinagar city which wiped away large portions of historic mohallas (neighbourhoods).

Floods have ravaged the Valley since early times. Between 1900 and 1965 AD, at least 15 major floods have been recorded. Considering that most traditional/historic buildings in Kashmir had mud brick, mortar and render as an essential feature, apart from wood (which is prone to rotting on prolonged exposure to moisture or water), the built stock would invariably be affected in the event of a flood which either did immediate or long term damage to the building.

4.2 Probability of the Museum being impacted by a Hazard

Based on the assessment of Hazard Maps and history of disasters in the Kashmir Valley, where the case study is located, the probability of the Museum being affected by a potential disaster is as under:

DISASTER	PROBABILTY
Earthquake	High
Flood	High
Wind	Moderate
Rains	Moderate
Fire	Moderate

Fig. 9

4.3 Hazard Vulnerability and Consequential Impact on SPS Museum

HAZARD	VULNERABILITY	IMPACT
Earthquake	The intermediate floor in the central bay of the building was dismantled during repair works carried out in the post 1950 period. The dismantling of the sub floor has also resulted in the loss of the structural strength of the building, with the loss of wooden beams and runners that helped in tying the 44ft high masonry walls together.	Partial damage from the earthquake of 2005. One of the arched door openings in the room developed cracks at the crown. 
		Some of the *papier mache* false ceiling panels also fell due to the earthquake. Rot in the supporting wooden members or loosening of the nails that held the panels in place. 

HAZARD	VULNERABILITY	IMPACT
Flood from excessive rains or river	The building was already suffering from rising damp	Apart from the collections, the building has exquisite murals on walls. The doors were adorned with papier mache. Portions of these ornamentations (at least 2ft) have also been completely obliterated by the floodwater.. 
	Walls are of brick masonry	Brick masonry quickly absorbed water but took very long to dry 
	Much of the timber absorbed water very quickly	
	Roof leakage allows rain to enter from the roof	There are also evident signs of water percolation from the rooftop which further makes the decorative elements within the building vulnerable 

HAZARD	VULNERABILITY	IMPACT
Earthquake	The intermediate floor in the central bay of the building was dismantled during repair works carried out in the post 1950 period. The dismantling of the sub floor has also resulted in the loss of the structural strength of the building, with the loss of wooden beams and runners that helped in tying the 44ft high masonry walls together.	Vertical masonry crack from earthquake have increased in size since 2005. 
		The building has also developed some superficial plaster or hairline cracks in the aftermath of the earthquake

HAZARD	VULNERABILITY	IMPACT
Flood from excessive rains or river	Most of the museum artifacts were either organic or organic.	Excessive silt deposition on wooden objects . 
	Most organic items (papier mache, textiles and manuscripts) were stored under 3ft height (this depth of floodwater entered and remained in the museum)	Manuscripts disintegrating due to excessive water absorption. 
	Displays were not water tight	Disintegration and deformation of papier mache decorative items due to excessive absorption of flood water. 

HAZARD	VULNERABILITY	IMPACT
Fire	Timber has been used extensively within the building as a building material. Ideally the building should be provided with a smoke detection and fire sprinkler system. In the absence of the same, the following steps should be taken immediately to ensure the safety of the building and the protection of the various artefacts housed within it.	An imminent fire will not only destroy the building, its exquisite wall frescoes, papier mache and naqashi, but also put the natural history specimens and paintings (still housed in Old Museum) at risk of burning.

Fig. 10

4.4 Site Situation and Site-specific Hazards

Growing unregulated urban pressure around the site, especially after the floods of 2014 poses severe risks to the site. Post flood, most damaged houses were rebuilt, the owners (out of paranoia) wanted to go higher – and have raised the level of their compounds. Most owners have significantly increased the height of the plinths (some to 5'-6") so over all height increases to 7ft – putting pressure on the SPS Museum

5. Risk Assessment and Risk Scenario

PRIMARY HAZARD	SITE SPECIFIC HAZARD	VULNERABILITIES	IMPACTS
EARTHQUAKE	Traffic	Inadequate security	Loss of architectural attributes
		Faulty and old electrical wiring	
		Roof leakage	
FLOOD		Inappropriate additions and alterations have weakened the building fabric	Loss of collections
	Stone Pelting	Further weakened from past flood and earthquake	Loss of value of miniatures and specimens
FIRE		Large trees around	Loss of value of decorative arts in the building
	Arson	Unregulated land-use	Loss of a repository of a cultural/architectural asset
WINDS		Inorganic Collections Organic Collections	Loss of educational material
RAINS	Water-logging	Display shelves do not conform to fire or water safety	Loss of lives
		Lack of mitigation plans/equipment	
CONFLICT		Low-lying site	
	Visitors	Inadequate maintenance and management	
THEFT		Night watch and ward	
		Constructed substantially in timber	

Fig. 11

"Incessant rains with glacier melt-offs has caused large-scale inundation of Kashmir Valley, affecting most low-lying areas and causing a humanitarian crises with many heritage sites being affected, worst among which is the SPS Museum."

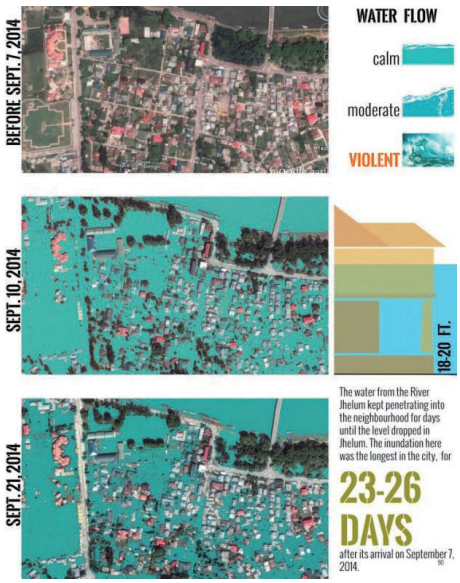


Fig. 12 Flood of 2014

Left: Flood of 2014
Satellite Maps showing the Lal Mandi area where the case study is located

Post flood, the museum has been abandoned and currently in disuse with only natural history specimens and some paintings and sculptures still there. A new reuse proposal for the old SPS Museum is currently underway.

IMPACT OF SEPTEMBER 2014 FLOOD ON MUSEUM COLLECTIONS AND THE BUILDING

Part of flooded SPS Museum post flood (image taken on 16th September, 2014 on which date the water had receded from the building to about 9ft after about a week – first visit by INTACH for prelim assessment)

Water aborption by pashmina yarns by excessive and prolonged flooding.

Mould growth on wet wooden decoartive artifacts

Disintergration and deformation of papier mache musical intruments due to excessive absorption of flood water.

Obliteration and colour disintegration of miniature painting collection

Overall condition of manuscripts post floods – manuscripts disintegrating due to excessive water absorption.

Disintergration and deformation of papier mache decorative items due to excessive absorption of flood water.

Fig. 13 Damage to objects and Building from September 2014 floods

6. Internal Institutional Capacities

The museum remains open throughout the year for six days a week. Presently the museum remains closed on Mondays. The museum normally remains open from 10 in the morning till 4 in the evening, during summer months. The winter timing is 10.30 to 4.30. The internal maintenance of the museum is looked after by the **Department of Archives, Archaeology and Museum**s. The external façade of the building is maintained by the **Public Works Department (PWD)**.

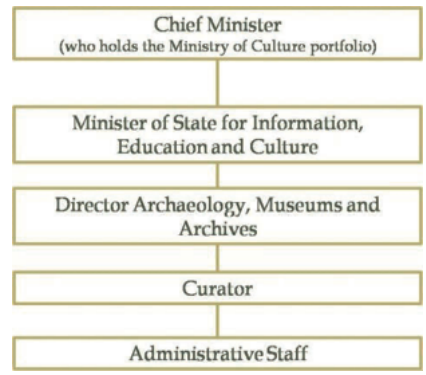


Fig. 14

7. Preventive and Mitigation Strategy

Two Level Flooding has been considered for the preparation of Prevention and Mitigation Strategy:

LEVEL 1: SHALLOW FLOODING TO A HEIGHT OF 2ft (with continuous rain)

Note: "Considering that most collections have been moved to the new museum (in proximity to the old one), priority will be given to the building instead of collections as collections won't be much affected. Since the museum site is itself lower than the area around it, flooding from the neighborhood will pose greater threat."

PLANNING LEVEL	SITE LEVEL	BUILDING LEVEL	COLLECTION
Better regulation on new builds, especially after floods of 2014	Address all drainage issues within the site, such as leaking roofs raise the levels of grounds that are prone to micro/shallow flooding from neighbouring areas .	The building will need to be appropriately conserved and a regular maintenance programme will need to be in place	Shallow flooding will not directly impact the collection inside the Museum building
	The site itself is becoming congested with newer support buildings coming up every other year. This needs to be controlled through a proper site management plan	Water-logging from shallow flooding can cause rising damp and cause material damage therefore a good repair/conservation process must be in place before a flooding occurs.	Micro-climate and humidity within the building envelope and the room where remaining collections are displayed will need to be monitored.

Fig. 15

LEVEL 2: DEEP FLOODING DUE TO JHELUM RIVER OVERFLOW

Preventive measures for a potential major flood disaster will require a multi pronged strategy.

PLANNING LEVEL	SITE LEVEL	BUILDING LEVEL	COLLECTION
Some of the land, otherwise part of flood plains, can be secured for housing.	The perimeter wall and all entry routes for water need to be sealed and a good site maintenance regimen put in place.	Services that are particularly vulnerable to flood damage should be moved above a likely flood level.	No storage under 3ft of depth.
Major wetlands need both rehabilitation and inter linkage to create a water distribution and release system. Desilting of the river and its tributaries has to be taken up on war footing	An additional mechanical pumping system can be permanently installed to assist in draining out the floodwater if it is taking too long to drain out on its own or if your area is particularly low-lying	The brick masonry set in lime mortar will need regular repairing and maintenance. Perhaps the decorative work that is already lost should not be restored and that level can be used as a reference.	Display shelves will need to be water-tight
The catchment areas in the river basins need to be conserved under a massive soil conservation cum plantation drive.	Training within the capacity Museum staff for evacuation drills.	Regular pointing of mortar and good health of masonry is necessary to make it effective against water	Humidity and temperatures within the building envelope and the display will need to be monitored and controlled

Fig. 16

4.5 Mitigation Strategy

PLANNING LEVEL	SITE LEVEL	BUILDING LEVEL	COLLECTION
Urban housing needs a major treatment, aiming at affordable and secure housing. Housing strategies to accommodate relocation from wetlands and marshes wherever possible	Regular cleaning of all drains, drain pipes, manholes and inspection chambers will be necessary.	. Regularly maintain and cleaning of rainwater goods. Clear leaves and debris from gutters, ensure downpipes are not blocked, check that seals at junctions are watertight, and that drains are unbroken and clear.	Documentation of all objects and a proper inventory and mapping wrt the Museum will have to be efficiently carried out and data to be preserved in multiple safe places
Early warning systems have become very cost effective, elementary technologies of forecasting, satellite imagery, contour information could have forecasted the flood	Houseboat community can be used for watch and ward during high precipitation seasons and they can evolve an alert mechanism using technology	Roof repairs as part of the conservation and repair programme will need to be carried out regularly	A repeatedly practise drill for evacuation of collections in time of emergency

Fig. 17

Note: Just as the first *Flood Alert* is sounded, the museum should be closed to public and staff put on high alert with some members on 24 hr, rotational monitoring duty. If the river starts flooding, the objects should be prescriptively evacuated to the upper, storage spaces of the new Museum.

Recovery Strategy

	REGIONAL	SITE	BUILDING	COLLECTION
LONG TERM (5-10 years)	LEGAL AND ADMINISTRATIVE FRAMEWORK EVACUATION DRILLS, TRAINING AND AWARENESS PROGRAMMES ADVOCACY AND URBAN PLANING INTERVENTIONS	IMPLEMEMTATION OF SITE MANAGEMENT PLAN MUSEUM COMMITTEE INVOLVING THE STAKEHOLDERS	REGULAR MAINTENCE AND MONITIORED INSTALLALED OF WARNING SYSTEMS AND DISASTER REDUCTION EQUIPMENT	SETTING UP OF AN ADVANCED CONSRVATION LAB FUND RAISING MONITORING
MID TERM (1-2 years)	TRAINING OF ALL STAKEHOLDERS STAKEHOLDER COMMITEMENT (MoUs etc) ADVOCACY AND URBAN PLANING INTERVENTIONS	MAINTENANCE OF TREES VOLUNTEERING FROM COMMUNITY AND STUDENTS STAFF TRAINING AND CAPCITY BUILDING	RETROFIT (SEISMIC, FLOOD) CONSERVATION MAINTENANCE	DOCUMENTATION/INVENTORY IMPROVE DISPLAYS MAPPING CONSERVATION FUNDING
SHORT TERM (0-6 months)	ADVOCACY AND STAKEHOLDER CO-ORDINATION NETWROKING BUILDING TRUST	CLEARANCE DECONTAMINATION EMERGENCY REPAIRS	DAMAGE ASSESSMENT EMERGENCY REPAIRS PITCH FOR FUNDING FOR EMERGENCY	EVACUATION DAMAGE ASSESSMENT SHELTER FUND RAISING FIRST AID

PILOT PROJECT IDENTIFICATION

Documentation, inventory and mapping of collections on display and in storage in the New Sri Pratap Singh Museum

Objective: This pilot project will inform the preparation of the DRM for collections in the New Museum to see where major lacuna exists and what risks and hazards they may be exposed to before a detailed Risk Assessment, Recovery and Rehabilitation Plan can be proposed for the Museum collections. Also undertake a detailed assessment of the movable objects that got damaged in 2014 floods.

Need: A preliminary survey carried out post 2014 floods in Kashmir estimated a damage of approximately 60-70 percent of artifacts, among which the most badly damaged were the manuscripts, wooden objects, and decorative items made papier mache and textiles like antique shawls, carpets of silk, woolens, terracotta tiles and tablets from Buddhist period, metal-based archaeological objects. The prolonged exposure to silt, mud and contaminated water has seriously impacted these organic objects. In the absence of any preparedness or response mechanism in place, a lot of irreplaceable damage was incurred on the Museum collections.

Expected Outcome: Revival of the lost/damaged objects through some form of interpretation, documentation or conservation.

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2.9 Implementation of Disaster Risk Management for the "Zoothèque" at the National Museum of Natural History, Paris

Bertrand Lavédrine
Centre de Recherche sur la Conservation, France

1. Introduction

The institution

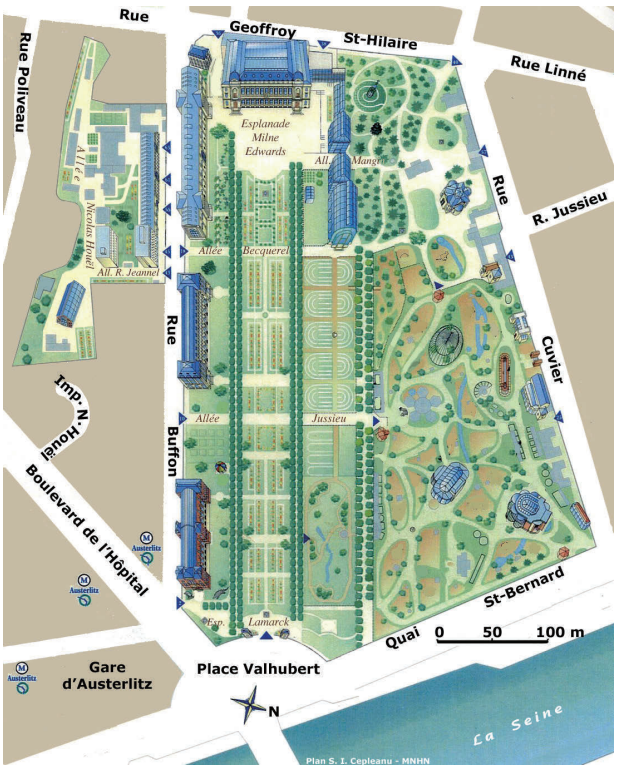

Fig.1: Administrative bundaries and core zone of the National Museum of Natural History (Paris, France). © MNHN

The National Museum of Natural History (MNHN) is a French institution for research and the dissemination of scientific culture. It is one of the first world establishments of this type, inheriting the Royal Garden of medicinal plants founded in 1626. The MNHN has five missions: the conservation of scientific collections, the dissemination of scientific culture in the specialties of the institution, research, teaching and training, and scientific expertise. In the centre of Paris, it encompasses eight galleries, one library, a zoo, gardens and greenhouses spread over 25.7 ha along the Seine River (Fig.1). The museum's collections of specimens are a heritage for humanity, as they are essential for understanding biodiversity. The museum houses around 68 million specimens that are available to all researchers. To store some of the zoological collections that are not exhibited, a new building was inaugurated in 1986 (Fig.2). This storage facility, called the "Zoothèque", is the subject of this disaster risk management (DRM) study, which aims to implement the best preservation of the value of this heritage asset using the available resources.

Context: core, attributes and values

The Zoothèque is an underground storage facility that is home to thousands of the museum's birds, mammals, reptiles, amphibians and fishes. Located on the premises of the MNHN, in Paris (48.842323, 2.357097), it houses 8 million specimens, or 20,000 m3 of various artefacts, stored on 40 km of Compactus shelves over three levels (Fig.3, 4). The items consist of stuffed specimens (dry), a wet collection (specimens in alcohol or formaldehyde) and a collection of "type" references for scientists (Fig.5, 6). These collections are at the basis of the classificatory analysis that rationalizes nature and man, and leads to phylogeny, that is to say, the evolutionary history of life. They also serve as the subject of research in the areas of the

natural sciences and reference for the expertise of the inventory of the diversity. Besides the scientific value for the academic community, this collection has a historical value due its provenance, as well as an educational value for the public at large.

Fig.2: Construction of the zoothèque in 1981. © MNHN - Bernard Faye

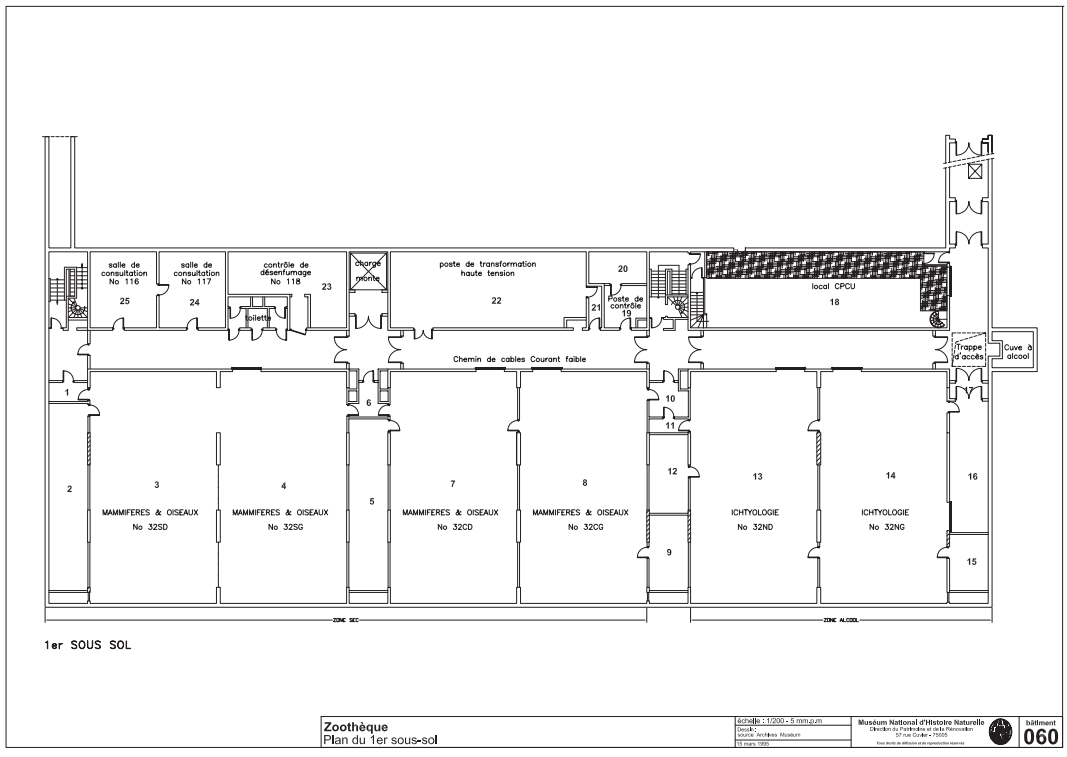

Fig.3: Map of level (-1) of the zoothèque. © MNHN

Fig.4: View of mobile shelving with stuff specimens. © MNHN - Bernard Faye

Fig.5: View of mobile shelving with stuff specimens. © MNHN - Bernard Faye

Fig.6: View of mobile shelving with fluid preserved specimens. © MNHN - Bernard Faye

2. Risk Assessment

Threats and vulnerability

The Zoothèque is in a flood zone, 200 meters from the river. In case of flood, basements of the neighbourhood will be flooded first. The water will infiltrate either from the top of the Zoothèque, or by rising in the drains, and will then stagnate in the building. The collections that are stored there are particularly vulnerable. The specimens are made of organic materials (such as feathers and fur), which will be seriously damaged by the water; moreover, they will release the toxic products (such as salts of mercury and arsenic) that were used as pesticides until the early 20th century when stuffing specimens. If flooding occurs, the jars filled with specimens stored in alcohol and formaldehyde will float, lose their tags, shock to each other, break and lead to the loss of specimens and the release of formaldehyde, a carcinogenic substance. Another problem that has already been identified for a neighbouring building of the museum is the collapse following a subsidence of the land. Thanks to the underground situation, the storing benefits of a great thermal inertia but this has the disadvantage of leading to high humidity due to water infiltration. As a result, the collections have been regularly subject to fungal contaminations. The problem is amplified by the presence of Compactus shelves that create containment and facilitates cross-contamination carried by excess dust. Air conditioning maintains a stable temperature but does not control the humidity. Finally, it should be noted that there is a substantial reserve of alcohol (600 liters) used by the scientists that could amplify or promote a fire. It should also be noted that there are

no permanent staff on the site, and there is a lack of awareness among the various actors, lack of an emergency plan, and lack of training for emergency interventions with the staff of the institution.

Tangible and intangible impact

Such events would lead to the damage or even the loss of unique or historical specimens, resulting in an impoverishment of the collections. Scientists would lose not only a source of reference for their studies on the living, the study of biodiversity, and evolution, but the impoverishment of collections could lead to a decrease in the number of visitors and the associated revenues for the institution.

Risk analysis and evaluation

By representing the hazards according to their probability and the impact on the collections, we can establish a matrix that will make it possible to prioritize the actions (Fig. 7).

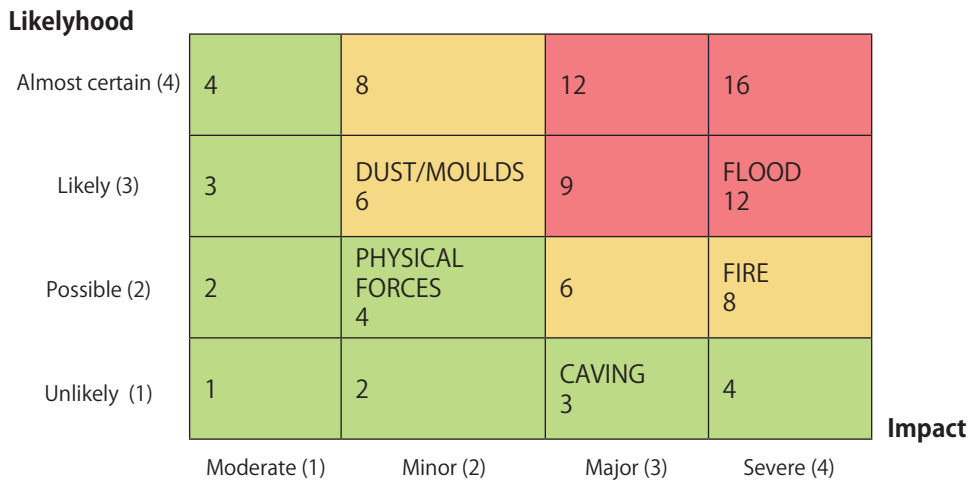

Fig.7: Risk matrix and magnitude of risks.

The risk of collapse is unlikely as the building is underground and build following recent standards. The same is true for mechanical damage: the artefacts are barely handled and stored stably on the shelves. These risks, with a magnitude of less than 5, are currently accepted. Mould and fire are significant risks (5 to 8) that should be reduced. The temperature is controlled and maintained at a constant temperature of 16° C to ensure optimum conservation of the specimens; however, the constant excessive humidity level induces mould infestations. The museum has already begun procedures to clean the atmosphere of this building to reduce moisture and biocontaminant load. The presence of a significant quantity of alcohol is subject to the control of authority external to the establishment. The building is equipped with a fire detection system. Fire extinguishers are present on the premises and a security team is permanently present nearby. The hazard that induces a high magnitude of risk (greater than 9), and that should be urgently reduced, is flooding.

Past history hazard and worst scenario

A flood of the Seine occurred in 1910, and various parts of the MNHN were affected. In 2016, the Seine reached a critical level without leading to a flood of the museum. However, Paris and its region expect a 100-year flood of the Seine. Indeed, even though retention basins have been built around the city, their efficiency decreases with the increased urbanization of Paris and its region. The worst-case scenario may then be considered: when the level of the river reaches a critical point (predefined by the civil security), the alert will be given and museums in Paris will start to apply emergency measures. In less than 24 hours, the garden will be flooded. The museum staff will start to protect the sensitive objects and materials in the other museum galleries or move them to the upper floors. Specialized staff will transfer animals from the zoo. In the meantime, the water will penetrate the lower levels and flood the Zoothèque. It will be difficult if not impossible for safety reasons (chemicals, low air quality, lighting) to intervene in the storage facility. Furthermore, the ability to open the Compactus shelves might be compromised. If it is not possible to avoid a river flood, the impact should be reduced by preventive measures.

3. Risk Prevention and Mitigation

Evaluation of the disaster management system

The building is only 20 years old and it adheres to the recent safety standards for people. There is a basic maintenance and monitoring of the building. The building and its contents have been declared to the local safety authority because a significant quantity of flammable liquid (ethanol) is stored on the premises. There are regular inspections, in particular for smoke detectors, which are connected to the security office. A team of firefighters is permanently at the MNHN and ready to act if there is an alert. However, there are no permanent staff within the building, no flooding alert system, no evacuation plan for the collection, no first aid kit and no emergency power supply. In addition, these public collections are not insured.

Disaster risk mitigation plan

- **Avoiding:**

The best option would be to move the whole collection to a safer location. The reallocation of this storage for another collection less water-sensitive (minerals, fossils, etc.) make sense; however, this seem difficult to achieve in the short term for financial reasons. Cheaper options would be to focus only on the most sensitive or most valuable specimens (the “type” references) that could be transferred to a safer place or at least to higher levels in the storage. This would mean rearranging the storage that has been made following a rational scientific organization.

- **Blocking:**

In case of a flood, it will be important to buy time to keep the water out as long as possible. The installation of a pump with a power generator will help to remove some water at the early stage of the flooding.

- **Detecting:**

A water detection system connected to the security office should be installed.

• **Reducing:**

In order to reduce the impact of a flood, it is necessary to list the most valuable specimens to be evacuated in order of priority. This should be posted on the door of each room and on the Compactus shelves to be able to find them in an emergency situation. A mapping system to locate these artefacts has to be established and kept at both the security office and the building itself. Regarding the jars that store specimens in liquid, it would be worth studying the possibility of using plastic waterproof bags or containers as well as techniques to keep them stable and protected on their shelves during a flood.

• **Building on the 2016 alert:**

For the entire site, the priority is to increase competences and staff involvement. This could be achieved by first recruiting a DRM coordinator and developing an emergency plan, an emergency response team and a reverse-planning scenario based on the lapse of time before the building floods when the river reaches a critical level. It is necessary to contact the firefighters for access and safety in the building before and during a flood, and to discuss with them and the civil protection about safety issues (e.g. toxic chemicals) in case of a flood. Among the stakeholders, residents, volunteers and museum supporters could be trained and listed for first aid in case the need arises.

• **Retrofitting:**

Keeping the water out of the building or out of the storage rooms looks difficult to achieve considering the underground location of the building, but it is worth estimating the range of techniques that could make such a space (building or room) waterproof for a period of time by delaying water infiltration through drains and access points.

4. Emergency Preparedness: Response and First Aid

In order to prepare responses when facing a disaster, all information about the collection (the most valuable items, a priority list) will be stored in a safe place. A list of volunteers (a rescue team) and an alerting system need to be establish and stay updated through regular contact. An evacuation procedure has to be set and tested through drills. Shelters for the storage of artefacts in good condition and another for those damaged after a disaster have to be located. Specialized conservators have to be identified.

Response

In case of an alert, when the river reaches a critical level, the MNHN site will be closed to the public. This information will be spread through proper channels of communication to alert police, firefighters, the rescue team and the public. The president of the museum will launch the rescue and start to evacuate the collection in order of priority.

When the water floods the building, for safety reasons, there will be no access to the Zoothèque but the collection recovery will be prepared by contacting/organizing the rescue team, assessing the shelter and checking the supplies.

Recovery

After the flood, the firefighters will remove the water from the building with an efficient pumping system. As soon as the building is secured, the trained staff will assess the damage, the losses and the needs. The flooded collection will then be evacuated for air drying in a ventilated place (shelter). Its evaluation for conservation measures will be conducted using appropriate methods. Priority for conservation treatment will be established and a campaign for funding launched through media channels. The empty building will then dried by blowing warm dry air in it.

5. Conclusion

As a general conclusion, and for the first steps in order to improve the DRM in the short term, it would be advisable to recruit a coordinator for this activity with the task of establishing an evacuation plan and team, in order to identify the more valuable items and the strategy for saving them (and gathering this data in a safe but accessible place). This includes locating and flagging the most valuable artefacts, identifying shelters, and so on. In the medium term, an emergency team will be constituted and trained together with the museum staff to coordinate emergency procedures and to train other staff and volunteers. This will include evacuation drills and procedures for salvage. In the long term (5–10 years), it is expected that the collection will be moved to a safer place if it is impossible to make the storage waterproof. A study should be devoted to the methods of drying stuffed specimens after a flood. It would be advisable to increase the awareness of the museum staff and the public at large through a conference on climate change and its impact on cultural heritage.

Acknowledgement

The author would like to thank Laurent Defendini of the Mnhn for his help and the Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University (R-DMUCH), Iccrom and UNESCO Chair Programme on Cultural Heritage and Risk Management

2.10 Archaeological Site of Paestum, Salerno Province, Salerno Province, Italy

Domenico Greco
Young researcher at Salerno University (Italy), ICOMOS Italia member, Italy

Fig.1 Archaeological Site of Paestum

1. Introduction

The Archaeological Park of Paestum is included in the "Cilento and Vallo di Diano National Park", World Heritage Site since 1998. Cilento is a cultural landscape of outstanding value and it has evidence of human occupation from 250,000 years ago. The park incorporate greek temples, roman remains and a museum.

The three greek temples of Paestum, built between VI and V sec. BC, are together with those of Athens and Agrigento the best preserved templar buildings from the classical age. Since the '700 the site has attracted travelers and artists such as Piranesi and Goethe. The construction of the temples began a few decades after the founding of the city of Paestum, which was originally called Poseidonia, around 600 BC. Settlers from the city of Sibari (Calabria) settled in the south of the Sele River, near the Etruscans of Pontecagnano in the North and the indigenous peoples who lived in the mountains in the East. The temples are located in the central part of the city, extending over 120 hectares and surrounded by a city wall, which is also among the best preserved we know. Among the temples there was the "market", that is the central square where the assemblies were held and the tomb (empty, in reality) of the mythical founder of Paestum was worshiped.

Around the temples and the market stretched the housing quarters. The remains of homes, spas and shops that can be seen on the site date back mostly to the imperial age (I-V century BC), while we still ignore many aspects of the greek hamlet.

The earliest evidence of the greek settlement was found in the urban sanctuaries, in the tombs located outside the walls and in the sanctuary of Hera Argiva at the mouth of the Sele, about 9 km from Paestum.

In the second half of the 5th century. BC, the city is conquered by Italic, non-greek people (called Lucani from some sources); both the language (from Greek to c.d. Osco) and material culture and funeral rites changed. There are, however, elements of continuity, such as the continuation of the function of temples.

In 273 BC there is a new incisive change: following a roman expansion, a latin colony was being set up

at Paestum. From now on, Paestum is among the many "Roman" cities of the peninsula. Around the 1st century BC, the residential districts were probably very similar to those of Pompeii and Herculaneum, kept under Vesuvius lapils.

This paper focuses on risk assessment, mitigation measures, response and recovery mechanisms for this archaeological site in case of disaster (natural or human-induced).

2. Introduction

The Archaeological Site of Paestum is part of "Cilento and Vallo di Diano National Park" included in the World Heritage List as criterion iii and iv:

Criterion (iii): During the prehistoric period, and again in the Middle Ages, the Cilento region served as a key route for cultural, political, and commercial communications in an exceptional manner, utilizing the crests of the mountain chains running east-west and thereby creating a cultural landscape of outstanding significance and quality.

Criterion (iv): In two key episodes in the development of human societies in the Mediterranean region, the Cilento area provided the only viable means of communication between the Adriatic and the Tyrrhenian seas in the central Mediterranean region, and this is vividly illustrated by the cultural landscape of today.

3. Attributes and Values

The most important attributes of the site are, for instance, the three Greek Temples (the Basilica, the temple of Neptune and the temple of Athena), the Roman City Ruins, the Ancient Walls of the city and the Museum.

Fig.2 The Basilica

Fig.3 Temple of Neptune

Fig.4 Temple of Athena

Fig.5 Roman City Ruins

Fig.6 The Ancient Walls

Fig.7 The Museum

S.No	Attributes	Type of attributes	Associated Values	Stakeholders	Scores for each Value
1	The Basilica	immovable	Architectural	UNESCO	3
		tangible		MiBAC	3
		cultural	Historic	Local Bodies and people	3
2	Temple of Neptune	immovable	Architectural	UNESCO	3
		tangible		MiBAC	3
		cultural	Historic	Local Bodies and people	3
3	Temple of Athena	immovable	Architectural	UNESCO	3
		tangible		MiBAC	3
		cultural	Historic	Local Bodies and people	3
4	Roman City Ruins	immovable	Architectural	UNESCO	3
		tangible		MiBAC	3
		cultural	Historic	Local Bodies and people	3
5	Ancient walls	immovable	Architectural	UNESCO	3
		tangible		MiBAC	3
		cultural	Historic	Local Bodies and people	3
6	National Archaeological Museum	immovable	Architectural	UNESCO	3
		tangible	Artistic	MiBAC	3
		cultural	Historic	Local Bodies and people	3

Table 1 List of attributes

4. Disaster Risk Analysis

The site, as well as the whole Cilento and Vallo di Diano National Park, has a historical background of hazards with respect earthquakes, landslides, fires, floods and lightnings. The lack of knowledge about the structure of the temples, and the low strenght of stone-made structures such as temples and roman ruins, make these elements really vulnerable to earthquakes. Moreover, owing the location of the site, which is close to hills and Sele river, there is the high possibility to face wild fires especially in summertime and landslides and floods in case of heavy rains with the probability of the blockage of roads and floods in some parts of the site. Furthermore the museum, built in 1952 with no anti-seismic regulations, is made by a masonry structure with some new parts in reinforced concrete but the overall behaviour is not properly capable to face horizontal shaking such as the movement of an earthquake. As a consequence, also objects and collections inside the museum are seriously at risk.

With the following diagram (Fig.8), the reader can understand the synthesis of Risk Analysis with all the factors which are interlinked with each other with respect the worst possible and probable disaster scenario.

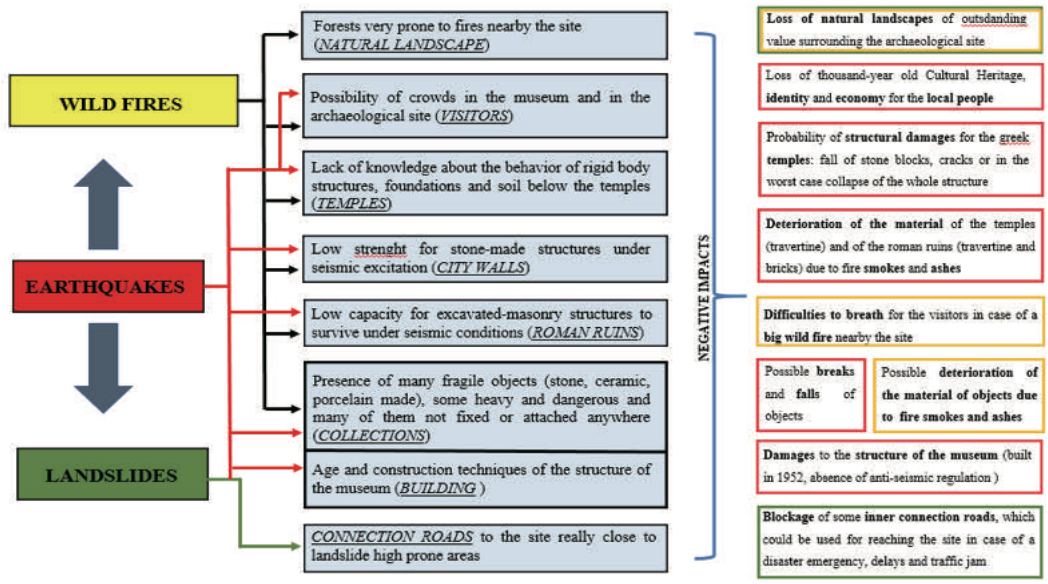

Fig.8 Risk Analysis diagram

On a Saturday evening, a 6.5 magnitude **EARTHQUAKE**, really shallow (10 km deep) strikes the inner part of the Cilento National Park (epicenter: Roccadaspide, 40°26'N 15°12'E). Its power reaches rapidily the Archaeological Site provoking the collapse of the Hera Temple (while a greek tragedy show was having been performed) and many other damages to the other greek temples, roman ruins and the Museum (to the structure and to the collections). The Site was still opened to visitors (many of them got wounded); big loss of Cultural Heritage and future Economic reflection on the local community;

As a direct consequence of the earthquake, many **LANDSLIDES** occur in the area of the epicenter causing the blockage of some routes of connection to the Archaeological Site, in particular for Civil Protection operative teams (for rescue people and salvage of collections) coming from inner part centres.

Due to presence of houses and restaurants close to the forrest,, a big **WILD FIRE** occurs on the hill of Capaccio, really close to Paestum (5-6 km) during the most probable and dangerous period (JULY-AUGUST). Its spread is helped by the WIND. Loss of forest and huge amount of smoke.

Fig.9 Worst possible and probable scenario for the case study

5. Prevention and Mitigation measures

Keeping in mind the past hystoric events happened in the area of the above scenario of earthquake, landslides and wild fire, a list of some prevention and mitigation countermeasures have been developed as shown in the following table (Tab. 2). For the listed mitigation/prevention measures, there are some priority-cost criteria based on several factors (value of the attribute, feasibility, technologies etc..) and involving different people and stakeholders.

N.	Attribute	Hazard	Method	Type	Level	Description
1	TEMPLES	Earthquake	Retrofit	Technical (structural)	Building (structural)	TENDON SYSTEM RETROFIT: a very simple and effective idea is to tie loose building blocks with steel tendons that run through their centres reducing displacement and dissipating energy at the joints, with control devices
2	ROMAN RUINS	Earthquake	Retrofit	Technical (structural)	Building (structural)	TENDON SYSTEM RETROFIT: a very simple and effective idea is to tie loose building blocks with steel tendons that run through their centres reducing displacement and dissipating energy at the joints, with control devices
3	CITY WALLS	Earthquake	Retrofit	Technical (structural)	Building (structural)	TENDON SYSTEM RETROFIT: a very simple and effective idea is to tie loose building blocks with steel tendons that run through their centres reducing displacement and dissipating energy at the joints, with control devices
4	MUSEUM (building)	Earthquake	Retrofit	Technical (structural)	Building (structural)	SEISMIC IMPROVEMENT of the whole building: traditional interventions aimed at improving the strength of the structural elements of a structure such as expansion of foundations, consolidation of reinforced concret element or masonry with both traditional and innovative materials (FRP), seismic joints (average cost) using energy dampers or base isolation (high cost)
5	MUSEUM (collections)	Earthquake Fire	Retrofit	Technical, Maintenance	Collections, Display, Storage	Different techniques in order to FIX OBJECTS (porcelain, travertine, metal, ceramic, paper…) to shelves, ATTACH shelves, pedestals and base to floors so that, in case of an earthquake, the probability of falling can be reduced (low cost), or design ISOLATED FLOORS, like in Kyoto National Museum (high cost)
6	NATURAL LANDSCAPES	Landslide Wild fire	Detection	Monitoring Systems	Site, Regional	Use of DISPLACEMENT SENSORS (high cost) and/or UNDER WATER PRESSURES MEASUREMENT (medium cost) for monitoring hydrogeological high prone areas nearby the Site to prevent possible landslides; use of h24 CAMERAS (medium cost) or DRONES (high cost) for monitoring possible wild fires in the forests nearby the Site

Table 2 Prevention and Mitigation Measures

6. Preparedness, Emergency and Response procedures

Normally, in case of a disaster, human lives are the first priority but in order to be properly prepared to face an extreme event, in particular in cultural heritage sites, there is also a need to think about movable / immovable, tangible / intangible attributes and to ensure their safety. It could be make possible following these several indications for each cultural heritage site:

- site map, buildings floor maps and building and objects/collections inventories should be in a ready-to-use form
- need of evacuation plan for visitors, staff and object/collections (archaeological site and museum)
- need of a list for most valuable objects/collections which have to be evacuated first from the museum
- prepare post event damage and risk assessment form
- training (volunteers and institutional teams) for post event damage and risk assessments
- propose emergency team based on the Site in order to be ready in case of a small/large event
- emergency response coordination lead by regional and provincial Civil Protection units
- emergency drills with the whole Archaeological Site emergency responders and staff
- communication systems around the Site (free-WiFi, Facebook Page, Crowd Map, Whatsapp

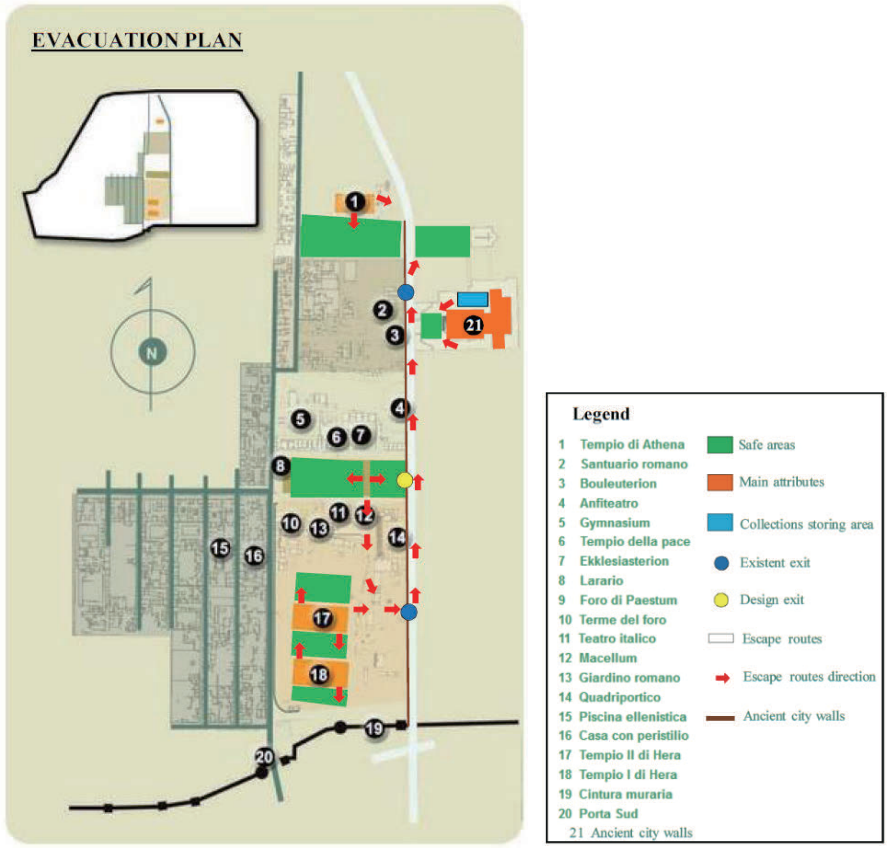

Fig. 10 Evacuation Plan Proposal for the Site

7. Recovery Planning

Actors	Short Term Activity up to 1year	Medium Term Activity 1 – 3 years	Long Term Activity 1 – 5 years
Municipality	Identify a Storage for Recovery and Install CCTV Starting Procedures to Revise and Implement the Emergency Plan	Multi Hazards Management Plan for the Site and Integration with Cilento National Park Apply to the European Union for funding on Mitigation Proposal	Implementation Policies and Strategic Plan Integrated Cooperation with Volunteering Associations in advanced state
Managing Autority Ente Parco (PAE)	Provide an inventory for Objects, Collections or Relicts Provide documentation from the Site (photos, maps, plans) BASELINE Data PDNA Report	Conservation and Restoration Inventory Evaluation for funding priorities, according with PDNA New Risk Assesment GIS Implementation	Trainings for Volunteers and Institutional Teams Cooperation with Volunteering Associations in advanced state
Civil Potection (Capaccio, Battipaglia, Eboli)	Support the PAE and Superintendence for the Storage Safety Start Plans Integration Process	Unique Operational Room established Integration Plans with the rest of the Cilento National Park Information Cluster established	Support for the Risk Assesment Training Coordinator for the Site staff
Fire Department (Capaccio, Agropoli, Roccadaspide)	Estinguish wild fires in the forrests Trasportation of Object	Support for the Safety Counter Measures	Support for the Training at the Site Frequent Maintanance of Fire System in the museum and around the archaeological site
Superintendence	Provide an inventory for Objects, Collections or Relicts Provide documentation from the Site (photos, maps, plans) PDNA Report	Conservation and Restoration Inventory Evaluation for funding priorities Apply for European Union funding	GIS Maps set up Support Training
LEGAMBIENTE Volunteers Associacion	Support the Recovery and the Transportation of Movable Objects Support for the Inventory	Training and Lessons Learnt Recruitment for new volunteers	Set up of the Cluster of Civil Protection Volunteers for the Recovery and Preservation of Cultural Heritage
Engineers and Architects Professional Orders	Expertise for Restoration and Retrofit	Expertise Support for Restoration and Retrofit	Training for Volunteers
UNESCO/ICOMOS/ICCROM	International Expertise for PDNA	Expertise on Restoration Methodologies on Cultural Heritage	Provide Expertise for DDR Training
Campania Region / Heritage Department	PDNA Report Set up for the Integration Plan	Apply to UE for funding priority	Provide Guidelines for DRR in the World Heritage properties in Campania Region

Fig 11 Short, medium and long term Recovery Planning

8. Conclusion

The preservation and enhancement of Cultural Heritage is a topic of crucial importance today as it guarantees the bond between the past and the present in order to preserve local identities for future generations. Italy, as it is well known, is a nation with a huge Cultural Heritage and, therefore, the importance that comes to this sector is even more pronounced. The Archaeological Site of Paestum is one of the most important sites in southern Italy, but also at national level and, precisely for this reason, a more accurate Risk Management could be triggered by the development of an adequate DRRM Plan which could perform the function of pilot project. It could be the first step in the design process that would lead to the drafting of the DRRM Plan for the whole "Cilento and Vallo del Diano National Park".

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2.11 Old City of Mrauk U

Khin Aye Yee
World Bank, Myanmar

1. Introduction

The city of Mrauk U was the old capital of the Rakhine (Arakan) Kingdom from 15th to 18th century AD, and was established in 1431 by King Min Saw Mon. Mrauk U is located in Rakhine State's river valley areas, the western part of Myanmar on the border with Bangladesh, and was built as a fortress city enforced by a smart hydrology system surrounded by mountains and waterways. It was a major trading port in the Bay of Bengal where hundreds of ships on their way from Europe to eastern trading cities like Java were docked, and was always crowded with foreign traders – Europeans, Arabs, Indians, Mon, and Burmese from Ava Kingdom. At its peak, Mrauk U controlled half of Bangladesh, including Dhaka and Chittagong, half of lower Burma and current Rakhine (Arakan) State. However, the heyday of Mrauk U ended abruptly in the early 19th century when it fell after the Burmese invasion from the Ava Kingdom near Mandalay.

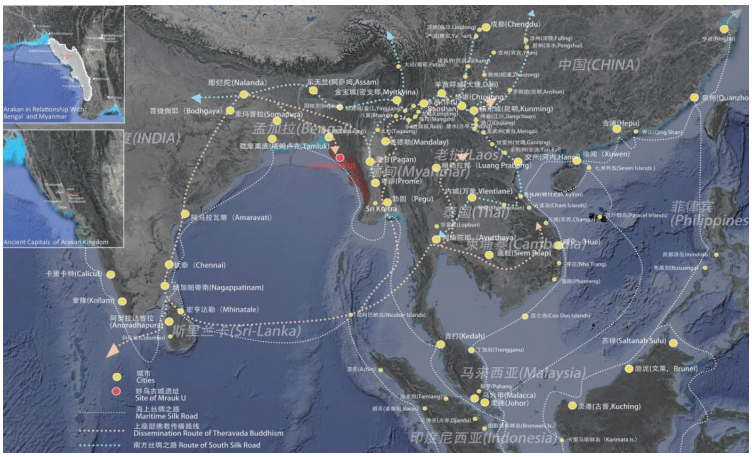


Fig.1 Research on Cultural Heritage of Mrauk-U, Key Laboratory or Urban and Architectural Heritage Conservation (SEU), Ministry of Education China and Mrauk U Branch, Department of Archeology, Ministry of Culture, Myanmar

Mrauk U is now a small traditional town with an area of approximately 30 square miles and a total population of 200,000 who are majority Buddhist. Up until today, you can see around 4,000 pagodas on the area's landscape but the Mrauk U site has been neglected and suffered from both natural and man-made disasters for many years. The State has not allocated the sufficient budget for maintenance of the ancient city. Mrauk U has been listed on the Tentative List since 1996 though there were no progress. The current government is now paying attention to conservation of Mrauk U and nominating it for the World Heritage List as part of the Rakhine development plan by 2018. The government's commitments have become essential to moving Mrauk U conservation forward and disaster management planning.

2. Cultural Heritage Attributes and Values

Ancient Arakanese cities are situated in the river valley areas. These capitals can be divided into two groups. Firstly, the cities flourished in the Kaladan Valley and secondly, in the Lemro Valley. Four main rivers in Arakan State, namely Naaf, Mayu, Kaladan and Lemro, have narrow alluvial flood plains. In the main Kaladan and Lemro Valleys, the hills often stand out as low ridges above the flood plain. A strategic fortress city is positioned between hills and streams, and characterized by a complex system of stone walls, reservoirs, moats and a water gate with both hydrological and defensive purposes. Around 4,000 masterpieces of art and architecture such as temples, monuments, and libraries were recorded and 400 were registered.

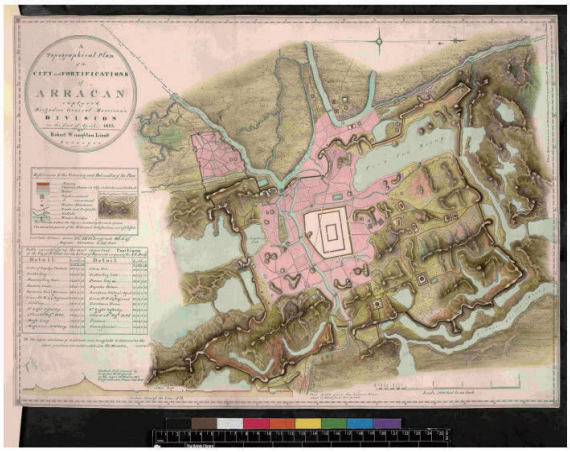


Fig.2

	Recorded	Registered
City Walls	31	9
Gates	25	16
Fortress	11	11
Moat	28	20

Fig.3

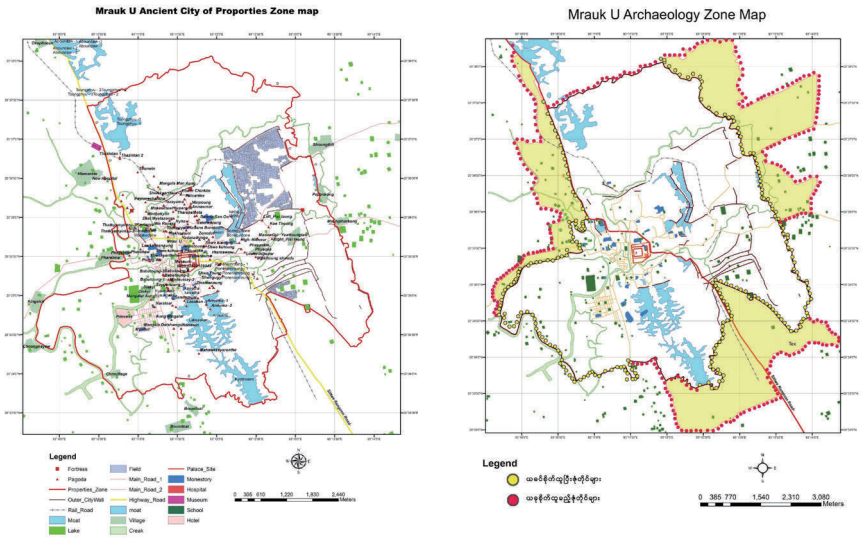


Fig.4 Mrauk U Archaeology Zone and properties zone maps by Mrauk U Branch, Department of Archaelogy.

3. Hazards, Vulnerabilities and Impact

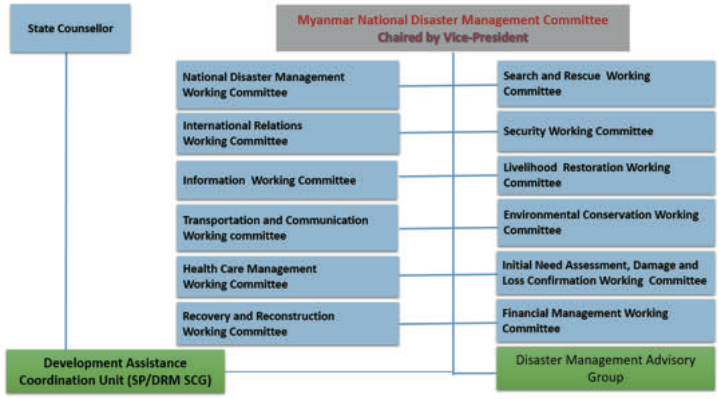


Fig.5 National Disaster Management Committee, Myanmar

Devastating catastrophes in the past as well as recurring disasters adversely affecting Myanmar and its people highlight both the need to reduce disaster risk and to build resilience. In the aftermath of past disasters, the government has had to divert existing resources earmarked for development projects to finance emergency relief, response and recovery activities.

Further, vulnerable communities take a longer time to recover from disaster impacts, making it more difficult to stabilize the local economy and ultimately impeding national progress. If the country and its communities become more resilient to disaster, losses will be mitigated and the recovery process accelerated.

Aside from Myanmar's exposure to natural hazards, climate variability, environmental degradation, and hazard development contribute to the likelihood of incurring increased damage and losses in the event of a disaster. Rakhine State in particular is prone to several hazard types which have caused monumental damage and loss of lives in the area over the years. At least four cyclones pass Myanmar from Bay of Bengal every year and most of them hit Rakhine State, resulting in damage and losses due to strong wind as well as coastal flooding from the cyclone-induced storm surge. Moreover, the mountainous areas of the state have faced a landslide problem in the past, especially in the rainy season.

Mrauk U's cultural sites are located in a flood prone area in Rakhine State. The average annual rainfall is more than 200 mm. The flash floods and landslides coming from Kaladan and Laymyo Rivers every year, and the 2016 Chauk earthquake also negatively impacted Mrauk U and some monuments were damaged. As the poorest state in the country, there is a lack of knowledge and resources on disaster preparedness.

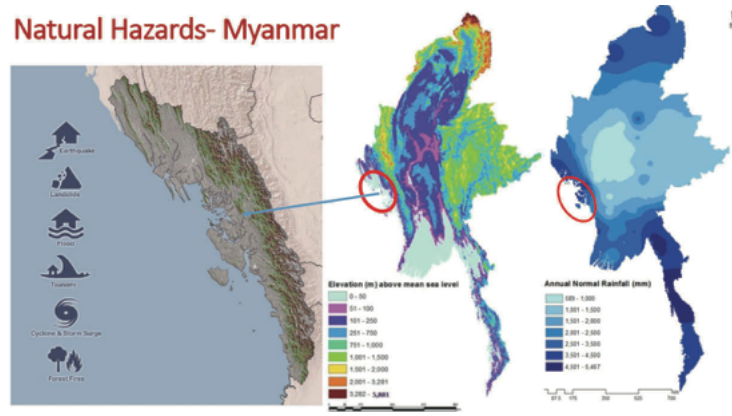


Fig.6 Natural Hazard Risk Assessment in Rakhine State of Myanmar, November, 2011, UNDP

Mrauk U's cultural sites are located in a flood prone area in Rakhine State. The average annual rainfall is more than 200 mm. The flash floods and landslides coming from Kaladan and Laymyo Rivers every year, and the 2016 Chauk earthquake also negatively impacted Mrauk U and some monuments were damaged. As the poorest state in the country, there is a lack of knowledge and resources on disaster preparedness.

The following risk analysis showed that Mrauk U has both catastrophic and progressive hazards. The catastrophic includes flash floods and earthquakes followed by fire, collapse and debris flow. The progressive hazards showed conflicts and long flood. The main vulnerabilities are weak temple structure, lack of maintenance, valuable ancient statues, lack of management, lack of technical people, blocked old water system, political sensitivity, religious extremism, river ecology, poor land and waste management systems.

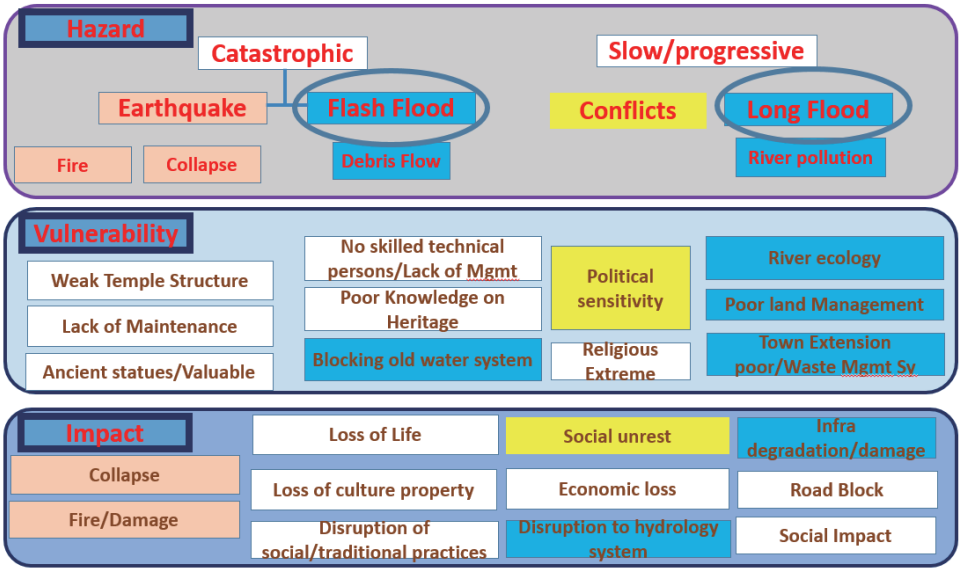


Fig.7 Hazard, Vulnerabilities and Impact Assessment, Case Study of Mrauk U

Flooding caused by torrential rains in highlands is not only enhanced by **climate change** but also the **political** agenda with regards to cultural sensitivities as well as a **lack of knowledge** in the community in terms of maintenance; this has been leading to **gradual decay** of the Mrauk U heritage site.

4. Emergency Preparedness and Response

Mainstreaming heritage conservation within existing DRM policy frameworks should be done across local as well as national levels. Preservation should be recognized as an integral part of rehabilitation. Simultaneously, heritage management policies and plans must incorporate DRM policies. This will ensure a more effective approach in which stakeholders focus on respective responsibilities. (Zuzana 2018)

Myanmar has a National Disaster Management Committee with 10 sub-committees chaired by the vice president. The Disaster Management Law and Myanmar Action Plan for Disaster Risk Reduction are enacted in conjunction with the Hyogo Framework for Action and the Sendai Framework for Disaster Risk Reduction (2012). The Environmental Conservation Law (2012), and The Protection and Preservation of Cultural Heritage Law (1998) were also link with international framework between aspects of culture, risk reduction, and resilience, and so provide a foundation and enabling policy environment for mainstreaming for Disaster Risk Management (DRM) to preserve cultural assets. However, Myanmar's legal policies need to improve those links.

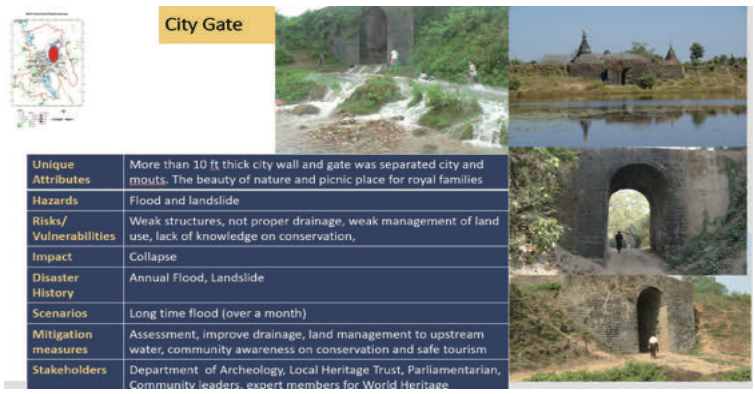
The Disaster Risk Management Plan was developed for overall immediate actions which identified involved parties, timelines, funding sources together with monitoring and evaluation. A few important monuments and places are mentioned in the below sample of the DRM plan.

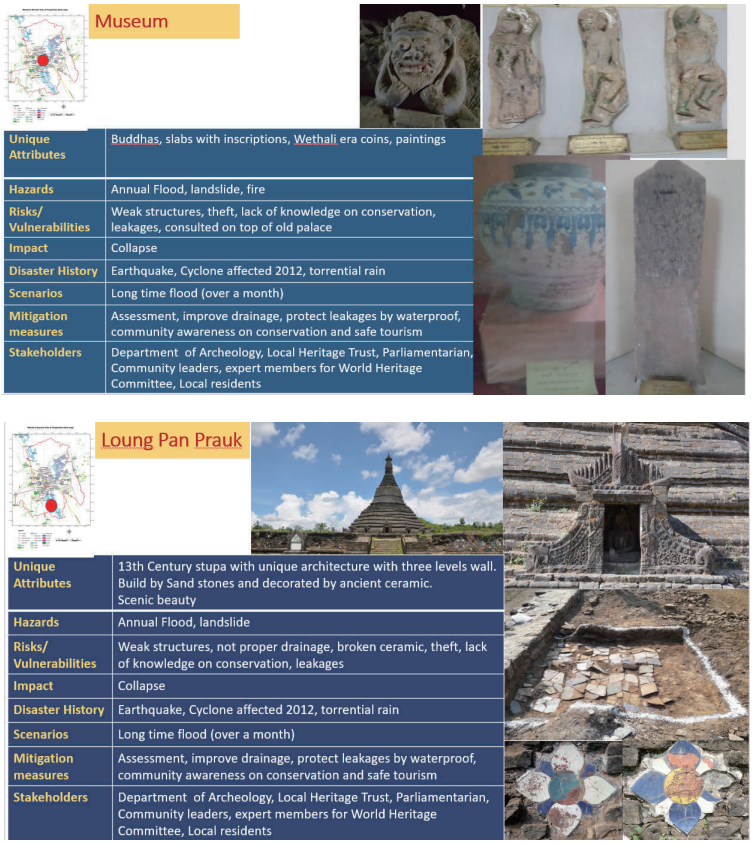
Disaster Risk Management Plan- Immediate Actions

	Action 1	Action 2	Action 3	Action 4
Project Title	• DRM Plan	• Hydrological Assessment	• Waste Management Campaign and Campaign	• Coordination
Involved Parties	- DOA, UNESCO, Experts, Local NGOs, Community Leaders, Religious Leaders, MHT	• DOA, DOH, Experts, Local NGOs, Community Leaders, Religious Leaders, MHT, Community	- DOA, DOH, Experts, Local NGOs, Community Leaders, Religious Leaders, MHT, Community	• Government departments, NGOs, UNESCO and other Development Partners
Duration	- June 2017- July 2018	• Sep 2017- Jan 2018	- June 2017- July 2020	• On going
Funding	- Government	• Government and Development Partners	- Government and Development Partners	• Government and Development Partners
Reporting/Evaluation	- On site visits and regular meetings with all	• On site visits and regular meeting with DOH, DOA and	- On site visits and regular meeting with all stake	• Government and Development Partners

Fig.8

A variety of measures can be taken to reduce disaster risks to cultural assets, including both physical mitigation and non-engineered solutions such as improved building codes, coordination, and inventory. Data and technology can help protect monuments against natural disasters at the level defined by criteria and expected risks, for example by helping to prioritize and protect the most important heritage assets in the context of limited resources. Post-disaster recovery is a sensitive time when additional factors (debris removal, theft, misclassification, further disaster events) can amplify the impact of the initial disaster. Stakeholders need to be better prepared if they are to effectively respond to disaster impacts on heritage assets and support sensitive recovery, especially when local communities and livelihoods are closely connected to heritage sites. Beyond physical characteristics, vulnerability is also driven by the socioeconomic environment in which cultural assets exist. (Jigyasu 2016)





Museum

Unique Attributes	Buddhas, slabs with inscriptions, Wethali era coins, paintings
Hazards	Annual Flood, landslide, fire
Risks/ Vulnerabilities	Weak structures, theft, lack of knowledge on conservation, leakages, consulted on top of old palace
Impact	Collapse
Disaster History	Earthquake, Cyclone affected 2012, torrential rain
Scenarios	Long time flood (over a month)
Mitigation measures	Assessment, improve drainage, protect leakages by waterproof, community awareness on conservation and safe tourism
Stakeholders	Department of Archeology, Local Heritage Trust, Parliamentarian, Community leaders, expert members for World Heritage Committee, Local residents

Loung Pan Prauk

Unique Attributes	13th Century stupa with unique architecture with three levels wall. Build by Sand stones and decorated by ancient ceramic. Scenic beauty
Hazards	Annual Flood, landslide
Risks/ Vulnerabilities	Weak structures, not proper drainage, broken ceramic, theft, lack of knowledge on conservation, leakages
Impact	Collapse
Disaster History	Earthquake, Cyclone affected 2012, torrential rain
Scenarios	Long time flood (over a month)
Mitigation measures	Assessment, improve drainage, protect leakages by waterproof, community awareness on conservation and safe tourism
Stakeholders	Department of Archeology, Local Heritage Trust, Parliamentarian, Community leaders, expert members for World Heritage Committee, Local residents

Fig.9

5. Capacity Building and Community Engagement

There are multiple dimensions to the role played by communities in relation to cultural assets. Both residents and nonresidents may pose risks to cultural heritage, such as through social issues like dumping of waste, illegal construction, and vandalism. Because the community and technical bodies/experts may have different priorities and make different uses of sites, achieving consensus between them on emergency response, post-disaster recovery, and long-term risk reduction can also pose challenges. (Zuzana 2017).

Mrauk Oo is located in a two-river creek and environmental issues such as erosion of the river banks as well as extension of human settlements are critical. Worsening the situation are a lack of awareness on hygiene and waste management.

It is important to build the capacity of government and other stakeholders for identification and monitoring of risks, risk reduction and response to disasters, and recovery and restoration efforts. Civil protection departments, heritage ministries, local governments, private investors, and communities can work together on preserving cultural heritage (Lingua et al. forthcoming). Lead agencies for heritage conservation need to understand DRM principles, as their contribution is vital not only for coordinating immediate post-disaster efforts, but also for ex ante asset management and risk reduction.

Community engagement in DRM is of great significance. Community perceptions of risks and mitigation measures associated with a particular heritage asset may not necessarily conform to views of technical experts. Consultations are essential to arriving at a consensus, and may be especially important in bringing

stakeholders together at the start of a project; so that communities can play an important role across different DRM stages, particularly risk monitoring and emergency response. (Zuzana 2017)

Fig.10 Community participation to protect city wall by flooding in 2017

6. Conclusion

There are many challenges in promoting resilient cultural heritage. There is a lack of knowledge and resources in the development of a Disaster Risk Management Plan in Mrauk U which could cover cultural heritage as well as awareness to all stakeholders. The four important aspects to pay attention to are a legal framework, heritage, landscape and community in addition to risk analysis, a preparedness plan and response.

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3 Activities undertaken after The International Training Course by Former Participants

3.1 Ministry for Culture and Heritage, New Zealand

Helen McCracken
Ministry for Culture and Heritage, New Zealand

1. Background

I have an MA in Anthropology, focusing on archaeology. Since graduating in 1994, I have had a long and varied career working in the cultural heritage sector, including undertaking historical research for iwi/Māori, local authorities and conservation architects. From 2001 to 2006 I worked for Heritage New Zealand, New Zealand's leading place-based cultural heritage agency. This included a period of time as the Registrar for what is now known as the New Zealand Heritage List Rarangi Taonga. I currently work for the Ministry for Culture and Heritage as a Senior Policy Adviser in its Heritage Policy Team.

2. Canterbury Earthquakes saw the loss of many heritage buildings

In February 2011 New Zealand's second largest city was struck by 6.3 magnitude earthquake. The region had already been hit by a number of earthquakes at the end of 2010, but the epicentre of the February event was closer to Christchurch and shallower. One hundred and eight-five people lost their lives and many more were injured. The earthquake and subsequent aftershocks caused significant (and ongoing) disruption to the social, economic, natural, built and cultural environment of Christchurch and the Canterbury region as a whole. Much of Christchurch's building stock, including a significant number of heritage buildings, were destroyed or later demolished. The impact of the earthquakes had a profound impact on how many New Zealanders saw heritage buildings, and, even though most of the deaths occurred in non-heritage buildings, it led to questions about whether New Zealand's older building stock was safe.

3. Changes to New Zealand's building legislation

At the end of 2011, the then Department of Building and Housing launched a review of the earthquake prone building policy. It was a requirement under the Building Act 2004 that all local authorities should have a policy to require the strengthening of earthquake prone buildings, including heritage buildings, within certain timeframes determined by individual authorities. I became involved in this review as a representative from the Ministry for Culture and Heritage.

It was in this context that in 2012 I applied, and was selected, to attend the 7th UNESCO Chair International Training Course on Disaster Management of Cultural Heritage. The theme for that year was disasters and cultural heritage in historic areas, in particular 'From Recovery to Risk Reduction for Sustainability of Historic Areas'.[1] My chosen case study was the 'Cuba Street Historic Area', situated in Wellington, the capital city of New Zealand. Many of the buildings were considered earthquake-prone and in need of strengthening and, due to the events of 2010 and 2011, were of great concern to many.

Attending the course in Japan greatly assisted my work, as it allowed me to think about the wider context to managing risk for heritage buildings. In particular, it reaffirmed to me that disaster-risk management for cultural heritage cannot happen in isolation.

In 2015 a new system for managing earthquake prone buildings was introduced in New Zealand. The changes brought in a nationally consistent framework for identifying buildings that posed the greatest

risks, allowing for targeting specific geographic areas due to the likelihood of a seismic event and specific parts of building that posed the greatest risk.

4. Development of a seismic strengthening heritage incentive package

In parallel with the development of the legislation and as part of my work in the Ministry for Culture and Heritage, I took the lead on investigating the potential for funding the seismic strengthening of heritage buildings. The work involved trying to understand what were the key barriers for owners who needed to undertake strengthening of heritage buildings. Although funding was the main issue, for many owners it was also the lack of knowledge of how go about strengthening a building and having certainty that a proposed engineering solution would be effective. There was also the added complication of the regulations around preserving the heritage values of the place and how they might influence the strengthening solution.

In recognition of the extra costs that heritage owners face, in 2016 the Government announced the establishment of a fund to assist privately-owned heritage buildings undertake seismic strengthening. This fund was accompanied by an information package to help owners make informed decisions on how to strengthen their buildings. Initially a $12 million dollar package spread over four years, the fund has just completed its first year of operation.[2]

5. Understanding the lessons from Christchurch

In addition to the work on the new seismic strengthening initiative for heritage buildings, in 2015 I joined the Canterbury Earthquake Recovery Authority (CERA) as a part-time researcher for their lessons and legacy project. CERA was a government department set up in April 2011 under special legislation to lead and coordinate the New Zealand Government's response and recovery following the 2010 and 2011 Canterbury earthquakes. CERA was intended to have a limited life and was eventually disestablished in April 2016 as part of a transition from a Government-led recovery to a long-term locally-led arrangement.

I was part of a team of researchers and oral historians who undertook a number of interviews and workshops focusing on various aspects of the agency's work. The results of this work were published alongside the recollections of other agencies (including non-government) involved in the recovery on a web platform known as EQ Recovery Learning.[3]

6. First Aid to Cultural Heritage in Times of Crisis

In 2016 I had the opportunity to expand my skills and knowledge in disaster risk management when I attended the International Course on First Aid to Cultural Heritage in Times of Crisis (FAC), held for the first time in Washington, D.C. Hosted by the Smithsonian and ICCROM, the month-long course, involving 21 participants from 18 countries, focussed on how to respond to the threat to cultural heritage in times of crisis. Through classroom activities and practical exercises, the course took participants through the key components of the cultural first aid process of context analysis, on-site survey, and security and stabilisation actions. [4] (See images below.)

In many ways the sister programme to the ITC course, the FAC course has seen over 100 people trained in Cultural First Aid since its establishment in 2010, and many more through regional programmes. It has now reached a point where it needs to become a self-sustainable programme, recognised as the best practice framework for providing first aid response to cultural heritage at immediate risk from disasters.

In October 2017 I along with a number of previous participants gathered at ICCROM in Rome, with the

course partner agencies from the Smithsonian, USA and the Prince Claus Fund, the Netherlands, UNESCO, CRAterre (France), Italian Civil Protection, and Ritsumeikan University (Japan) to participate in a workshop to review the existing First Aid international training. The workshop also looked at how to create an effective network of cultural first aiders.

Attending the workshop were three other graduates of the ITC course who have also had the benefit of attending the FAC course. (See image below.)

7. Using the information from ITC

Much of my current work within the Ministry for Culture and Heritage is focussed on helping advise other government agencies on how to incorporate heritage in their policy development. With the knowledge provided by the ITC and FAC courses, I have gained considerable confidence in raising awareness for better disaster risk management for cultural heritage.

I have been very keen to share my developing knowledge in this area. Since 2013 I have been a guest lecturer for the Museum & Heritage Studies programme at Victoria University, introducing the concept of disaster risk management to post-graduate students. This has included teaming up with another past graduate of ITC, Richard Nester, to run a day workshop for students.

8. Future work

As part of my role in the Ministry, I have commenced a piece of work to understand how culture and cultural heritage is important to New Zealand's resilience, including its place within New Zealand's disaster risk management system.

This work is very much in its early stages, focused on identifying who is currently working and researching in this area within New Zealand, and includes initial thinking about how we might begin to define cultural resilience for New Zealand. Teaming up with organisations such as QuakeCORE: the New Zealand Centre for Earthquake Resilience, the intention is to bring together policy makers, practitioners and academics to better understand the role of culture and cultural heritage to resilience, which, in turn, will inform how better investment in the cultural sector to improve resilience for New Zealanders as a whole.[5]

The work has huge potential to connect the cultural sector with others, including those working in the more traditional emergency management areas, to understand more about how culture influences resilience. This cross-sector interest is not only due to the recent developments on the international stage around meeting obligations under the Sendai Framework for Disaster Risk Reduction, but also borne out of the knowledge gained since the Canterbury Earthquakes in 2010 and 2011 and how disasters effect the lives of people and communities and what they value.

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First Aid for Cultural Heritage in Times of Crisis, Washington June 2016

All images taken by Eugénie Crété. Images reproduced by permission of ICCROM.

Fig. 1 Learning to communicate with key stakeholders during a crisis.

Fig. 2 Practicing emergency shoring techniques

Fig. 3 Learning how to triage a museum collection in need of evacuation

FAC Design Workshop, hosted by ICCROM, Rome 2017

Photo © Madhusudan Singh

Past attendees of ITC AbdelHamid Salah, Zeynep Gül Ünal, Helen McCracken, and Valeria Suruceanu with Rohit Jigyasu, UNESCO Chair professor at the Institute of Disaster Mitigation for Urban Cultural Heritage at Ritsumeikan University.

3.2 CHwB Albania Projects on Risk Management and First Aid Response

Elena Mamani
Deputy Executive Director/ Program Manager
Cultural Heritage without Borders, Albania

1. Introduction

The foundation Cultural Heritage without Borders (CHwB) is an independent non-governmental organization dedicated to rescuing and preserving tangible and intangible cultural heritage affected by conflict, neglect or natural disasters.Founded by Swedish intellectuals back in 1995 as a reaction to the targeted destruction of cultural monuments during the war in Bosnia and Herzegovina, the organisation has expanded its activities to other countries in the Balkans, as well.

CHwB works with heritage conservation and interpretation, community empowerment, education and museum development. We design and implement innovative strategies and manage various interventions on the ground— using cultural heritage as an active force in peace building, promoting human rights and developing a sustainable socio-economic environment.

Following the overall mission of the organization, CHwB-Albania has been very active for the last 10 years, working with heritage restoration, conservation, emergency interventions, revitalization, interpretation and training in Albania and the Western Balkans region.

In recent years, the work of CHwB-Albania has also been directed towards risk management and first aid response. This development has been inspired by the attendance of two staff members at the course on "Disaster Risk Management of Culture Heritage" at Ritsumeikan University, Japan in September 2014 and the ICCROM course “First Aid to Cultural Heritage in Times of Crisis” in Amsterdam in April 2015. These experiences, along with the support of the Prince Claus Fund and the Swedish Government, have allowed CHwB Albania to develop several activities with this focus in Albania and the region. Some of these activities were worked up during the training in Japan and have already been introduced as pilot ideas within the Disaster Risk Management Plan for the Historical Center of Gjirokastra, a UNESCO World Heritage Site.

2. Condition Assessment: Gjirokastra Monuments

Gjirokastra's historic zone is vulnerable to a range of natural disasters and human interferences. The political and economic situation in Albania over the last 20 years has also had a negative impact on the condition of historical buildings. Unsolved ownership issues and out-migration of population are only some of the reasons behind the lack of preservation and rapid deterioration observed throughout the city. The poor condition of monuments, as well as the lack of maintenance or negligence, make them even more vulnerable to hazards such as earthquake or fire, which are identified as the most frequent hazards for the city.

The preservation of Gjirokastra’s cultural heritage is vital to the city’s economy as tourism is seen as a basic resource for the development of the city.

CHwB-Albania saw that there was an urgent need to investigate the current condition of the listed monuments. Information is the key to better management but also a very important tool for policymakers, specialists and developers to mitigate or even prevent further destruction. Therefore, CHwB, in collaboration with the Regional Directorate of National Monuments of Culture(DRKK) and Epoka

University, conducted a risk assessment evaluation for 658 listed monuments within the historical core of the city. The results of this survey were compiled in a statistical report and GIS maps (figure 1) that illustrate the level of risk of the monuments of Gjirokastra. The goal of the assessment was to analyze the condition of the monuments and prioritize them according to the need for intervention. The report was used to alert the government about the critical situation facing the built heritage of the city; to assist them in defining conservation strategies according to the level of risk and the values of the monuments; and to build an operational plan for interventions.

Each monument was assessed using a condition assessment form. In this way, a documentation folder was created for each monument containing the completed assessment and photos. The methodology for prioritizing intervention focused on cross-referencing the condition, occupancy/use, risk category and historical content of each monument. The priorities for interventions were then analysed, resulting in proposed sets of actions for 7 different priority categories of monuments.

According to the results of the condition assessment, the designated monuments of Gjirokastra are in a critical condition. Of the 658 monuments assessed, 169 are in poor or very bad overall condition[1] out of which 35 are in ruins. When classified according to the abovementioned priority categories, it was found that 51 monuments are in need of the most urgent interventions, while a further 40 require urgent interventions of some kind. Illegal interventions have affected 357 monuments, which represents more than half of the listed monuments in Gjirokastra. Of these, 122 have lost all their monumental characteristics. A further 170 are transformed almost totally.

Vacant monuments still represent the biggest threat to Gjirokastra's historic fabric. Today in Gjirokastra there are 79 unoccupied monuments (not including ruins) and their condition is worsening.

The objective of the assessment was to lay the foundations for a hands-on strategy for interventions in Gjirokastra. The results of the assessment were presented to the National Technical Council of Monuments of Culture in Albania and also at conferences and meetings with important donor and policy-making institutions in Albania. The assessment is intended to direct the priorities for all future interventions on monuments in Gjirokastra.

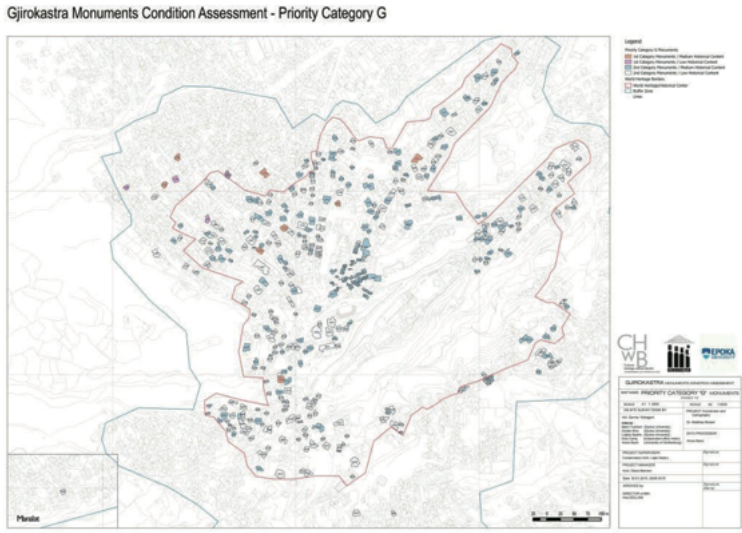

Fig.1 Map of Priority G Category[2], second (lower) category monuments

[1] Overall condition scale is: Good, Fair, Poor, Very Bad
[2] Priority Category G, Building in a good or fair condition and end use or user identified; building with high or low historical values.

Currently CHwB-Albania is conducting, together with Worcester Polytechnic University in Massachusetts, the Regional Directorate for the Protection of National Monuments in Berat and Berat Municipality, a condition assessment of listed monuments in the historical city of Berat (listed as a World Heritage Site together with Gjirokastra) and is preparing an update on the condition of the monuments in Gjirokastra. This time the assessment is linked more to the risk of natural and manmade hazards, in addition to current condition and occupancy. As in the case of Gjirokastra, the data gathered through the assessment will be compiled in reports and strategies for interventions. Due to the current government's overall strategy to develop the economies of these two cities based on their cultural heritage resources, this is the right moment for both assessments to be finalised and their data to be used to build the strategy of interventions.

3. Balkan Culture Aid Response for Emergencies (B+Care)

The Balkans is a geographical region of Southeast Europe that faces similar risks from natural and manmade disasters- ranging from earthquakes, floods and fires to riots and interethnic conflict. With so many hazards, however, national emergency response is often inadequate, particularly when it comes to threats to culture heritage. Therefore, we saw the need for a cross-border initiative to address the needs of culture heritage in times of crisis across the region. B+CARE is a regional project that aims to:

1. Understand the risks to heritage in the Balkans and formulate strategies to address those risks.
2. Coordinate with and among national disaster response institutions and cultural institutions on effective strategies for cultural emergency response.
3. Train and deploy a network of volunteers that can conduct 'first aid' for cultural heritage across the Balkans.

The pilot training on First Aid response implemented in partnership with Urban Development Center – Belgrade (UDC), gathered 20 young participants (most of them from the alumni network of Regional Restoration Camps,(http://chwb.org/albania/activities/rrc/) from the Balkans who had both the knowledge of culture heritage and a desire to protect and preserve heritage in case of disasters. The one week training in Gjirokastra created a strong basis for a regional program, with a dedicated first group of volunteers in the region. Contacts were created with the national disaster response institutions in Albania and Serbia and gathered together a resource base information on different risks and hazards threatening culture heritage in the region, in a website (balkancare.net). In addition, a quick reference brochure was produced (available in all regional languages), on how to prepare heritage sites and collections in case of emergencies.

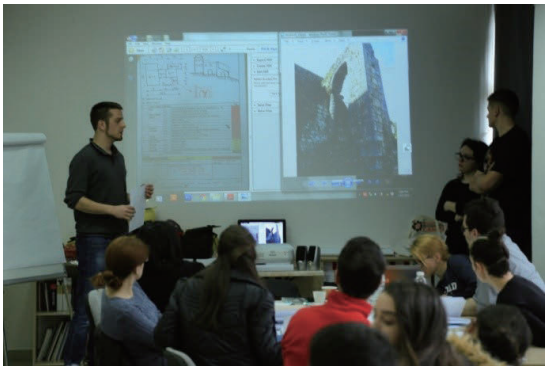

Fig.2 1st B-CARE training in Gjirokastra (Albania)

Fig.3 2nd B-CARE training, Prishtina week (Kosovo)

The 2nd phase of the B+CARE program aimed to build on the current efforts on risk preparedness and disaster response with a cross border project implemented by all three CHwB offices in the region (Albania, Bosnia and Herzegovina and Kosovo) (figure 3). This project was divided into three concrete country-based interventions within a common 3-week training running in all three countries (one week in each country). Through this training, 28 heritage students and junior professionalscoming from the Western Balkans, Eastern Europe and the Middle East were introduced to disaster risk management and first aid to cultural heritage through a comprehensive training in both theory and practice that focused on museum artifacts, historic buildings and intangible heritage.The geographical origin of the participants was expanded from the first training, so as to accommodate the need for increased capacity in the first aid to cultural heritage for neighboring regions that share common challenges.

Among the most important documents consulted when designing this training were the "Disaster Risk Management of Cultural Heritage in Urban Areas" training guide developed by Ritsumeikan University, UNESCO World Heritage Centre and ICCROM, as well as the "ICCROM Programme on Disaster and Risk Management" background paper by Aparna Tandon and the personal experience of the CHwB staff members that participated in these two trainings. These guiding documents were complemented by the huge expertise brought to the training by experienced professionals from ICCROM, GEA Search and Rescue, ICOMOS-ICORP, the Egyptian Heritage Rescue Foundation and others.

B+CARE now exists as a regional platform for training, awareness raising and response for cultural heritage threatened by disaster. However, more work needs to be done, in terms of formulating strategies for response in case of disaster.

4. Utilization of Traditional Water Cisterns as Water Resource in Case of Fire, (Pilot Project in Two Historical Cities).

The idea of revitalizing the traditional system of collecting rain water and making this water available for the firefighting system started back in 2004, during the DRM training in Kyoto. Due to the limited waterresources in both Gjirokastra and Berat, people used to collect rainwater in water cisterns – dedicated rooms within their houses. Nowadays the towns' water supply networks have marginalized the cisterns. Only a few of them are still functional while the rest are either left without maintenance or transformed into living rooms serving the needs of growing families.

Gjirokastra and Berat's historic zones are vulnerable to a range of human and natural disasters. Fire is one of the hazards with the highest probability of occurrence. Within the histories of both cities, there have been many records of fires and of monuments completely destroyed by fire.

The firefighting systems in both Gjirokastra and Berat are limited and not very efficient, taking into consideration the limited water supply in both cities, the absence of fire detection devices, the street infrastructure of the historical zone that severely limits access for fire engines, as well as the close proximity of the buildings, which could lead to fire spreading quickly from building to building.

While the water supply systems in both cities are insufficient to cover the need for fire protection, the inbuilt traditional water cisterns have an enormous capacity of unused rain water. One water cistern contains from 50m^3 to 120m^3 of water inside its walls while one fire truck contains 3-9m^3 of water, 15 times less than the water cistern. Besides this, due to the specific urban landscape of both cities, less than half of the monuments can be accessed by car.

The aim of this project was to use the traditional knowledge and practices of the local people to cope with the threats and hazards facing Gjirokastra and Berat's built heritage. As such, this project intended to revitalize the historical water cisterns, as well as revitalizing intangible aspects of Gjirokastra and Berat's heritage, like the ritual of collecting rainwater and the knowledge of traditional materials and practices. In this project, the traditional water cisterns can be integratedinto the city firefighting systems by turning them into water resources in case of a fire.

In brief, the objectives of this project are:

1. Develop an integrated strategy for disaster preparedness and response in case of fire;
2. Train local staff to be prepared in case of emergency;
3. Raise awareness within the local community on how to behave in case of fire;
4. Engage a large array of social groups actively in the process of heritage protection and disaster response;
5. Conserve and restore the traditional water cisterns within the monuments and also revitalize the traditional ritual of collecting rainwater.

In Gjirokastra, CHwB-Albania staff identified possible monuments to intervene, taking into consideration different aspects:

- Coverage of all neighborhoods within the historical center;
- The importance and values of the monuments;
- The presence of functional water cisterns in the monuments;
- The possible number of surrounding monuments to be covered by the fire extinguisher system in case of fire;
- Accessibility of monuments by car;
- Water supply in the neighborhood.

A map of selected monuments was prepared, which also shows the coverage of other monuments around the selected ones. A folder with materials for each monument was prepared, including site plans of the monuments, drawings, photos and descriptions of the condition of the cistern systems.
Several meetings have been organized between the CHwB team, the owners of the selected monuments, the fire department of the city, the directorate responsible for the maintenance of the monuments and a mechanical engineer so as to decide on the best possible solution for the system to be installed and also the monuments where the systems will be installed.
Three different scale proposals were developed, starting from solutions covering one monument to solutions covering a whole neighborhood. Based on the funds available for the moment, it was decided to implement two pilot projects, one in each city, Berat and Gjirokastra. This was done in order to increase the impact of the project by extending this new approach to another important site, which faces many of the same problems as Gjirokastra, in terms of the threats to cultural heritage.
The system contains the installation of a pumping system within the cistern and its connection with a hydrant that can be used by the owner of the house where the pump is installed, as well as by the neighbours and the fire department. In case of fire, the owners can immediately react in the first crucial

Fig.4[3], 5[4], 6[5]. Installation of pumping system at Jaho monument in the Historic Center of Gjirokastra (World Heritage Site)

minutes of the fire and localize it while the fire department can connect their pipes and use the water of the cistern to completely extinguish the fire. The whole system is automatic and completely independent of electricity. The system is successfully installed and fully functional in Gjirokastra (figure4,5,6), while in Berat the works are still in progress.

Training of the local community on how to react in case of fire and how to use the system installed in the monuments will be organized by the fire departments in both cities.

5. Ways Foreword

CHwB Albania is currently working on its strategic re-orientation and will continue to build its organizational knowledge and capacities in DRM (particularly disaster preparedness and mitigation, but also response if opportunities allow).

[3] Figure 4. Testing of the fire extinguisher system installed at Jaho monument in Gjirokastra
[4] Figure 5. Hydrants installed at Jaho monument in Gjirokastra
[5] Figure 6. Generator installed to make the fire extinguisher independent of electricity

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3.3 Resilient Cultural Heritage at the World Bank – Learning from the Japanese Expertise – 2017

Barbara Minguez Garcia
Disaster Risk Management and Cultural Heritage Specialist, World Bank, Spain

After my participation in the ITC 2016 , I finished my case study report with the following sentence: Hopefully, the end of this article is just the beginning of future projects. I had just mentioned an initiative that it was starting to take shape; at that time it was just an idea, an intention from the World Bank Disaster Risk Management (DRM) Hub in Tokyo, to engage Japanese experts to capture key solutions for resilient cultural heritage to be shared with World Bank clients and teams. One year later, that intention has already become a whole technical assistance project including several activities, some completed and some still ongoing. And it is being possible thanks to the support of the R-DMUCH team.

For me, and I guess also for many other ITC former participants, becoming part of the international network of DRM of Cultural Heritage practitioners has been a key to open professional opportunities based in collaborations with other colleagues worldwide. Here my experience.

1. Engaging Japanese expertise – the DRM Hub, Tokyo (GFDRR)

The World Bank has significant resources and a professional network in the area of DRM. For instance, the Global Facility for Disaster Reduction and Recovery (GFDRR) is a global partnership that helps developing countries better understand and reduce their vulnerabilities to natural hazards and adapt to climate change. In the area of Cultural Heritage, the World Bank is cooperating closely with governments and financing a number of initiatives. However, there is still opportunity to further mainstream cultural heritage in the DRM agenda of developing countries.

From 2014, and inspired by the Great East Japan Earthquake and Tsunami in 2011, the Japanese Ministry of Finance and the World Bank established the "Japan-World Bank Program for Mainstreaming DRM in Developing Countries. " It is administrated by GFDRR through the DRM Hub in Tokyo. Among their technical assistance projects, and inspired by the ITC, the DRM Hub team decided to develop a knowledge program on Resilient Cultural Heritage and Sustainable Tourism, aiming to share Japanese and international expertise on DRM for Cultural Heritage with World Bank clients and teams.

The Resilient Cultural Heritage program includes three components:

1. Development of Knowledge Products: aiming to serve teams currently working on the topic and at the same time mainstreaming resilient cultural heritage within the World Bank.
2. Technical Deep Dive (TDD): one-week learning program in Japan for World Bank clients and staff including lectures, site visits and work on specific action plans for the teams.
3. Operational Support to specific World Bank projects: covering specific needs within the topic of DRM for Cultural Heritage, requested by World Bank teams.

This program is possible thanks to key partnerships and collaborations with Japanese institutions such as the Institute of Disaster Mitigation for Urban Cultural Heritage at Ritsumeikan University (R-DMUCH), the Agency for Cultural Affairs (ACA) Government of Japan, Hyogo Prefecture, Kyoto Prefecture and Kyoto City, among others.

2. Creating awareness through a practical approach – the Resilient Cultural Heritage TDD

The mentioned component 2, the Technical Deep Dive (TDD), was a learning event held in Tokyo and Kyoto, from April 10 to 14, 2017, organized in collaboration with the World Bank Tokyo Development Learning Center (TDLC), UNESCO, and R-DMUCH, among others. During that week, multi-disciplinary teams from nine countries and several organizations shared experiences and learnt from experts, practical Japanese examples, and site visits in Kyoto (Fig.1), about how to protect their cultural heritage in the face of disasters, and create resilience in their sites.

Fig.1 Visit to Kiyomizu-dera area in Kyoto, Japan.

The TDD was structured around six main themes, illustrated by Japan's good practices:

i) Fundamentals of disaster risk management for cultural heritage;
ii) Management of cultural heritage sites: from preparedness to post-disaster recovery;
iii) Addressing earthquakes and related secondary hazards over traditional buildings;
iv) Addressing hydro-meteorological hazards, including storms and flooding;
v) Engaging Communities to preserve cultural heritage;
vi) Connecting to Tourism: promotion and protection of heritage.

The nine countries participating (Albania, Bhutan, China, Myanmar, Nepal, Philippines, Saudi Arabia, Tanzania, and Uzbekistan) were represented by teams comprised of one World Bank staff and one or two government officials from the country. Among the professional profiles, there were urban specialists (21%), national (25%) and subnational (18%) cultural heritage officials, local government leaders (18%), and DRM specialists (18%). Together, the projects from these teams represented more than US$700 million in

government-led investment, supported by the World Bank. And just like in Japan, their cultural heritage is very much threatened by natural hazards.

Fig.2 A moment during the TDD at the World Bank Office in Tokyo.

Each participant team delivered an initial presentation about their country's institutional situation regarding DRM and Cultural Heritage, and the main cultural assets included in their investment projects along with the hazards threatening them. During the week they focused identifying their main challenges and potential solutions based in the learning from Japan. The last day, each team presented an action plan to implement the lessons learned in their ongoing projects, which was discussed together with a panel of experts and the rest of participants (Fig. 3 and 4).

Despite being very different countries and projects, participants identified common challenges and approaches required, such as the lack of funding to invest in heritage, limited technical expertise, especially regarding restoration of heritage and maintenance, lack of regulatory framework and governance, and difficulty in engaging communities, creating awareness, and ensuring collaboration between stakeholders from different sectors.

Fig.3 Team working session during the TDD.

Fig.4 Participants presenting their Action Plans during the last day.

As previously noted, the TDD was based in a strong collaboration between different institutions and specialists. In addition to the already mentioned, the TDD counted also with the participation of Toyama City (Rockefeller Foundation - 100 Resilient Cities), and the United Nations World Tourism Organization (UNWTO) Regional Support Office for Asia and the Pacific (RSOAP).

3. Moving forward – Further knowledge development and operational support

The other two components of the Resilient Cultural Heritage program are currently under implementation. Some of the TDD participant teams requested further support on specific needs for their projects. For instance, Bhutan is organizing a workshop for this year 2018, and Myanmar is developing a DRM plan for Bagan Archaeological site, both with support from DRM Hub/R-DMUCH; also, Albania requested explicit information regarding landslide stabilization systems from Japan, while Uzbekistan requested support to implement resilient tourism projects.

Regarding the knowledge development component, some materials are currently under preparation. On September 16, 2017, the DRM Hub in Tokyo and R-DMUCH organized a Kick-Off Workshop for the Knowledge Program on Resilient Cultural Heritage and Tourism at Ritsumeikan University, Kyoto. It counted with the participation of experts from the World Bank, JICA, ACA, Hyogo and Kyoto Prefectures, ICCROM, UNESCO, and the Universities of Loughborough, Tsukuba, and Yokohama City, as well as participants from the ITC 2017 (Fig. 5).

Fig.5 Participants at the Kick-Off Workshop for the Resilient Cultural Heritage Knowledge Program.

The objective of the upcoming knowledge note is to provide guidance and operational insights to World Bank teams and clients, by explaining the state of the art, experience, and practices on specific topics of DRM for cultural heritage, highlighting the Japanese expertise. Specifically, the planned content focuses

around three main points: i) key elements of Japan's framework for DRM and Cultural Heritage, taking into account the legal framework and analyzing the relevant institutions at national, regional and local levels; ii) overall structure of DRM-Cultural Heritage Site Management in Japan, and specific cases of good practices in DRM related to cultural heritage sites, analyzing different Japanese examples of risk management for specific primary and secondary hazards at cultural heritage sites; and iii) key role of communities in the process of establishing systems for DRM in cultural heritage sites, providing an overview of different local communities in Japan, and examples to effectively engage and empower them to reinforce the protection of their cultural heritage sites from disaster risk.

4. Looking to the future

Once again, I am finishing my article looking to new opportunities. The Resilient Cultural Heritage Program, the first on this topic at the World Bank, is being a start point for many other initiatives. For instance, a session developed in collaboration with UNESCO on Cultural Heritage - an Engine for Social Recovery, was delivered in the 3rd World Reconstruction Conference (WRC3) co-organized by GFDRR, UNDP, EU, and ACP, in Brussels, Belgium, on June 6-8, 2017. Likewise, a session on Cultural Heritage is being planned for the upcoming Understand Risk Forum 2018 to take place in May 2018 in Mexico.

In the same line, the partnership of World Bank-UNESCO is strenghtening through the signature of the MOU last July 2017, reflected in an upcoming publication on city reconstruction post-conflict/disaster with culture as core. Also, a module on Cultural Heritage is under preparation for the second edition of the City Strength Diagnostic, and this topic is also being considered for the GFDRR Recovery Hub.

To summarize the main idea from my experience, collaboration is the key to move initiatives and develop projects on such challenging topic as DRM of Cultural Heritage. Every step counts and contributes to create awareness on the importance of linking Cultural Heritage and DRM. In my case, the resources and contacts gained during the ITC are fundamental to keep moving forward this agenda in other contexts such as at the World Bank.

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[Photos: Barbara Minguez Garcia]

4 Report of the International Symposium "Working Internationally toward the Integrated Protection of Cultural Heritage from Disasters"

4.1 Background and Objectives

Since the establishment of its UNESCO Chair in 2006, the Institute of Disaster Mitigation for Urban Cultural Heritage at Ritsumeikan University (R-DMUCH) has annually conducted an International Training Course (ITC) as part of its UNESCO Chair Program on Cultural Heritage and Risk Management. This year, the National Institutes for Cultural Heritage (NICH), which oversees the National Task Force for the Japanese Cultural Heritage Disaster Risk Mitigation Network (CH-DRM Net), has collaborated in the organization of the 2017 ITC—dealing comprehensively with integrated disaster risk management for movable and immovable cultural heritage—as well as an international symposium.

In this symposium, experts from international organizations such as UNESCO, ICCROM and ICOM, and World Bank will join with Japanese specialists from various domestic institutions to discuss past and current activities and to consider future initiatives to protect cultural heritage from disaster.

4.2 Programme

13:00 – 13:20 Opening Remarks

Kozo WATANABE (Vice President, Ritsumeikan University)

Johei SASAKI (Executive Director, Kyoto National Museum)

13:20 – 13:50 Key Note Speech

Rohit JIGYASU (Professor, R-DMUCH)

13:50 – 14:35 Final Presentation Report by ITC 2017 Participants

14:35 – 15:00 World Bank DRM Hub Tokyo Knowledge Program on Resilient Cultural Heritage and Tourism in Collaboration with Institute of Disaster Mitigation for Urban Cultural Heritage

James NEWMAN (Disaster Risk Management Specialist, Disaster Risk Management Hub, Tokyo, Global Facility for Disaster Reduction and Recovery, World Bank)

15:15 – 16:45 Panel Discussion

Moderator: Joseph KING (Director of the Sites Unit, ICCROM)

A. Introduction

Elke SELTER (Expert Emergency Response, Emergency Preparedness and Response Unit, Culture Sector, UNESCO)

"Introduction of PDNA Culture and Build Back Better by UNESCO"

Elizabeth KIRBY (Grants Development Specialist, Smithsonian Institution)

"Introduction of Smithsonian and the Project of Disaster Risk Management for Cultural Heritage"

Takeyuki OKUBO (Director, R-DMUCH)

"Introduction of the Project of R-DMUCH and its Future Challenge"

Ken OKADA (Head, Promotion Office, CH-DRM Net, NICH)

"Introduction of the Cultural Heritage Rescue in 2011 Earthquake and Tsunami"

Yasumichi MURAKAMI (Councilor, Hyogo Prefecture Board of Education)

"The Experience from the Last Disasters and Heritage Manager System"

B. Discussion

Topic 1. Challenges of DRM for Cultural Heritage from Last Disasters (Response and Recovery)

Topic 2. Preventions: What We have done by Institutional Level, National Level and International Level?

Topic 3. What is the Next Challenges and the Roll of Institution and International Organization?

16:45 – 17:00 Summary and Closing Address

Kenzo TOKI (Former Director, R-DMUCH)

Opening Remarks 1: Vice President of Ritsumeikan University, Kozo WATANABE

Fig. 1 Opening Remarks by Kozo WATANABE

Welcome to Ritsumeikan University. I am Kozo WATANABE, Vice President of the university and Vice Chancellor of the Ritsumeikan Trust.

Since the establishment of its UNESCO Chair in 2006, the Institute of Disaster Mitigation for Urban Cultural Heritage at Ritsumeikan University (R-DMUCH) has annually conducted an International Training Course (ITC) as part of its UNESCO Chair Program on Cultural Heritage and Risk Management. This is the only UNESCO Chair in the world of which theme is disaster mitigation for cultural heritage. Therefore we believe that this training course is one of the world's best program in this field.

This year, we invited 25 government officers and researchers who are engaged and specialized in heritage preservation or disaster mitigation from Japan and overseas. The 20 days they spent together are not so long, however, I think it was a valuable opportunity for all the participants, since they could have an experience of formulating disaster risk management plans which respect to values of the cultural heritage and historic city in local context of their own country. I am sincerely grateful to all who gave very valuable lectures.

As a new challenge from this year, the National Institutes for Cultural Heritage (NICH), which oversees the National Task Force for the Japanese Cultural Heritage Disaster Risk Mitigation Network (CH-DRM Net), has joined and collaborated in the organization of this international training course, dealing comprehensively with integrated disaster risk management for movable and immovable cultural heritage. I, as an anthropologist, share this important idea to focus both on movable and immovable cultural heritage. Mr. Sasaki, Executive Director of the Kyoto National Museum will give a speech later, and we also invite a panel from NICH for the panel discussion.

In this international symposium, some of the ITC2017 participants will give presentations on their disaster mitigation plans as outcomes of the training. I am very much looking forward to it. Then in the panel discussion, panels including international experts who gave lectures during the course will discuss past and current activities and to consider future initiatives to protect cultural heritage from disaster.

116 trainees, who participated in this ITC in previous years from every corner of the world, brought back the knowledge and experiences they gained through ITC and now they are actively working as leaders in the field of disaster mitigation for cultural heritage. Ritsumeikan sets a mid-term plan which aims to be a global research university. This is one of the reasons why I am very proud of their success.

It is thanks to everyone who has been supporting this training course that we can hold this symposium today. In addition, on behalf of Ritsumeikan University, I would like to express our sincere gratitude to the support of NICH which enabled us to enhance the training course.

At last, I hope this symposium would be productive for all of you. Thank you for your kind attention.

In memoriam: Kozo WATANABE, the eminent professor and a vice president of Ritsumeikan University passed away on December 16th, 2017. We express our deepest sympathy and respect to his memory.

Opening Remarks 2: Executive Director of Kyoto National Museum, Jōhei SASAKI

I am SASAKI from the National Institutes for Cultural Heritage (NICH), Executive Director of Kyoto National Museum. I would like to give a brief speech as opening remarks of this symposium.

Fig. 2 Opening Remarks by Johei SASAKI

First, I would like to express my sincere respect for the efforts of R-DMUCH, which has been authorized as a UNESCO chair, for continuing this International Training Course on Disaster Risk Management for Cultural Heritage.

Issues and research related to risk management and disaster mitigation have been addressed and conducted on immovable heritage. This year, I am very pleased that we can have the opportunity to discuss issues on disaster mitigation of cultural heritage from a comprehensive perspective, as we NICH, which manages CH-DRM Network focusing on movable cultural properties, joined this program as a co-organizer.

Now cultural heritage is facing various disasters, such as earthquakes, tsunamis, and flood damage and landslide disasters by heavy rainfall, and these are coming one after another.

How we can protect cultural heritage from diversifying disasters? In what kind of risk management process can damage be minimized? By gathering knowledge and information from each country and discussing with each other based on our own experiences, we can accumulate know-how required to solve those issues regarding disaster risk management.

Cultural heritage objects have a long history, thereby they are very vulnerable without exception. Accordingly we have to understand that cultural heritage is always facing risks. This is the reason why disaster mitigation and risk management play very important role in the preservation and inheritance of heritage.

I look forward to participants' presentations as outcomes of this 20-day intensive course. I also hope that this international symposium can suggest an important guideline for the future of disaster mitigation for cultural heritage.

Thank you very much for your kind attention.

Key Note Speech: Professor of Ritsumeikan University, Rohit JIGYASU

Lessons Learnt from Current Disasters

- **Movable / Immovable Heritage**

We have witnessed many disasters around the world during recent years, such as Myanmar earthquake and the Central Italy earthquake in 2016, and the series of earthquakes in Nepal, 2015. From these disasters, we understand that we are always facing disaster risks, and that cultural heritage also can be victim of these disasters besides lives and livelihoods.

Although many heritage buildings and sites were damaged by these earthquakes, we also have to pay enough attention to museums. In the case of national museums in Kathmandu, the storage area and items stored inside were extensively damaged. It was very difficult to take those objects out, because the building itself was badly damaged. From this case, we can learn how it is important to consider both movable and immovable heritage.

- **Climate Change in Relation to Historic Cities**

Today we all know that the number of disasters caused by climate change is increasing. Floods, Typhoons and hurricanes are the examples to illustrate this. Flooding in the Balkans hit historical urban areas in Croatia and Serbia. We have to be concerned about disaster risks to historic cities since they are very vulnerable to floods and other hydro-meteorological events. In fact, climate change is a very irregular and uncertain phenomenon. For example, flash floods, which hit Himalayan region in 2013 causing widespread damage to cultural heritage were caused not only by a large amount of rainfall but also by the melting of glaciers. In addition, unregulated development along the river flood plains was also one of the vulnerability factors.

Fig. 3 Key Note Speech by Jigyasu ROHIT

Another case of cloudburst in Leh region of Himalayas shows that vernacular constructions are sometimes unable to adapt and adjust to the changes in climate, because heritage has as evolved as per local climate characteristics. Traditional buildings in desert area are not resistant to heavy rains. Statistics show that climate change is already happening and the situation is becoming worse by day, which implies that cultural heritage is also becoming more vulnerable, necessitating the development of adaptation techniques.

- **Economic Impact**

Another issue which we should pay attention to is the economic impact of disasters. Economic loss due to disasters is increasing many folds, especially in urban areas. With regards to cultural heritage, we should focus not only on protection because of symbolism or identity attached to heritage, but also on the economic values associated with heritage through tourism revenues as well as livelihoods of communities dependent on heritage. Therefore it is very important to consider economic benefits of cultural heritage.

- **Urbanization**

Urbanization is also a phenomenon that we can see everywhere in the world. Everyone knows that more people live in urban areas than in rural areas. However, the pace of urbanization is considerably rapid beyond our expectation, and this is happening remarkably in some cities of developing countries. The point here is that many cultural heritage sites are located in urban areas. Therefore urbanization would increase the vulnerability of heritage as in the case of Kyoto or Mumbai or Kathmandu.

- **Human Induced Disasters**

In addition to natural disasters, human induced disasters are becoming more urgent concerns. A site in Mosul, Iraq, which one of our previous participants had selected and worked on for his case study project collapsed due to bombing. Unfortunately, the worst-case scenario that he had prepared for his case study (Alaa HAMDON, ITC 2014) was indeed realized. In yet another case in Syria, a world heritage site was bombed and got totally destroyed. A world heritage site in Mali was also damaged due to internal conflict, but fortunately, restoration work has been done with support from UNESCO. From these events, we understand that human induced disasters such as conflicts are also issues we need to address through disaster risk management.

How to Manage Disaster Risks for Cultural Heritage and Museums

- **Multiple Hazards**

Through our international training course, we have advocated comprehensive multi-hazard framework to manage increasing disaster risks to cultural heritage sites and museums. We can no longer understand and response to earthquakes, floods, and fires separately. Moreover, human lives, social and cultural impacts and livelihoods should be considered together. In other words, we have to adopt a holistic view towards disasters.

From the experience of disasters in Japan, we can easily imagine that earthquake should be considered in relation to fire. In the Great East Japan Earthquake in 2011, tsunamis caused by the earthquake led to the nuclear power plant accident. We learned a very important lesson that one disaster would bring about secondary disasters.

- **Complex Vulnerability**

We should look not only at physical aspects but also at social and economic aspects of vulnerability. We have to be reminded that vulnerability is a factor that creates environment due to which disasters are likely to happen. Therefore disaster risk management should aim at reducing vulnerabilities.

- **Disaster Risks and Impact**

When we think about disaster risks, we also have to think who are exposed to various risks. Many cultural heritage sites are not just places where people are coming, but are also places where people live. Therefore it is important to know who are exposed to the risks, what aspects of the site are exposed and the reason for exposure.

Of course, we also need to consider risks to cultural heritage comprehensively by taking account into potential impact on people's safety, economy, daily lives and social structures. I believe that cultural heritage should be the mainstreamed into disaster risk management. We cannot expect effective disaster risk management for cultural heritage if it is considered in an exclusive manner.

- **Disaster Risk Management (DRM) Cycle**

Ideas mentioned so far leads to the concept of Disaster Risk Management (DRM) cycle for cultural heritage. This is what we have been developing and revising for years, and in fact this is the basic concept of our international training course. This cycle consists of three phases; 1. Before, 2. During and 3. After disaster and each of these phases corresponds to the following steps; 1. Prevention and Preparedness, 2. Response and 3. Recovery and Rehabilitation.

Various aspects should be considered when we think about each of those phases. It starts from risk assessment from a comprehensive perspective, then moves on to risk prevention and mitigation measures, and facilities and equipment suitable for emergency response at the cultural heritage site that can be effective in reducing disaster risks. Meanwhile they should very sensitive to the special characteristics of the place and not spoil values of cultural heritage. We have to investigate how to design them, what kind of equipment to install, how to secure the access to evacuation routes, how to organize an emergency response team within the cultural heritage site or museum, how to carry out emergency drills and so on.

At the earliest stage of disaster emergency, lifesaving must be the first priority. However, after human lives have been saved we have to start rescuing damaged cultural heritage with careful consideration about the process with minimal impact on the values. Damage assessment and emergency protection measures should be undertaken in the intermediate phase. During the following recovery phase, more detailed damage assessment is required for restoration and repair works. After that, recovery and rehabilitation takes place.

This is an essential idea that we should keep in our mind when we implement disaster risk management

for cultural heritage. It is also the philosophy of our training programme. What is important is that we do not wish to return to the same situation as before the disaster. Rather we must achieve better preparedness for the next disaster. This is exactly what the phrase 'Build Back Better' means and it also should be applied for disaster management of cultural heritage for reducing vulnerability while retaining the heritage values to the best possible extent.

International Training Course on Disaster Risk Management of Cultural Heritage

- **Objectives**

What I have been taking about so far is the background of the international training course that we have been conducting over last 12 years. The objective of this course is to provide interdisciplinary training for professionals from both disaster management and cultural heritage fields. This training covers comprehensive risk assessment and integrated risk management for cultural heritage. As the idea of DRM cycle shows, through this course participants learn what is to be done at each phase; before, during and after disasters.

In addition, we emphasize that it is very important to formulate disaster risk management plan that corresponds to the local context. Japan is a leader in this field, and we can see a lot of good examples which demonstrate respect for local characteristics in urban planning, disaster mitigation plan, and institutional systems for disaster risk management of cultural heritage. During the course, the participants learn the methodology as well as more practical skills.

- **ITC Family as a Scientific Network**

The greatest achievement of this training course is establishment of an international scientific network. The network developed through this course, we call 'ITC family,' is very powerful and becoming larger every year. The experts take advantage this network and constitute their scientific exchanges at global, regional and local levels in various contexts.

The target group of this course is not only people from cultural heritage field. This is also an important basic idea of this course that we aim to make them cooperate and work together with professionals from disaster risk management. It is not easy in practice, because they have different knowledge and skills, and use deferent vocabularies. Therefore, in order to achieve disaster mitigation for cultural heritage, they need to learn how to communicate and learn from each other.

Based on this concept, we select almost the same number of experts from both sides every year; half from cultural heritage and the other from disaster risk management. At the end of the course, we find that they understand and communicate with each other very comfortably. I believe that this is the best way to move forward for disaster mitigation of cultural heritage.

- **Course Contents**

Here I would like to introduce how this training course is organized. Participants learn development process of disaster risk management plan of cultural heritage. Basic terminologies, theoretical frameworks and methodology is introduced. Of course, we think that it is very important to learn from Japan's rich experience in this area. This year, we visited Kobe and Kumano, and we had lectures and site visits there which cover both aspects of cultural heritage and disaster management.

Additionally, we conducted exercises and workshops on disaster risk management planning based on these site visits. Case study project is very important component of this programme. As part of the case study projects, participants prepare outline of disaster risk management plan for the cultural heritage site or museum which they selected from their own country. They formulated the plan based on related data they collected and mentoring by the lecturers. After this training course, they will bring it back to their own country.

During the course lecturers from Japan and overseas, who have excellent skills, knowledge and experiences, provided meaningful and useful lectures. Each of them is a specialist in a specific field,

such as landslide and earthquake mitigation. We also had lectures based on practical experiences, from lecturers who were personally involved in disaster emergency response in Nepal and who have been working for international organizations such as UNESCO and ICCROM. Participants were able to acquire much knowledge through these lectures

Moreover, we strategically focus on having interactive workshops. Participants of this training course are not students, but resource persons themselves. They have knowledge and skills to be shared. That is why it is important for them to communicate each other for better understanding of ideas and concepts in this area. In other words, this course should be participatory programme rather than series of lectures just to be listened.

I would like to introduce an interesting role-playing workshop we carried out during the course. The given situation is as follows. A construction business owner who is in charge of recovery is planning to make a lot of money. Other stake holders are also engaged in the process of decision making. In such competing situation, how can we give space for heritage? We tried to introduce the participants to the realistic situation in which they are supposed to come up with various options for possible solutions.

We also conducted many exercises simulating emergency situation where we need to rescue damaged cultural heritage. We do not sit in the room and face to a computer if such situation actually happens. So in fact, we went out and did exercises by our hand.

I was very happy that we could have those exercises this year for the first time with support from Kyoto National Museum. Through these exercises, we could learn new skills which were actually useful and practical for disaster mitigation for cultural heritage.

Another good experience was onsite demonstration on the design and usage of fire hydrants in a historic district in Kyoto. We also could learn how local community get involved and cooperate for disaster mitigation work. In Ponto-cho, another historic district, we could directly listen to the community leader how the local people behaved when a fire occurred.

We also visited Kumano area famous for its World Heritage Site "Sacred Sites and Pilgrimage Routes in the Kii Mountain Range" and learned about landslide disaster, especially focusing on acceptable interventions for mitigating disasters. Participants were very open-minded and had very active discussions on various issues such as decision-making methods which consider values of cultural heritage, costs and sustainable intervention.

This is indeed a very intensive training course and we encourage participants to work hard especially for preparing outline of disaster risk management plan for their selected sites. On the last day, they gave a presentation on their own DRM plan.

Participants developed proposals for pilot projects in their own countries after returning from the course. This course is not something that ends up here, but this course is indeed the starting point. Previous participants continue their efforts by carrying out their efforts for disaster risk management of cultural heritage in their countries.

I have been talking much about our training course so far, but I think the most important aspect of this course is that we experienced and enjoyed fantastic and beautiful Japanese culture together throughout the three weeks as a result of which we have made strong social bonding between the participants and resource persons. With this social bounding, they can cooperate and support each other when disaster happens. In fact, former participants have been cooperating

Fig. 4 Pictures of ITC 2017 Participants by Rohit JIGYASU

in many occasions. Thus, we regard development of social relations as a very important part of this programme.

- **ITC Participants**

I would like to show you the statistics from past 12 years. 127 people from 56 countries participated this training course and the ITC family definitely became a large network over the years with participants from all the continents.

For the first year, we received only 8 applications in Asia and all of them were selected for participation. This year, we got 235 applications and 11 out of them were selected. It was highly competitive process by which we could have applications not only from cultural heritage sector, but also from other sectors such as civic society groups, national and local government representaties from development and disaster risk management fields.

During the formative years, applications for the course were received from very few countries, but we have been making efforts to encourage people from various regions to apply although the number of people who can be selected is small.

- **This Year's Theme**

"Integrated Protection of Immovable and Movable Cultural Heritage from Disasters"

This year, we have 11 participants from 11 countries and 2 observers as well. As I mentioned earlier, this year we focused on integrated protection of movable and immovable cultural heritage. This is an important area on which we have made little progress so far. Although museums around the world have been making efforts, it was just within the scope of their own sphere limited only to the field of movable cultural properties. However, once a disaster occurs, it does not matter, whether it is movable or immovable heritage. People involved in each field must take actions by considering both movable as well as immovable components of heritage. So, we need to think about the linkage between them.

Here I would like to introduce an actual example showing the importance of considering movable and immovable heritage in an integrated manner. When a big earthquake struck Nepal, a very important museum in Kathmandu was suffered. At that time, there was a big challenge. Engineers were thinking only about buildings, while curators responsible for the museum were thinking only about the collections. In fact, the museum had very important collection belong to the first Nepalese dynasty, and in salvaging collections from the historic palace building, they were confronting challenges, where and how those items were located, how they can access to the items and how they handled and rescued the objects. Due to many challenges encountered in this process, it became clear how cooperation between building experts and museum experts was important. At the same time, it became clear how important it was to share necessary strategies beforehand, in case such a situation occurs.

Let me introduce another case in Nepal after the earthquake. It is not a monument, it is an ordinary traditional residence, which is important for the people living there. (Fig. 5) Especially the windows are a very important part of their identity. Therefore, even though the house itself was to be rebuilt because of damages caused by the earthquake, they used the same windows attached to the previous house for the reconstructed new house. In this

Fig. 5 A Picture of Heritage Residence on Kathmandu by Rohit JIGYASU

case, when it is attached to a building, it is a part of immovable heritage, while in the process of removing and reattaching, it can be movable heritage. However, we do not actually divide this by movable or immovable. This also shows the importance of thinking about movable and immovable heritage in an integrated way, and this is indeed what we are supposed to take up in our training programme.

- **Follow-up Activities**

I would like to talk about the follow-up activities of ITC that we have carried out during past few years. Some of former participants brought back the knowledge gained through the training here and actually conducted training programs in a leadership position in their own country. This initiatives has been totally led by the former participants. Although we cannot give them financial support, we extended all possible technical support to them. Therefore we cooperated and worked together by teaching at the follow up course held in different countries. In this way, by continuing to support activities after the training, it is possible to further disseminate the knowledge.
In terms of dissemination, we have published some material based on training programs such as trainers' guide. We also publish annual reports and proceedings based on disaster risk management plan for case study projects which participant develop each year. In this way, we disseminate the knowledge accumulated in this training for the future.

- **Achievements**

In the end, I would like to summarize what we have managed to accomplish. First of all, we were able to create a powerful global network of experts involved in academic exchange and support to protect cultural heritage from disasters. The ITC alumni have built initiatives through trainings, awareness workshops and projects in their own regions and countries. In addition, we have developed case study project as a learning tool aiming at wider dissemination. Finally, with the support of international organizations such as UNESCO and ICCROM, we have promoted the mainstreaming of cultural heritage in broader disaster risk management through exchanges between participants in the fields of cultural heritage and disaster risk management. In the "Sendai Framework" on disaster risk management adopted in March 2015, we can see that disaster mitigation of cultural heritage is now understood as an important sector, which supports our efforts in this area.

- **Our Missions**

Although we have been doing many things, there are still many challenges to be solved.
Disaster risk management of movable and immovable heritage is the theme that we considered this year for the first time, but in addition to this, I would like to add consideration for intangible cultural heritage. We have just started exploring this area.
Likewise, cultural heritage and natural heritage are also areas where cooperation is necessary. We cannot think of culture and nature separately. In fact, international initiatives are trying to handle them all in an integrated way, and we need to link these with disaster risk management.
Furthermore, in cooperation with private military organizations and humanitarian support organizations, we should concentrate on connecting post-disaster response and recovery of cultural heritage with disaster risk reduction. We cannot overlook the complexity of disasters and therefore should consider not only natural disasters but also human induced disasters such as conflicts and terrorism. Under such circumstances, we are required to strengthen scientific network of professionals for further cooperation to advance the cause of disaster risk management of cultural heritage. We also believe it is very important to establish a certification system for experts of disaster risk management of cultural heritage at national and international levels. When people complete such training, they must get advantage when they look for jobs by arming them with practical skillsets during the course.
Our mission is still going on. I would like to expand the ITC family, not only by involving more resource persons, but also by adding new issues that we confront these days. Thank you for listening.

Final Presentation Report by ITC 2017 Participants

Three representative participants made a presentation of each disaster risk management plan and pilot project which has been studied through the ITC 2017. The contents of each presentation are described in chapter 2. "Outline of Disaster Risk Management Plans for Case Study Projects by ITC2017 Participants"

Fig. 6 Khin Aye YEE (Myanmar, Chapter 2.11)

Fig. 7 Innocent Hudson MANKHWALA (Malawi, Chapter 2.5)

Fig. 8 Abner Omaging LAWANGEN (Philippines, Chapter 2.2)

Engaging Japanese and Global Expertise for Resilient Cultural Heritage through Development Finance

James NEWMAN
Disaster Risk Management (DRM) Specialist , Coordinator, World Bank DRM Hub, Tokyo
Global Facility for Disaster Reduction and Recovery (GFDRR)

Thank you very much to Ritsumeikan University and the organizers for asking me to speak today and special thanks to the excellent presenters from Myanmar, Malawi and Philippines. For Myanmar, I am personally delighted to see the presentation of Ms. Khin Aye YEE (ITC 2017), my colleague at the World Bank, who is working to engage DRM and cultural heritage in our work around the world.

My name is Jay Newman, coordinator of the World Bank's Tokyo DRM Hub. At the DRM Hub, we help developing countries integrate DRM into their development planning and investments and connect Japanese and global expertise to their projects. I am also very lucky to lead a knowledge program on Resilient Cultural Heritage, focusing on capturing Japan's experience in this area.

I'd like to leave you with three key messages here today:

1. **Importance of Integrating DRM and Cultural Heritage**: The work that you, as students of the ITC 2017, have completed here at Ritsumeikan University and that you, as practitioners of resilient cultural heritage around the world, are doing in your professional capacities is critical. These important skills are safeguarding essential treasures and traditions against the ever-present risks,

and I am delighted to see the depth and reach of this program. In fact, as Dr. Jigyasu pointed out, the Sendai Framework explicitly notes the need to protect cultural heritage, and the ITC is an important contribution to this agenda.

2. **Disaster Risks are Growing and put more Cultural Heritage at Risk**: It is the point that Dr. Jigyasu mentioned earlier, but I would like to emphasize again. Every year, 26 million people are pushed into extreme poverty by disaster and climate risk[1]. Moreover, due to the impact of climate change, it is expected that this number will increase to 100 million by 2030. The effects are growing, as climate change exacerbates hazards and urbanization and economic development put more people and assets in harm's way. For the same reasons, cultural heritage remains very much at risk.
3. **Connecting Expertise to Development Finance Can Make the Difference**: Finally, connecting expertise, good practice, training and capacity building to development finance can be catalyst to greater resilience of cultural heritage sites. Without financial support, through government, development partners, and the private sector, the plans and efforts we make will likely not have the scale of impact we seek.

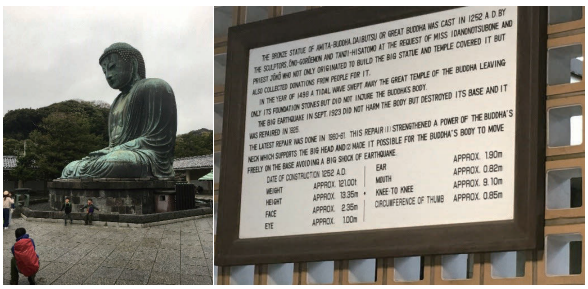
Fig. 9 A Presentation of James NEWMAN

World Bank's Support for Mainstreaming DRM: For the World Bank and GFDRR, DRM has proven a critical aspect of sustainable development. You can see this in the World Bank's work to support developing countries with risk identification, resilient infrastructure, preparedness, financial protection, among many other areas. In fact, the World Bank invests nearly US$5 billion dollars per year, a dramatic increase over the last several years.

How to integrate DRM and Cultural Heritage in Development Projects: Protecting cultural heritage from disaster and other risks is part of this effort, and should be considered in an integrated manner. There are many ways that development support can make this happen. In some project contexts, it is about building capacity in disaster management agencies to take on the unique challenge of cultural heritage sites, so they can respond and protect these sites and engage the local management teams in their emergency response mission. In other cases, there is work to be done to retrofit cultural heritage buildings from seismic risk and encourage authorities to invest in flood risk management and slope stabilization – ensuring that the cultural heritage's integrity.

Japan's Unique Place in this Expertise:

In connecting DRM and cultural herita ge efforts, Japan stands at the forefront. Japan's culture of preparedness – from business continuity plans to recovery planning – is also on display at cultural heritage sites around the country. There is a large seated Buddha Daibutsu near the sea in Kamakura. It was constructed in 1252, faced a tsunami in 1498,



[1] Hallegatte, Stephane; Vogt-Schilb, Adrien; Bangalore, Mook; Rozenberg, Julie. 2017. Unbreakable : Building the Resilience of the Poor in the Face of Natural Disasters. Climate Change and Development;. Washington, DC: World Bank. © World Bank. https://openknowledge.worldbank.org/handle/10986/25335 License: CC BY 3.0 IGO.

has been shaken by numerous earthquakes, and still stands there to this day. What is incredible is that this site's managers actually featured a point-by-point description of exactly how they had rehabilitated the Daibutsu over the years, showing how they separated the neck from the base of the body in order to allow a seismic isolation. This is incredible documentation that shows the value that Japan has in this area.

World Bank Resilient Cultural Heritage Technical Deep Dive: It is for this reason that we held a Technical Deep Dive (TDD) on Resilient Cultural Heritage and Tourism[2] in Japan in April 2017. Nine teams of World Bank clients and staff – representing US$700 million in World Bank-supported projects in Albania, Bhutan, China, Myanmar, Nepal, Philippines, Saudi Arabia, Tanzania and Uzbekistan - learned from Japanese and international experts about innovative techniques and approaches to protect their cultural heritage from natural hazards. These countries together have 85 world heritage sites, 193 in the tentative list, over 275 world-renowned sites, but are very much in the face of disaster. In total, they have 11 million people exposed to flooding every year on average, and 1.5 million people expected to be in a 6.0 earthquake or higher in a given year.

The TDD allowed us to bring clients, teams, and experts from different perspectives. In our case, it was urban specialists, local government leaders and officials, national cultural heritage officials and DRM specialist. By bringing together this mix, they are able to work together to seek the technical, policy, and funding solutions needed to protect irreplaceable cultural heritage. Japan's Agency for Cultural Affairs (ACA), UNESCO, R-DMUCH, Kyoto prefecture, Kyoto city and Hyogo prefecture were critical experts contributing to these countries' search for solutions.

The Success and Promise of the ITC Network: Before today's symposium, I was pleased to participate in the wrap-up session of the ITC participants' action planning. This culminated from your research and hard work over the last few weeks. I look forward to see how you are able to connect DRM and CH disciplines, apply DRM practices in new ways to your work, and engage a creative mix of financing solutions to ensure the resilience of cultural heritage in your work. Since I am pleased to call many ITC alumni my World Bank colleagues, as well as clients, I know the potential that you all have and look forward to working with many of you on this for years to come.

Panel Discussion

Moderator: Joseph KING (Director of the Sites Unit, ICCROM)

Joseph KING:

Thank you for Joining us for this second half of this important symposium on working internationally to integrated protection of cultural heritage from disasters. This is a very important theme, and ICCROM is very proud to be partner in this program. ITC is very important and ICCROM would expresses its gratitude to Ritsumeikan University, Institute of Disaster Mitigation for Urban Cultural Heritage (R-DMUCH), which established this course and have been carrying it out for past twelve years. I would like to thank Professor Takeyuki Okubo who is the director of the institute and would especially thank Professor Kenzo Toki, who is the guiding spirit of everything what we do, and we have done last twelve years. ICCROM as an institution is grateful to Professor Toki, and I as a professional and a person am very grateful to Professor Toki for his contribution. In addition, for this particular addition of the course, we formed a knowledge partnership with National Institutes for Cultural

Fig. 10 A Panel Discussion

[2] http://www.worldbank.org/en/news/feature/2017/12/19/world-bank-holds-resilient-cultural-heritage-and-sustainable-tourism-tdd-in-tokyo-and-kyoto

Heritage of Japan, which has broad additional insights and expertise in relation on movable cultural heritage and I would like to thank Kyoto National Museum who has been actively involved in this work.
Each panel members will make short introduction for 5 minutes and after those opening statements, we will have a discussion on three topics related to learning from past, what we need to do in present and we need to do in the future. Afterwards, we will have a discussion among panelists, leaving 10 minutes of the end to allow questions from the audiences. If this is agreeable to everyone, I would like to turn over to the first speaker who is Elke Selter from UNESCO.

Elke SELTER (Expert Emergency Response, Emergency Preparedness and Response Unit, Culture Sector, UNESCO)

"Introduction of PDNA Culture and Build Back Better by UNESCO"

Good afternoon everyone. First of all, thank you very much to Ritsumeikan for inviting me and having given me this opportunity. As Joseph said, I have 5 minutes to talk to you about the things the UNESCO does, in terms of Cultural Post Disaster Needs Assessments (PDNA). I chose this because of two reasons: first, the PDNA is a very concrete example of how an organization like UNESCO can help governments, and second, it is about data collection about assessing needs, and as such forms the foundation for what we do in recovery.
The PDNA is a methodology developed by the World Bank, the United Nations, and European Commission, which has been adopted by a lot of donors and NGOs. It is a multi-sectoral approach, which means that this is not a cultural methodology. It also applies to education, housing, infrastructure, telecommunications, etc. and the chapter on culture was added in 2013. This is very positive, because it means that culture is part of a much broader system.
The PDNA methodology helps to assess needs, to qualify and quantify those needs and to formulate a framework for recovery. And it is quick - we normally do this within the first one or two months after disaster - and it is quick is because the PDNA feeds into the humanitarian Flash Appeals. Those Flash Appeals are what you may have seen, when after a disaster the international community comes together with the government, and presents needs for recovery, expressed financially. This is one of the reasons it is very important for culture to be in the PDNA: because it relates to funding.
Probably the main strength of the PDNA is that it is very broad. It looks at the culture sector far beyond built heritage. Rohit already mentioned how this program is trying to move beyond built heritage, the PDNA is a good example, because it covers built heritage but also movable heritage, institutions, intangible heritage, cultural and creative industries – such as crafts, the film industry, music industry, etc - and also the culture ministry, culture authorities. These last ones have an important role in recovery, so it is important to keep them in mind when you look at the impact of a disaster on the culture sector.
In the PDNA, all these aspects of the culture sector are assessed according to four dimensions. Together the different aspects of culture and the 4 dimensions form a matrix of data. The four dimensions are: 1. Cultural assets (These are the heritage buildings, institutions like museums, objects and intangible traditions). 2. Access to those assets (Can be a tradition be practiced? A museum be visited? And a site be reached?). 3. New risks and vulnerabilities associated with the disaster (Has your heritage been exposed to new risks, become more vulnerable after the disaster?). And finally, 4. Governance and decision-making processes (which is related to the management of the sector).
In principle, the PDNA is an assessment that is coordinated by the government. In practice, who takes the lead, depends on how much the government itself has been affected by disaster. There have been quite a few occasions where organizations like UNESCO were asked to take the lead and work in partnership with the government.
I will simplify the process because it is quite complicate methodology: We can look at four main steps. We start with data collection on the pre-disaster and post-disaster situation. These data are then compared to assess the affects and impact of the disaster. Step 2 is calculating the direct effect of the disaster. We

do that by looking at damage and losses in terms of material damage and economic flows. Thirdly, we analyze the indirect impact which covers both macro-economic and human development levels. And finally, we make broad recovery plan with clear priorities and sequence in short medium and long term.
At the conclude, I just want to express why the PDNA is in my view very important.
- Above all, it is very comprehensive. We have extremely little tools that look at the culture sector as a whole. UNESCO has culture conventions, and it is very hard, even working within UNESCO to bring these conventions together.
- The PDNA is also quick.
- It provides access to recovery funds. This means that it provides culture authorities and cultural organizations access funds. These can be international funds or local funds. There are a lot of cases where after a disaster the government recovery funds goes the ministry of health, the ministry of infrastructure and so on. Culture ministries often face a lot of problems to access that kind of financing. The PDNA helps to make this easier.
- And finally, it is a multi-sector assessment, which is an excellent step for culture to be better integrated with humanitarian response and recovery.
Thank you.

Elizabeth KIRBY (Grants Development Specialist, Smithsonian Institution)
"Introduction of Smithsonian and the Project of Disaster Risk Management for Cultural Heritage"
First of all, I'd like to say the power of museum, its biggest super power is ability to remember the people. What the Smithsonian Institution holds are the triumphs, the difficulties, and the connections to the world for the American people. When we started put in together to the Smithsonian Cultural Rescue Initiative, we decided what we wanted to do was overlaying successful structure preservation on to cultural heritage recovery. Today I am going to talk about four approaches and some of projects that attached each of those.
The first one is response. This is an incredibly important work because we believe that preserving and understanding past is the way of inspiring people to create the better future. Whenever the project is the saving cultural heritage of Syria and Iraq, our goal is to provide Syria and Iraq colleges with conservation materials and training with the whole we can help them salvage in the sites. This is Ma'arra Museum, you can see here we have stakeholders who had applied a glue to the mosaic, and putting the protected paper over it. Then they stocked sand bags against to the protected paper. And unfortunately, the museum was hit by battle bomb at June 15th, but fortunately because of these mitigation measures, the mosaics were survived. We also as a team went out to Nepal Earthquake, and join the entire international assessment team. We gave an advice on stabilizing building, salvaging and rehousing objects on documentation. We also conducted training for the staff of ministry of culture, and training for the Nepal police and Nepal army. After the response, Smithsonian Cultural Rescue Initiative, we continue doing research on helping speed recovery, and how we can better prepare for responders to react in emergency. We don't want to lose the valuable lessons to be learned from this difficult time. We Smithsonian initiative department joins forces and the rescue project to how prepare local stakeholders, when the city moved to be safe and move to when began recovery on the sites. This is a group of stakeholders participate in the field exercises to learn when we first go there. We also working with them on implementation plan. (Fig.11)
The second one is a raising awareness for the new audiences who may not understand

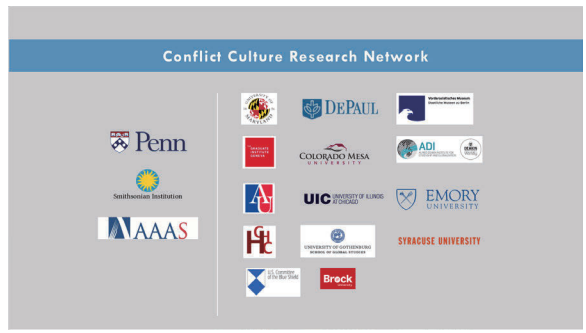


Fig. 11 A presentation slide (copyright: Elizabeth Kirby)

cultural heritage and its importance. We were able to put together a small ten panel museum exhibit that is exhibited in two places on Capitol Hill, discussing the death of history and outright damaged cultural heritage and cultural heritage risk in countries Syria and Iraq, and talking a little bit about mitigation measures during the time congress was considering the protecting and preserving National Cultural Property Act. We have also produced two guides for the military to take in when they begin to conduct operations and areas where there is cultural heritage. The first of them was guide of Mosul Heritage, which is written in several languages, has pictures and has represented samples of what kind of culture that the military can expect move to the area. We did that for the military operate them, and then they came to us to ask for us to create the heritage guide to Raqqa.

We also do research on cultural heritage at risk. In June of 2016, we launched the Cultural Conflict Research Network. Now we have all these partners working on what the root causes of why cultural heritage is targeted during conflict what strategies we can use mitigation. And goal is developing large data we can develop predictive ability.

And I am happy to say during the short period of the time, we have been able to involve 60 undergraduates, 13 graduated students and 5 post doctoral scholars in our on-going research. We also want to support resilience in heritage organizations. We were privileged to work on ICCROM first aid for cultural heritage crisis course and we were happy to host them at Smithsonian in 2016. We welcomed 21 participants from 17 countries. I would like to thank very much for the opportunity to present this work. Thank you.

Takeyuki OKUBO (Director, R-DMUCH)

"Introduction of the Project of R-DMUCH and its Future Challenge"

I would like to talk about the research outline of institute and what kind of research activities will be carried out in the future. Everyone gathered here are people who interested in cultural heritage or disaster prevention. However, activities in the field of disaster mitigation, science and engineering, humanities, conservation of and cultural heritage have not been integrated well. It is a project that started in the historic city of Kyoto, to protect cultural heritage from disasters and pass it on to the next generation.

According to these objectives, we are working on several research projects. The first is technology development. In addition, we are also focusing on the history of disasters. Historical townscape and cultural heritage have survived because they have overcome numerous past disasters. It is a study that seeks to learn from the past how past disasters were overcome without modern technology, and utilize these experiences for the future. We also undertake, advanced research not only on natural hazards but also human induced disasters and those caused by animals. As a university institution, there are two pillars: "research" and "education". In order to conduct useful applied research, we are engaged in the field study on actual disasters or cultural heritage sites. In terms of human resource development, our mission is to educate not only young researchers and students, but also experts who have got trained in this training course, and send them back to the site again. Combining these two pillars really helps in contributing to the society.

As reported by Professor Jigyasu, 127 people from 56 countries participated in the international training courses during last 12 years. We also had received support from the Toyota Foundation and have cooperated with the National Institutes for Cultural Heritage from this year. This shows the growing importance of this course and we respond to the growing needs by cooperating with various international organizations, like ICCROM, ICOM, ICOMOS, World Bank and UNESCO, and by collaborating with various foundations and universities around the world.

For future research, our primary objective is to protect historic cities and cultural heritage from disasters and pass them to the next generation. However, the way of thinking about disaster mitigation of cultural heritage is changing gradually over time.. Therefore, we are trying to evolve the disaster prevention culture around the world with our current technology and knowledge, and share the advanced

technology for protection of our cultural heritage from disasters.. Our team as a research institution, continues to work on cultural heritage disaster mitigation since 2013. We would like to protect the life of human beings first of all, which leads to protecting cultural heritage. Thank you very much.

Ken OKADA (Head, Promotion Office, CH-DRM Net, NICH)
"Introduction of the Cultural Heritage Rescue in 2011 Earthquake and Tsunami"

The National Institute for Cultural Heritage consists of seven organizations: four national museums, two cultural property research institutes and the International Research Centre for Intangible Cultural Heritage under the support of UNESCO. The National Institutes for Cultural Heritage is doing the core work of building a network for disaster prevention of cultural heritage in Japan. I would like to introduce what we are aiming for.

Japan is exposed to many natural hazards. Many disasters have struck during the last 30 years, especially during last two or three years. It is unbelievable that there hasn't been a typhoon in Kyoto in the past three weeks. There are many typhoons in this season indeed and there are reports that a typhoon will come tomorrow.

The Great Hanshin-Awaji Earthquake occurred in 1995. I think that many of you have visited Kobe, and gained experiences from Kobe`s recovery. Kobe suffered big fires after the earthquake.. We also experienced the Great East Japan Earthquake in 2011. Nothing remained in the historic centre of Ishinomaki city. This is an offering box of a Japanese shrine. It was a huge problem to protect properties inside of the museum whose walls have collapsed.

Rescue activities were carried out after that. This is a picture of museum staff gathering from all over Japan and rescuing properties. Here is a property list. This list is not from the museum. It is a copy from another place. We used the list in the rescue work. This is by a sculptor Funakoshi Yasutake. However, no one knew him at that time. The deputy director of the art museum is an expert in Western art history who is unfamiliar with Japanese art. Thankfully, we could start rescue work because we had this list with the pictures.

Rikuzentakata city was also greatly damaged. We carried properties from the museum to an elementary school on the mountain and started emergency conservation work. Although the Great East Japan Earthquake occurred on March 11, moving them to the elementary school finished in July that year. Some properties were moved in April, but some artworks have been left for some reason. As you know, because of the nuclear power plant accidents in Fukushima, there were some areas we could not enter. We did a study for one year to check how to enter the area and rescue the cultural properties. Conducted rescue activities with participants from the Agency for Cultural Affairs and various organizations, also with the cooperation of each prefecture as well as the association of art museums, , the National Art Museum, and the National Library, etc. There are also prefectural art museums and prefectural museums in the disaster area where the people themselves are affected by the disaster. Though their own building hall was damaged, and museum staff were among the victims, they played a core role in the rescue activities as a local museum. In addition, the National Museum of Ethnology held an exhibition in July 2010 about various earthquakes such as the Niigata Prefecture Earthquake. Their experiences had great influence on the rescue activities in 2011. It is very important to learn from such experience and develop case studies for learning.

There was a typhoon in August last year, and a library in the Tohoku area was damaged. The library staff had experience in the Rikuzentakata city rescue activities in 2011. So, they made a judgment soon that they would not be able to handle all the rescue work by themselves, and decided to send emails to ask for help around Japan. The reason that they could quickly respond was that they had experience in previous disaster.

Next, I'd like to talk about future activities. I've talked about the fact that various organizations have participated in rescue activities. In Japan there is a concept of nationally or prefecture-designated

cultural properties. Those designated properties can receive salvage funding from national or prefecture government. However, undesignated cultural properties, the government does not provide support. So, it is necessary to promote cooperation with various organizations., Although fine rescue organization structure is formed beforehand, it is difficult to decide actual operationalization without experience of a real disaster. So we are making efforts to build the network first. In Japan, cultural heritage is defined as property because it is owned by someone. Because much is private property, we often don't know what kind of cultural properties are in the area. When people lose their lives and buildings collapse in disasters, the rescue of personal property is needed for recovery. In such situations, it may become difficult for cultural property experts to expand rescue activity. So, it is important to let people know what kind of cultural properties exist in the area. The most important thing for building cultural property networks is to make people understand what regional cultural properties are the region, and then consider how to expand the activity. Thank you very much.

Yasumichi MURAKAMI (Councilor, Hyogo Prefecture Board of Education)
"The Experience from the Last Disasters and Heritage Manager System"

There was an earthquake in Kobe in 1995.We have engaged in various initiatives since then and implemented an evaluation project during the 10th year 2005. At that time, we suggested the concept that the cultural heritage is a public property and the idea was submitted to the UN World Conference on Disaster Risk Reduction.

The word "Build Back Better" came out of the Sendai Framework in 2015. In my opinion, it is an idea that history and culture play a large role in the regional sustainability, and creative reconstruction after disaster would be realized.. Another important thing suggested in the conference is that disaster prevention should be based on people's thinking of the history and culture and the contribution of the community.

Building only new structures may erase the memory of people living in the area, so when we think about "Build Back Better", we need to deal with as people who are engaged in history and culture in order to prevent this kind of situation.

Secondary disasters such as fire have also occurred in Kobe earthquake. We started rescue activities for protecting the historical and cultural heritage from damage. And when repairing immovable properties, we considered the earthquake resistance of buildings to prepare for future disasters, and developed a full-scale model of shaking table experiment equipment for evaluating its seismic performance on the real situation. We are doing efforts to make organization charts during these 20 years so that people can be collected quickly during disasters.

We educated about 400 architects in Hyogo prefecture, and more than 1,000 people from other fields.. We have also prepared a map with location of cultural properties which can be linked to damage assessment. Even private citizens can add information to it. It is important to prepare regularly and therefore disaster prevention should be part of the usual activities.

Discussion

Joseph KING:

I would like to ask some questions from myself and afterwards open the questions from the audiences. And I would like to start with a question for Dr. Okada. It is very good to remind us all that we should think not only about the cultural properties declared by law but in larger sense. You gave an example about the treatment of cultural heritage after disasters. I am wondering if you can talk more about what the National Institute for Cultural Heritage is doing before disaster happens to be able to protect the movable cultural property.

Ken OKADA:

We have various experiences in reducing damage in disasters. For example, in the case of museums, we

conduct studies on earthquake-resistant exhibitions and storage methods; and in the case of general private cultural properties, we recommend owners to deposit them in the local museum, since it is more dangerous if they are placed in private houses. This process helps the researchers of local museums to better understand what kind of properties are in the area. A prefectural designated cultural property burned down in Nagano a week ago. It was burned down in a fire. Not only the staff of the local museum but also the staff of the Nagano Prefectural Museum knew that ancient documents were kept in the local museum and soon went out to ascertain the damage situation. From this case, we can see that it is important to know what kind of properties are in the area. After the earthquake, we conduct research on what would be technically necessary for the properties' recovery when mold grows days after getting wet with water. One more example: in the fire a week ago, Meiji era photographs (approx. 100 years old) got wet from water from the fire hoses. So we asked photograph experts and learned that if ordinary water was used, the photographs, can be recovered just by washing, but if they have been extinguished by firefighting with chemical substances, then H2O chemically reacts causing negative impact on the photographs when you wash them. So our staff in Nagano prefecture immediately went to the fire station and asked what they used. We have accumulated such kind of experiences for over 20 years. There is a "Emergency Response and Salvage Wheel" developed in the United States and translated into Japanese. However, unfortunately this did not always fit well with the situation of actual disasters in Japan. We would like to accumulate various experiences and work on technical issues as well.

Joseph KING:
Thank you very much. Actually, my next question was to ask to Elke about community involvement in the PDNA process.

Elke SELTER:
I think it is important to understand the PDNA is methodology only explains WHICH data have to be collected, but not HOW they have to be collected. In the past, there has been a tendency to send experts to do a quick assessment, but we are slowly moving away from that and working much more strongly together with the community, especially because the component of intangible heritage is gaining more and more recognition. You cannot do an assessment of how the intangible heritage has been affected by a disaster without of working with the community.

Joseph KING:
Thank you. My second question to you is when you are doing PDNA, how much information on past disasters goes into community assessment work. And a lot of work goes into PDNA. I understand it is very useful in short term for carrying out recovery efforts but how is it also useful in a longer term for mitigating future disasters?

Elke SELTER:
How much past disasters are reflected to PDNA? Actually, not so much. It is really focused on what just happened. Past disaster information is only considered when looking at existing vulnerabilities or for recovery planning, which has strong component of “Build Back Better”. So, the idea is that we cannot not just “build back”. There has been damage, but rehabilitation should also take into account the whole range the other risks that the area is facing, to reduce the impact of future disasters. Regarding how useful the PDNA is in the long term, of course we don’t know, because the PDNA culture methodology only exists since 2013, and we only started doing the first PDNAs in 2014 and 2015. So we don’t have a long-term perspective yet. However, in my view, it can be really useful because the value of the PDNA lies in collecting a very broad set of data on how the disaster has affected the culture sector. Last when we did in Peru for an example, because we had a such good data, we recommended ministry of culture to put

those data into a database system, to also use them access for future planning and as a basis for future assessments. If a new disaster will happen, it can serve as comparable material.

Joseph KING:
Thank you. Ok, my next question is to Elizabeth. I want to ask first of all what you think are other ways we can try to engage with military in a relation to post disaster emergency situations, and do we have feedback from military on what kind of things they need, and they would have in post disaster situation.

Elizabeth KIRBY:
Yes, the Smithsonian actually hosted a meeting for a military group that kind of configure that very interesting culture. And now holding the listening session with them and we also keep in touch with them. And that session just happened about 3 weeks ago. And it was very interesting that the main thing the military seem to be interested in, was how could they get information quickly about culture. As what they said is they are looking at things they know this may be important, but how do we immediately get feedback because they need to protect lives, it is important to hold that but how do we make that determination. So, it is very interesting that I think these guides are a sort of first step to set up. We don't have yet information of impact, but I do know we were asked to print both guides.

Joseph KING:
This is good approach. But do think it is possible that the expert attend the military operation and give a quick advice to them, apart from that guide book?

Elizabeth KIRBY:
Yes, I think that probably the place to start is military themselves. Because a lot of them have travelled a lot and become very interested in places they grow. And I think it is possible to start looking at the people who are there, who are interested in culture. It would be good starting point.

Joseph KING:
Thank you very much. Mr. Murakami talked about capacity building. Can you elaborate on theof institutions and people whose capacity needs to be built in order to deal with disasters, before during and after.

Yasumichi MURAKAMI:
In my experience, 70% of the buildings damaged in urban areas due to the Kobe earthquake. On the other hand, we also worked on flood disasters, but at that time, ancient documents and movable properties rather than buildings were considerably damaged. Considering two cases, it is necessary to develop human resources in the field of architecture and arts and crafts. In the case of architecture, we educated 400 people in Hyogo Prefecture, and 4000 people in the whole country. When the Tottori Earthquake occurred last year, approximately one hundred people gathered in response to one e-mail. And we finished the damage investigation of 80 to 90 buildings in 4 days including drawing and budget estimate. One institution in each field cannot prepare everything. Therefore it is important to create a system to expand the network of various institutions and share information.

Joseph KING:
You talk about architecture and architectural engineers, but other professional categories that can also get themselves involved in post disaster damages assessment.

Yasumichi MURAKAMI:
There are about 1000 people in all, but about 600 people work in other fields such as arts and crafts, buried cultural properties, ethnic cultural properties, planting trees and gardener, etc. Each field has their own NPO.

Joseph KING:
My last question is to Professor Okubo. Since you talk about the research needs, and traditional and modern technologies. If you don't mind my asking a bit more specifically if you could think about three of important research needs. What are the three largest research needs you and Ritsumeikan University need to be approach in the next 5 or 10 years.

Takeyuki OKUBO:
I think it is a very difficult topic. Since we belong to Ritsumeikan University and also research institute, we need to work harder on the research side than others. For the cultural heritage and the historical city, the most important point of thinking about disaster prevention is how to improve disaster safety which does not lose the cultural value. I think that there is a need for research as well. So, of course, we can use advanced technologies that our Japanese are good at, but what we really want to pay attention to is the wisdom of traditional disaster mitigation. Our predecessors have been making efforts to reduce the impact of disasters since long time. So, it is necessary to do evaluate it first. If the effect can be evaluated objectively, we can see the possibility of enhancing both disaster safety and cultural value. From the view point of 'Build Back Better', it is important to properly evaluate traditional technologies since it is not only necessary to return the cultural heritage to the original after the disaster, but as Sendai's framework also indicated, it is import and to reduce vulnerability of cultural heritage to future disasters. I believe that if such a thing can be done, it will become an asset for disaster prevention culture for the future.

Ken OKADA:
In a disaster many records and memories are lost. So, it is important to continue investigations on cultural heritage and for which the value is already known, and to convey the information to the next generation. In addition it is important to understand well what kind of information needs to be communicated.

Yasumichi MURAKAMI:
I think that it is necessary to make the property register for preservation and utilization of history and culture for each region.. In addition, as I mentioned in the whole plan, each organization has its own characteristics: for example, the Smithsonian is very strong in the movables heritage field and the Ritsumeikan University is very strong in the immovable heritage. I expect that the whole image will come out gradually while exchanging information between such institutions. I hope that such kind of international activities would be organized regularly to exchange information.

Joseph KING:
Thank you very much. I think it is interesting that you highlight the movable and immovable and of course I would like to also add tangible and intangible. And all of them would have to be integrated into thinking planning. Thank you for raising.

Elizabeth KIRBY:
Whenever we look at cultural heritage and risk, I think it is good to find out root causes and develop predictive abilities so that you can look far ahead into future and figure out things that are likely happen and accordingly devise mitigation strategies. In terms of technology, I think it is very important to find people who understand GIS and cultural heritage, so that they can make good data bases.

Elke SELTER:
I would like to talk about the same topic looking at two points that we faced in PDNA. First, I think that intangible heritage is the part of the sector that is the most far behind and we run into very concrete problems, for example that we don't know how to design the reporting form to assess needs of the intangible heritage sector. And second, we need better data in the culture sector. For example, data on in how far prevention really works for cultural heritage and what way. Also the kind of data that provide arguments that would make a stronger case for including culture and heritage in disaster risk management. We talked about the example of Peru where thanks to PDNA we managed to come up with very good figures that showed return-on-investment for the government on a program that invested in preventive measures for archaeological sites. Even though that was unique example, it is probably possible in many more contexts.

Joseph KING:
Thank you very much for all those comments. We are left with 10 minutes for the audience to ask questions to panelists.

Audience 1:
My name is Alessandra, a Brazilian, student of World Heritage Studies in one of university of technology in Germany. It is quite general question to any of the Japanese experts. I would like to ask about location of resources after disaster situation for example, in a disaster situation, how is it ensured that money and people are invested in heritage instead of only building houses.

Yasumichi MURAKAMI:
I don't know whether it is appropriate, but in my experience, first, we need to submit a rough estimation for getting budget. It is very quick work that is done in three weeks for meeting deadline of budget request. After that, detail budget needs to be prepared for individual cultural properties, and based on that application form is submitted for funding. After that the budget will be allocated. This is the method of designated cultural property. Meanwhile, in the case of the request of undesignated cultural properties, we ask for donation to various people as well as institutions such as National Agency for Cultural Affairs. As a result a considerable amount of money will be gathered.

Ken OKADA:
In the case of national designated property, the budget comes from the national government. In the case of the prefectural designated property it comes from the prefectural government. There is no case in which 100% funding is provided for heritage conservation in Japan. It is provided in increments of ten percent in the form of subsidies. There is a list made when the Agency gathers information in disasters. On the left side of the list there are the name of area, the name of the cultural property and the number, and there is a column on the right side for the subsidy. It is carried out based on the list. Regarding undesignated property, there is no subsidy, but in the case of large scale disasters such as the Great Hanshin-Awaji Earthquake or the Great East Japan Earthquake, when many undesignated cultural properties are seriously damaged, the methodology of PDNA is introduced: allowing staff to evaluate damage quickly and report it to the administration, and soliciting a donations from citizens. It is still a developing method.

Audience 2:
I am Kai Weise, ICOMOS Nepal, and former participant of the course. I have a question to Professor Okubo in connection with the modern technology use. I think the question is how we approach the whole question of modern technology. Very often there are parallel discussions on conservation approach on

one hand and use of technology on the other,. And I have second question with respect to PDNA. Can we consider the PDNA to cover the recovery plan? And do we have to clearly state that PDNA is not recovery plan, and the recovery plan will have to be prepared after the PDNA. Thank you.

Takeyuki OKUBO:
In actual cases of disaster reconstruction various kinds of technology was used, and as a result the value of cultural heritage is compromised. In order to avoid that, we would like to find out what kind of technology has been accumulated through history. Therefore, though various buildings, townscape, community activities are included in the wisdom of disaster mitigation, it is important to choose a technology that has successfully evolved through skills accumulated over time. Of course, there are cases where completely new technology is needed. However, it is consider continuity of technology as well as the culture and tradition. Conversely, if the continuity of the technology can be secured, it would be impossible to apply various modern disaster prevention technologies in most of the disasters. In such a case, technologies accumulated in history will certainly mitigate damages. That is why, many cultural heritage and historic townscapes have overcome lots of disasters. I think that it is very important for us not to be confident about technology, but to properly understand the direction of technology and tradition that has been accumulated so far, and thereafter introduce new technologies.

Yasumichi MURAKAMI:
Regarding advanced technology, we did evaluation test with traditional materials at the time of Kobe earthquake. Finally, the best solution was implemented after examining the results of tests. When considering the future deterioration, we try to record our own way of thinking so that we can evaluate whether it is good or not after decades. If there is no such trial, there will be no progress of human beings as well. I think it is important to think about that balance.

Elke SELTER:
On the question whether the PDNA can be accepted with the recovery plan, the answer is “no”. The PDNA is a needs assessment which lead to a product called a “recovery framework”. But the terms used are not the issue. It should be very clear that the result of the PDNA is an assessment and a very broad plan that can serve as a basis for developing one or more detailed recovery plans. There is a separate methodology for doing that. In my view it is important to understand the PDNA as a quick assessment, which results in a broad overview, the impacts of the disaster on the culture sector and that will result in a broad framework that outlines (broadly) the needs. It is not a detailed plan.

Summary and Closing Address: Professor of Ritsumeikan University, Proffesor Kenzo TOKI

Kenzo TOKI:
I would like to introduce how ITC started. Because, I would like you to go back to your countries and start the things that we did in Japan in accordance with the situation in your countries.
ITC began in 2006. The trigger was that in March 2004, a professor of Canadian university named Herb Stovel came to Ritsumeikan University and discussed about our research center. He gave us the hint of international training in that time. He is former Director of the Sites Unit at ICCROM, which is the same position that Joseph King holds at present in ICCROM. Unfortunately, Dr. Stovel is no longer with us. Dr. Stovel came to Ritsumeikan in March 2004, and in January 2005 the United Nations World Conference on Disaster Reduction was held as an event of the 10 years memory of the Kobe Earthquake. I am a disaster prevention structure engineer involved in disaster prevention field for about 50 years. However, I have never heard the word "cultural property" at Japanese or International conferences on disaster prevention. In addition, we got big fund from the national government in 2003 and made a team at

Fig. 12 A closing address by Kenzo TOKI

Ritsumeikan University to study disaster prevention of cultural properties. Dr. Stovel suggested the international course when we were thinking about what to do. The big fund from the country means that we need to make a world-famous research facility and to do a high-level education. However, it is very difficult to satisfy both objectives. Especially graduate students who want to study disaster prevention of cultural properties rarely existed. So, instead of educating Japanese students, we decided to invite experts in cultural properties and in disaster prevention around the world based on Dr. Stovel's advice, to study and train together. It is the trigger of this training.

As I mentioned earlier, we never heard the cultural properties in the international conferences on the theme of disaster prevention. So, I was just chairing a domestic committee at that time, and I suggested to Japan and to UNISDR indirectly that we need to make such a session. Cultural property disaster prevention was finally recognized and a thematic session was held during Kobe UNISDR World Conference on Disaster Reduction. Afterwards since the training courses started in 2006, Dr. Jigyasu had to organize this it was a hard work.

At that time, he just came to Japan and could not immediately understand the country. We carried out such activities with the fund we got from government in 2003. It was a very competitive research fund that almost universities in Japan applied and the representative should be the president of the university. Initially, we could only choose 8 people because we had to pay travel expenses and accommodations of people who came from abroad. At that time, there were only 8 entries and it was very easy to choose 8 people. However, this year, the competition has increased by25 times and this year we had to choose 11 people among 235 applications. The number of applicants have exceeded from 8 in 2006 to 230 people in 2017. During this period, we received support from the Toyota Foundation for three years. When it ended in 2016 and we were in trouble, the National Institutes for Cultural Heritage offered to collaborate with us. I don't know what will happen in the future. However, we have been doing the course for 12 years. So somehow, I think that we would like to continue conducting such course for 20 years at least. I am doing projects in various places other than this one, and I have done some projects for more than 20 years. If you work little hard you can do ten years, but if you try to do 20 years, you have to work very hard. I think probably I am the oldest here. I'm sorry I spoke with so much pride and thank you for your understanding.

Finally, please let me just say one thing about "Build Back Better" that came out in the previous discussion. It is an idea that was invented during very hard times in Japan. It is a word not familiar with cultural properties. Japan lost in 1945 after the Second World War, and each year the typhoon and flood attacked, and the lives of 1,000 or 2,000 people were lost. It stopped in 1963. Why is it called Built Back Better? During flooding, the water overflows from the river, and the same thing happens if we recover things to the original state. So, In Japan, we call for improved restoration. Therefore in the case of cultural heritage you have to modify the original meaning slightly. Thank you very much.

Epilogue

This year, Japan's National Institutes for Cultural Heritage participated for the first time in the 12th Ritsumeikan University UNESCO Chair Programme, International Training Course on Disaster Risk Management of Cultural Heritage as a co-organizer together with the Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University. Eleven trainees from Asia, South America, and Europe participated in a rich program held over twenty days from August 28 to September 15, 2017, followed by an international symposium on September 16.

The National Institutes for Cultural Heritage (NICH) is an umbrella organization comprising the Tokyo, Kyoto, Nara, and Kyushu National Museums; the Tokyo and Nara National Research Institutes for Cultural Properties; and the International Research Centre for Intangible Cultural Heritage in the Asia-Pacific Region. Tracing its origins back to the founding of the Tokyo National Museum in 1872, NICH is engaged in the collection, storage, and exhibition of works of art, historical materials, and archaeological artifacts that exemplify the culture and tradition of Japan, and it engages in research on such areas as the history of art and architecture, archeology, and intangible cultural heritage. NICH also conducts research on preservation principles and conservation techniques and materials using natural science methods, thereby playing a leading role in the protection of cultural properties in Japan.

The Japanese archipelago is subject to frequent natural disasters occurring throughout the year, including volcanic eruptions, earthquakes, tsunamis, typhoons, heavy rains, floods, and landslides. Sometimes entire regions are destroyed. Such disasters bring with them the loss of lives and property; at the same time they can also damage the cultural and historical heritage preserved and passed down in their localities.
The Great East Japan Earthquake of March 2011 inflicted the greatest damage of any Japanese natural disaster in recent history on the Tohoku region and its surrounding areas. Not only was enormous damage caused by earthquake-generated tsunamis, but the resulting nuclear power plant explosions forced the mandatory long-term evacuation of residents over a wide area. This also caused dilemmas as to how to rescue cultural assets remaining in the affected areas.

The Cultural Properties Rescue Operations were established in response to an appeal from the Agency for Cultural Affairs. After the Agency for Cultural Affairs sent a request for cooperation, a Salvage Committee Secretariat was established within NICH. It oversaw recovery activities for disaster-affected cultural properties over a period of two years. In addition to those from NICH, the Salvage Committee gathered representatives from thirteen cultural property related organizations, including Japanese museum and library organizations as well as cultural property related academic societies. It responded collaboratively to prefectures that submitted requests for support to the Agency for Cultural Affairs. At the end of the second year, in March 2013, the Salvage Committee held a symposium summarizing its activities and vowed to maintain its organization in preparation for damage to cultural properties caused by large-scale earthquakes and tsunamis in the future.

In response to this, NICH launched the National Task Force for the Japanese Cultural Heritage Disaster Risk Mitigation (CH-DRM) Network under a 2014 grant from the Agency for Cultural Affairs. NICH's participation this year as a co-organizer of the Ritsumeikan UNESCO Chair ITC is part of its CH-DRM Network activities.
It is worth pointing out that the salvage activities by the Committee for cultural heritage of the Tohoku region beginning in 2011 targeted only movable heritage such as art objects, ethnographic materials,

historical materials, books, archeological artifacts, and natural history materials. Immovable cultural heritage such as architectural structures, archaeological sites, and historical sites were conserved by other organizations. This division reflects the system of cultural property administration in Japan and was not limited to the Great East Japan Earthquake: response is still carried out separately today for natural disasters large and small.

When disasters impact protected buildings of historical and cultural value, such buildings tend to be placed under the jurisdiction of departments and experts in architecture and monuments; however, this can result in delays if the need arises to salvage artworks or ethnographic materials that have long been stored within. For example, if a building has a 150-year history, there is a possibility that 150-year-old objects remain inside the building. If at least four generations of people have lived in the building over those 150 years, it may also contain objects telling the history and culture of each era. In such situations, lack of coordination between the immovable and movable heritage sectors impedes the disaster risk management and salvage of movable cultural properties.

The activities of the National Task Force for the CH-DRM Network that I run currently contains twenty-three organizations, and we continue to focus our efforts on movable cultural heritage. Nevertheless, even after the recent Kumamoto earthquake of April 2016 or after the heavy rains of Northern Kyushu that occurred in July 2017, we were still not able to collaborate effectively with architecture and monuments departments and experts.

The UNESCO Chair Programme International Training Course on Disaster Risk Management of Cultural Heritage (ITC) has for many years been organized by Ritsumeikan University's Institute of Disaster Mitigation for Urban Cultural Heritage (D-MUCH), which researches how to protect the historical and cultural city of Kyoto from natural disasters and fire with primarily an urban engineering and architectural perspective. For this reason, past themes of the ITC have tended to focus on immovable heritage such as buildings and townscapes. This year, the National Institutes for Cultural Heritage's decision to participate as part of its CH-DRM Network Task Force activities comes partially out of its wish that the preservation of movable cultural property be covered in the ITC.

We would like to express our sincere gratitude to D-MUCH director Takeyuki Okubo and all his colleagues and staff for their work in organizing this training course and symposium in conjunction with experts from international organizations such as UNESCO and ICCROM. And, as it was our first time participating, I see areas in which we can improve next time.

This training is intended for trainees from abroad; however, the particular circumstances in Japan and the characteristics of its cultural properties may not necessarily be analogous to those in foreign countries. Nevertheless, the disaster risk mitigation, salvage, and conservation of movable cultural heritage housed within historic buildings are extremely important issues for Japan. I hope that our co-organization of the ITC will lead to a strengthened cooperative relationship with D-MUCH and new pathways to solutions

Ken OKADA
Head, Promotion Office, Cultural Heritage Disaster Risk Mitigation Network
National Institutes for Cultural Heritage
Translated by Melissa RINNE, Kyoto National Museum

Epilogue

The International Training Course, Ritsumeikan University is the first attempt at the international level to provide high level education opportunities on the topic of natural disasters for people in the cultural heritage field and on the topic of cultural heritage for people in the natural disaster field. In the 12 years that the course has been implemented, we have had 1242 applicants and 127 people from 56 countries have been trained. The accepted number of trainee is only 10.2% of applicants and it is small percentage. Particularly in this year 2017, we could receive 11 people as trainee among 235 applicants and this is only 4.7%. We, therefore, have been proposed to increase the number of trainee from past applicants and people of relevant fields, both of domestic and international communities. The course, however, is financially supported by COE (Center of Excellence) program of Japanese Government and the budget of the training course is not large enough to accept all the applicants because the course is one of the projects of COE program.

Recognizing our activities and achievements for ITC, the Independent Administrative Institution National Institutes for Cultural Heritage（NICH）has started to coordinate for the training course from the fiscal year 2017. This is the big support after the Toyota Foundation supported the course for three years from 2014 to 2016. Therefore, the training course was able to compliment the interdisciplinary part of disaster risk management for movable heritage and intangible heritage which have been not fully covered by Ritsumeikan university. Furthermore, we have been proposed to establish a follow-up program from the graduates of our course and people of relevant fields, which is to establish a similar course to our training course in their counties and communities. We will carry out a follow-up training course in March, 2018 in Bagan, Myanmar where people need to plan a long-term recovery strategy and better resilient heritage rehabilitation from the earthquake which occurred in August, 2016. This follow-up initiative is cooperated with SEAMEO-SPAFA (Southeast Asian Ministers of Education Organization- Southeast Asian Regional Centre for Archaeology and Fine Arts) and ICCROM (International Centre for the Study of the Preservation and Restoration of Cultural Property)

In this way, we have cooperated with national and international community by the course and through the course. Hereby we would like to express our heart-full gratitude to the all cooperated organizations. A noteworthy fact is that trainees gave us the best assessment for our course. We promise to continue this training course as one of our most important missions.

Kenzo TOKI
Representative, Enhancement of the UNESCO Chair International Training Course on Cultural Heritage and Risk Management and Post-training Follow-up
Professor, Ritsumeikan University

Appendix

List of Resource Persons

(As of 2017 September)

Kozo WATANABE
Vice Chancellor,
Ritsumeikan University

Kenzo TOKI
Professor,
Institute of Disaster Mitigation for
Urban Cultural Heritage,
Ritsumeikan University (R-DMUCH)

Takeyuki OKUBO
Professor,
Department of Civil Engineering,
College of Science and Engineering,
Ritsumeikan University
Director,
Institute of Disaster Mitigation for
Urban Cultural Heritage,
Ritsumeikan University (R-DMUCH)

Rohit JIGYASU
UNESCO Chair Holder,
President of ICCOMOS-ICORP,
Professor,
Institute of Disaster Mitigation for
Urban Cultural Heritage,
Ritsumeikan University (R-DMUCH)

Dowon KIM
Associate Professor,
Institute of Disaster Mitigation for
Urban Cultural Heritage,
Ritsumeikan University (R-DMUCH)

Ken OKADA
Head, Promotion Office, Cultural Heritage Disaster
Risk Mitigation Network (CH-DRM Net),
Independent Administrative Institution National
Institutes for Cultural Heritage (NICH)

Naoko USHITANI ITAYA
Associate Professor,
Institute of Disaster Mitigation for
Urban Cultural Heritage,
Ritsumeikan University (R-DMUCH)

Teiichi MIYAKAWA
Senior Researcher, Curatorial Division,
Kyoto National Museum

Atsushi KOMIYA
Assistant Manager, Cultural Asset Division,
Board of Education, Kyoto Prefecture

Masamitsu FUJIMOTO
Associate Professor,
Department of Civil Engineering,
College of Science and Engineering,
Ritsumeikan University

Ksenia CHMUTINA
Lecturer,
Sustainable and Resilient Urbanism,
The School of Civil and Building Engineering,
Loughborough University

Lee BOSHER
Senior Lecturer,
The School of Civil and Building Engineering,
Loughborough University

Rashmin GUNASEKERA
Senior Disaster Risk Management Specialist,
GSURR, World Bank

Shinta YOSHITOMI
Professor,
Department of Civil Engineering,
College of Science and Engineering,
Ritsumeikan University

Ryoichi FUKAGAWA
Professor,
Department of Civil Engineering,
College of Science and Engineering,
Ritsumeikan University

Yoshifumi SATOFUKA
Professor,
Department of Civil Engineering,
College of Science and Engineering,
Ritsumeikan University

Kenji SAWAI
Professor Emeritus,
Setsunan University

Kazumasa HANAOKA
Associate Professor,
Department of Humanities,
Geography Major,
College of Letters,
Ritsumeikan University

Junko FURIHATA
Chair,
Department of Conservation Science,
Curatorial Division,
Kyoto National Museum

Melissa RINNE
Research Fellow for International Affairs,
Kyoto National Museum

Aparna TANDON
Project Manager,
Collections Unit, ICCROM

Corine WEGENER
Director,
Smithsonian Cultural Rescue Initiative,
Office of the Provost/Under Secretary for
Museums and Research,
Smithsonian Institution

Kimiko MEKATA
Deputy Manager,
Section Head, Cultural Property,
Fire Prevention Section,
Fire Prevention Division,
Kyoto City Fire Department

Akira NATANI
Chief,
Fire Prevention Section,
The Higashiyama Fire Station

Noriyoshi TSURUOKA
Manager,
Cultural Asset Division,
Board of Education,
Kyoto Prefecture

Yohsei KOHDZUMA
Director,
Center for Archaeological Operations,
Nara National Research Institute for
Cultural Properties

Yuko ISHIDA
Senior Researcher,
Research Organization of Science and Technology,
Ritsumeikan University

Takehiro SAKAGUCHI
Director,
Wakayama Sabo Research and Education Institute

Daisuke IDO
Senior Priest,
Kumano Nachi Taisha

Yasumichi MURAKAMI
Senior Administrator,
Hyogo Pref. Board of Education

Rohit Kumar RANJITKAR
Nepal Director,
Kathmandu Valley Preservation Trust (KVPT)

Wesley Webb CHEEK
Urban Studies Doctoral Fellow,
City, Culture and Community,
Tulane University

Yoshihiro HIRAOKA
Professor,
Architecture Design Laboratory,
Department of Design Information,
Miyagi University

Kai Ube Prasad WEISE
Architect,
Planners' Alliance for the Himalayan &
Allied Regions (PAHAR Nepal)

Elke SELTER
Expert Emergency Response,
Emergency Preparedness and Response Unit,
Culture Sector, UNESCO

Giovanni BOCCARDI
Head,
Emergency Response Unit,
UNESCO World Heritage Centre

Rajib SHAW
Professor,
Graduate School of Media and Governance,
Keio University

Joseph Allan KING
Director of the Sites Unit, ICCROM

Hiromichi KUBOTA
Head,
Intangible Cultural Properties Section,
Tokyo National Research Institute for
Cultural Properties

Sadahiko TANAKA
Specialist for Cultural Properties/ Architect,
Architecture and Other Structures Division,
Department of Cultural Properties,
Agency for Cultural Affairs, Government of Japan

Mingji CUI
Senior Researcher,
Kinugasa Research Organization,
Ritsumeikan University

Go TANIBATA
Senior Researcher,
Kinugasa Research Organization,
Ritsumeikan University

List of Participants

Dorji WANGCHUK
Conservator,
National Museum of Bhutan

Abner Omaging LAWANGEN
Local Disaster Risk Reduction and
Management Officer,
Local Government of Tublay, Benguet, Philippines

Hamit BİRTANE
Technical Expert,
Directorate of Gallipoli Historical Site

Innocent Hudson MANKHWALA
Archivist - (Conservation Section),
Department of Culture - National Archives of Malawi

Ming Chee ANG
General Manager,
George Town World Heritage Incorporated

Victor MARCHEZINI
Researcher,
National Centre for Monitoring and Early Warning of
Natural Disasters (CEMADEN)

Virasith PHOMSOUVANH
Acting Deputy Director,
Remote Sensing Center, Ministry of Natural Resource
and Environment (MONRE)

Sayma IQBAL
Lead Conservation Consultant,
INTACH, Kashmir Chapter

Bertrand Pascal LAVEDRINE
Director,
The Centre de recherche sur la Conservation,
National Museum of Natural History

Domenico GRECO
Civil Engineer – Young Researcher,
University of Salerno, ICOMOS/ICORP Italy

Khin Aye YEE
Operation Officer,
Social, Urban, Rural and Resilience Global Practice,
World Bank Group, World Bank, Myanmar

<Observer>
Chan Min PARK
Curator,
National Research Institute of Cultural Heritage

<Observer>
Sophie ABRAHAM
Junior Professional Officer,
Disaster Risk Reduction, Emergency Preparedness &
Response Unit, Culture Sector
UNESCO

Photos of ITC 2017

A lecture by Cultural Asset Division, Kyoto Prefecture

A Site Visit of Kiyomizu-dera Conservation Place

A Site visit of Preservation District (Citizen Hydrant)

A Field Work for Risk Assessment at Ponto-cho

A lecture at R-DMUCH (Landslide)

An Exercise at the Kyoto National Museum

A Salvage Exercise at the Kyoto National Museum

A Lecture of Firefighting Facilities at Tofuku-ji WHS

A Sight Visiting of Yokogaki Ridge

An Observation of Wakayama Sabo Research and Education Intitute

A Site Visit of Nachi-waterfall at Kumano Nachi Shrine

A Workshop for Designing Recovery Process

The Presentation and Discussion

Final Presentation of Case Study Projects and Discussion

A Group Photo of International Symposium

A Farewell and the Certificate Ceremony

The situation analysis exercise for damaged collections on the simulation of emergency response phase.

DMUCH Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University

CPDRM 文化財防災ネットワーク

UNESCO United Nations Educational, Scientific and Cultural Organization 国際連合教育科学文化機関

UNESCO Chair on Cultural Heritage and Risk Management, Ritsumeikan University, Kyoto, Japan 立命館大学 ユネスコ・チェア 「文化遺産と危機管理」 京都・日本

ICCROM

ICOM international council of museums

ICOMOS

INTERNATIONAL SCIENTIFIC COMMITEE ON RISK PREPAREDNESS ICORP