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 10 YEARS ANNVERSARY SYMPOSIUM / ACCOMPLISHING REPORT of the TOYOTA FOUNDATION 'INITIATIVE PROGRAM'

2016, 11th year
From 10th to 26th September 2016,
At Kyoto, Kobe and Sasayama, Japan

Organized by Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University (R-DMUCH), Kyoto, Japan In Cooperation with UNESCO, ICCROM, ICOMOS / ICORP
Supported by Toyota Foundation "Initiative Program"

Caption for front cover photo: Townscape of "Sasayama-shi Sasayama Important Preservation Districts for Groups of Historic Buildings" . This area had been affected by 1953 floods and few traditional wooden town houses were burnt by 2007 fire.

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Preface

Recently devastating earthquakes in Italy and Myanmar in 2016 have caused significant loss to rich cultural heritage. Not long time ago, floods in Balkan region in 2014 affected numerous historic towns, 2011 floods in Thailand severely damaged the World Heritage Site of Ayutthaya. As exemplified through these incidents, cultural heritage is confronted with various kinds of disaster risks, due to natural hazards such as floods, fires, earthquakes etc. as well as human induced events such as terrorism, vandalism, armed conflict and arson. As a result, many cultural heritage sites including those on the World Heritage List have been significantly damaged in the recent years.

Climate Change is contributing towards increased intensity and frequency of hydro- meteorological events such as heavy rainfall, cyclones, hurricanes, storms, sea level rise and extreme temperatures. 1990–1999: around 200 climate related disasters per year, while the following decade (2000-2009) witnessed nearly 350 climate related disasters on average per year. In this period, 55 million people were affected on average by climate related disasters annually, and 789 billion US dollars was the estimated damage.
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, world is facing increased rate of urbanization than ever before. Number of people living in cities equaled those in villages in 2007 and is rising ever since. Such a fast pace of urbanization accompanied by densification, poorly constructed buildings and overburdened infrastructure is putting tremendous pressure on heritage sites especially those located in urban areas, thereby increasing their disaster vulnerability. Considering these issues, the 11th International Training Course on Disaster Risk Management of Cultural Heritage specifically focused on “Protecting Cultural Heritage from Risk of Natural Disasters including those induced by Climate Change”

However, despite the increasing vulnerability of cultural heritage to hazards, disaster risk reduction unfortunately does not register as a priority area for management. This is supported by the fact that only handful of World Heritage Properties have formulated disaster risk management plans and even fewer and implemented them. Among other factors, this is result of low levels of awareness among various stakeholders and the public and the limited capacity building of those in charge of protection and management.

Therefore it is important to conduct site-based risk assessments and, where appropriate, develop the necessary disaster risk management plans outlining mitigation, emergency preparedness, response and recovery measures for various hazards to which the properties are exposed. On the other hand, measures must be taken to advance heritage concerns in the wider agenda for disaster risk reduction and to raise awareness among heritage managers and professionals.

This necessitates building the capacity of heritage managers, civic defense/emergency response agencies as well as decision makers from heritage as well as disaster management fields on reducing disaster risks to cultural heritage. In this direction, a pioneering initiative has been undertaken by the UNESCO Chair established within the Institute of Disaster Mitigation for Urban Cultural Heritage at Ritsumeikan University, Kyoto (Japan), which in cooperation with ICCROM, ICOMOS-ICORP and the UNESCO World Heritage Centre has been organizing international training course on disaster risk management of cultural heritage every year since 2006. The target groups for this course include government institutions, departments, universities, NGOs and private consultants from cultural heritage, as well as relevant disaster management fields. In 2016 10th Anniversary Symposium of the International Training Course was celebrated by inviting some former participants of the course, who have been undertaking various initiatives in their home countries and regions based on the learnings from the course. In these proceedings we have included the report on this 10th Year Symposium and a special report by one of the former participants.

The proceedings also contains 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.

The importance of this training course has been globally recognized as seen with increasing number of applicants from all over the world and our institute hopes to continue this initiative in the future.

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

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 10 years’ anniversary supported by UNESCO, ICCROM, Toyota Foundation, Ritsumeikan University and many national and international organizations. 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 2016 with theme as “Protecting cultural heritage from risks of natural disasters including those induced by climate change”, most of participants thought about developing their case project toward multiple and simultaneous disaster risk, and did their best within short period. The outcomes were fantastic and some of participants are already starting their project in their site. And 10 years Anniversary Symposium of the UNESCO Chair International Training Course on Disaster Risk Management of Cultural Heritage/ Accomplishing Report of the TOYOTA Foundation 'Initiative Program' was held in the last day of ITC. Fortunately, we could invite 7 of former participants from the world who have started their project in real world and we could learn much from their experiments. This year’s participants, all the resource persons and staffs could share the importance of this activity and strong expectation for future continuity from the world.

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

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 11 years that the course has been implemented, we have had 1007 applicants and 116 people from 53 countries have been trained. The accepted number of trainee is only 11.6% of applicants and it is small percentage. Particularly in 2012, we could receive 9 people as trainee among 175 applicants and this is only 5%. 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 Toyota Foundation has decided to support the course for three years from the fiscal year 2014. Then the total budget has been almost doubled and the number of trainee has increased. Moreover we could increase speakers not only from domestic but also abroad. In 2016, the last third year with the support from the Toyota foundation, we could invite 15 trainees and it is the largest number same as 2015. On the other hand, 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 second follow-up training course in March, 2017 in Kathmandu, Nepal where people need quick recovery from the Gorkha earthquake which occurred in April, 2015.

In this way, the support by the Toyota Foundation allowed us to provide better course for more people, so that our course has been receiving high evaluation from the international community. A noteworthy fact is that trainees gave us very good assessment for our course. Hereby we appreciate the recognition and evaluation of activities of our training course by the Toyota Foundation and we would like to express our heart-full gratitude to the foundation. We promise to continue this training course as one of our most important missions.

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

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1 Introduction

1.1 Background and Objectives of the 11th International Training Course 2016

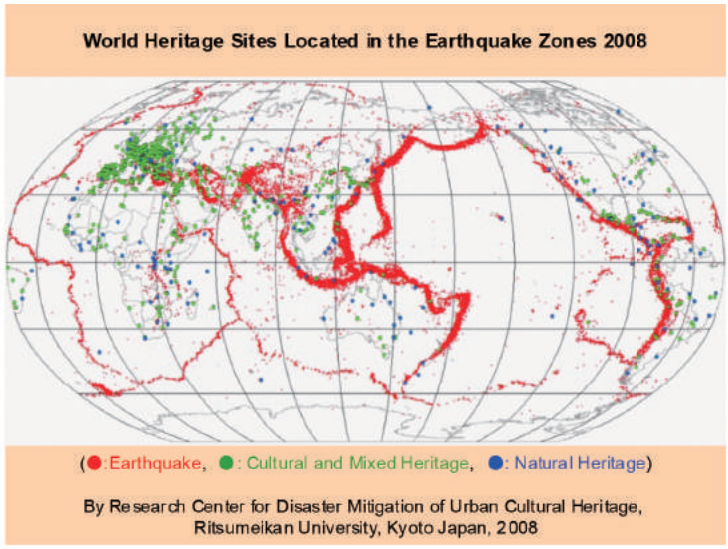
Disasters and Cultural Heritage

Recent disasters such as 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 11th International Training Course on Disaster Risk Management of Cultural Heritage will specifically focus on 'Protecting cultural heritage from risks of natural disasters including those induced by climate change.'



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	No.5
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	No.3
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	No.2
Southeastern Asia	6	1	7	39%	11	61%	18	
Southern Africa			0	0%	7	100%	7	
Southern Asia	6	8	14	29%	34	71%	48	No.6
Southern Europe	35	23	58	45%	70	55%	128	No.1
Western Africa			0	0%	16	100%	16	
Western Asia	13	8	21	40%	31	60%	52	No.3
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 2015 and many of its faculty are expert members of the Scientific Committee.

The past training courses have been attended by participants from China and Korea from East Asia; Indonesia, Malaysia, Myanmar, Philippines, Thailand and Vietnam from South-East Asia; Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka from South Asia; Australia, Fiji, New Zealand and Palau from the Pacific region; Chile, Colombia, Ecuador, Haiti, Honduras, Jamaica, Mexico and Peru from Latin America and the Caribbean; Albania, Croatia, Italy, Moldova, Netherlands and Serbia from Europe; Afghanistan, Iran, Iraq, Palestine, Syria and Turkey from Middle East; Egypt, Ghana, Kenya, Nigeria, South Africa, Tanzania and Uganda from Africa.

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 by analyzing the vulnerability of cultural heritage 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 urban and regional disaster management plans and policies; and
- ✓ Establish an international scientific support network for risk management of cultural heritage in order 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.

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.

Special Theme of 2016 International Training Programme:

Protecting cultural heritage from risks of natural disasters including those induced by climate change

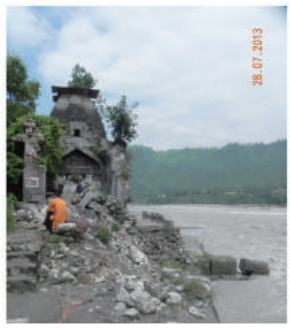
Climate change is increasing the frequency of disasters caused by hydro-meteorological events such as heavy rainfall, flash floods, cyclones, typhoons and storm surges. As a result, many heritage sites located in global hot spots such as coastal areas especially below sea level are exposed to risks of 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.

These hazards are adversely impacting peoples' safety, livelihoods as well as values associated with cultural heritage. The increased vulnerability and exposure of cultural heritage to these climate related hazards and potential scenarios will impact various typologies of cultural heritages in the future. Critical challenges in integrating Climate Change Adaptation and Disaster Risk Reduction are also experienced especially in the light of the existing international frameworks on disaster risk reduction and climate change adaptation and their implications on national level policies. Therefore there is urgent need of mainstreaming cultural heritage protection in wider policy, planning and institutional systems for disaster risk reduction and climate change adaptation. Moreover disaster risk reduction and climate change adaptation need to be integrated within existing site management systems.

World is facing unprecedented rate of urbanization than ever before. Number of people living in cities equaled those in villages in 2007 and is rising ever since. Such a fast pace of urbanization accompanied by densification, poorly constructed buildings and overburdened infrastructure is putting tremendous pressure on heritage sites especially those located in urban areas, thereby increasing their vulnerability to hydro-meteorological hazards related to climate change.

In order to reduce these risks, appropriate mitigation and adaptation strategies need to be developed taking into consideration the exposure to hazards and the heritage values. It is also important to recognize many examples of traditional knowledge evolved by communities through series of trials and errors that demonstrate that cultural heritage can be an effective source of resilience against climate change induced disaster risks and integrate these in disaster risk management strategies.

Considering these issues and challenges, the 11th International Training Course will give special focus on the **Protecting cultural heritage from risks of natural disasters including those induced by climate change**



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 (2006-2015)

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**.

Organizers and Participants

The training course is organized from the beginning in cooperation with the UNESCO, ICCROM, ICOMOS and relevant institutions of the government of Japan. In 2014, the Toyota Foundation "Initiative Program" has proposed to support our training course by providing the budget for three years. 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	BANGLA-DESH	Deputy Secretary, Ministry of Home Affairs, GOVT. of Bangladesh	Lal Bagh Fort, Dhaka, Bangladesh
2	Md. Rafiqul ALAM	BANGLA-DESH	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	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	BANGLA-DESH	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	AFGHA-NISTAN	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 SIRIPHATTHA-NAKUN	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 RUTTANAWO-NGCHAI	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)	TArchaeological 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	amela 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

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

	9/9 Fri	9/10 Sat	9/11 Sun	9/12 Mon	9/13 Tue	9/14 Wed	9/15 Thu	9/16 Fri	9/17 Sat
THEME	Arrival	Introduction and The First Presentation	Core Principle and Value	Principles, Framework and Risk Analysis at Site Level	Risk Assessment and Planning at Urban Level	Urban Disaster Risk Reduction and Integrated Risk Assessment	Risk Preparedness and Response	Risk Prevention and Mitigation	The Middle Presentation
Venue		DMUCH	DMUCH	Kiyomizu-District	Ponto-cho	DMUCH	DMUCH	Ninna-Ji	DMUCH
9:00		Registration	Lecture 2 Disaster Risk Management of Cultural Heritage - Significance and Core Principles (R.JIGYASU)	to Kiyomizu-Dera	Recap	Recap	Recap	Recap	
10:00		Opening Address; Orientation of the Course (R.JIGYASU)		Lecture 5 Introduction to the Context of Japanese Wooden Cultural Heritage (A.KOMIYA, Kyoto Pref.)	Lecture 6 Disaster Imagination Game and Environmental Water Supply System in Kiyomizu Area (T.OKUBO)	Lecture 7 Multiple Hazards and Urban Areas (L.BOSHER)	Lecture 11 Climate Change and Risk Prevention (Y.SATOFUKA)	to Ninna-Ji; Self Study	The Middle Presentations by the Training Participants
11:00			Lecture 3 Assessing the Values of Cultural Heritage (R.JIGYASU)		to Ponto-cho			Site Visit 5 Fire Prevention Facilities at Ninna-ji Temple (N.TSURUOKA, Kyoto Pref.)	
12:00		Lecture 1 The Need for Disaster Risk Management for Cultural Heritage in Historic Cities: The Case of Kyoto (K.TOKI)	Workshop 1 Assessing the Values (R.JIGYASU)	Site Visit 1 Observations of Risks at Kiyomizu-Dera World Heritage Site (A.KOMIYA, Kyoto Pref.)	Site Visit 4 and Field Work Ponto-cho Townscape Improvement Area (T.OKUBO and D.KIM)	Lecture 8 Disaster Risk Reduction and Integrated Risk Management of Historic Cities: Who is Responsible? (L.BOSHER)	Lecture 12 Flood Prevention and Mitigation Techniques (K.SAWAI)		
		Lunch	Lunch	Site Visit 2 Landslide Assessment in Kiyomizu-dera Temple (M.Fujimoto)	Lunch	Lunch	Lunch	to DMUCH	Lunch
13:00				Lunch				Lunch	
14:00		The First Presentations by the Training Participants/ Cultural Heritage and Disaster	Lecture 4 Introduction to the Context of Historic City of Kyoto (N.ITAYA)	to Sannei-Zaka	Site Visit 4 and Field Work Ponto-cho Townscape Improvement Area (T.OKUBO and D.KIM)	Workshop 4 Applying the IRM Process (L.BOSHER)	Lecture 13 Disaster Prevention for Cultural Heritage in Kyoto City (Y.MACHIDA, Kyoto City FD)	Lecture 15 Landslide Prevention and Mitigation Techniques (R.FUKAGAWA)	The Middle Presentations by the Training Participants
15:00			Self Study	Site Visit 3 and Field Work Sannei-Zaka Important Preservation District (T.OKUBO)	to DMUCH; Workshop 3 Risk Assessment Exercise: Discussion and Presentation on Disaster Imagination Game (DIG) (T.OKUBO)		Workshop 5 Role Playing Workshop on Emergency Response (R.JIGYASU)	Case Study Project Work	
16:00						Lecture 9 Introduction to the Integrated Methodology for Assessing Risks (R.JIGYASU)	Lecture 14 GIS for Disaster Management of Historical Cities and Cultural Heritage (T.NAKAYA and K.HANAOKA)		to Kobe
17:00				Workshop 2 Impact of Disaster on Cultural Heritage/ in Case of Kiyomizu-Dera Temple, Introduction to Key Terminology (R.JIGYASU)	Case Study Project Work	Lecture 10 Dynamic Analysis of Earthquakes and Seismic Performance of Japanese Historical Structures (S.YOSHITOMI)	Case Study Project Work		
18:00									
19:00		Welcome Dinner							
Accommodation	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	Kobe

Management of Cultural Heritage 2016, 11th year,

9/18 Sun	9/19 Mon, Holiday	9/20 Tue	9/21 Wed	9/22 Thu, Holiday	9/23 Fri	9/24 Sat	9/25 Sun	9/26 Mon	
Planning for Recovery: Lessons from Kobe	Community Engaging DRM: Fire and Water Hazard	From Response to Recovery: Great East Japan Disaster	Self Study	Community Engagement	Policy for Risk Management	International Frameworks for DRM	The Last Presentation	10 years Anniversary Symposium of ITC, Ritsumeikan University	THEME
Kobe	Sasayama	Kyoto	Kyoto	DMUCH	DMUCH	DMUCH	DMUCH	Kinugasa Campus	Venue
								Soshi-kan	9:00
	Recap	Recap	Self Study	Recap	Recap	Recap		Registration	
Exhibition of Disaster Reduction and Human Renovation Institution	Lecture 17 Floods and Fire Post Disaster (T.UEKI, Sasayama-city)	Workshop 6-1 Group Work for Designing the Recovery Process (W.CHEEK)		Case Study Project Work	Case Study Project Work	Case Study Project Work	Preparation for the Last Presentation	Opening Remarks by President of Ritsumeikan Univ., Former Director of DMUCH, Rep. of Toyota Foundation	10:00
								Anniversary Ceremony	
								Keynote speech by R. JIGYASU	
Lecture 16 Planning for Disaster Mitigation of Cultural Heritage Training of Heritage Manager (Video of Y.MURAKAMI, Hyogo Pref.)	Lecture 18 Local Community Engagement for Disaster Mitigation (Local Key Person and D.KIM)	Lecture 19 Thinking About Disaster Through a Social Science Lens (W.CHEEK)		Lecture 22 Engaging Communities for Disaster Risk Reduction (R.JIGYASU)	Lecture 23 Governmental Policies of Disaster Risk Management for Cultural Properties under the Legislative Protection in Japan (K.KANAI, ACA Japan)			Keynote speech by G. BOCCARDI, UNESCO	11:00
								Keynote speech by J. KING, ICCROM	
								Keynote speech by J.VELASQUEZ, UNISDR	
								Report of Follow up Activity by K. WEISE	12:00
Lunch at JICA	Lunch	Lunch		Lunch	Lunch	Lunch	Lunch	Lunch	
									13:00
								Introduction of Program	
		Lecture 20 Post Disaster and Recovery Process by the Government and Community in Case of Minami Sanriku Cho (Y.HIRAOKA)		Case Study Project Work	Lecture 24 Management Systems and Management Planning for Heritage Sites (J.KING, ICCROM)	Case Study Project Work	The Last Presentation	Progress Activity Reports of Former Participants for 20 min. each. Juan Diego BADILLO REYES (Ecuador、ITC2014) Zeynep GUL UNAL (Turkey、ITC2010) Sang sun JO (South Korea、ITC2012) Barbara CARANZA (Italy、ITC2013) Hatthaya SIRIPHATTHANAKUN (Thailand、ITC2013) Abdelhamid SAYED (Egypt、ITC2014)	14:00
Site Visit 6 After the Kobe Earthquake Site and Flood Area	Site Visit 7 Visit to Areas Affected by Flood and Fire on Sasayama Important Preservation District	Lecture 21 Lessons from Post Disaster Recovery of Intangible Heritage (N.ITAYA and G.TANIBATA)			Lecture 25 Making Historic Cities Resilient (J.VELASQUEZ, UNISDR)	Lecture 26 Global Initiatives for Disaster Risk Management of Worald Cultural Heritage (G.BOCCARDI, UNESCO)			15:00
									16:00
to Sasayama		Workshop 6-2 Group Work for Designing the Recovery Process (W.CHEEK, L.BOSHER, Y.HIRAOKA, N. ITAYA and G.TANIBATA)			Case Study Project Work	Case Study Project Work		Panel Discussion : J. KING、Seven Former Participants	17:00
	to Kyoto							Closing : Diretor of DMUCH	18:00
								Farewell Party	19:00
Sasayama	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	Kyoto	

Organized by Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University, Kyoto, Japan
In Cooperation with UNESCO, ICCROM, ICOMOS/ICORP
Supported by Toyota Foundation "Initiative Program"

2 Outline of Disaster Risk Management Plans for Case Study Projects by ITC2016 Participants

2.1 Mohenjo Daro Archeological Site, Sindh Province, District Larkana, Pakistan

Amna SHUJA
National Disaster Management Authority, Pakistan

Fig. 1 Mohenjo Daro Archeological Site

1. Introduction

Mohenjo-Daro, 5,000 year old city is an excellent example of early town planning system, modern urbanization and building techniques. The city is recognized as one of the most important cities of South Asia and Indus Valley Civilization (IVC) and referred as 'An Ancient Indus Valley Metropolis'. The archeological site of Mohenjo-Daro is a demonstration of Indus Valley Civilization and is on UNESCO's list of the World Heritage sites.

Soon after its excavation in 1922, the structural remains at Mohenjo-Daro started to decay and crumble due to salt drainage and thermal problems. Moreover, the continuous rise of ground water caused salt laden moisture to move into the structure through the capillary action. Recently, the havoc flood of 2010 in Pakistan caused a serious threat to these antique site of Indus Valley Civilization. Floods in Pakistan is a common phenomenon every year and as this site lies near the Indus water basin, hence floods are constant vacillator and crucial to its ancient importance. This archeological site is a portrayal of developed human civilization and town city planning which is worth seeing. This paper focuses on the risks, mitigation measures, response and recovery mechanism for the archeological site of Mohenjo Daro in case of disasters.

2. Background

'Mohenjo-Daro' meaning "Mound of the Dead" was built by unbaked brick in the third millennium BC. The reason of destruction of the city is unknown but the deterioration can be traced back in around 1700 BC which buried many precious objects and lives, hence, posterity's named it "Mound of the Dead" for its ruins. The ruins of Mohenjo-Daro had once been a center of ancient society. The excavators divided the actual excavation into two main areas, east and west. The higher settlement to the west has the ruins of ancient administrative buildings and some that were likely residences for the elite.

Mohenjo-Daro is a proof of a remarkable ancient work showing the modern construction. It has a planned layout based on a grid of streets, laid out in perfect patterns. According to Archeologists, the city probably had around 35,000 residents. The buildings of the city had been constructed with same-sized sun dried bricks of baked mud and wood and had advanced designs. The public buildings of the city also reflects a high degree of social system. Houses are opened only to inner

courtyards and smaller lanes. It has a 2.4 m deep 12m long, and 7m wide pool made by fine baked waterproof mud and bricks with thick layer of tar named as Great bath, is associated with religious bathing. The city is the perfect demonstration of urban plan included the world's first urban sanitation systems. Some of the houses included rooms that seem to have been set aside for bathing, waste water diverted to covered drains, which lined the major streets. Individual homes or groups of homes obtained water from the system of well.

3. Outstanding Universal Value OUV

The Archeological site is at World Heritage List of UNESCO as per criterion ii and iii. However the determination of core and buffer zone of the site is not maintained yet but the process of core drilling has been initiated in 2015. The OUV criteria for Mohenjo Daro is as following:

Criterion (ii): The Archaeological Ruins at Mohenjo-Daro comprise the most ancient planned city on the Indian subcontinent, and exerted great influence on the subsequent urbanization of human settlement in the Indian peninsular.

Criterion (iii): As the most ancient and best preserved urban ruin in the Indus Valley dating back to the 3rd millennium BC, Mohenjo-Daro bears exceptional testimony to the Indus civilization.

4. Attributes and Values

The archeologist called it city of mounds mainly because the ancient city sits on elevated ground in the modern-day Larkana district of Sindh province. The site has famous attributes for instance Granary, Assembly hall, Great Bath, Buddhist stupa, Priest King, College of Priest however for the purpose of this case study three attributes has been selected i.e. Buddhist Stupa, Great Bath and Archeological Museum.

Fig. 2 Buddhist Stupa

Fig. 3 Great Bath

Fig. 4 Symbolic Value of Site

Fig. 5 Archeological Museum

Fig. 6 Dancing Girl and Priest King

Table 1

S.No.	Attributes of your Site and their location (Refer Map)	Type of attribute (movable/ immovable, tangible/ intangible, natural/cultural/ mixed)	Associated Values	Qualifiers			Stakeholders for these values	Scores for each Value 1(low), 2(Medium), 3(High)
				Integrity	Authenticity	Sustainability		
1.	Great Bath	•Immovable •Tangible •Cultural	•Historical •Archeological •Symbolic	Yes	Yes	Yes	•Historians •Archeologists •Dept of Antiquity •Community	•3 •3 •3 •2
2.	Buddhist Stupa	•Immovable •Tangible •Cultural	•Historical •Archeological •Symbolic	Yes	Yes	Yes	•Historians •Archeologist •Dept of Antiquity •Community	•3 •3 •3 •2
3.	Archeological Museum	•Immovable •Movable artifacts •Tangible & intangible •Cultural	•Historical •Educational •Archeological •Social context	Yes	Yes	Yes	•Archeologist •Historians •Administrative staff of musem •Community	•3 •3 •3 •2

5. Hazards and Vulnerabilities

The site has a historical background of hazards with respect to floods and earthquakes in nearby areas. As the site is an excavated structure therefore it is fragile in its nature and can easily be affected due to shaking of the land. The floods in the area is also a threat as Indus River passes near the site and the 2010 flood of Pakistan affected the archeological site of Mohenjo daro. Moreover weathering of the structure, salt drainage and raise in water table of the area are the environmental hazards that are affecting the site.

Furthermore owing to its location which is close to the Indus River and the fertile land in and around, the spurs of human settlement is increasing on the World Heritage property. The excavated structure, non-determination of core and buffer zone, weak coordination between federal and provincial management and lack of implementation on the already formulated Master Plan aggravates the vulnerabilities of the site resulting in negative impacts on the archeological remains. The fig 7 shows the probable hazard, vulnerabilities and the impacts they can threaten the site.

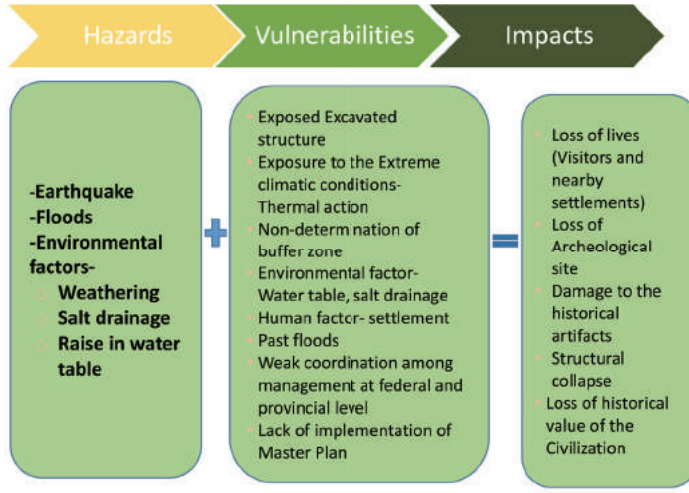


Fig. 7 Hazards, vulnerabilities and their probable impacts on the site

6. Risk Mitigation Strategy

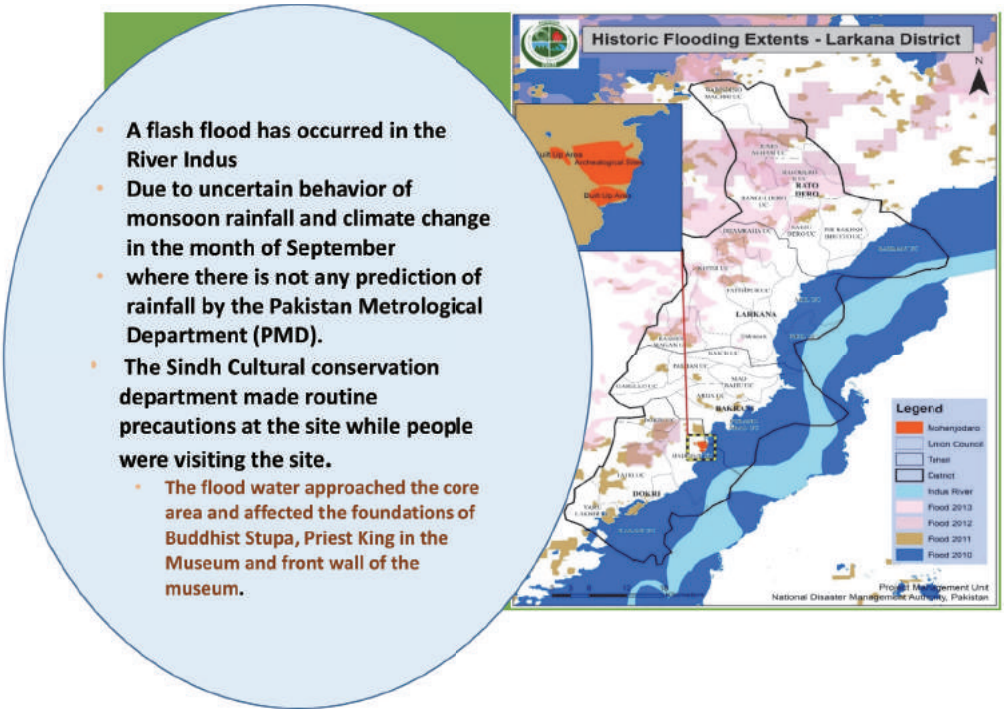


Fig. 8 Scenario of the case study of the archeological site

Keeping in view the past history of hazards in the area the above stated scenario of floods has been selected for the purpose of this case study and consequently the mitigation plan is aligned to the scenario of flood.

i. **Planning**: In terms of planning following mitigation measures are suggested in order to reduce the risk of damage
   a. Determination of core and buffer zone
   b. Determination of elevated storage space for artifacts in museum where they can be placed temporarily in case of flood
   c. Tree plantation along the river side can reduce the flow of damage of floods
   d. The plantation of salt tolerant trees and grass in and around the site for controlling the drifting of salt
   e. Archeological Park near the site for revenue generation and visitors attraction
   f. Data management system for artifacts in museum- this can be done through proper documentation and prioritization of artifacts in the museum so that in case of disaster lost or damage articles can be traced.
   g. Irrigation system (canals) to utilize the water for crops

ii. **Infrastructure**: In terms of infrastructure, the site can be protected by following measures.
   a. Embankment along the river side
   b. Rapid Sewerage system installation
   c. Improvement of traditional system by installation of new sewerage lines or maintenance of old and checking the blockage. It is pertinent to mention that Mohenjo Daro was the first city to have the proper sewerage and drainage system. So the installation of new sewerage lines or maintenance of old can be an efficient and adequate measure for mitigating the risks.
   d. Temporary flood walls/ barrier along the buffer zone of the site – on the call of early warning,

temporary barriers can be installed along the buffer zone however this methods needs due care because of sensitivity of the excavated site

iii. **Policy**: Following mitigation measure can reduce the risks associated to the site
   a. Integration of DRM plan with the Cultural Heritage Conservation system and Master Plan
   b. Formulation of guidelines on DRM of Cultural Heritage (CH)

iv. **Monitoring mechanism**: A systematic and periodic monitoring mechanism can well identify the loopholes in any action as well as ascertain the need of improvement so that a hazard cannot turn into disaster. Following is required in terms of monitoring mechanism
   a. Coordination among Federal and provincial government
   b. Systematic revenue collection mechanism
   c. Monitoring the implementation of Antiquities Act 1975 – from threats of damage and new development around the site
   d. Monitor the Flood Warning System
   e. Risk assessment of site & Museum

v. **Building and maintenance**: For the maintenance of the site the already utilized technique i.e. mud slurry is beneficial however the periodic maintenance of important attributes for instance Buddhist stupa and Great Bath can mitigate the risks in case of disaster.

vi. **Awareness of DRM of CH**: For this media and public sensitization workshops can play its role in order to highlight the importance of the DRM integration in Cultural heritage.

7. Emergency Response Measures

In case a flash flood occurs at the site, the first response measure must be deporting people to the safe locality and afterwards protecting the site and artifacts. For this purpose firstly, the determination of evacuation routes as well as indication of symbol/sign for evacuation at the site is required. Secondly, on emergency call, placement of precious artifacts at the museum needs to be transferred to the elevated storage space by the trained staff of the museum. Thirdly, emergency equipment like CCTVs inside the museum, fire extinguishers and emergency lights would be required for response action in disaster. It is extremely essential to establish the coordination mechanism between the response team and cultural heritage managers at the time of disaster, therefore, there must be a link at district level with the Executive Board of Mohenjo daro so that the site is also protected timely.

8. Recovery Plan

Many post disaster recovery and reconstruction measures destroy significant components of cultural heritage rather than protecting them. This signifies that recovery mechanism and reconstruction must be in such a way that can reduce the risk and leads towards mitigation from disasters in future. The first and foremost thing in terms of recovery of cultural or historical heritage is the adequate damage assessment of the loss of site or artifacts. For this purpose, suitable 'Damage Assessment Form' is required in order to assess and appropriately recover the loss.

In case of flood, firstly the structure of the site can be recovered by using the technique of Mud slurry on the affected areas. Secondly for the damaged artifacts inside the museum, the adequate step would be codification of damaged pieces with respect to their places in the Museum and their maintenance considering the integrity and authenticity of articles. And last but not the least would be reconstruction or maintenance of Museum in such a way that it can resist the future hazards.

9. Conclusion

Like the way we preserve our ancestors treasure, cultural heritage has such sanctity and needs protection. It is extremely essential to mitigate the risks of disasters which can result in the loss of irreplaceable artistic and cultural assets. The paper aims to produce a disaster management plan which is well integrated with the requirements of historical heritage of Mohenjo Daro. After thorough analysis of the archeological site and disaster management strategies, this plan is formulated for mitigating risks associated to the World archeological site of Mohenjo Daro.

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2.2 Disaster Risk Analysis in Volubilis Roman Archaeological Site, Morocco

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1. Introduction

Volubilis is the most important and famous Roman archaeological site in northern Morocco (Fig. 1). Founded in the 3rd century BC, Volubilis holds fine monuments and beautiful Roman mosaics, and is classified as world cultural heritage by Unesco.

Volubilis is located 400m height on the south-western hillside of Jbel Zerhoun, with 10% average slope, the most part of the city lies on Miocene marls, overlying calcareous Jurassic terranes (Faugeres, 1987).

Fig.1 View of Volubilis archaeological site

Despite it is the most preserved archaeological site in Morocco, it shows serious marks of soil instability threatening some monuments and mosaics. In this study, we consider other kind of hazards, particularly earthquakes, and we propose a disaster risk management analysis for the archaeological site.

2. Attributes and Values

Volubilis was inscribed on the Unesco World Heritage List since 1997.The mean attributes of the site are the Roman monuments and the precious open-air Roman mosaics, with high associated archaeological, historical and aesthetic values.

Fig. 2 summarizes the relation between these attributes, their values and the involved stakeholders.

ATTRIBUTES	TTYPE OF ATTRIBUTE	ASSOCIATED VALUES	SCORES 1(low), 2, 3(High)	STAKEHOLDERS
Roman Mosaics 	• Immovable • Tangible • Visible • Mixed	• Archaeological • Historical • Aesthetic • Touristic / economic for local people (souvenir shops, etc.)	• 3 • 2 • 3 • 2	• Ministry of Culture • INSAP-Rabat • Local authorities • University • Civil society (Association Amis de Volubilis, ONA foundation, etc.) • UNESCO , ICCROM, ICOMOS
Monuments 	• Immovable • Tangible • Visible	• Archaeological • Historical • Touristic / economic for local people (souvenir shops, festival, etc.)	• 3 • 2 • 2	• Ministry of Culture • INSAP • Local authorities • University • Civil society (Association des Amis de Volubilis, ONA foundation, etc.) • UNESCO, ICCROM, ICOMOS
Artifacts (Museum) 	• movable • Tangible • Visible	• Archaeological • Historical • Aesthetic • Touristic / economic	• 3 • 3 • 3 • 2	• Ministry of Culture • INSAP • Local authorities • University • Civil society (Association Amis de Volubilis, etc.) • UNESCO, ICCROM, ICOMOS

Fig.2 Volubilis attributes and associated values

The site is administered by the ministry of Culture, research is mainly performed by the INSAP as public institute and the conservation/restoration is carried out in the framework of international cooperation with the support of the cited organisms.

3. Hazards and Vulnerability

Volubilis archaeological site is under the threat of several hazards at different intensities. Here is considered the geological and atmospheric weathering, earthquakes, landslides and flooding.

Weathering is related to time and Roman mosaics are the most vulnerable attribute (Dekayir et al., 2003) that needs most protection. A shallow landslide (gravitational creep) was identified on the eastern quarter of the city (Rouai et al., 2015) related to clayey expansive soil and the topography. Flooding is not to be completely neglected, especially in south-western part of the site due to vicinity of Oued Khoumane that threats the Islamic vestiges in this area.

The most expected hazard is earthquake; the site is located in an earthquake prone zone near active geological faults. Even if the seismicity is moderate, an important seismic activity has been observed near Volubilis by July 1987 reaching a magnitude 5 in Richter scale (Ramdani, 1991). The historical seismicity catalogue (El Mrabet, 1991), and historical records indicate that the region have been completely destroyed following the Great Lisbon 1755 earthquake and other important events during past centuries.

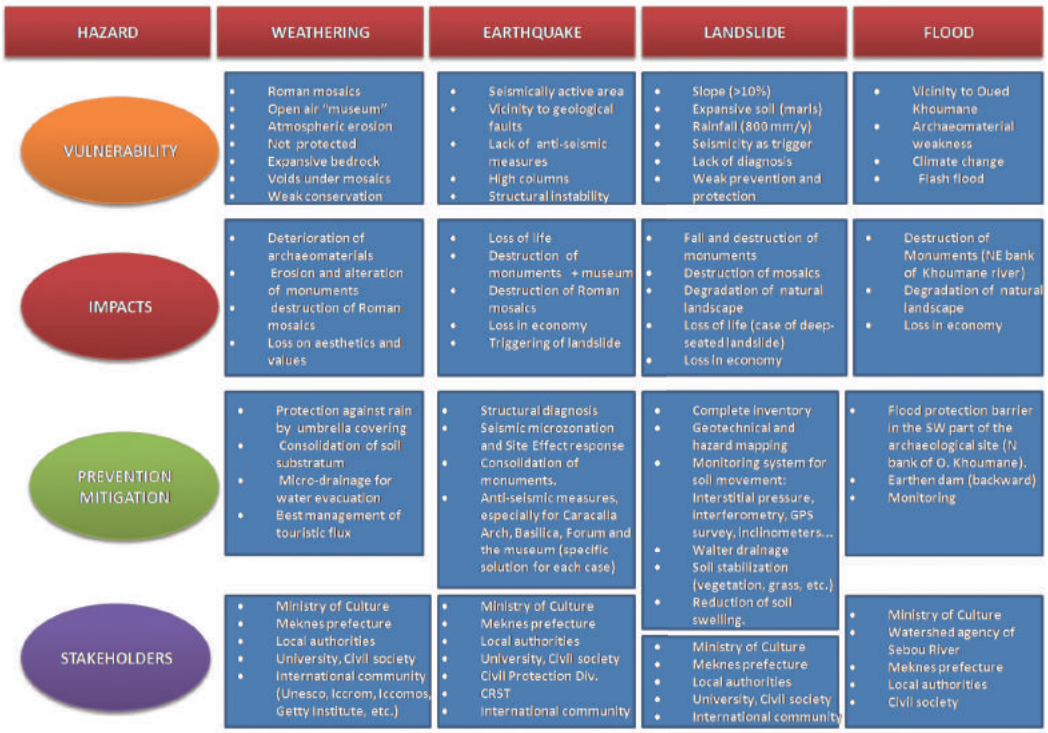

Fig. 3 Hazards, vulnerability, impacts and mitigation measures

3. Risk Mitigation Measures

There are many important prevention and mitigation measures that should be implemented at national and local levels to reduce the above mentioned risks.

Suggested interventions are listed on Fig.3. A monitoring of the shallow landslide should be implemented with consolidation of the ancient house walls to prevent ruin and mosaics damage. A flood protection barrier is also needed to mitigate Oued Khoumane flooding in rainy seasons and flash floods. Anti-seismic measures seem to be urgent, particularly for tall monuments (Caracalla arch, Basilicata, etc.) after a structural diagnosis.

4. Earthquake Scenario

After rainy days, a superficial earthquake will strike the area with a magnitude 6.1 on Richter scale, the epicenter is close to the site. Hundreds of deaths and around one thousand injuries on Moulay Idriss city, few casualities and injured persons in Volubilis site. In this scenario, we expect destructions of tall monuments (Caracalla Arch, Basilica, and Forum) and important damage on Roman mosaics.
Rescue and relief do not arrive at time and we will show a big anarchy due mainly to lack of coordination and bureaucraty (waiting for instructions from the prefecture and the central governement), the responsabilities are not clear.
It is to notice the lack of knowledge to deal immediately with archaeological brocken materials. Fortunately some trigerred landslides occure outside volubilis. As result, no touristic and economic activities around the site for some time after the event.

5. Emergency Preparedness and Response

It is obvious that saving human lives is the first priority in the case of catastrophic event, and after then dealing with cultural heritage.
We propose the evacuation paln on Fig. 4. The mean evacuation zone for tourists and workers seems to be the southern gate for logistical reasons to evacuate injuried people towards Moulay Idriss city (4 km) or Meknes city (26 Km). The local museum, if not destroyed during the event, could be used as temporary shelters, but only after preventive and mitigation measures (anti-seismic reinforcement, hydrants or underground water tank, smoke alarms, more extinguishers, etc.) and the safeguarding of artifacts.
Temporary open air shelters : firstly near south gate, secondarily the Tingis gate.
The most vulnerable items are the highest monuments: Caracalla arch (9), Basilica (16) and Capitol (17), but also the Roman mosaics (NE part of the city).

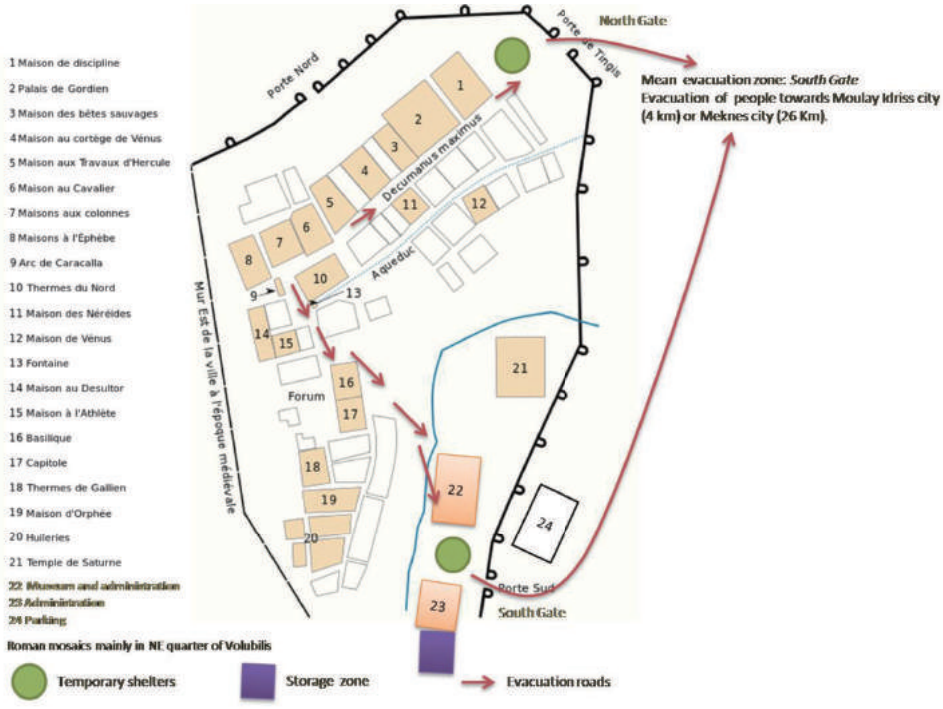

Fig.4 Evacuation plan

The emergency management needs an efficient emergency team, headed by the curator/director of Volubilis site. Such team should include representatives of civil society and the local authorty (Caidat).

An emergency plan with high coordination is mandatory due to the multiplicity of actors (Fig. 5).

Fig. 5 Emergency management and actors

6. Recovery Planning

A recovery planning is presented on Fig. 6, showing situation analysis, on site survey and security/ stabilization.The collumns and heavy fallen structures should be stored in-situ and safeguarded if not completly destroyed (temporary storage). Roman mosaics could not be stored, only fragments to be inventored and stored. Local interventions are necessary to clean and protect mosaics for further conservation. Recovery post-disater at short rerm consists of stengthen monuments and mosaics after a full damage assessment, and a retrofiting and restauration at long term with a continous monitoring.

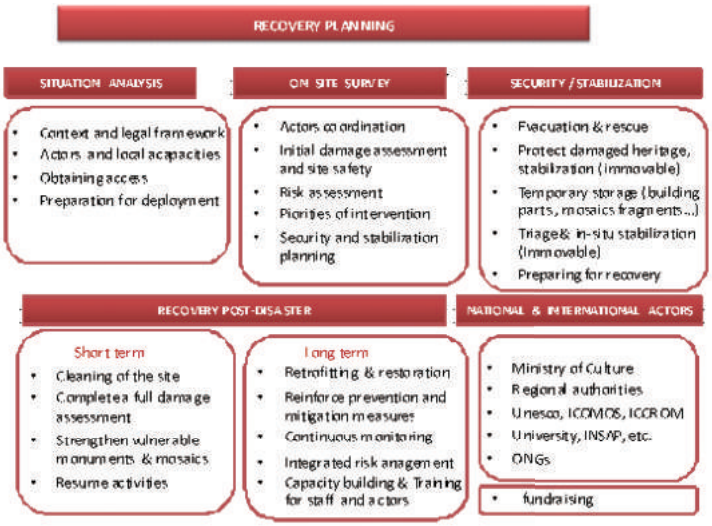

Fig.6 Recovery planning.

7. Conclusion

This case shows that disaster risk assessment is crucial and urgent for cultural heritage in Morocco in general, and in Volubilis archaeological site in particular. A disaster risk management plan should be enhanced and implemented. This imply, among others, the reinforcement of capacity building and training of staff and actors following international procedures and rules.

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2.3 Tajín (Thunderlight Deity) Archaeological Site, México

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1. Introduction

The Archaeological Site of Tajín (800-1200 a.C.) was the biggest and most outstanding pre-Hispanic city close to the north coast of the Mexican Gulf (1). It is part of a broad area of 1220 hectares that contains both important cultural and natural heritage, while the intangible heritage of the ritual ceremony of Los Voladores (Flyers) is part of the traditions of the Totonaca people that live close by. Tajín was inscribed in the World Heritage List in 1992, under criteria iii and iv, due to its "significance as the best preserved and most thoroughly excavated example of a pre-Hispanic town from the period between the Teotihuacan and Mexico-Tenochtitlan empires. It is crucial to an understanding of artistic and socio-economic development in these intervening centuries".

2. Heritage Value Assessment

The site contains around 200 constructions, 50 of which have already been excavated, including 17 ceremonial playing grounds "*juegos de pelota*", as well as a site museum and storage areas. Magnificent sandstone reliefs and wall paintings decorate the buildings constructed with an innovated architectonic style within the Mesoamerican context. The outstanding construction Niches Pyramid has been used as a regional and national symbol, while people that live near the site relay on the economic opportunity of providing touristic services. The surrounding natural area houses what is left of plants and wildlife native to this ecological zone, that live along with other species introduced throughout the historic times.

Fig. 1 General view of the Archaeological Site of Tajín.

ATTRIBUTES	VALUES
Group of pre-Hispanic buildings	architectural
Decorative elements (reliefs, wall painting, renderings, stucco elements)	archaeological
Museum objects and fragments collection	historic
Storage areas collection	technological
Surrounding environment	aesthetic
Totonaca culture	social-identity
	economic
	environmental

3. Disaster Risk Assessment

The exposed buildings, a site museum, and storage areas are located on an even morphology with two water streams surrounding the area, while a remaining jungle and still uncovered buildings are distributed on elevations of medium slopes up to 18°. The area has humid and warm climate, with plenty water supply and rain throughout the year, as well as an annual hurricane season. On the other hand, the increase in the urban settlement from two nearby cities, Poza Rica and Papantla, has promoted the rural population to move closer to the archaeological site, and the land to be used for cattle and animal raising, consequently deforestation. Finally, Poza Rica is an important city

for petroleum industry whose infrastructure has as well invaded the surrounding areas generating pollution, abandoned pipelines, and ground setting (2). A disaster scenario has been developed, based on previous evidence, to analyze the probable disaster risk at Tajín.

PRIMARY HAZARDS & THREATS (3)
Hurricane & Deforestation

- SECONDARY HAZARDS
- Heavy rain fall and wind
- Flood (Museum & storage areas as well as on specific areas of site)
- Thunderlight and fire
- Landslides

VULNERABILITIES

- Stakeholders lack coordination
- Community has little engagement
- No Disaster Risk Management Plan exists
- Low budget
- 68.5% population of the municipality is clasified as poor (4)
- Access road partially blocked with flamable stands (wood and plastic)
- Flamable materials on shelters (fig. 2)
- Shelters and exhibition cases prone to pest infestation
- Several buildings are located on slopes or close to them
- Response will be slow as some buildings are on isolated areas (no water, no road)
- Ground soil over a non permeable layer (favours landslides)
- Storage areas are not enough, therefore improvised
- Insuficient maintenance on drainage at the site during the last 15 years
- Museum has several glass windows and dome (fig. 3)

RISKS

- Visitors might fall on slippery pathways due to rain or hurt by landslides
- Burning of shelter, wall painting and stuccos at Building I
- Flooding around some buildings and consequent loss of renderings at base level, salt efflorescences and setting
- Flooding on storage areas and or Museum
- Breaking of glass windows and dome at Museum
- Landslides of slopes that damage buildings on top or close to them
- Removal of stone slabs of buildings close to streams
- Loss of remaining flora and fauna
- Land erosion

Fig. 2 Palm leaves and wood shelter of Building 1

4. Disaster Risk Management

An integrated plan is required for an effective management of disasters in the site, which should include all stakeholders and consider the socio-cultural characteristics of the region.

4.1 Mitigation

Mitigation	Priority	Responsible
Planning and educational level • Update management plan and include DRM strategies • Create a program for dissemination of attributes and values and raise awareness (bring back to living heritage and favor community engagement) • Create building guidelines for better shelter	1 (short term)	SC-INAH+ COM+ SO
• Build a network among the stakeholders to decide a plan for fast response where coordination is clear • Design a strategy for raising funds • Reinforce bonding with national security actors • Train army personnel for fast response • Create a volunteers program for response = emergency team • Revise rules for land use in core area and negotiate with local communities • Design commercial area that substitutes the current low quality stands • Generate a risk map	2 (medium and long term)	SC-INAH+ CENAPRED+ VG+ MP+ COM+ SO+ LO
Technical Level • Install lighting conductor, apply fire retardant, locate fire-extinguishers nearby, and build water container and mechanical hydrant system close to flammable shelter • Install sound warning system on isolated areas • Monitoring of structural stability of shelter • Monitoring of the soil over impermeable layer and further georadar analyzes of ground fractures • Update Museum and storage collection inventory • Register of ongoing deforestation practices • Promote a reforestation campaign • Maintenance of trees close to Museum, storage areas, and pre-Hispanic buildings	1 (short term)	SC-INAH+ SO+ U
• Maintenance of Museum and storage areas infrastructure • Select collection that should be moved on a disaster scenario, according to friability of materials • Design transportation, documentation, and equipment as well as select an area for temporal storage • Periodical control of pest infestation • Drainage maintenance	2 (medium and long term)	SC-INAH+ CENAPRED+ VG+ MP+ SO+ LO

Fig.3 Museum

SC-INAH= Mexican culture agency, CENAPRED=Federal government agency for disaster management, VG=State government, MP= Papantla municipality, COM= community members, SO= Shop owners, LO= Land owners, U=Universities

4.2 Response

Strategy	Responsible
Transmit the alarm signal to the previously organized emergency-related contacts and volunteers	SC-INAH
Cordon the area and take tourists through the evacuation path out of the archaeological site to Papantla or other nearby town.	SC-INAH + PTA + OV + MP
Set to work the fire control actions (fire-extinguishers and hydrants)	Fire department + PTA + OV
Protect glass windows and dome against protruded objects by wind	SC-INAH + PTA
Make sure the drainage is working properly and block water from getting inside the Museum and storage areas	SC-INAH + PTA + OV
Block water streams from getting closer to buildings and areas prone to landslide	SC-INAH + PTA + OV + U
Identify the objects that need to be taken to a temporary storage area from Museum or current storage areas (photograph, mark on inventory, pack, and transport)	SC-INAH + PTA + OV
Provide accurate information to media and politicians	SC-INAH + CENAPRED

SC-INAH= Mexican culture agency. CENAPRED=Federal government agency for disaster management, MP= Papantla municipality, PTA=previously trained army personnel, OV= organized volunteers

4.3 Recovery Planning

Short term (3 months)	Medium term (1-3 years)	Long term (4 years ……)
Remove debris and fragments and take them to storage areas SC-INAH + PTA + OV	Improve preventive conservation actions according to DRM strategies SC-INAH	Revise DRM strategies on management plan and install a constant planning process SC-INAH + VG + MP + COM + SO + LO + PTA + OV
Cordon insecure areas as to prevent visitors from being hurt SC-INAH + PTA + OV	Raise funds SC-INAH + VG + MP+ SO Improve touristic and commercial infrastructure VG + MP + SO	Raise awareness on disasters, and disseminate attributes and values of the site among the community and visitors SC-INAH
Install temporary shelters for onsite buildings, storage and museum objects SC-INAH + PTA + OV	Build new shelter according to building guidelines and DRM strategies SC-INAH + U	Create a Monitoring Plan for shelter and wall painting SC-INAH
Fast damage assessment of buildings and objects SC-INAH + PTA + OV	Carry conservation treatment SC-INAH	Worshops to prevent loosing local construction traditions SC-INAH + MP + COM
Clean drainage SC-INAH + PTA + OV	Monitoring of drainage system SC-INAH	Improve drainage system according to DRM SC-INAH
Consolidate buildings close to landslide areas SC-INAH	Negotiation and relocation of land owners SC-INAH + VG + MP + COM	Permanent reforestation campaign VG + MP + COM + LO + SC-INAH

Responsible: SC-INAH= Mexican culture agency, VG=State government, MP= Papantla municipal government, COM= community, SO= Shop owners, LO= Land owners, U=Universities, PTA=previously trained army personnel, OV= organized volunteers

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2.4 Formulating a Disaster Risk Management Plan for a World Heritage Site in Danger: Chan Chan Archaeological Zone in Trujillo, Peru

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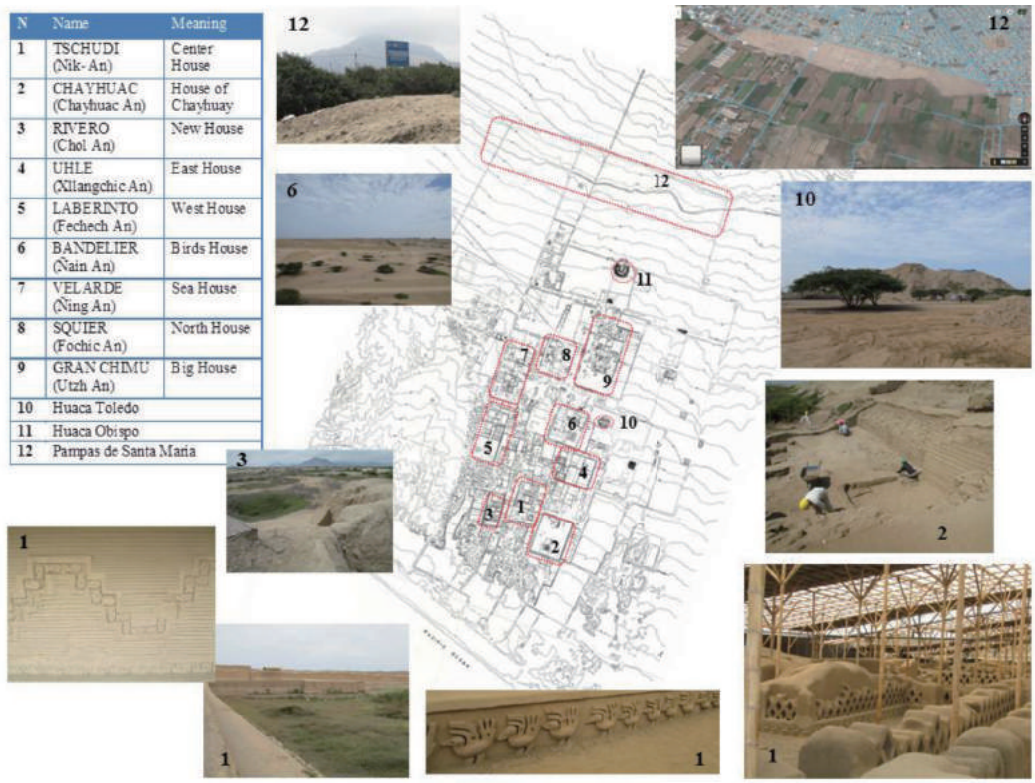
1. Introduction - Chan Chan Archaeological Zone

The Chan Chan Archaeological Zone is a national monument of 1414 hectares (5.5 miles) recognizes by Peruvian government and managed by the Decentralized Directorate for Culture of La Libertad, coastal region located 345 miles north to Lima. This cultural property is situated in the city of Trujillo, more specifically in Huanchaco district surrounded by the heavily populated areas of La Esperanza, Victor Larco Herrera and Trujillo districts. It is managed by the Ministry of Culture through the Special Project of the Chan Chan Archaeological Complex - PECACH ("Proyecto Especial Complejo Arqueológico Chanchan", in Spanish).



N	Name	Meaning
1	TSCHUDI (Nik-An)	Center House
2	CHAYHUAC (Chayhuac An)	House of Chayhuay
3	RIVERO (Chol An)	New House
4	UHLE (Xllangchic An)	East House
5	LABERINTO (Fechech An)	West House
6	BANDELIER (Ñain An)	Birds House
7	VELARDE (Ñing An)	Sea House
8	SQUIER (Fochic An)	North House
9	GRAN CHIMU (Utzh An)	Big House
10	Huaca Toledo	
11	Huaca Obispo	
12	Pampas de Santa María	

Fig. 1 Map of Chan Chan Archaeological Zone and its 9 palaces (Photos: By the author, except for Google Maps image)

Chan Chan was the capital of the ancient Chimu Kingdom, a civilization that ruled the current Peruvian Coast since 13th century and reached its apogee during the 15th, almost at the time when the Inka Empire expanded its borders from Cusco highlands to the north dominating most of the Andean territories. In 1986, Chan Chan Archaeological Zone was inscribed on UNESCO World Heritage List based on Criteria (I) and (III). The World Heritage Center points out that "The Outstanding Universal Value of Chan Chan resides in the **extensive, hierarchically planned remains of this huge city, including remnants** of the industrial, agricultural and water management systems that sustained it"[1]. The planning of the whole earth-architecture city is organized into nine 'citadels' or 'palaces' which form independent units that were built in different chronological periods of the Chimu

Kingdom' development. Each Palace has its own inner spatial organization and hierarchy, showing a high expression of technical knowledge in earth architecture and symbolic designs (Fig. 1).

The World Heritage Committee, following a request from the Peruvian authorities and the recommendation of WHC Bureau, also decided in 1986 to inscribe the Chan Chan Archaeological Zone on the List of World Heritage in Danger, making Chan Chan the second cultural property inscribed in this List after Old City of Jerusalem and its Walls (1982). At the time, the Committee *"recommended that appropriate measures be taken for the conservation, restoration and management of the site and specifically that the excavation work on the site be halted unless it was accompanied by appropriate conservation measures and that all possible steps be taken to control the plundering of the site[2]".*

2. Territory: Values and Attributes

Two important reports on the impacts of climate change —the Intergovernmental Panel on Climate Change's (IPCC) Special Report on Emissions Scenarios and the Stern Review on the Economics of Climate Change (UK Government Economic Service)— place Peru as one of the countries that will be most affected by the effects of climate change. The Stern Review also confirms that Peru is one of the world's most climate vulnerable countries.

Considering aspects related to its territorial features, the Chan Chan Archaeological Zone is located on a slightly sloped alluvial terrace that faces the Pacific Ocean. According to PLANDET, a project by the Municipality of Trujillo, Chan Chan area is a geological alluvial deposit, hydro-geologically is located in an area with unconsolidated aquifers, whose underground waters could increase its level during every rainy season. Nowadays, it is surrounded by agricultural lands (especially in the West and North-West) and consolidated urban areas (North-East and east like La Esperanza district). However, the West side of Chan Chan is progressively changing from being mainly agricultural to become an urban zone in a process of consolidation.

Following the OUV statement, Chan Chan could be understood as a cluster comprising of three main attributes: Urban Planning, Emplacement and Construction Technique, each of them associated with values well recognized by national and the local authorities, academics, and local community, just as described in the Fig. 2.

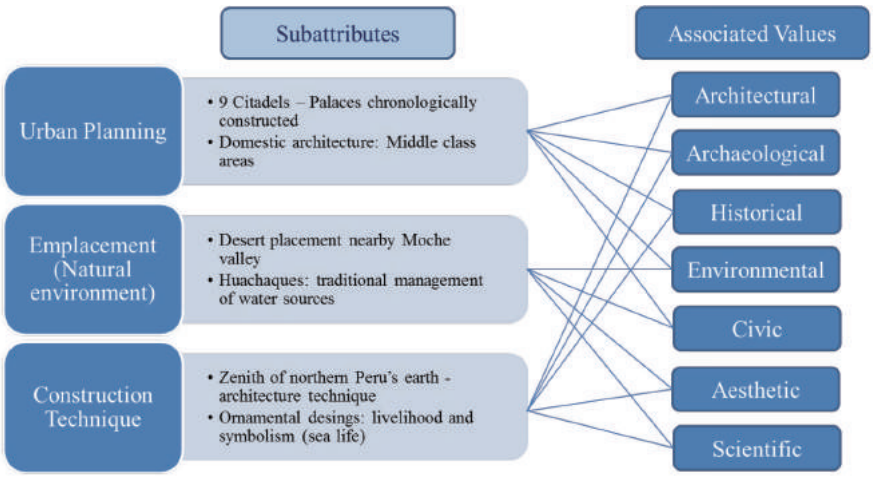


Fig. 2 Attributes and Associated Values

3. Disaster Risk Analysis

ITC 2016 provided us with methodological tools to assess the hazards and vulnerabilities of each case of study in order to understand and analyze different disaster risk scenarios. First of all, it is important to focus on two main recommendations stated by the WHC in its justification to inscribed Chan Chan in WHL in Danger: 1) Excavation work on the site be halted unless it was accompanied by appropriate conservation measures, and 2) all possible steps be taken to control the plundering of the site. Each of them is associated with natural and human-induced hazards, respectively. Chan Chan's common natural hazards are heavy rainfall, salty winds, El Niño (ENSO). On the other hand, human-induced hazards consist of encroachment and the illegal occupation inside Chan Chan. These threats allow us to be aware of Chan Chan's main vulnerabilities. (Fig. 3).

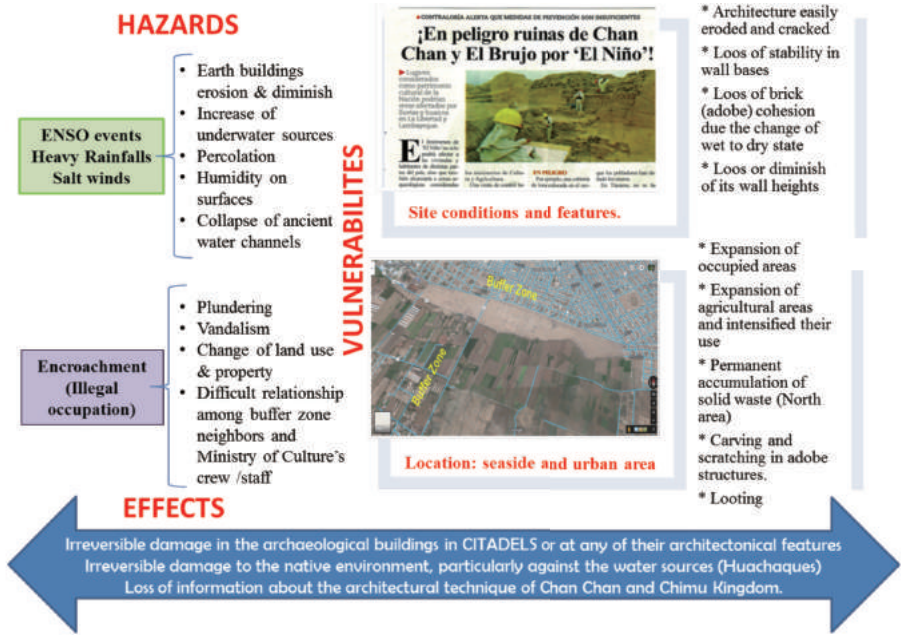


Fig. 3 Disaster Risk Analysis

According to first WHC recommendation, from the 1414 hectares of Chan Chan's global area, just 19 Ha are open to visitors, which correspond to Nik-An Palace area (former "Tschudi Palace") plus the Site Museum area (Ministry of Culture, Chan Chan Master Plan). Nik-An Palace is nowadays a well-preserved Citadel with a permanent conservation program and protective infrastructure against climate-environmental decay factors. Other Palaces have a preventive conservation action plan based on monitoring and emergency measures, in order to avoid the impact of the main hazards on Chan Chan; also, financial budget invested by national government could suffer a lack of income, which turns it difficult to start a new integral archaeological and conservation program in any other Palace of Chan Chan.

Furthermore, in the case of Chan Chan Archaeological Zone, as well as many other archaeological sites in the northern coast of Peru, human-induced threats and hazards could be more frequent and consequently, more damaging than naturals or climatic hazards. In this context, it is relevant to know that a group of families (some sources confirm there are almost 200 people) lived inside the archaeological zone working on some sectors of Chan Chan with agricultural fields. (Especially the area between the Pampas de Santa Maria (12), Ñing – An Palace (7) and Utzh – An Palace (9). Fig. 1.)

4. Emergency Preparedness and Response

Climate change has intensified the frequency and strength of the natural events which put in danger the conservation and protection of Chan Chan. Between late 2014 and first months of 2015, the

Ministry of Culture of Peru developed "ENSO Program" invested approximately US $7 million in 53 archaeological sites along the coastal area; Chan-Chan was one of them, receiving almost US $600,000 for conservation and preventive measures. Therefore, a possible scenario of heavy rainfalls in the context of an El Niño phenomenon could put to test those measures, affecting different sectors of the Palaces, in an area of approximately 450 Ha., rain water could concentrate in the intricate internal rooms of Chol An and Chayhuac An Palaces (nearby to Nik An Palace which has a recently installed protective cover), causing floods and percolation in the earth constructions.

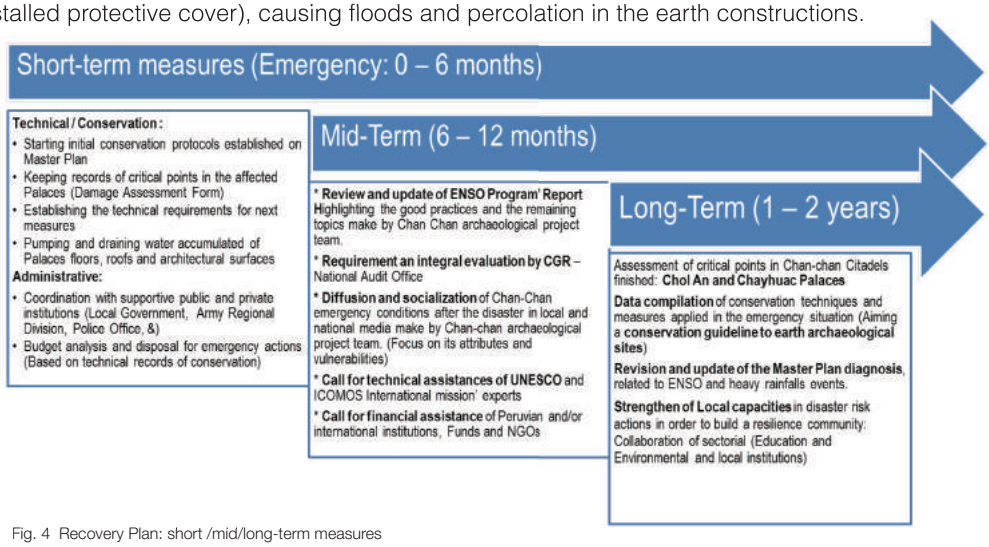


Fig. 4 Recovery Plan: short /mid/long-term measures

5. Conclusion and Pilot Project

Current environmental and climate conditions increased by climate change predict highly damaging effects against the conservation of Chan Chan Archaeological Zone. Despite of the efforts by the Ministry of Culture and PECACH, it is important to note that many of the threats come from the surrounding areas and from different governmental sectors that are beyond the scope of Ministry of Culture. The Buffer Zone main uses i.e. housing and agriculture, increase the challenge for management and conservation activities in the archaeological zone. This context is an urgent call to the subnational governments that aim to establishing a territorial organization with a cultural focus in the whole Trujillo/Huachaco/La Esperanza area.

As a Pilot project, an integral assessment of cultural values and social potentials are proposed in Buffer zone of Chan Chan. It becomes necessary then to establish a Coordination Bureau comprising of all the main stakeholders related to the conservation of Chan Chan and its territory.

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Acknowledgments

To Maria Elena Córdova and Cesar Galvez of Chan Chan Archaeologial Project - PECACH, to my workmates of CGR - National Audit Office (EDUS) and to my family.

2.5 The Old Bridge Area of the Old City of Mostar, Bosnia and Herzegovina (B&H)

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1. Historical background and description

Fig. 1 The Old Bridge in Mostar (photo: Author)

The most significant period of development of the historic urban area of Mostar is Ottoman period, 16 century in particular, when the Old Bridge with its towers was built on the canyon of the Neretva River, and the city was formed around it. This historic area consists of several important historic buildings designated as a national monument of Bosnia and Herzegovina with the highest level of legal protection in the country. The most important one is a remarkable masterpiece of the Old Bridge, built as the one-arch stone structure with the span of around 28 m. Within the Bridge complex there are also two monumental towers Tara and Halebija standing on the opposite sides of the Bridge, the Herceguša tower, masjid and the buildings within the complex on the west bank. Inscribed area covers 7,6 ha and besides the Bridge complex, one of the most important features of this Ottoman historic centre is Čaršija (commercial centre) developed on both banks of the Neretva river creating with few mosques nucleus around which, the streets were formed and spread.

Fig. 2 View on the Bridge (source: Author)

Fig. 3 Tara tower (source: Author)

Fig. 4 Halebija tower (source: Author)

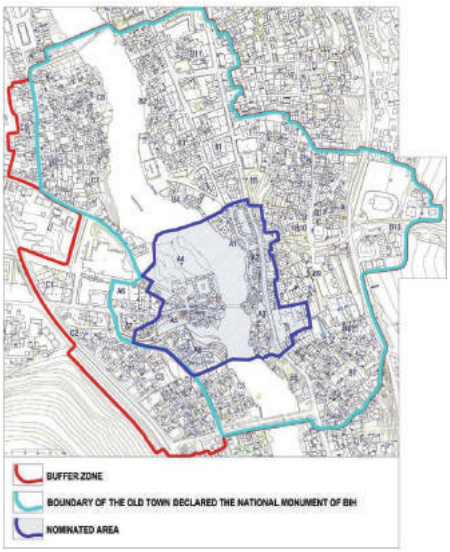

Fig. 5 Map 1: Inscribed area with buffer zone

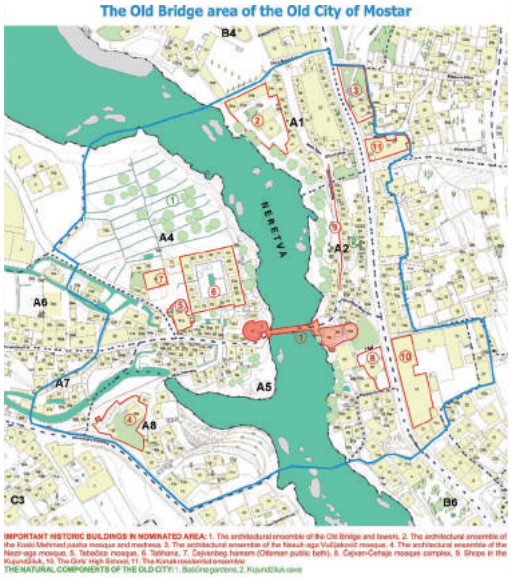

Fig. 6 Map2: The Old Bridge area of the Old City of Mostar

2. Understanding the context:

Living in the country that has faced heritage destruction of great proportions it is impossible not to, as an individual or as a group and with great care, approach to permanent conservation of what has survived. The Old Bridge area in Mostar is among those which suffered the most experiencing severe destruction having a large number of structures destroyed and ruined, and that is the main

reason why this site has been chosen to be my case study. The Bridge, built in 1556 by mimar Hayruddin, the student of the main Ottoman architect mimar Sinan was completly destroyed in 1993 by shelling. That stunning architectural jewel, iconic bridge collapsed into the Neretva river on November 9, 1993. That day the world went silent.

The reconstruction of the bridge was supported by international community with respect to its uniqueness and rarity, and symbolic value to the Mostar community. The reconstruction started in 1997, under the patronage of UNESCO and was completed in 2004, when it was inscribed on the UNESCO list. The official justification of the inscription of the Old Bridge Area of the Old City of Mostar on the World Heritage List is: „With the "renaissance" of the Old Bridge and its surroundings, the symbolic power and meaning of the City of Mostar - as an exceptional and universal symbol of coexistence of communities from diverse cultural, ethnic and religious backgrounds - has been reinforced and strengthened, underlining the unlimited efforts of human solidarity for peace and powerful co-operation in the face of overwhelming catastrophes."

The Old Bridge area was inscribed only under criteria (vi) because of its symbolic value and the memory of the site. It was recognized as an exceptional case, such as Auschwitz Concentration Camp, the Island of Goree and the Hiroshima Peace Memorial, all of which are symbols of human suffering and yet the great strength and win.

The symbolic value of Mostar is kept annd cherished by the people of Mostar as well as entire Bosnia and Herzegovina community. That is why they are the most important component for conservation as the most important human legacy that was passed down over generation for the future.

Fig. 7 The Old Bridge, 1993 (source: https://aipetcher.wordpress.com/2012/06/11/stari-most-bridge-mostar/, Photo Studio HADŽIĆ Mostar)

Fig. 8 The Old Bridge, 2016 (photo: Author)

3. Hazards, vulenrabilities and risks

The Old Bridge area in Mostar faces number of hazards that could endanger and destroy its irreplaceable cultural resources, but according to the research and data collected on hazards, two main hazards have been proven to be primarily the most common as well as the most destructive: earthquakes and floods.

Even today this site lacks the Risk Management plan. Analyses as well as defining threats and risks for the area have never been done. Having in mind the destruction of this area during the war and regardless of the bridge reconstruction and restoration of the surrounding buildings this area is more vulnerable to natural disasters.

What makes this area particularly vulnerable is the fact that in Bosnia and Herzegovina there is no institution for disaster risk management for cultural heritage as well as there is lack of effective cooperation between Cultural Heritage institutions at different levels (state, entity, canton, local), unclear responsabilities for the Cultural Heritage protection and lack of cooperation between Cultural Heritage institutions and Civil defence departments.

UN agencies have compiled a collection of hazard and risk maps of Bosnia and Herzegovina developed by open source Geographic Information System (GIS) software relying on a combination of country-specific datasets as well as best international scientific data. In the maps it is clearly highligted that for Mostar area the earthquake hazards as well as the flood risk is extremely high.

Earthquakes

The territory of Bosnia and Herzegovina is in active seismic region of South-East Europe. On the seismic intensity map of Bosnia and Herzegovina it is shown that Mostar lies in the zone 8th intensity degrees according to European Macroseismic Scale. Although strong earthquakes haven not occured in this region before, according to the map of expected earthquakes, done by Federal Meteorological Institute of Bosnia and Herzegovina, an earthquake up to 10 degrees can affect Mostar in the next 100 years. An earthquake like that can destroy almost three quarters of housing and other facilities and since most of the constructions are in stone-masonry, the stronger earthquakes can cause substantial or heavy damages. Weak earthquakes measuring 2.5-4.5 degres frequantly affect the Mostar area and they have already caused smaller cracks on the side arches and part of the intrados of the Old Bridge but without causing loss of stability. At its 32nd session, the World Heritage Committee discussed the appearance of cracks on the Old Bridge, and requested from Bosnia and Herzegovina to continue monitoring, collecting data with precise indicators and take the appropriate measures to ensure the stability of the width and grade of the bridge, in collaboration with the World Heritage Centre and Advisory Bodies.

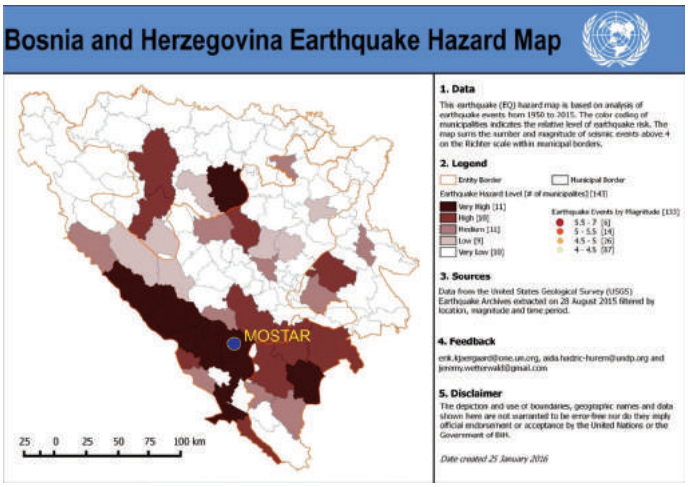

Fig. 9 Map 3: Bosnia and Herzegovina Eartquake hazard map (source: www.reliefweb.int)

Floods

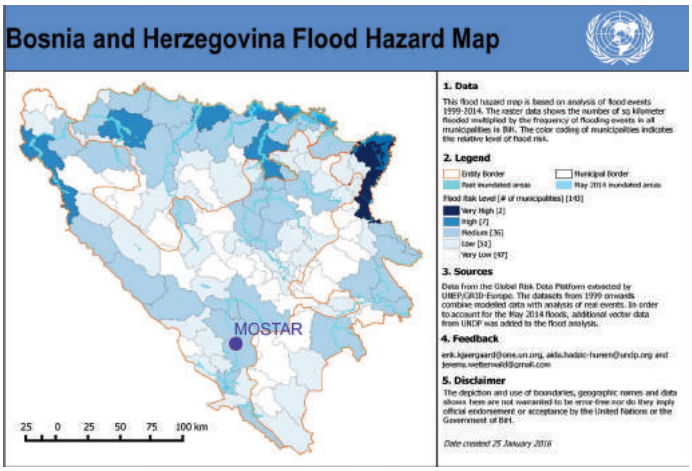

Fig. 10 Map 4: Bosnia and Herzegovina Flood hazard map (source: www.reliefweb.int)

The Neretva river flows through the Old City and presents a potential danger for it. Heavy rainfalls very often cause its raising to a dangerous level although the stability of the Neretva river depends on synchronization of hydro power plants downstream and upstream of the bridge. The floods were recorded almost every year. Increased level of Neretva floods terraces and buildings on the lower levels of the riverbanks and rises to the arch of the bridge endangering the structure of the bridge. Another river flooding every year is Radobolja river which flows into the Neretva on the right bank, very close to the Bridge and its few canals also flow through the Old city. The Radoblja river is not regulated properly. Inadequate infrastructure, nonfunctional drainage system, disposed sewage in the rivers increase the level of flood risk.

Fig. 11 Floods in Mostar 2010 (source: www.hercegovina.info)

The impact of the mentioned vulnerabilities may vary depending on the hazards intensity, which may cause loss/damage of cultural heritage properties along with the loss of lives, damage of infrastructure and housing, decreasing the number of tourists, endanger public safety, contamination of the area as well as health risks.

4. Mitigation Measures

Mitigation measures needed to be implemented are grouped in several fields:

Institutional strengthening:

- Establishing the Institute for Disaster risk management (DRM) for Cultural Heritage (CH) sites/ establishing department for CH protection in Civil protection institutions / establishing DRM departments in CH institutions,
- Improving the coordination between institutions (state/entity/canton/municipality)
- Establishing the cooperation between CH institutions and Civil protection sector
- Adopting the regulations at state level on responding to disasters - defining the responsibilities
- Improving communication and information exchange among all authorities

Capacity building

- Education of the CH experts in DRM field
- Establishing the Emergency team for the site

Data collection

- Identifying the risks
- Collecting data from the previous disasters: Damage assesment reports, maps of the affected areas
- Improving the information availability
- Surveying the site, analysing the structure conditions, analysing the material conditions
- Assessing structural stability of the bridge, proposing the measures
- Conducting a monthly reports on seismic activities and weather prognoses
- Developing detailed hazard maps for the area

Financial resorces

- Fund raising events
- Applying for International funds
- Engaging the local community in fund raising events

Regulation of rivers and infrastructure

- Improving the infrastructure
- Regulating of the Radobolja river
- Imroving the road access/riverbanks

Local communities involvement:

- Creating a volunteering network for disasters
- Organizing education for volunteers on response in time of emergencies
- Providing volunteers with basic equipment
- Trainings for volunteers on how to assess the damages after a disaster
- Preparing the Damage assessment sheets for volunteers
- Involving the local communities linked to the site in planning activities

STAKEHOLDERS: *national level*: Commission to Preserve National Monuments, Ministry of Security, Ministry of Defence, Ministry of Civil Affairs, National Commission for UNESCO, Armed forces; *entity level*: Federal Institute for Protection of Monuments, Federal Department of Civil Protection, Civil Service Agency; Agency Old Town Mostar, Civil protection department Mostar, Local communities, Unesco Office in B&H, Touristic organisations, Nongovernment organisations, Owners of the properties, UNDP, , Volunteers, Fire and police departments, UNESCO, ICOMOS.

5. Recovery Plan

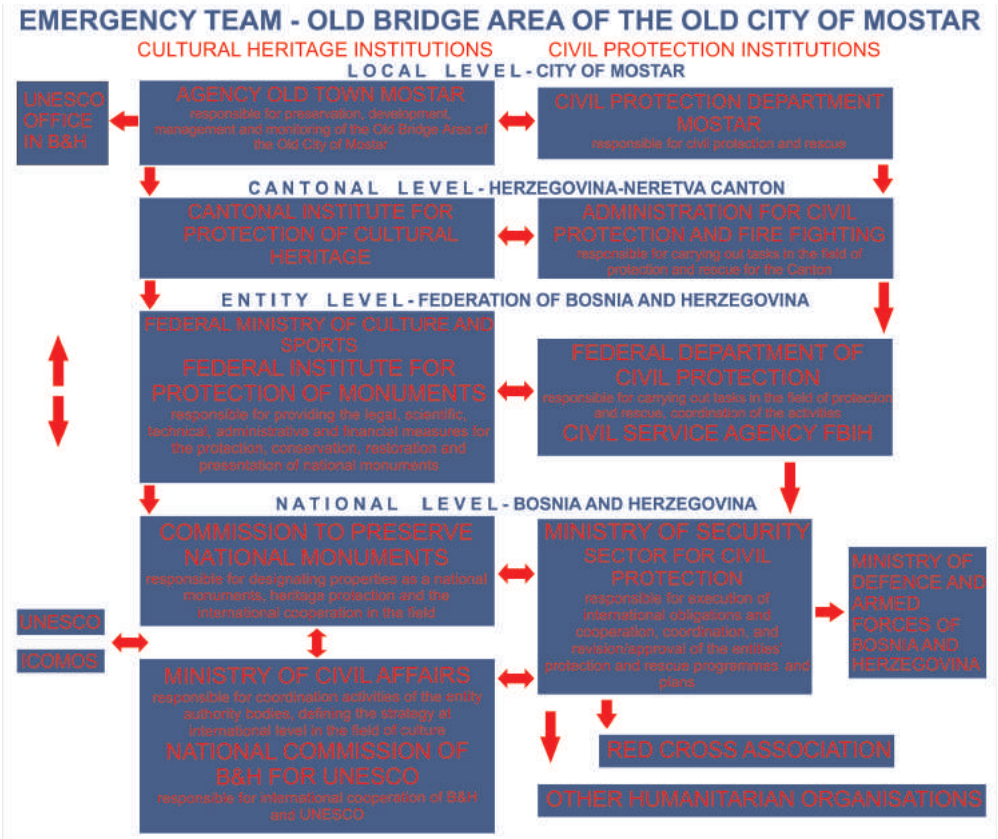

Fig. 12 Emergency team - response on disaster scheme

Short Term

- Cleaning the streets for evacuation
- Identifying the evacuation routes and temporary evacuation zones
- Providing temporary shelters for people
- Cleaning the area, removing the debris from the streets and rivers
- Conducting damage assesment reports

Mid Term

- Creating emergency intervention plan
- Fundraising
- Developing the restoration projects

Long Term Action Plan

- Restoration of the damaged buildings
- Raising awerness among people on importance of the heritage
- Involving local communities in planning activities and fundraising events
- Ongoing fundraising

6. Conclusion

As it was noted in Sendai Framework for Disaster Risk Reduction 2015 - 2030, there is a need for action in the four priority areas: 1: Understanding disaster risk, 2: Strengthening disaster risk governance to manage disaster risk, 3: Investing in disaster risk reduction for resilience, 4: Enhancing disaster readiness for effective response.

Natural disasters are a major threat to our cultural heritage and for its effective protection we immediately need to start defining risks, exposure and vulnerability of the cultural heritage and to plan how to reduce it so we can prevent creation of new disaster risks. In Bosnia and Herzegovina it is necessary to establish institute for disaster risk management of cultural heritage or include experts from cultural heritage field into disaster risk management sector, adopt regulations and methodology for disaster risk reduction and strengthen cooperation among institutions. Every interested party needs to be involved in creation of Disaster Risk Managment Plan for the Mostar area and not to forget local communities and their importance and role in preservation of cultural heritage.

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2.6 Fortifications on the Caribbean Side of Panama: Portobelo-San Lorenzo, Panama

Alberto Enrique PASCUAL
Director at Fundación CoMunidad, Panama

1. Introduction

It is a priority to address Disaster Risk Management of Fortifications on the Caribbean Side of Panama: Portobelo-San Lorenzo, environmental factors, lack of maintenance and uncontrollable urban developments have been cited as reasons to inscribe UNESCO's List of World Heritage in Danger in year of 2012. The ensemble monumental of Portobello-San Lorenzo, have key features to integrate and implement mitigation and adaptation measures to climate change and risk management to protect the cultural heritage, as an exceptional variety of habitat from an urban center to protected areas in which can be found different ecosystems in this heritage site: coral reefs, mangroves, tropical forests and mountains, further developing the link that must be between cultural and natural.

2. Attributes and values / OUV

The component parts of the property represent characteristic examples of military architecture developed by the Spanish Empire in its New World territories largely between the 17th and the 18th centuries. As a whole, these structures comprised a defensive line to protect Portobelo's harbour and the mouth of the Chagres River, which were the Caribbean terminals of the transcontinental route across the Isthmus of Panama. The defensive system includes fortifications in different styles, some of them skilfully integrated into the natural landscape as part of its military defensive design. They were also adapted to the changing needs of defensive technologies in the course of three centuries in order to protect the capital resources sent from colonial America to Spain after crossing the Isthmus of Panama. In the earliest constructions, a military style with mediaeval features prevailed, while in the eighteenth century the structures were rebuilt in the neo-classical style, which can be observed at the forts of Santiago, San Jeronimo and San Fernando, and also at San Lorenzo. The Fortifications on the Caribbean Side of Panama: Portobelo- San Lorenzo was inscribed on the World Heritage List under criterion (i): The Fortifications on the Caribbean Side of Panama: Portobelo-San Lorenzo are a masterpiece of human creative genius. Portobelo is a remarkable example of an open fortified town, destroyed and built several times. San Lorenzo underwent the same process of renovations along the colonial era. Criterion (iv): The Fortifications on the Caribbean Side of Panama: Portobelo-San Lorenzo, a group of late 16th, 17th and 18th century fortifications, are among the most characteristic adaptations of Spanish military architecture to tropical climate and landscape features, and represent the structural and technological development of military structures in the Caribbean.


Fig. 1 Fort San Lorenzo in the province of Colon Panama

3. Natural disasters / hazard, mitigation, vulnerabilities and stakeholders

Fortifications on the Caribbean Side of Panama: Portobelo-San Lorenzo

	Vulnerability	Mitigation	Hazards	Stakeholders
Planning	Lack of Management Plans to Portobelo-San Lorenzo	Update Management Plan from 2002 of San Lorenzo and develop new MP for Portobelo	Floods Landslide	Local population Institute of Culture Ministry of Environmental Civil Protection Local Government
	Lack of Distric Terriorial Plan for Historic Town of Portobelo	Approval and Implementation of DTP developed 2012	Encoachments And Urban Presure Floods Landslide	Local population Institute of Culture Ministry of Housing Civil Protection Local Government
Physical	Lack of maintenance and limited conservation	Implementation of the Strategic Plan 2016-2019 for Portobelo and San Lorenzo	Floods Landslide	Local population Institute of Culture Local Government

4. Mitigation strategie

The District Territorial Plan has been structured at three levels to to differ each one as for the managing of the zones and areas of territorial classification. The first level corresponds to the offer of territorial classification of the district, the second one to the Historical Monuments set, and the third part to Portobelo's Historical Center.

The First Part. Conceptual Model

It is orientated towards the search of the harmony between place, form and public spaces. The model seeks to guarantee a balance between the protected area constituted by the Portobelo National Park, the Historical Monuments Set, Portobelo's Historical Center, the constructed space and the free current space.

The second Part. Normative and Territorial Classification Offer

Territorial Classification Offer was determined from the structure of the territory at three levels of agreement; the identification and location of the principal elements that allow to organize and to classify the territory for its better utilization; the organization of the urban and rural space as for function and habitability, bearing in mind the existence of the National Park and the Historical Monuments Set.

Third Part. Vial Traffic offer.

5. Evacuation Plan

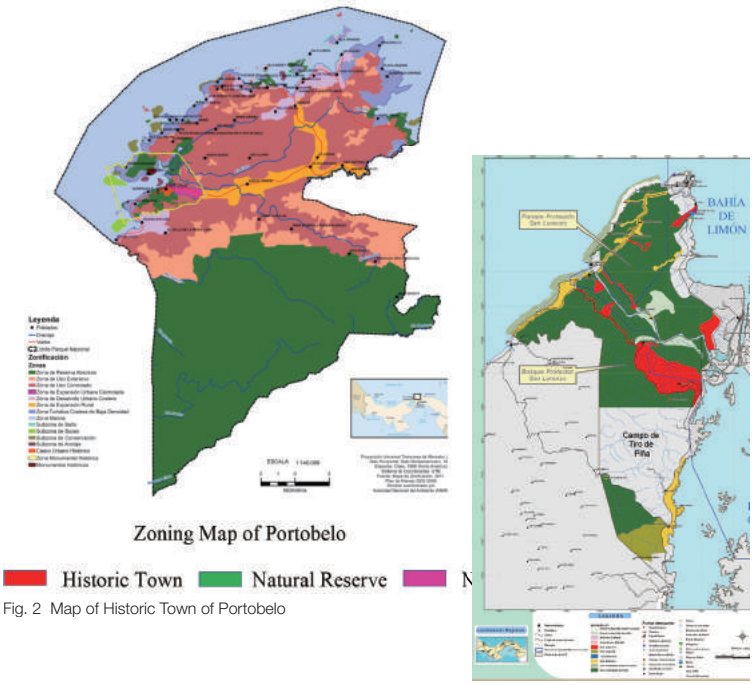

Fig. 2 Map of Historic Town of Portobelo

The historical urban center of Portobelo where the largest population is concentrated is located in a vulnerable site between the Portobelo Bay and the Portobelo National Park. The only place possible place to establish shelter and emergency services is located the New Urban Expansion área.
Emergency Team would consist of: Police, National Air Service, Fire Department, Red Cross, Civil Protection, Maritime Authority, Ministry of Environmental, Tourism Authority, Ministry of Health and the Emergency System 911.

6. Conclusion

The Disaster Risk Management Plan focused on the Fortifications on the Caribbean Side of Panama: Portobelo-San Lorenzo, should be a priority because it is the only UNESCO World Heritage of the country, which is included in the Danger List and the implementation of DRMP, will contribute significantly to the efforts to conserve this heritage site, to take action will be necessary to develop a joint strategy with all the revalantes stakeholders.

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2.7 Mombasa Old Town, Kenya

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1. Introduction

Mombasa County is the country's second largest city and is comprised of the island / CBD, north, west and south mainland. Mombasa Island is the core of urban growth in the county and has experienced immense pressure from population growth within unsustained infrastructure. The Old Town, the origin of Mombasa, is within a larger modern city affected by rapid urbanisation, shifting economic activities and rising costs of urban land. This rapid growth has had to be accommodated in a static physical character with inadequate and degenerated infrastructure amidst uncertainties of climate change effects.

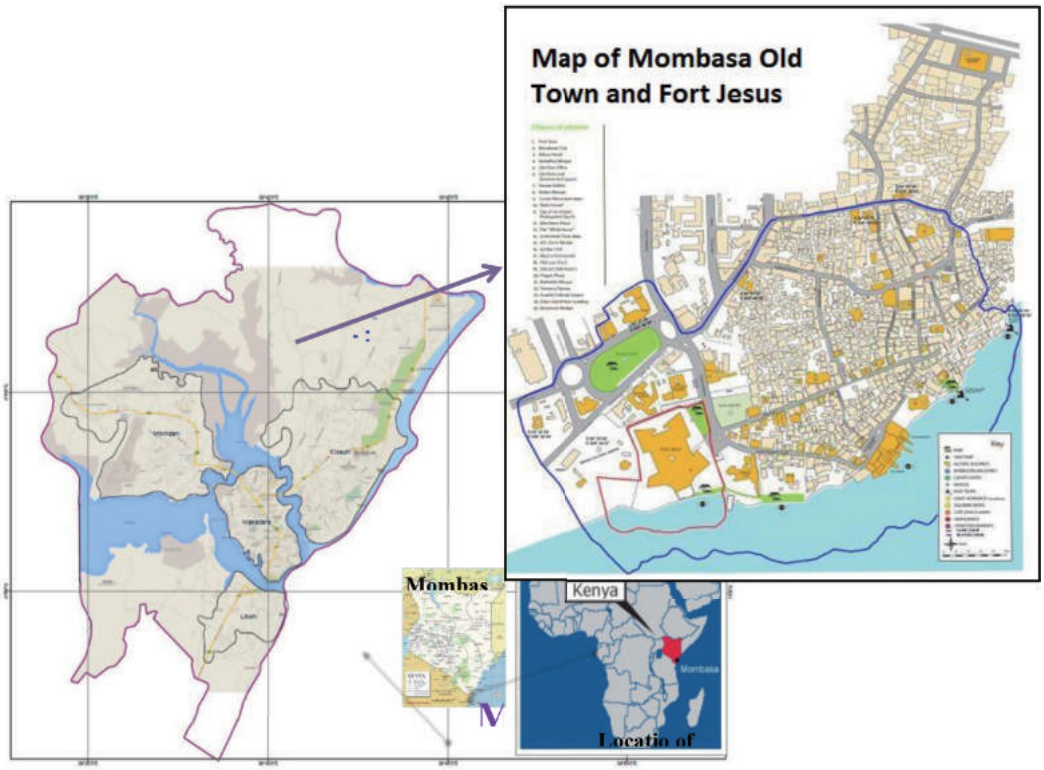


Fig. 1 Location of Mombasa Old Town

2. Heritage Values

The gazette Mombasa Old Town Conservation Area is part of the Old Town located on the south west of Mombasa Island and the buffer zone for Fort Jesus World Heritage site. Its extents corresponding to the old walled 16th century Portuguese town with an addition of Piggot Place, Treasury Square and Fort Jesus; all public open social spaces. It was said to be the centre of activity (Fort, harbour and the stone town) for Mombasa between the late sixteenth and early twentieth century with 2 main commercial streets currently accommodating tourism supporting functions. The conservation area consists of 774 plots covering approximately 31ha. It has been surveyed, a management plan adopted in July 1990 and a pilot project undertaken in which buildings identified with architectural significance were restored in order to showcase the possibility of incorporating modern needs into old structures.

Fig. 2 Fort Jesus World Heritage site

Fig. 3 Old Post Office at Government square

3. Climate Change, Hazards and Vulnerabilities

Coastal regions; where the Old Town is located; are vulnerable to climate change because of their low altitude, high temperatures and intense rainfall. They will be impacted by sea-level rise, salt water intrusion into ground water resources, flooding, sedimentation, prolonged droughts and elevated CO2 levels. For instance, the high precipitation experienced has caused massive sedimentation and flooding in mangrove forests leading to die-back in many areas. Climate-related disasters are projected to increase in frequency and intensity with long-term climate change. Unfortunately, other than coral reefs, not much has been done in assessing the impacts of climate change on heritage.

Vulnerabilities to intense rainfall within the Old town include:

(1) Physical/Age: Historic buildings were made of coral blocks, mud mortar, lime based plaster and iron sheets roofing. This makes them porous; soaking in stagnant storm water leading to condensation, damp, mould and increased decay hence weakening their structural stability. The walls were load bearing with no additional reinforcement. The narrow roads on the other hand make fire engines inaccessible to pump out stagnated water and send in response teams to evacuate people during disasters. Other modern interventions like tarmacking the roads with asphalt makes the storm water more impermeable to ground infiltration

.

(2) Environmental: The Old Town is located at the edge of the coastline with a low altitude of 10 -24m. It experiences a progressive increase in coastal erosion; 2.5-20cm/year. (Mwakumanya). Storm water is also discharged into the sea and an anticipated sea level increase is of 1.1mm/ year due to climate change may make this challenging.

(3) Institutional: The Island has experienced uncontrolled urbanization/ growth leading to high densities and shortage of piped water hence reliance on ground water that may result in

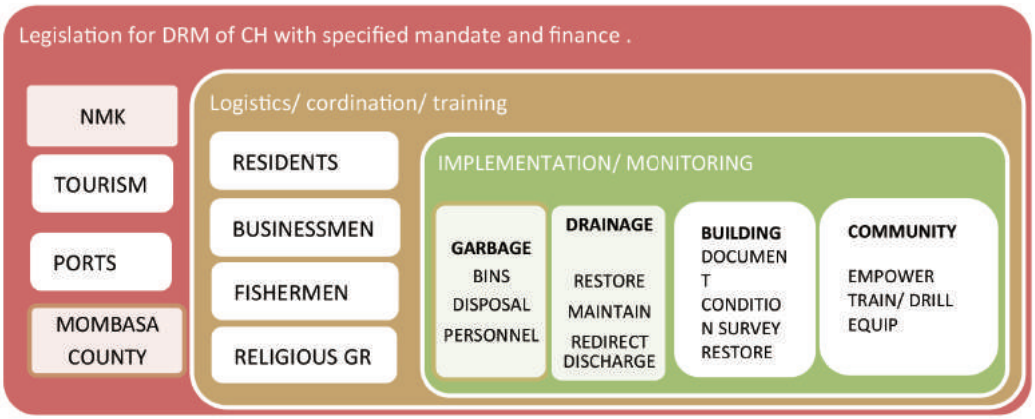
lowering of the landmass. Ineffective garbage collection has amounted to blocked storm water drains. Institutions/ stakeholders have no co-ordinated disaster risk management plan, with no relation between research institutions and city management. Heritage managers and their legislation have no implementation mechanisms hence most historic buildings are not well maintained.

(4) Socio-economics: The poverty levels within the Old Town have brought about increase in vandalism of drain covers, dust bins and the lack of concern about the garbage management.

Therefore when rainfall becomes intense; which is annually; the following disasters are predicted:

4. Mitigation strategy

The Mombasa Old Town mitigation strategy requires integrating the stakeholders with variable strengths and local networks for possible partnerships and co-operations.



This mitigation strategy has highlighted the strengths of some long standing heritage buildings; continually being used by local and international community; as places of refuge hence increasing their intrinsic values.

5. Emergency Response Preparedness

Emergency response would be under the management of a registered Disaster Risk Management Committee (DRMC) comprising of a co-coordinator and all the identified stakeholders. It would involve:

- **Strategic Planning:** Identification of the team and its gazettement/ registration comprising of DRMC + Community. They should then campaign for financing logistics, regular meetings and drills, establish tactic and evacuation routes, supplies route/ helpers route, operational refuge areas- Fort Jesus area/ Portuguese church and identification of response team (youth groupings/ tour guides) on the ground.
- **Mobilisation:** allocate responsibilities like the DRMC to facilitate radio communication, Red Cross- medical equipment, Mombasa Club- refreshments, Mombasa County- temporary shelters and safety gear, Community police- rescue manpower, NMK- bags/ stationary/ photography,

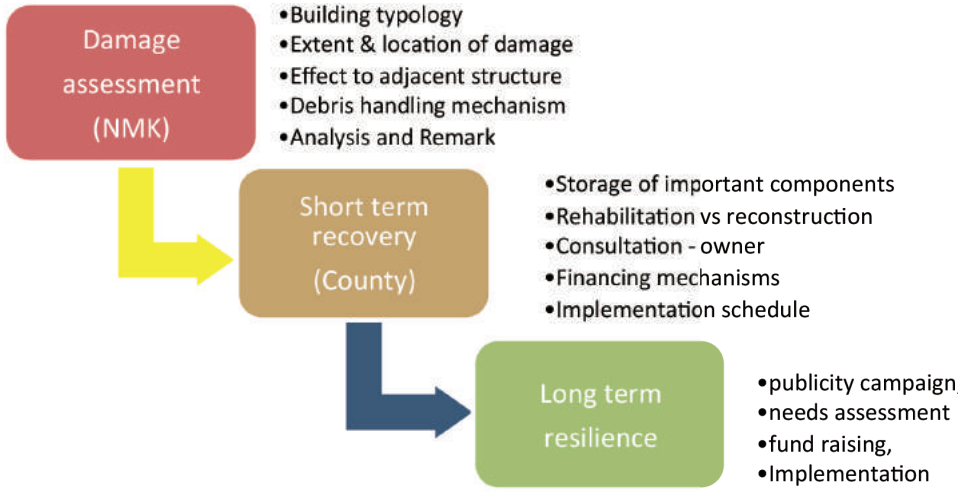
KPA- machinery and the Police handling the general security

- **Operations:** it would be initiated by an alarm / media (radio) announcements; evacuation with guidance from trained community youth, Red cross offering medical assistance, Fire department/ civil engineering with NMK undertaking condition assessment and salvaging.
- **Handing over:** this would include site clearance and heaping by waste types, its disposal, shelter dismantling, return of equipment and photography for documentation.
- **Reporting:** DRMC to compile comprehensive report having the location of the disaster, time, area affected, physical destruction, actions taken, resources used and challenges. Lessons learnt in these reports would be used to improve the disaster management strategies.

Once emergencies have been averted, preparation should be done for recovery.

6. Recovery Plan

In order for the disaster site to go back to normal, recovery needs to be done; starting with damage assessment, short term recovery and long term resilience creation.



7. Conclusion

When mitigation actions are implemented, the community would have restored buildings, upgraded infrastructure and improved service delivery hence improved resilience to disasters through youth empowerment and conserved heritage and marine environment.

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2.8 Disaster Risk Management of Cultural Heritage in the Philippines: The Case of the Historic Town of Vigan

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1. Cultural Heritage Profile

Established in the 16th century, the historic town of Vigan in the Philippines is a good example of a well- planned Spanish colonial town in Asia. Its architecture reflects the coming together of various cultural elements from the Philippines, China and Europe, resulting in a townscape that is unique and unparalleled anywhere in East and Southeast Asia.

An important trading post before the colonial era, Vigan is located at the river delta of Abra River, along the northwestern coastline of the main island of Luzon, in the Province of Ilocos Sur.. The total area of the inscribed property is 17.25 hectares. The traditional hispanic checkerboard street plan opens up into two adjacent plazas. The Plaza Salcedo is the longer arm of an L-shaped open space while the Plaza Burgos is the shorter. The two plazas are dominated by the St. Paul's Cathedral, the Archbishop's Palace, the City Hall and the Provincial Capitol Building . The urban plan of the town closely conforms to the Renaissance grid plan specified in the Ley de la Indias for all new towns in the Spanish Empire.

2. Socioeconomic and Demographic Profile

Being the capital of Ilocos Sur , Vigan is the center of the province's politics, commerce, education and religion. It is where most regional offices of the national government's line agencies are located and where people go to receive secondary and tertiary hospital care. Being a commercial center since the Spanish period, traders from municipalities all over Ilocos still go to Vigan to buy and sell goods.

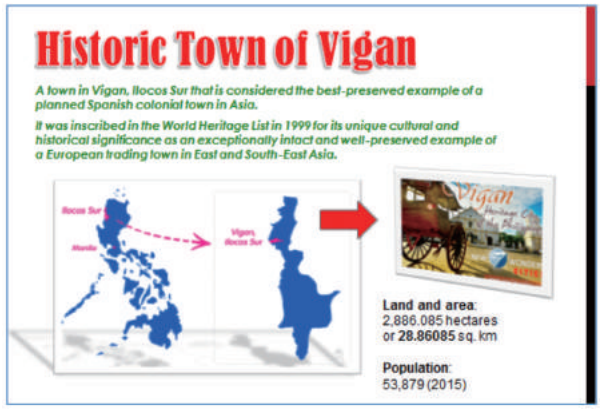

Fig. 1

The city has a 5th class classification and has received many regional awards for its city government-implemented projects. The local government aims to continue to keep Vigan the leading municipality of Ilocos Sur, which could be accomplished by instilling in the minds of the locals the value and pride of Vigan's culture, conserving and protecting Vigan's heritage and environment, delivering high-standard social services as well as programs for poverty alleviation. The city's local authority plans to do all of these with the participation of the community, empowering the residents in the process. The people of Vigan are known to be extremely industrious, prudent and hospitable. Visitors will not encounter any problems communicating with the locals as they know how to converse in English and Filipino. Their local dialiect is called Ilocano, which is also how the people of the Ilocos region are called. As 2015, the population of Vigan reached 53,879 people.

3. Vigan Tourist Arrivals

When Vigan made it to the UNESCO World Heritage List in 1999, it was dubbed the "best-preserved example of a planned Spanish colonial town in Asia." Thereafter, tourism consistently increased. In 2014, Vigan was named one of the New 7 Wonders Cities. As a result, tourism further increased. Data from the City Tourism Office shows a total of 752,074 guest arrivals in 2015 – an almost 30 percent increase from the 580,381 guests in 2014.

Table 1

YEAR	TOTAL GUEST ARRIVALS
2009	373,579
2010	396,737
2011	400,409
2012	439,855
2013	478,959
2014	580,381
2015	752,074

4. Attributes and Associated Values

The historic town of Vigan was inscribed in the World Heritage List under Criterion (ii): Vigan represents a unique fusion of Asian building design and construction with European colonial architecture and planning; and Criterion (iv): Vigan is an exceptionally intact and well-preserved example of a European trading town in East and Southeast Asia. These qualities are linked to tangible and intangible components in the site such as monuments, public and private houses, churches, open spaces and cultural & spiritual activities.

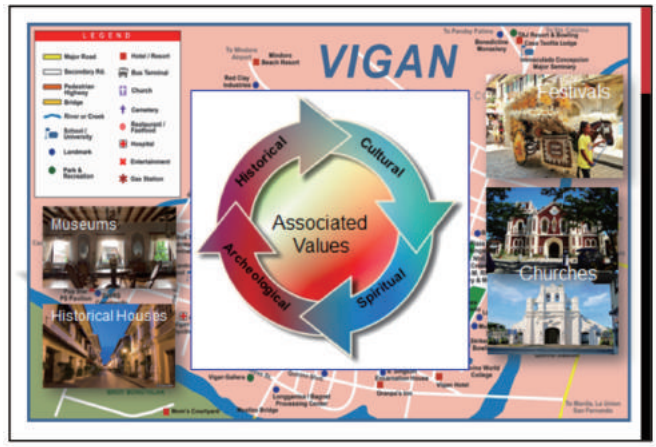

Fig. 2

5. Natural Disasters/Hazards and Vulnerabilities

Vigan is located in the northern part of Luzon, one of the Philippines' main islands. Due to its proximity to the open South China Sea, it is very vulnerable to typhoons originating from the west. And being situated in a country located in the Pacific Ring of Fire, it is highly prone to earthquakes, volcanic eruptions, and typhoons and flooding.

In the event of a natural disaster, a secondary hazard may also take place, such as an earthquake that leads to fire and typhoon that leads to flood. Below is a sample scenario of two sequential hazards with their combined impacts. When earthquake occurs, a subsequent fire is expected to break out in the heritage site due to possible fire sparks arising from electrical wiring disruption and falling debris. Expected impacts include loss of life, injury, loss of livelihoods, disruption of economic activities, loss of local income, collapse and burning of historical buildings, structural damages and disruption of site cultural activities. These impacts can be attributed to the following vulnerabilities: a) site is surrounded by volcanoes; b) houses are attached and many are made of wooden materials; c) nearly 50 percent of the structures are in mediocre to poor conditions; d) no dedicated disaster management plan; e) lack of maintenance; f) limited fire extinguishers and hydrants; and g) lack of firefighting system.

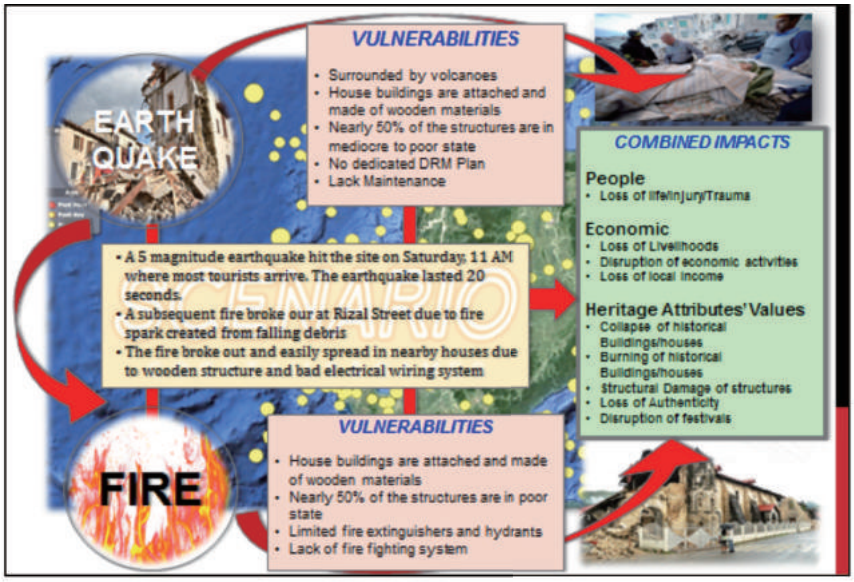

Fig. 3

6. Proposed Mitigation Measures

To mitigate the impact of earthquake and fire as well as other natural disasters, the following measures are proposed. On the legislation aspect, it is proposed that a Fire Safety Act be passed for cultural heritage sites. A disaster management budget for cultural heritage sites is also warranted for a standing fund that would be readily tapped in the event of a natural disaster. On the institutional aspect, there should be a disaster management plan for each hazard for cultural heritage site. Disaster risk management should also be integrated in urban and development plan in the locality. On the organizational aspect, there is a need to establish a staff structure with clear and defined responsibilities in disaster management. On the technical aspect, a disaster management protocol should be established as to who should respond first and what agencies to coordinate with to avoid confusion and finger pointing. Moreover, there is a need to regularly monitor fire safety systems; identify sources of ignition that should be eliminated or minimized; coat or apply houses with liquid hydrants; require each house to have at least one fire extinguisher; and increase number of hydrants.

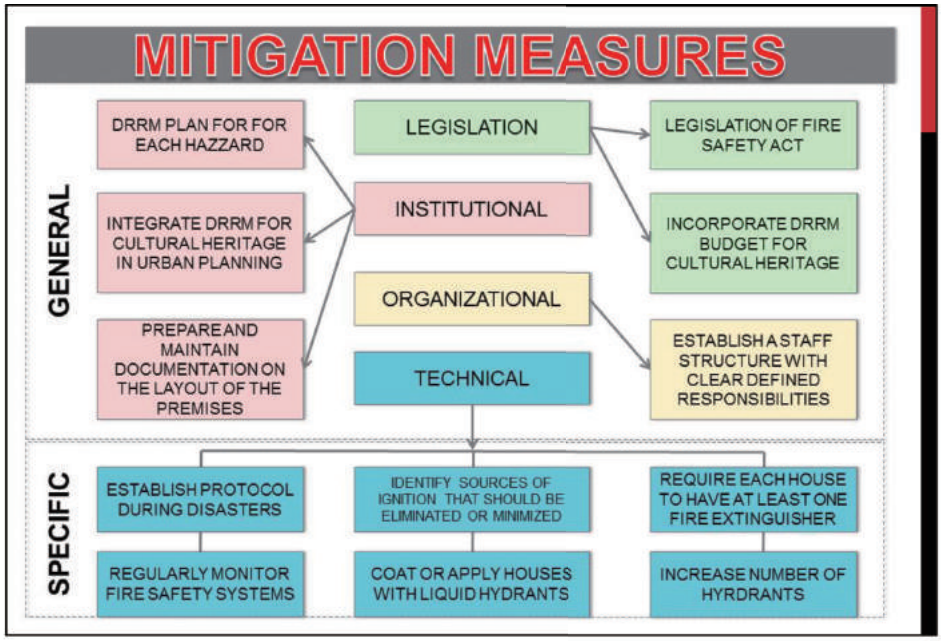

Fig.4

7. Emergency Preparedness and Response

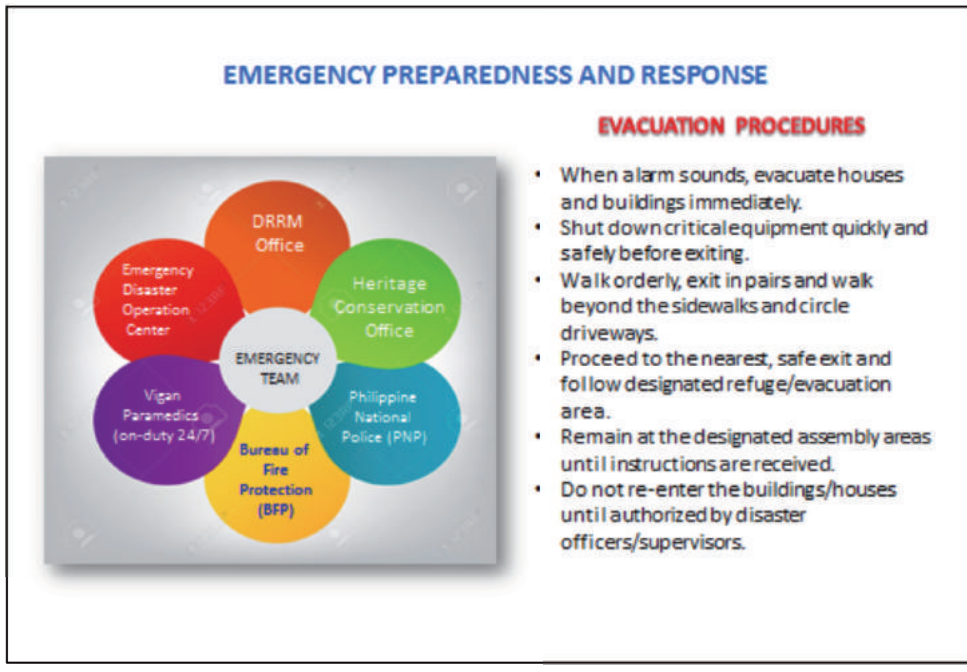

Fig.5

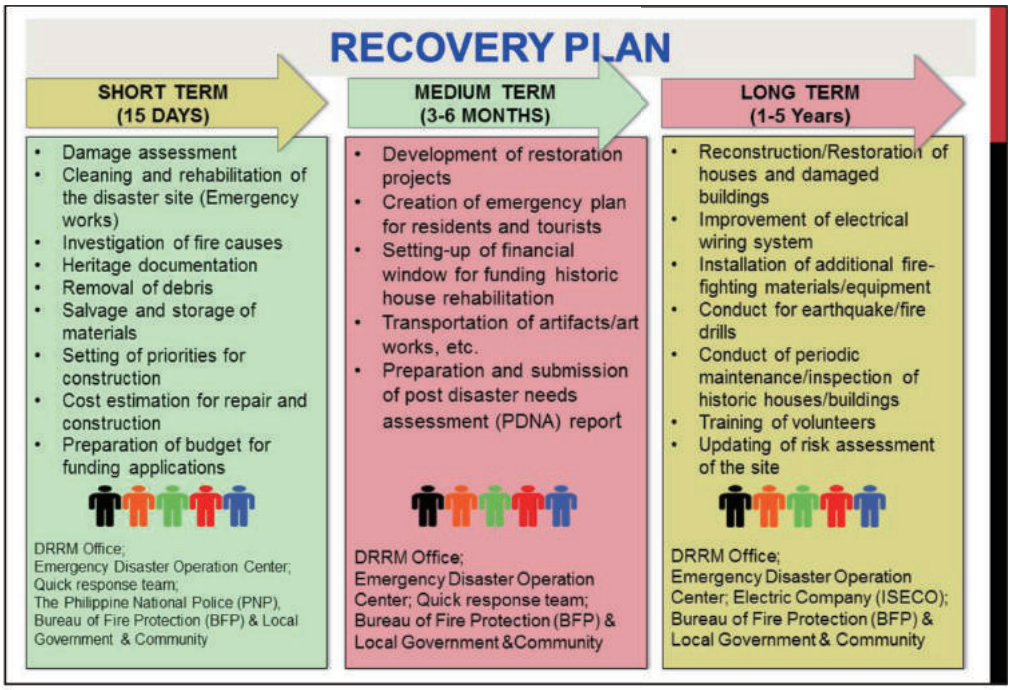

Fig. 6

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2.9 Disaster Risk Management Planning for Heritage in New Zealand: Case Study Newtown Shopping Centre Heritage Area, Wellington

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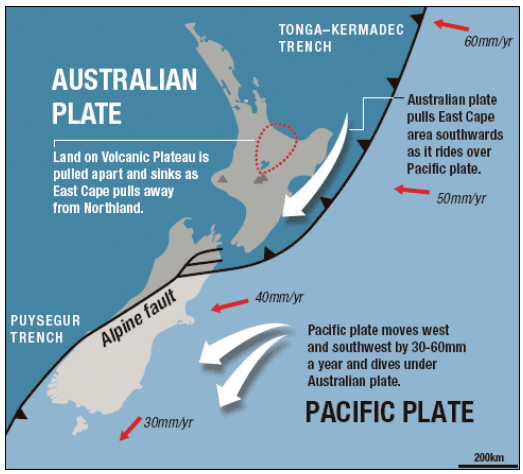
1. Introduction

Disaster risk management of cultural heritage in New Zealand was characterized by a lack of communication and coordination between agencies responsible for cultural heritage and those for emergency response. Following the 2010 and 2011 Christchurch earthquakes and the significant loss of heritage that occurred as a result of the initial response to that event, changes are being enacted to enable greater consideration to be given to heritage in the initial response period after a disaster. A review of the response to our current earthquake, Kaikoura 14 November 2016 magnitude 7.8 and continuing aftershocks (response currently underway), which has devastated parts of the northern South Island and significantly affected the operation of Wellington's central city will shed light on any progress made in our integrated response to disaster risk management of cultural heritage.

The Capital of New Zealand, Wellington is located in a zone of high seismic activity and another major earthquake is an ever-present threat in our planning for cultural heritage protection. In response to the Christchurch earthquakes 2010 and 2011 new regulation for shortening timeframes within which owners must seismically strengthen their buildings will be enacted in 2017, this affects a number of Wellington's heritage buildings including those in case study Newtown Heritage Area. Figure 1 illustrates both tectonic plates, the proposed new zones for seismically strengthening and the location of Wellington relative to these.

Wellington's settlement and cultural heritage places are primarily situated around the city's harbor and our volatile south coast, increased storm events and sea level rise also threaten the future of our cultural heritage places.



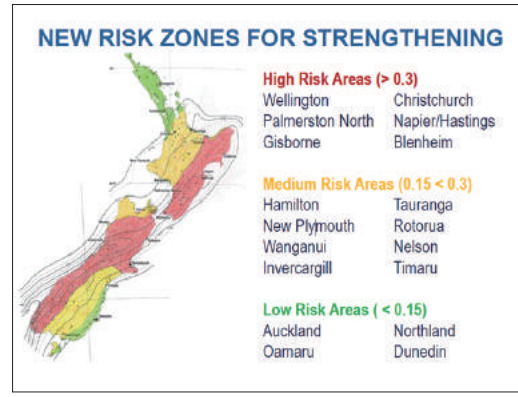


Fig.1 Map illustrating tectonic plates and the location of Wellington (Source: sciblogs.co.nz) and an illustration of the proposed new risk zones for seismically strengthening buildings (Source: www.behive.govt.nz/release/more-targeted-approach-earthquake-prone-buildings)

2. Newtown Shopping Centre Heritage Area Heritage Values

Newtown Shopping Centre Heritage Area lies at the heart of one of the most distinctive and best known of Wellington's suburbs. A product of Wellington's late 19th and early 20th century expansion into its suburban margins, Newtown was the largest and most significant of the city's inner-city suburbs. It played a crucial role in accommodating both those abandoning the more densly populated inner city and also the successive waves of immigrants. It is perhaps the city's best example of the importance of transport development in expanding the city's boundaries. Collectively, the buildings have high overall architectural value; while the majority of buildings are modest and unpretentious commercial structures, they are well-designed and good representative examples of their kinds. In a city where lengthy streetscapes of older buildings are rare, the blocks of buildings along Riddiford Street in particular are of singular significance to Wellington (Figure 2). The shopping area has historically played a key role in ensuring the cohesiveness of the community, this continues today and is celebrated in Wellingtons largest annual street festival; the Newtown Festival.

Fig.2 Photographs of Newtown Heritage Area (Source: Wellington City Council 2015)

3. Heritage Management

The properties situated within the Newtown Heritage Area are privately owned. Planning rules protect the heritage values of the exterior of the buildings only; modifications to the exterior require planning permission however modifications to the interior are a permitted activity. The current planning framework protects only tangible heritage values. Where buildings are considered earthquake prone they are prioritized for Council funding which assists owners to seismically strengthen them. There is no identified buffer zone for the Newtown Heritage Area, nor are the heritage values of the buffer zone well understood.

4. Risk Assessment

Wellington is situated in a zone of high seismic activity; the primary hazard identified for Newtown Heritage Area is earthquake (including ground shaking and liquefaction). Wellington is also at risk from tsunami; although the Newtown Heritage Area is situated outside of the areas at highest risk from tsunami it is a place people will evacuate to in response to a tsunami warning. Climate change related hazards including higher rainfall, flooding and wind are also identified as risks to the Newtown Heritage Area. In the wider landscape the town's green belt on the hills surrounding Newtown is a risk from wildfire.

Newtown Heritage Area is subject to a number of vulnerabilities these are documented in Table 1 below.

Table 1 List of vulnerabilities identified for Newtown Heritage Area

Vulnerability	Description
Legislation/Institutional/ Policy/Planning	•Legislation for the protection of tangible heritage only •Changes to legislation shortening timeframes for seismic strengthening may mean that owners may seek to demolish their buildings •No DRM policy for heritage a national, regional or district level •No DRM plan for Newtown Heritage Area •Heritage is not incorporated in a Community Disaster Response Plan •Situated on a strategic route for hospital and emergency services which means the road must be kept open •Buffer zone not defined or understood
Physical	•Earthquake prone buildings •Wooden buildings (fire) •Lack of maintenance (abandoned buildings) •Past interventions •Failing infrastructure •Power and trolley bus lines
Communication	•Lack of coordination between heritage agencies and those responsible for civil defense. Heritage values not known by emergency response agencies •Lack of communication between heritage agencies and community stakeholders •Risks may not be fully understood by the community
Information	•Risk identification information lacking for climate change at this location (rain, wind, frequency of storms, past effects) •Detailed information on buildings incomplete and not necessarily available digitally
Intangible	•Lack understanding of the intangible values of the heritage area

As part of the ITC, the scenario I developed for the Newtown Heritage Area case study involved a magnitude 7.1 earthquake with continued aftershocks and a tsunami warning requiring the evacuation of the central city. Potential impacts of such a disaster include building damage or collapse, injury or loss of life, financial loss, loss of business during the recovery, loss or reduction of heritage values and a loss of a focal point for the community. Potential impacts of a disaster on the heritage values in the case of Newtown Heritage Area are documented in Table 2 below.

Table 2 Heritage attributes for Newtown Heritage Area and potential impacts

Heritage Attribute	Potential Impact
Historic buildings	Irreversible loss of heritage fabric and buildings
Continued use	Temporary or permanent loss of the street for commercial activity will affect the livelihoods of the community. Shift in community focus/identity
Cohesive streetscape	Due to the significance derived from the group value the loss of just one of the buildings would diminish the value of the group and the heritage area

5. Risk Management

A number of mitigation methods need be developed for the Newtown Heritage Area a preliminary selection of these are detailed in Table 3 below. Table 3 also includes identified key stakeholders who should be integral to the development of mitigation methods.

Table 1 List of vulnerabilities identified for Newtown Heritage Area

Vulnerability	Mitigation	Stakeholders
No DRM policy for heritage at national/ regional/district level No DRM Plan for Newtown Heritage Area	Prepare evidence that heritage is at risk, that it has economic value and that it contributes to recovery; this will support an argument for incorporation of heritage into DRM Policy and Planning	Heritage Agencies: Ministry for Culture and Heritage, Department of Conservation, Heritage New Zealand. Universities: University of Canterbury Civil Defense Local Government: Strategy and Policy, Community Relations, Building Resilience, City Planning - Heritage
Lack of coordination between heritage agencies and those responsible for civil defense. Heritage values not known by emergency response agencies.	Identify stakeholders in Civil Defense at a national, regional and local level and create a communication network	Heritage Agencies: Ministry for Culture and Heritage, Department of Conservation, Heritage New Zealand. Civil Defense Emergency response agencies Local Government: City Planning – Heritage, Resilience
Risk identification information lacking for climate change at this location (rain, wind, frequency of storms)	Identify climate change indicators, measure, monitor, identify vulnerabilities	National Institute for Water and Atmospheric Research New Zealand Climate Change Research Institute Universities: Massey University Department of Geography, University of Victoria Department of Geography, Environment and Earth Sciences Greater Wellington Regional Council Local Government: Resilience, City Planning – Heritage
Earthquake prone buildings	Seismically strengthen buildings	Central Government: Ministry for Culture and Heritage, Heritage New Zealand, Ministry for Building Innovation and Technology Independent funding organizations: Lottery Grants Board Local Government: City Planning – Heritage, Resource Consents, Building Consents and Compliance, Building Resilience Industry professionals: engineers, conservation architects, construction
Detailed information on buildings incomplete and not available digitally	Gather complete set of information on buildings for inclusion in the online heritage inventory	Local Government: City Planning - Heritage, City Archives, Building Consents and Compliance, Building Resilience Consultants: historians, conservation architects, engineers

6. Response and recovery

In terms of the initial response to a disaster, Figure 3 illustrates a proposed emergency response team and communication protocol that could be developed between emergency responders, Civil Defense and heritage agencies. Along with legislation that has designed to enable greater consideration of heritage in an initial response to a disaster, it is envisaged that a coordinated initial response involving heritage agencies and experts would go some way toward preventing such unnecessary loss of heritage as was experienced as a result of the 2011 Christchurch earthquake. Figure 4 illustrates an approach from emergency response through short and long term recovery planning for the Newtown Heritage Area case study. The diagram also lists key stakeholders identified for each stage of recovery.

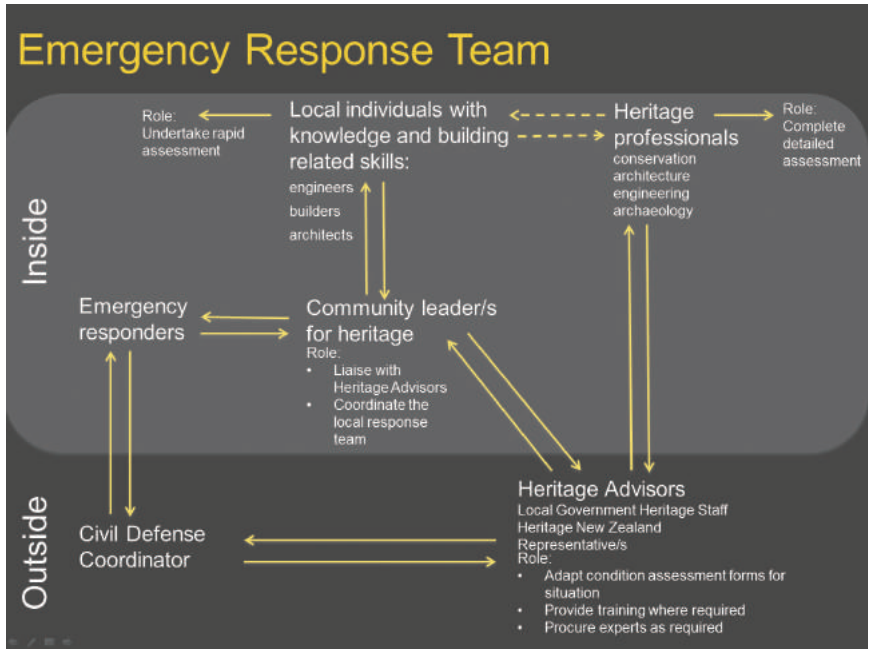


Fig.3 Diagram illustrating how an emergency response to heritage might be coordinated

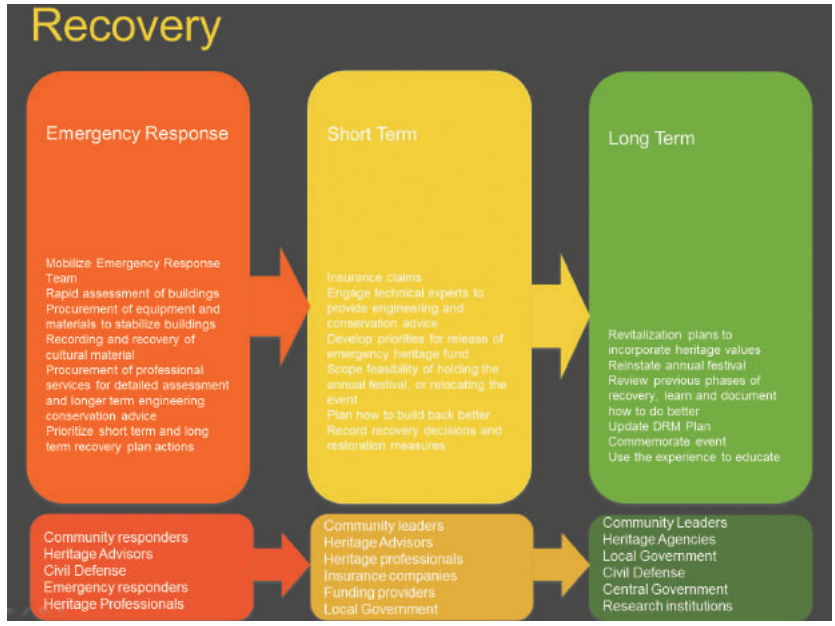


Fig.4 Flow diagram illustrating response and recovery for the case study heritage area

7. Pilot Project

As a result of the Christchurch earthquake in 2011 numerous heritage buildings were demolished in the initial response to the earthquake. Following a review of that event and the, legislation was amended to ensure that New Zealand's lead heritage agency, Heritage New Zealand, is consulted before the demolition of places of national significance. A communication protocol and framework for how consideration will be given to cultural heritage in an emergency response has not yet been established. As a priority, therefore I proposed a pilot project aimed at opening lines of communication between emergency responders, civil defense and the heritage agencies and working with these agencies and the community in the development of plans and protocols. Table 3 below outlines the components of my proposed pilot project.

Table 3 Outline of proposed pilot project

Proposed pilot project
Issue: Lack of Coordination between heritage agencies and those responsible for Civil Defense. **Action**: Identify stakeholders in Civil Defense at a national, regional and local level and create a communication network. **Involve**: Heritage Agencies: Ministry for Culture and Heritage, Department of Conservation, Heritage New Zealand. Research institutes. Civil Defense. Local Government: Strategy and Policy, Community Relations, Building Resilience, City Planning – Heritage **Timeframe**: 6 months
Issue: No DRM policy for heritage at national/regional/district level **Action**: Prepare evidence that heritage is at risk, that it has economic value, that it contributes to recovery to support argument for incorporation into DRM Policy and Planning **Involve**: Heritage Agencies: Ministry for Culture and Heritage, Department of Conservation, Heritage New Zealand. Research institutes. Civil Defense. Local Government: Strategy and Policy, Community Relations, Building Resilience, City Planning – Heritage **Timeframe**: 6 months
Issue: Lack of communication between heritage agencies and community stakeholders. Heritage is not incorporated into Community Disaster Response Plans. **Action**: Identify community leaders, key individuals in Civil Defense who are responsible for the development of community response planning. Develop and understanding of community values of the Heritage Area and where those values align with heritage. **Involve**: Heritage New Zealand. Civil Defense. Emergency response agencies. Local Government: City Planning – Heritage, Community Relations. Community Leaders **Timeframe**: 12 months.

8. Conclusion

The pilot project that I developed during the ITC was underway at the time the 7.8 magnitude Kaikoura earthquake occurred on the 14th of November. Unfortunately I had not sufficiently progressed the development of our emergency response team and communication protocol for heritage at this time. However following the earthquake a network of heritage professionals were coordinated to undertake rapid assessment of heritage buildings using a digital rapid assessment form I developed for this purpose. The aim of the form is to develop a comprehensive understanding of heritage buildings in Wellington City, including Newtown Heritage Area, that require stabilization, repairs and engineering assessments. The results will aid Council in its prioritization of recovery funding. Changes are currently being made to the Wellington City Council's heritage fund to enable us to assist with immediate stabilization, repairs and engineering assessments in response to the earthquake. This experience and the development of tools for an initial response to disaster will provide a useful platform for informing my continued work on the pilot project. The training I received on the ITC has been invaluable in my ability to formulate a heritage response to the 2016 Kaikoura earthquake and I am very grateful to R-DMUCH for the experience. Thank you.

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2.10 Climate Change over the Historic City of Antigua Guatemala

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1. Introduction

As ITC participants usually present case studies from their own countries, it is fair to start this article explaining why a Spanish national, living in the United States, presents a Guatemalan study case. The explanation is I work in the Latin American Region at the World Bank [1)], an institution with extensive experience in Cultural Heritage since its inception, and long and deep engagement with client countries on Disaster Risk Management. Recently, the World Bank has also included Climate Change as one of the key cross-cutting topics. However a big challenge has been linking disaster risk assessments to specific cultural heritage sites [2)].

Fig. 1 Arco de Santa Catalina, symbol of Antigua

The Central American Region is one of the most hazard prone areas in the world. Although the disaster risk management discipline has evolved during the last decade, from post-disaster management and emergency response to risk preparedness and prevention, other priorities usually relegate culture heritage in the agenda of local and national governments and disaster risk plans don't include heritage. Antigua Guatemala, a city with centuries of history threatened by increasing impacts of natural hazards, is a perfect example to illustrate the importance of linking disaster risk management and cultural heritage disciplines.

This study presents an imaginary scenario with a focus on climate change induced hazards, following the theme of the ITC 2016. It includes some tangible and intangible attributes, in order to evaluate potential risk, and suggest some mitigation measures.

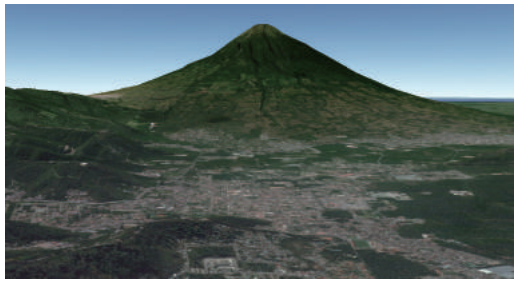

Fig. 2 Antigua Guatemala and Volcán de Agua (Google Earth)

2. Antigua Guatemala

Natural disasters have characterized the history of Antigua Guatemala. The city was founded in 1542 as the capital Santiago de los Caballeros de Guatemala, moved already from today Ciudad Vieja (Old City) after an eruption of *Volcán de Agua* (Volcano of Water). However, the Santa Marta earthquakes of 1773 destroyed the city, forcing another relocation of the capital, to current Guatemala City. The people living in the ruins of Santiago slowly rebuilt their city and started referring to it as *Antigua Guatemala* (Ancient Guatemala City) [3)]. During almost three centuries this city was the cultural, economic, religious, political and educational center for the entire region, boasting an important number of monuments, still preserved as ruins. UNESCO designated the city of Antigua Guatemala a World Heritage Site in 1979, recognizing it as one of the best examples of 16th-century city in Latin America. Not only has the basic Renaissance grid plan of the city had been

Fig. 3 Antigua Guatemala cobblestone street

maintained since 1543, but also most of the surviving Baroque buildings from 17th and 18th centuries are magnificent examples of colonial architecture.

Regarding the legal framework, the *Protective Law of the City of La Antigua Guatemala, Decree 60-69* (1969) created the *National Council for the Protection of La Antigua Guatemala* (CNPAG) [4]. With respect to risk management, the *National Coordination for Disaster Reduction* (CONRED) implements the *National Policy for Disaster Risk Reduction*, at the national level. In 2010, the *Master Plan of La Antigua Guatemala* was developed following UNESCO guidelines to safeguard the declared heritage, including an extensive database of buildings of the historic centre [5]. Nevertheless, an extensive plan for risk management has not been developed yet for this historic city, despite the recommendations of different experts [6].

3. Attributes and Values

Antigua Guatemala shows several cultural attributes, both tangible and intangible, with different associated values.

An important feature of Antigua historic architecture is the development of a regional adaptation of the Baroque style, designed to withstand intensity of shaking from earthquakes very common to the region. The **Barroco Antigüeño** or Seismic Baroque architectural style includes the use of *decorative stucco for interior and exterior ornamentation, main facades with a central window niche and often a deeply-carved tympanum, massive buildings, and low bell towers designed to withstand the region's frequent earthquakes* [7]. The **Ruins** (Fig. 4) and the city's **16th-century Renaissance grid pattern** are signs of identity of Antigua Guatemala, preserved thanks to the partial abandonment of the city in 1776 and the regulations prohibiting the repair and construction of new buildings. **Cobblestone streets, plazas** –including **fountains** –, and **vernacular architecture** complete the heritage of this living historic city.

Fig. 4 Ruins of the Cathedral

Religion also has significant relevance in Antigua. Numerous **churches** and **monasteries** reflect today the influence of the Catholic Church during the colonial period. Antigua Guatemala was also a center for the exportation of religious images and statues to the rest of the American continent and to Spain during the 17th and 18th centuries. This kind of traditional art remains present in the celebrations during ***Semana Santa*** (Easter). The manifestations of intangible culture in Antigua, especially during this religious festivities, are therefore another fundamental sign of identity, and attract an increasing number of visitors every year. Fig. 5 shows the traditional *alfombras* –carpets over the cobblestone streets made by dyed sawdust, flowers, vegetables, etc., and the *procesiones* –processions with images representing the Passion of Christ carried on huge wooden platforms.

Fig. 5 Semana Santa celebration [5]

Historic buildings, museums and **cultural centers** are also tangible attributes. Finally, two more intangible attributes are the admirable

landscape characterized by the volcanoes surrounding the city, and the language: Antigua Guatemala is a leading destination in the region for foreign students who want to take **Spanish** courses, so this learning tradition should be taken into account as a cultural attribute.

Table 1

Attributes		Associated Values
Barroco Antigüeño	Intangible – Immovable – Cultural	Architectonic, Historical, Archaeological, Touristic, Aesthetic.
Ruins	Tangible – Immovable – Cultural	Architectonic, Historical, Archaeological, Touristic, Aesthetic.
Churches	Tangible – Immovable – Cultural	Religious, Architectonic, Historical, Touristic, Aesthetic.
Semana Santa	Intangible – Movable – Cultural	Religious, Historical, Touristic, Aesthetic.
Historic buildings	Tangible – Immovable – Cultural	Administrative, Architectonic, Historical, Touristic, Aesthetic.
Museums	Tangible – Movable – Cultural	Historical, Archaeological, Touristic
Squares/ Streets	Tangible – Immovable – Mixed	Social, Historical, Touristic, Aesthetic.
Vernacular archit.	Tangible – Immovable – Cultural	Residential, Traditional, Architectonic, Historic.
Spanish Schools	Intangible – Movable – Cultural	Educational, Social, Touristic.
Cemeteries	Tangible – Movable (?) – Cultural	Religious, Traditional, Social.
Landscape	Intangible – Immovable – Natural	Environmental, Aesthetic, Social, Touristic.

4. Hazards and vulnerabilities

Natural hazards only lead to disasters when its effects negatively affect human life, and the consequences depend on the vulnerability of the assets and population exposed to these hazards. Antigua Guatemala is located in one of the most hazard prone regions, threatened by **earthquakes**, **volcanic** eruptions, **landslides**, **fires**, and, exacerbated by climate changes, **hurricanes** and **floods**.

Figure 6 shows the risk map for landslide and flood (blue). In addition, **tourism** should be considered both hazard and vulnerability, since an increasing number of tourists might cause an uncontrolled growth of the city, as well as gentrification and increase traffic throughout the historic district. According to UNESCO, there are concerns relate to new hotels constructed into existing ruins [7]. On the other hand, tourism represents

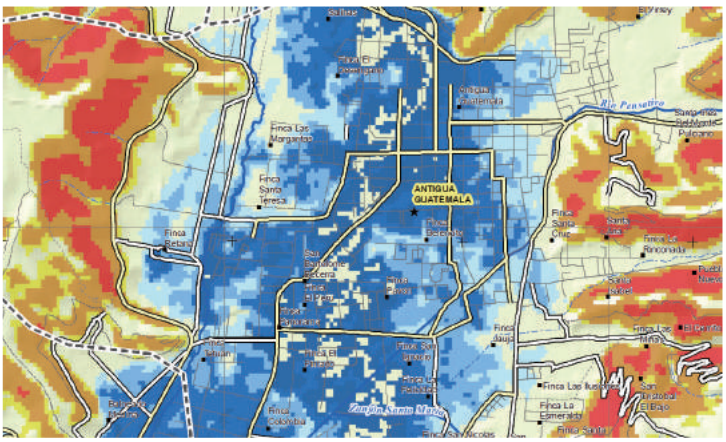

Fig. 6 Detail of the Landslide and Flood Risk map by CONRED [8]

a vulnerability because visitors are not familiar with the environment in case of emergency. In addition, it is important to highlight that hazards associated with climate change are becoming more and more unpredictable and intense, making heritage more vulnerable [9].

Three main types of vulnerabilities could be identified in Antigua Guatemala: **physical**, mainly to earthquakes (the biggest ones took place in 1773 and 1976), hurricanes (Mitch 1998, Stan 2005, and Agatha 2010), and floods (caused by Pensativo River overflows during rainy season); social, because of the variety of groups with different interests and necessities, such as residents, staff of the tourist sector, visitors, and international students; and **institutional**, due to the lack of communication/ coordination between the Municipality and the agencies involved in heritage conservation and disaster risk management, such as CNPAG and CONRED, respectively.
Nevertheless, a broader and more comprehensive study should analyze the specific vulnerabilities associated to each one of the cultural attributes. In order to do that, it would be necessary to investigate the possible impact of different hazards, and the effects over the assigned values. As mentioned, the uncertainty caused by climate change needs to be taken into consideration, because it affects the frequency of the hazards and the grade of their impacts.

5. Risk and mitigation

Since risk is the resultant combination of hazard + exposure + vulnerability, in the case of the heritage of Antigua Guatemala calculate the risk is not easy. There are several variables that need to be taken into account. Therefore, it would be necessary to analyze different scenarios, with different hazards (as well as developing multi-hazard scenarios) and review the specific vulnerabilities for each exposed attribute. This case is also more complex because is a whole historic living city, therefore the heritage is distribute through a large space and in case of an emergency, the priority will focus in saving lives. This is why risk assessments and subsequent mitigation plans are fundamental to protect cultural heritage for future generations.
The imaginary scenario developed during the ITC 2016 focused on climate change induced hazards. A hurricane followed by floods, and landslides in the surrounding of the city, during the Easter celebration. The election of this case study highlights the uncertainty that climate change is causing over phenomena such as hurricanes and other associate hazards like floods. These can be increased by city vulnerabilities –for instance, clogged sewerage caused flooding in the past. This case also brought both movable art and intangible culture into the picture. The table below shows a summary of the imaginary scenario.

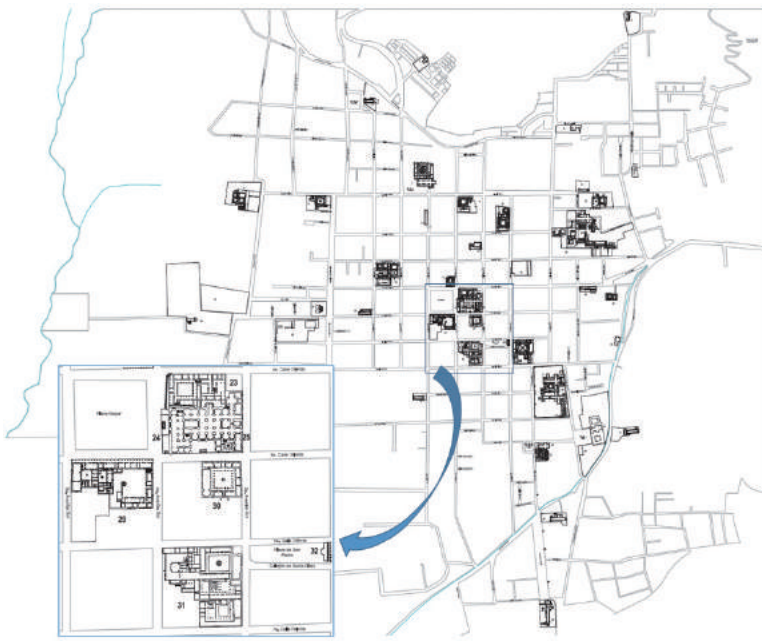

Fig. 7 Map and plan detail of Monuments of Antigua Guatemala [4]

Table 2

Scenario	Possible Impact	Mitigation measures	Stakeholders	Attributes
Hurricane from the Caribbean, changing direction unexpectedly	Strong winds and heavy rainfall over the non-prepared city	Early warning system for hurricane alert; tourists evacuation plan; Possible structural studies of buildings to reinforce external elements	CONRED Municipal authorities CNPAG	Ruins Historic buildings Semana Santa
Flood in the core area caused by heavy rainfall and clogged sewerage system	High level of water in streets and houses basements; affecting Easter celebration art	Periodically cleaning & maintenance of the sewerage system; Water collection for storage and use during dry season to mitigate drought	Municipal authorities CNPAG Communitie	Streets/ Squares Vernacular Arch. Museums Churches
Landslide in the buffer area, caused by heavy rainfall	Disruption in roads, communication lines, electricity system	Geological studies recommended and possible retaining wall methods in prone areas close to roads or services	CONRED National government	Landscape
Easter celebration, brings more visitors to the city, national & foreigners	Incidents caused by delay in cancellation the celebration and uninformed tourists	Reinforce emergency service focus on tourists; information campaign; Prepare shelters for movable art used in processions	Municipality CNPAG Communities Tourist sector	Semana Santa Religious sculptures and street art

Therefore, the disaster risk over Antigua heritage can be reduced. While hurricanes are unavoidable, preparedness measures could be taken and floods and landslides could be anticipated and mitigated. In the same way, vulnerability increased by tourism could be reduced by developing a comprehensive tourism management plan, including disaster mitigation measures as well as risk preparedness, and reinforcing emergency services with a special focus on tourists, foreign students and visitors. Fig. 7 shows the detailed map of monuments developed in the Master Plan [5] reflecting the exhaustive work of documentation carried out.

6. Conclusions

Antigua Guatemala is a jewel from 16th-18th centuries, preserved despite several natural hazards. At the same time, the city is a living cultural reference in the region for its artistic manifestations, celebrations, and language learning traditions. Therefore, the role of the local community in the preservation of the heritage of Antigua is crucial.

A key consideration while designing disaster risk plans for cultural heritage should be the community involvement to ensure that official efforts are appropriately supported. In the case of Antigua, there are several groups, such as religious fraternities, communities of residents, commerce associations, tourist sector, who should be involved in action plans to protect the city heritage.

The coordination between authorities is fundamental. The Municipality should lead the efforts, strengthening the capacities of the CNPAG, as the main institution to protect the heritage.

There are a series of challenges that would need to be addressed:

Fig. 8 Local artisans close to ruins serving as storage for Eastern movable art

- Changing the post-disaster response approach into a culture of preparedness and prevention;
- Developing a public policy for local risk management with the objective of reducing disaster impacts;
- Organizing trainings on Disaster Risk Reduction of Cultural Heritage for the local community, with the objective of involving them and building capacity on risk preparedness;

- Developing a comprehensive visitor management plan, including disaster mitigation measures as well as risk preparedness, and strengthening the role of the touristic police;
- Promoting interinstitutional collaboration at national and international levels.

7. Looking to the future

Preserving historic legacy for future generations is an important way to consolidate urban resilience, especially because we are facing an increasingly uncertain future: it is essential for our historic cities to adapt their heritage conservation strategies to disaster risk plans. In order to actively promote this idea, an initiative started by the World Bank DRM Hub, Tokyo [10] –which supports developing countries in mainstreaming disaster risk management in national development planning and investment projects– is currently engaging Japanese experts through R-DMUCH to capture key solutions for resilient cultural heritage to be shared with World Bank clients and teams, all around the world.
Hopefully, the end of this article is just the beginning of future projects.

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Photo Credits

Figs. 1, 3, 4, 8: Bárbara Mínguez García; Fig. 5: Carlos Enrique Berdúo, Master Plan of La Antigua Guatemala (ULPGC). Fig. 7: Map courtesy of Manuel Martín, Master Plan of La Antigua Guatemala (ULPGC).

2.11 Disaster Risk Management Plan for Qhapaq Ñan in Chile

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1. Introduction

Qhapaq Ñan (QÑ), the Andean Road System, is a World Heritage Site inscribed in 2014. Its nomination process was a tremendous effort of international coordination among Peru, Equator, Colombia, Argentina, Bolivia and Chile, carried out during more than ten years.

The Outstanding Universal Value of QÑ refers to an extensive **Inca communication, trade and defence network of roads and associated structures** covering more than 30,000 km, constructed by Prehispanic Andean communities over several centuries, through one of the world's most extreme geographical terrains, **linking towns and centres of production** over long distances. It demonstrates **mastery in engineering technology** used to resolve challenges posed by the Andes various landscapes and geography.

Several local communities remain custodians and continue to safeguard **associated intangible cultural traditions** including languages, and values and principles of reciprocity, redistribution and duality. QÑ played an **essential role in the organisation of space and society** of an extensive territory in South America. (UNESCO 2014)

2. Qhapaq Ñan in Chile, the selection of a case study

In Chile, 5 sections were nominated, in three regions of the north. The selected attributes (archaeological sites and roads) are expressions of different technologies and responses to diverse geographical and climatic conditions.

For the purpose of developing a Disaster Risk Management (DRM) Plan, one of the sections was selected, located in Antofagasta Region. The Cupo-Catarpe section comprises archaeological sites and roads located in two communes, Calama and San Pedro de Atacama (Fig. 1). One of these sites, "Tambo Catarpe" is situated on a terrace near San Pedro river and it is composed by dozens of structures made by stone and mud probably built during the Inca period, and various cemeteries from previous cultural groups. This site is characterised by a strong relationship with its surrounding landscape, in the ancestral territory of Catarpe indigenous community.

Tambo Catarpe is 6.4 km north from San Pedro de Atacama, one of the three main tourist destinations in Chile, due to its natural and cultural heritage. The area is visited by more than 100,000 tourists annually. However, Catarpe site has no many visitors, and the access to the site is not regulated yet.

The main values of Tambo Catarpe are: archaeological value; scientific, technical and typological value (a Double Tambo); contextual value regarding its integration to landscape; identity value for local communities; symbolic value of the cemeteries and Inca structures; and touristic value.

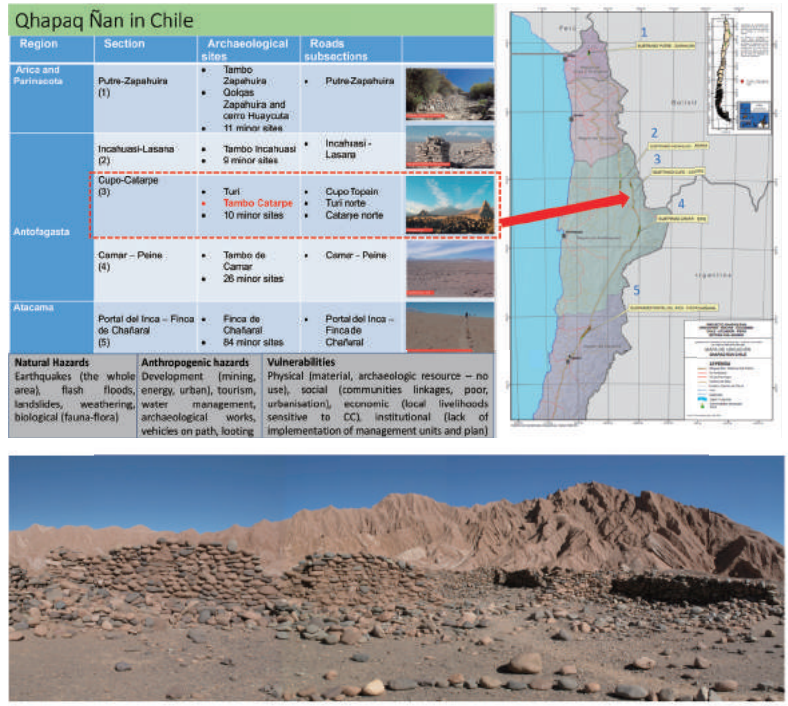


Fig. 1 Qhapaq Ñan in Chile and selected case study, Tambo Catarpe archaeological site. (Pictures credits: CMN-UTA 2014. Catarpe's picture is courtesy of Ambito Consultores. Map from Nomination Dossier provided by Council of National Monuments)

3. Risk assessment and disaster scenario

The Management Plan (MP) of QÑ Chile defined three levels of management: National, Regional, and Local. In each section, many stakeholders are supposed to be involved, including local authorities (Municipalities) grouped in an Association at regional level; and, at the local level, the management units should be conformed by the indigenous communities on which territories the sites and roeads are located.

Although a Disaster Risk Reduction (DRR) Program was developed as part of the MP, none of the proposals are in place. Beside the lack of implementation, other vulnerabilities were recognised in the existing DRR program as it considers only hazards at the local scale with lack of understanding of a wider context, and interrelation with surrounding areas. Moreover, it proposes to do DRM but doesn't considers all the stakeholders involved.

At the local scale, Tambo Catarpe is placed in an area highly exposed to landslides, erosion, and floods. But it is also exposed to earthquakes, weathering effects, uncontrolled tourism, looting of archaeological objects, and water management issues affecting San Pedro river. Although earthquakes can be very destructive, they are less recurrent than other hazards that can affect the site, especially hydro-meteorological events. Moreover, an important issue is that annual precipitations are going down, diminishing the caudal from San Pedro River (thus affecting local agriculture) but **extreme weather events are increasing in number and severity**, particularly between December and March, **related to ENSO and Climate Change**.

To prepare a possible disaster scenario for Tambo Catarpe, two things were taken into account. First, an event that affected a section of Qhapaq Ñan in 2015, in Atacama Region, due to floods and mudslides that disturbed three regions of the country, destroying one of the protected archaeological sites and damaging others. The second was an analysis of total rain and maximum daily rain in the watershed of San Pedro river, as well as previous events occurred in the area, to estimate the recurrence period and magnitude of a heavy rain event than might cause flood.

The disaster imagined situation starts with an event of heavy rain during February 2018, summer vacation time in Chile, which triggers a flash flood and debris flow on the river plain, along with some landslides that affect several sectors of the archaeological site and its access. The effects of this event are related to vulnerabilities and capacities (Fig. 2) as well as the characteristics of the event itself, so due to weakness of structures and their materials some of them partially collapse, several people in the site were injured due to landslide and lack of refuge, and there were diverse economic losses affecting the site, the riverbed of San Pedro River, and the town of San Pedro de Atacama.

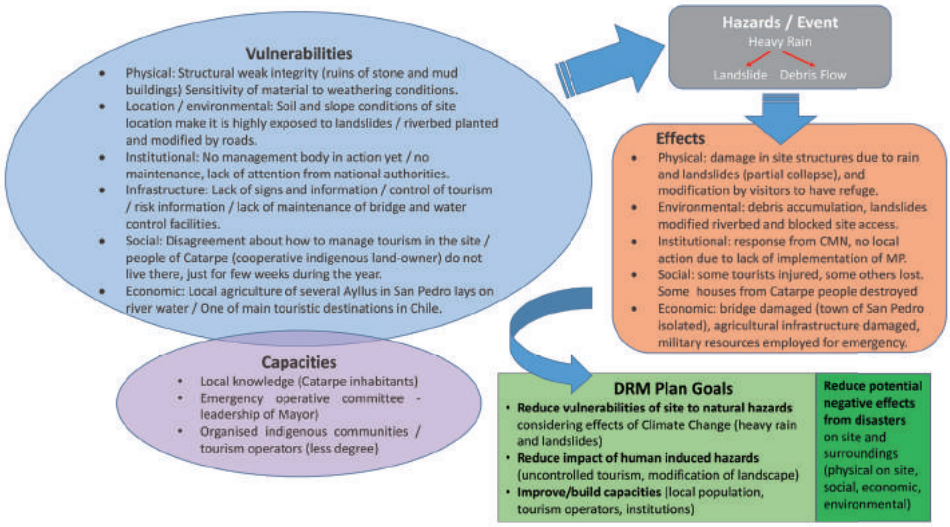


Fig. 2 Analysis of disaster scenario leading to DRM Plan goals

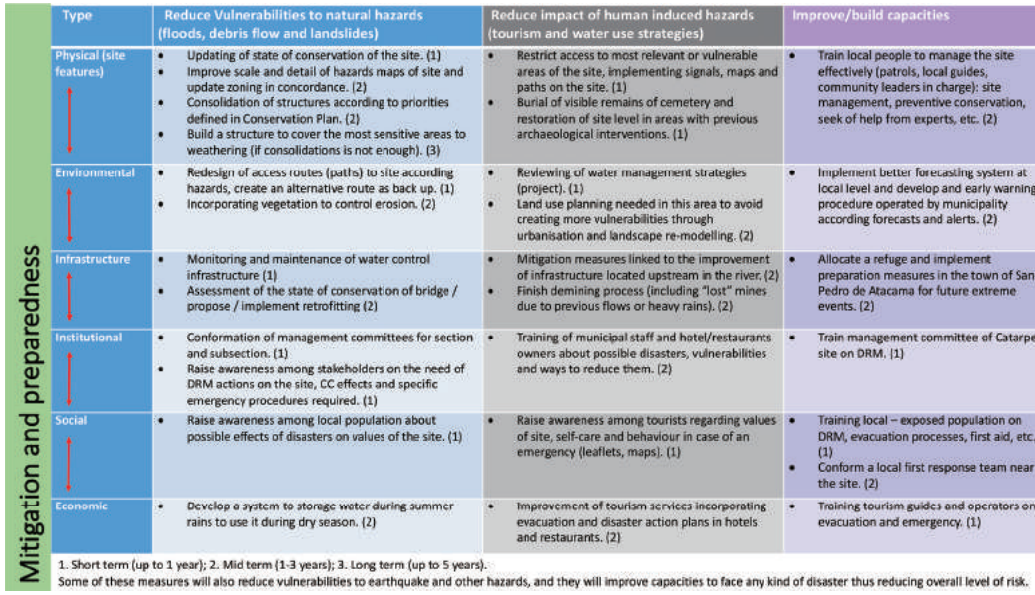
4. The Disaster Risk Management Plan

Based on the possible effects of an event triggered by heavy rain on the values of the site, the landscape, the associated communities and their livelihoods, three goals for the DRM plan were proposed: (1) to reduce vulnerabilities, (2) to reduce impacts of anthropogenic hazards, and (3) to build capacities, that aim to minimise the potential effects of a disaster on the site and its nearby area.

The DRM planning team should involve specialists, the local management unit and national authority for cultural heritage; with the active participation of the local community, people involved in tourism, the municipality, and some public offices and ministries related to infrastructure and DRM in general. In addition, the plan should comprise all the stages of the disaster cycle.

Both the goals and the structure of DRM planning team are also applicable to other sites and roads in QÑ Chile, with local differences.

A set of measures for mitigation and preparedness was proposed for Tambo Catarpe, related to each of the goals defined and to each type of vulnerability recognised (Fig. 3). Measures include physical actions in the site such as consolidation of archaeological structures, evacuation plan, an equipped visitor centre; the improvement of river infrastructure and the bridge to access San Pedro de Atacama; institutional actions; education and training actions as well as land planning arrangements, considering the site and the village of Catarpe as well as the town of San Pedro de Atacama. Measures were prioritised according to short, medium, and long term (5 years). Some of the proposals take into account the current MP, although in this case DRM considerations were also integrated. It must to be mentioned that most of these activities and projects would decrease the vulnerability of the site and its surrounding area not only to the occurrence of floods and landslides caused by heavy rain, but also for other hazards that could affect them such as earthquakes and human induced hazards.



Type	Reduce Vulnerabilities to natural hazards (floods, debris flow and landslides)	Reduce impact of human induced hazards (tourism and water use strategies)	Improve/build capacities
Physical (site features)	• Updating of state of conservation of the site. (1) • Improve scale and detail of hazards maps of site and update zoning in concordance. (2) • Consolidation of structures according to priorities defined in Conservation Plan. (2) • Build a structure to cover the most sensitive areas to weathering (if consolidations is not enough). (3)	• Restrict access to most relevant or vulnerable areas of the site, implementing signals, maps and paths on the site. (1) • Burial of visible remains of cemetery and restoration of site level in areas with previous archaeological interventions. (1)	• Train local people to manage the site effectively (patrols, local guides, community leaders in charge): site management, preventive conservation, seek of help from experts, etc. (2)
Environmental	• Redesign of access routes (paths) to site according hazards, create an alternative route as back up. (1) • Incorporating vegetation to control erosion. (2)	• Reviewing of water management strategies (project). (1) • Land use planning needed in this area to avoid creating more vulnerabilities through urbanisation and landscape re-modelling. (2)	• Implement better forecasting system at local level and develop and early warning procedure operated by municipality according forecasts and alerts. (2)
Infrastructure	• Monitoring and maintenance of water control infrastructure (1) • Assessment of the state of conservation of bridge / propose / implement retrofitting (2)	• Mitigation measures linked to the improvement of infrastructure located upstream in the river. (2) • Finish demining process (including "lost" mines due to previous flows or heavy rains). (2)	• Allocate a refuge and implement preparation measures in the town of San Pedro de Atacama for future extreme events. (2)
Institutional	• Conformation of management committees for section and subsection. (1) • Raise awareness among stakeholders on the need of DRM actions on the site, CC effects and specific emergency procedures required. (1)	• Training of municipal staff and hotel/restaurants owners about possible disasters, vulnerabilities and ways to reduce them. (2)	• Train management committee of Catarpe site on DRM. (1)
Social	• Raise awareness among local population about possible effects of disasters on values of the site. (1)	• Raise awareness among tourists regarding values of site, self-care and behaviour in case of an emergency (leaflets, maps). (1)	• Training local – exposed population on DRM, evacuation processes, first aid, etc. (1) • Conform a local first response team near the site. (2)
Economic	• Develop a system to storage water during summer rains to use it during dry season. (2)	• Improvement of tourism services incorporating evacuation and disaster action plans in hotels and restaurants. (2)	• Training tourism guides and operators on evacuation and emergency. (1)

1. Short term (up to 1 year); 2. Mid term (1-3 years); 3. Long term (up to 5 years).
Some of these measures will also reduce vulnerabilities to earthquake and other hazards, and they will improve capacities to face any kind of disaster thus reducing overall level of risk.

Fig. 3

In addition, an **evacuation plan** was developed for Tambo Catarpe. People should stay safe in the site during a first stage of the emergency, until water recedes enough to allow them going back to the town by car or by foot. The exhibition room at the visitor centre (to be built) would serve as temporary refuge; it must have provisions for three days, satellite phone, and first aid supplies. Badly injured people should be moved to Calama hospital located 100 km west, by ambulance or helicopter. Archaeological objects that emerge due to the rain should be temporary stored in the visitor centre, and then moved to the archaeological museum located in the town.

During an emergency, the local management unit and the staff in the site are the core emergency team, in coordination with local authorities. Response actions require also mutual collaboration with tourism guides and neighbours. The local management unit should inform to regional and national levels, and the national authority in charge of cultural heritage (the Council of National Monuments) should inform and/or ask for assistance to the international level (UNESCO, ICOMOS, and international management committee of QÑ, when applies).

For the **recovery process** related to the scenario created, the DRM plan considers a period of 5 years for total recovery (Fig. 4). During each phase, technical and economic resources are needed. For funding, several national and international funds are considered for application. In addition, it could also possible to ask for funding to private companies operating in the area, as part of their Corporate Social Responsibility actions, considering that they already have an active relation with local communities and municipalities. Recovery actions are aimed not only to build back to the previous state but to reduce the vulnerability of the site to the various hazards that may affect the area.

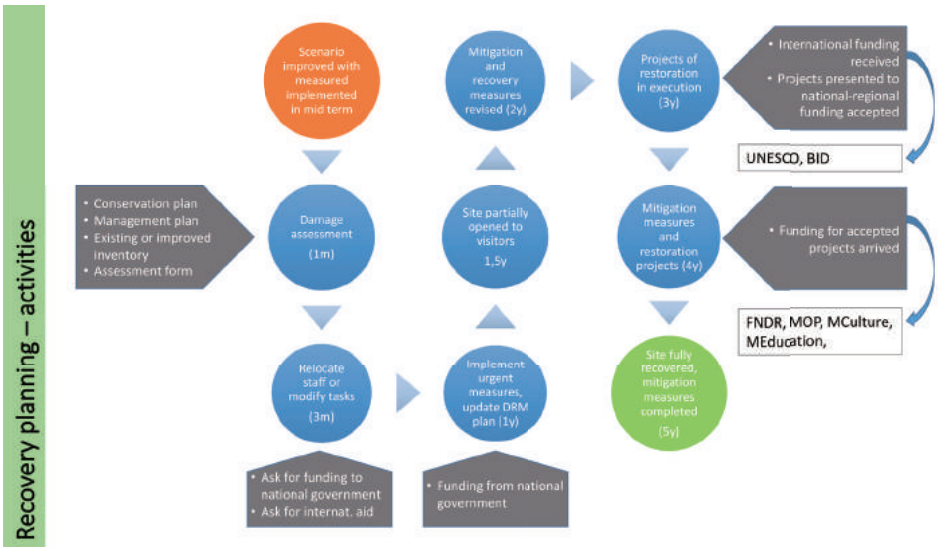


Fig. 4 Recovery activities and funding processes.

5. Conclusions

Although Qhapaq Ñan is a very complex World Heritage Site, some lessons learned during the International Training Course on DRM of Cultural Heritage are applicable at different management levels both at national and international scale. QÑ attributes such as archaeological ruins and roads are very sensitive to natural hazards and specially to the effects of climate change. But beside the possible loss of tangible values due to disasters, the associated communities can also suffer and their livelihoods may be affected as they are intrinsically related.

To raise awareness and improving coordination are key factors to reduce the overall vulnerability from the site and its nearby area to different hazards. In addition, to consider the importance of cultural heritage for local communities is also crucial to prioritise actions of DRM in contexts where resource for conservation of cultural properties are scarce.

It is relevant to consider multi-hazards and cascading hazards assessments as well as to define feasible disaster scenarios to prioritise DRM measures, that should consider all the disaster cycle. The implementation of these actions are aimed to reduce vulnerabilities of the heritage site and its surroundings as well as to improve capacities of communities and authorities to deal with future events, some of which will be probably more recurrent and severe due to climate change.

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2.12 Cultural Heritage and Disaster Risk in Danube Delta Biosphere Reserve, Romania

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1. Introduction

The Danube Delta Biosphere Reserve (DDBR) is a complex site situated in South–East of Romania that was created by Government Decision No. 983/1990 and by the Law No. 82/1993. At international level, DDBR is listed within three international environmental protection networks: The International Convention for the Protection of the World Cultural and Natural Heritage (1990), The Convention of Wetland Zones of World Importance (RAMSAR Convention - 1991), Natura 2000 and the International Biosphere Network (UNESCO - M&B program).

The Danube crosses Europe from Germany to the Black Sea, Romania, where it forms the Danube Delta with a shape of a triangle whose tip is oriented westwards whereas its basis is situated eastwards, all along the Black Sea coast. The hydrographic network formed by three main branches: Chilia in the north, Sulina in the central part and Sfântu Gheorghe in the south. The last two main branches have been rectified several times and 93.3% of the delta area is between –1 m and +2 m from the Black Sea mean level and 79.5% is under the 0 m level, meaning that almost two thirds of the total areas of the delta are permanently submerged[1]. The site includes geographic units, divided by their morphological and biological characteristic: The Danube Delta itself, the Razim – Sinoe lagoon complex, Danube River east to Cotu Pisicii, the Isaccea – Tulcea floodplain, the Murighiol -Plopu saline plains and the Black Sea coast from Chilia arm to Capul Midia, out to 20 m depth [2] (Fig. 1).

Fig. 1 UNESCO site Danube Delta Biosphere Reserve (DDBR) location and specificity

Inscribed in UNESCO for criteria (vii), (x) as a natural property, the Danube Delta Biosphere Reserve was described by the Committee as "Outstanding example representing the major stages of the Earth's evolutionary history, a significant ongoing geological processes, biological evolution and interaction of human beings with their natural environment. It contains unique, rare or superlative natural phenomena, formations or features of exceptional natural beauty. It is an outstanding example of a most important ecosystem, being a wetland ecosystem on a vast scale, unique both in its European context and internationally." [3]

2. Value and attributes

Considered the second largest delta in Europe, a vast and complex property with an area of 5800 km2, the Danube Delta Biosphere Reserve can be read at different scales, showing different attributes of the site related to different associated values. The heritage values of the Danube Delta represent the natural (landscape, fauna, flora, delta's biodiversity, climate) and human (culture, history and human

settlements) resources of a landscape in continuous geological and man-induces transformation. Within site boundaries, there are natural zones with special complete protection (natural heritage strictly protected), buffer zones, areas for ecological restauration and economic (sustainable developments) zones, including also human settlements. While its natural attribute is certainly obvious for its biodiversity value and well known through experts, academics for educational potential value, there are, however, substantial visible marks of uninterrupted habitation and productive activities for centuries and one attributes can carry more values. What is certain is that today the site is a socio-cultural palimpsest (Fig. 2) created by successive cultures and the landscape display significant cultural assets, an intangible value, own to the acculturation phenomena between the Romanian and other ethnics (Bulgarian, Ukrainians, Lippovans). Cultural diffusion and diversity is also proved in the different types of existing attributes associated to historical and cultural values, architectural value (mosques, churches ancient settlement, fortresses, vernacular architecture, etc).

The beauty complexity of the site attract a large number of visitors generated by tourism industry, most of the time from spring to autumn and the territory has been transform into international touristic destination.

Attributes/ elements			Type of protection	Position in the teritory	Relation with the WH Properties
49 habitats identified			18 habitats strictly protected; 29 important status in Habitats Directive	World Natural Heritage Site	DDBR
Archeological sites/ archeological settlements/ ancient settlements			National [A]	Tulcea	DDBR limits
			Local [b]	Babadag	DDBR limits
			Local [b]	Caraorman	DDBR
			Local [b]	Murighiol	DDBR limits
			Local [b]	Izvoarele	
			National [A]	Enisala	DDBR
			National [A]	Jurilocva	DDBR; World Natural Heritage Site limits
Fortresses			National [A]	Tulcea	Outside of DDBR [limits]
			Local [b]	Bestepe	DDBR limits
			National [A]	Enisala	DDBR; World Natural Heritage Site limits
Urban sites			National [A]	Tulcea	Outside of DDBR [limits]
			Local [b]	Sulina	DDBR
			Local [b]	Babadag	Outside of DDBR [limits]
Urban Ensembles			Local [b]	Tulcea	Outside of DDBR [limits]
			Local [b]	Sulina	DDBR
Buildings	Houses	Private adm.		Enisala	DDBR
				Tulcea	Outside of DDBR [limits]
		Public adm.		Sulina	DDBR
	Public buildings	Administration	National [A]	Tulcea	Outside of DDBR [limits]
			Local [b]	Sulina	DDBR
		Schools	Local [b]	Enisala	DDBR limits
		Museums		Tulcea Enisala	Outside of DDBR [limits] DDBR limits
	Religious	Churches	National [A]	Tulcea	DDBR limits
			Local [b]	Sulina	DDBR
			National [A]	Chilia Veche	DDBR
			Local [b]	Chilia Veche	DDBR
		Mosques	Local [b]	Babagdag	DDBR limits
Monuments Cemeteries			National [A]	Tulcea Sulina	Outside of DDBR [limits] DDBR
Lighthouse			National [A]	Sulina	DDBR

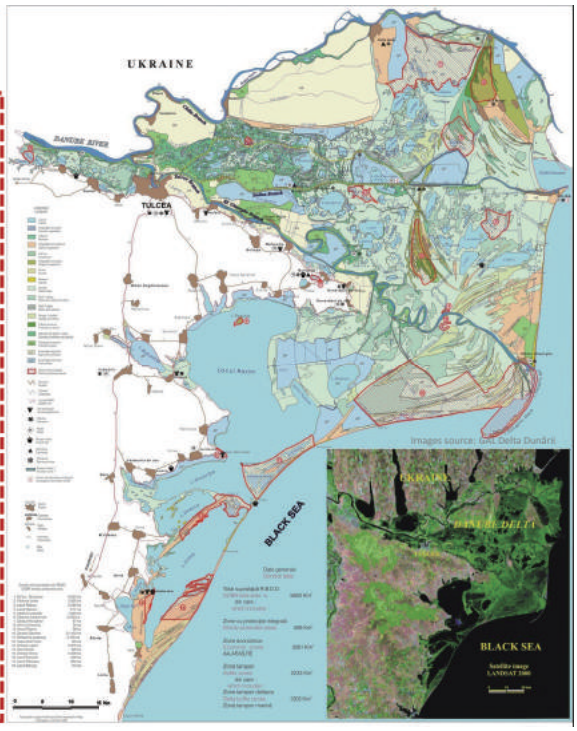

Fig. 2 DDBR Cultural and natural heritage inventory and the relation with the UNESCO site

Gradually, from the adaptation of human communities to environment and available natural resources (traditional fishing, productive landscape, reeds) to intensive exploitation of the land and developed tourism exploitation went alongside to economic, social and political changes and highlights the continuous use that have more local and regional value.

3. Partners and stakeholder's identification

Due the spread of the monuments and sites throughout the site territory, the entities that involved in the protection of the cultural heritage are National Institute of Heritage and Ministry of Culture, for the national monuments and sites (A) and County Office of the Ministry of Culture for local monuments and sites (B).

Due to the high complexity of the site, DDBR has its own governmental management administration -

Danube Delta Biosphere Reserve Authority (DDBRA) that protect biodiversity values of the UNESCO site, there are more three categories of possible entities involved in management process:

- Entities with regional level interests;
- Entities with local level interests such as: receiving fish points, private commercial societies, local councils etc;
- Governmental institutions that are involved in the territory level: National Environment Guard; Administration And National Affaires Ministry; Agriculture, Forests And Rural Development Ministry; Tulcea County Council; Tulcea Mayority; County Council; Local Councils; County; Association For Sportive Hunting And Fishing (CASHF); National Administration "Romanian Waters"; Dobrogea-Litoral Waters Department; National Department For Tourism Forests National Department – Romsilva; Romanian Shipping Authority.

4. Vulnerability and risk assessment

Climate change is a major challenge of our generation and is not anymore a surprise that could increase flooding and other risks throughout the whole water cycle in the next years. In Europe flood risk still represent a major threat and despite all the policies, the measures taken (European Flood Alert System) during the past decades and also the decision to implement of the European Flood Directive 2007/60/EC, large floods have occurred almost every year. The statistics shows that catastrophically floods in Europe are especially along the Danube river [1)]. Looking of the last major flooding from 2006 and 2010 following by heavy rain and snowfalls and in the next years by sever droughts, can be noticed also maximum discharge of the Danube in Tulcea town that reveals the water levels at the entrance of the delta and touristic, confirmed by a major flood of that area. (Fig. 3).

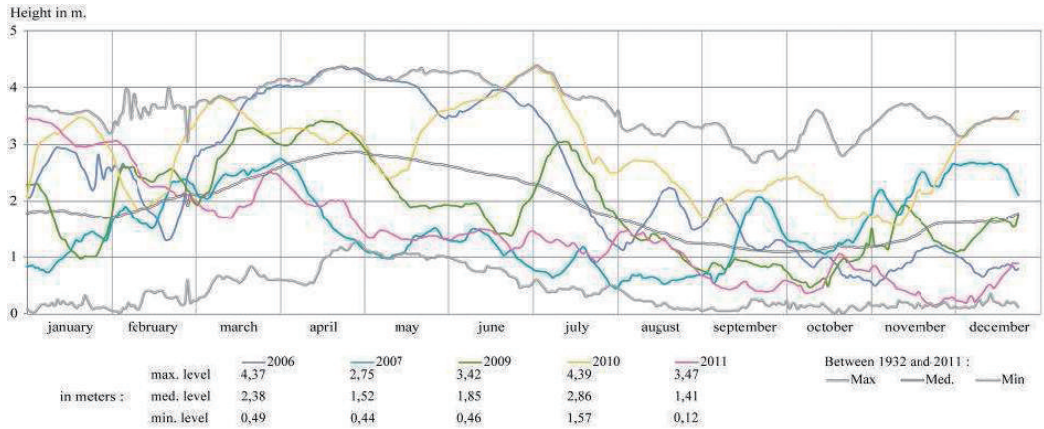

Fig. 3 Danube water levels at Tulcea in 2006, 2007, 2009, 2010 and 2011 and between 1931-2011 [2)]

Main drivers of change in the region are increase in average annual temperature and change in seasonal distribution of precipitation in the Danube Delta sub-basin and in the entire Danube basin. The DDBR is a representative flood hazard site as it has been affected by climate-related floods and hence by systematic rises of the water level and some areas are more prone to this risk, some less. To evaluate the risk, it is important to take into analysis the anthropic / build component of the landscape and geographical position of the attributes that, in this case is reported to inland, wetland and shoreline. Besides climate change impacts, also other factors such as social, demographic, and economic development are crucial here and each settlement has its specificity in many respects, including the flood [4)] and resulting different types of vulnerabilities:

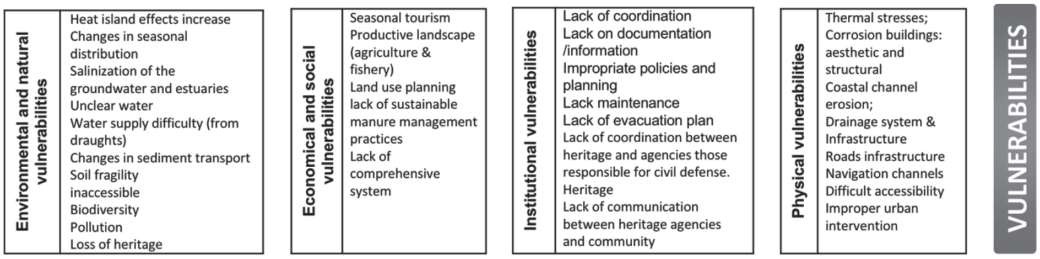

Fig. 4

Delta's landscape is made up of a multitude of channels, canals, floating islands and lakes (8.9% of the delta), rural settlements and two towns: Tulcea, gate to the Danube Delta and Sulina, gate to Black Sea. On the other hand, the human settlements confront with economic loss that cannot be coped, thus generating additional pressure on environment and humans. Here it is worth to mention two historical periods: from 1910–1944- PARID – Fishery and Floodplain Ad- ministration on Danube and the communist period, 1948–1989, when during the programs exploiting the Delta's resources they built fishponds and reed, agricultural and forestry arrangements through embankments and cutting channels.

Due the succession of the possible hazards in a different times, the repeated alternation flooding - drying can be highly destructive to habitats, human settlements and their resources [2)], and also the existing cultural heritage:

Table 1

POSITION OF THE CULTURAL ATTRIBUTS	TYPES OF ATTRIBUTES	VULNERABILITIES	IMPACTS
DDBRA site	Archeological sites Fortresses; Heritage buildings; Lighthouse; Cemeteries.	•Draughts, salt air, landslides, coastal erosion, Corrosion •Salt wind, floods, draught, Corrosion •Inappropriate policy and planning •Wood buildings •Difficult accessibility •Disagreement about how to manage tourism in the site	•Physical damages: building structures, infrastructure drainage form the landslide; •Economic damages: touristic place, transport economy, disruption of basic services; •Social damages: possible injured tourists and trapped; •Environmental and natural damages of water supply; •Institutional damages: delay responses and organization from local administration and actors involved; •Loss of lives
Outside DDBRA site	Urban sites; Urban settlements; Heritage buildings; Ancient settlements.	•Inappropriate policy and planning •Past intervention-lack of coordination •Detailed information about every building •Disagreement about how to manage tourism in the site •No management body in action yet	

In an extreme weather condition, during the flooding season, the most vulnerable are the attributes from Tulcea town, with a total of 40 attributes (3 archeological sites, 35 architectural monuments, 33 heritage buildings, 2 urban sites and 2 memorial monuments), especially the part along the Danube river and the city center, at the limits of the preserve natural site. (Fig. 5)

Fig. 5 Tulcea General Urban Planning, vulnerability plans of the city center and promenade, author processing source (PUG Tulcea)

5. Outline a Disaster Risk Management System

To develop and to implement preventive measures and strategies in the entire territory of the reserve requires different stakeholders, coordination and actions at different levels and territory scales.

5.1 DRM Plans goals

The goals of the DRM Plan are to reduce potential negative effects from disasters on that area, impact and surroundings (physical on site, social, economic, environmental) prioritizing human and cultural heritage through decision, actions and direction:

- Identify ways to reduce the risk to cultural heritage attributes/ properties and assets involved in the area;
- Prioritizes risk reduction measures of human safety and cultural heritage;
- Detection: (policies and regulations); Limits the size hazards, Mitigation and adaptation, emergency response;
- Improve capacities: Plan team, different entities/actors/stakeholders;
- Reduce potential negative effects from the hazards.

5.2 Mitigation strategies

For the mitigation strategies, several measures are proposed below. These measures takes in consideration legal framework, national, regional and local policies, reconnecting different services and monitoring and maintaining the water characteristics for peoples' safety.

Table 2

	MITIGATION MEASUREMENTS	ENTITIES/ STAKEHOLDERS
INSTITUTUTIONAL MEASUREMENT	Measures of legislative and institutional measures related flow management and monitoring: •Institutional arrangements; •Regional, local/ DD policies coordination with European Directive 2007/60/EC on the assessment and risk management flood legislative transposi¬tion: GD nr.846 / 2010 to approve the national strategy for flood risk management in the medium and long term. •Flow management information system data as part of the water; monitoring; •Developing/ review an inventory system of cultural heritage: buildings, objects (from the museum) intangible heritage	MMAP; MAI (IGSU); MFE; MDRAP; ANAR; local administration; CJ, Romsilva; Hidroelectrica; another owners of flood defense infrastructure; Professional experts

STRUCTURAL MEASURES	Technical flood protection measures, most known structural measures are: •For river: Dams and reservoirs/ Dikes and Embankments Drag at territorial level; green infrastructure; •Recalibration of the watercourse: shore defenses; •Review on existing natural and human-induced hazards on the area heavy rains, flooding, landslide and fires; •Buildings structure: consolidation, materials, hydro isolations; •Urban structure: drainage system, place of scenic beauty revival, •Art objects: restauration.	MMAP; MAI (IGSU); MFE; MDRAP; ANAR; Local administration; Professional experts.
NON - STRUCTURAL MESUREMENTS	•Measurement to reduce inundation possibility; •Flood warning system; Measures on rainfall forecast –monitoring system of equipment for selection and processing information on rainfall; •Promoting and establish on interactive system for reporting information on sediment-related disasters •Water natural retention measures in populate areas – to specify on the map; •Flood natural retention measurements - to specify on the map; •Disaster information to underground buildings administrators regarding the basements buildings (phreatic water); •Measures to increase resilience to flooding; •Measurements to increase awareness of the communities: education, training; Prevention measurements by changing or adapting land use practices: •Land use regulation: For any construction (except defense works and fences) located on a parcel or contiguous affected by natural hazards such areas, documentation that will be prepared for construction will be substantiated by studies specialty risks related to natural conditions will determine the placement of new construction and works required for the removal or mitigation and will be endorsed and approved by law; •Environment engagement of the river/ water supply for the communities: Regulation regarding water/ drainage infrastructure: recommended to use a rainwater collection system separately from wastewater and industrial saver •Regulation on building safety: Integrate risk reduction into design, construction and policy development sustainability to building development/ Involves with the design, planning, construction, operating and management a new development / redevelopment; •measures on management of emergency situations: Evacuation measurement and plan for further hazards; •Monitoring and maintenance on CH inventory; •Integrating DRM into the existing urban planning: multi sector coordination during the emergency and control urban development.	MFE; MDRAP; ANAR; Local Authorities; Municipality County another owners of flood defense problem; Ngo,s; Professional experts.

5.3 Emergency preparedness and response

Emergency team will be involved at the different levels from urban area to the building level (Museum of Fine Arts, in-use building). The proposed emergency preparedness and response procedure brings together institution, technical teams, management units (Ministry Culture and INP), private sector (leader communities, NGO's, etc.)

Considering that are existing management plans for all the levels, the local authority will play a big role during the disaster and an evaluation plan is necessary (Fig. 6) that will conduct to minimize flood damages.

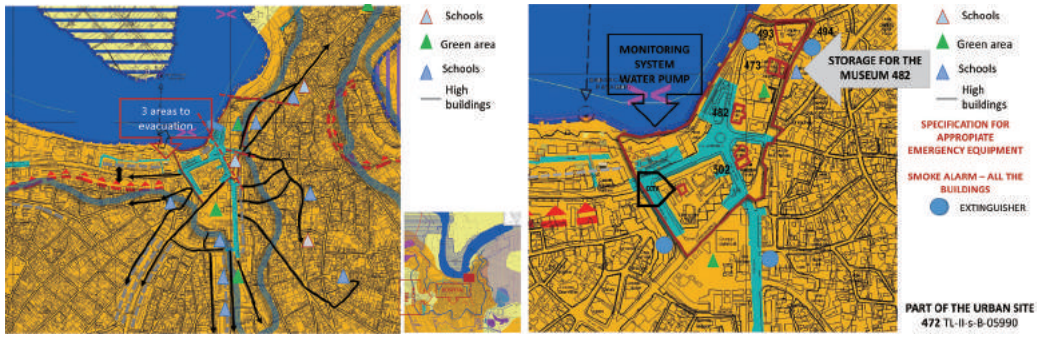

Fig. 6 Evacuation plan proposal

5.4 Recovery plan

There are proposed three phases of the recovery plan. The first phase is the phase of the emergency response: procurement of equipment and materials to stabilize buildings; recording and recovery of cultural material; prioritize short term and long term recovery plan actions; procurement of professional expertize for the needed fields.

The second one is recommended to be on short term strategies and aimed at stabilizing the recovery of the most damages part elements and objects but also most valuable doing the restorations 6 months after flooding: damage assessment of the urban area, environmental area and the cultural heritage buildings.

Long term strategies are important to integrate recovery / damages assessments in urban planning; retrofitting the affected cultural attributes according to their value; prepare a full documentation for all the area and its attributes (environment, cultural heritage, infrastructure, etc); use the experience to educate. The entities involved: Community Leaders, INP, Civil Defense, research and education institutions.

6. Conclusion

The Danube Delta Biosphere Reserve is an interesting study case for DRM proposal, a path to landscapes awareness and a holistic approach on the nature- human relation. To connect strategies, policies and different entities involved in the DRM of the Danube Delta is the important outcome from the chosen study case. The territory is a continuous living and overlap with climate change issue, will need more attention and respect which is built with peoples' education and awareness to DRM.

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2.13 Disaster Risk Management Plan for Petra Archeological Park, Jordan

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1. Introduction

Petra is a resource of extraordinary cultural and natural significance with considerable aesthetic, archaeological, anthropological and scientific values, and further potential yet to be discovered. It's a multicultural site where a lot of remains refer to many ancient cultural occupations; the first excavations shows evidences for Pre-history age occupations; Paleolithic and Neolithic Ages, in addition to many inscriptions discovers during excavations refers to the King of Edom (Iron Age). After then, Petra was glorious in the Nabateans period as a capital them kingdom and continued to flourish under Roman rule until Byzantine time, when Petra declined rapidly due to sea-based trade routes. After the interlude of the Crusaders, Petra was rarely mentioned in history. It regained attention after the famous visit of The Swiss Traveler Burckhardt in 1812 (Akasheh and et al, 2013; Taylor, 2001; PNT, 1994).

Petra was inscribed on the UNESCO World Heritage List as a cultural site in 1985. According to the World heritage centre of UNESCO, the Outstanding Universal Value of Petra resides in the vast extent of elaborate tomb and temple architecture; religious high places; the remnant channels, tunnels and diversion dams that combined with a vast network of cisterns and reservoirs which controlled and conserved seasonal rains, in addition to the main three criterions: the dramatic approaching natural winding rocky cleft (the Siq), the serried rows of numerous rock-cut tombs reflecting architectural influences from the Assyrians and the outstanding fusion of Hellenistic architectural of the so-called "royal tombs" in Petra (including the Khasneh ... etc.), Petra became an iconic and famous international archaeological site as well as a national icon and the best known, largest and most visited attraction in the Hashemite Kingdom of Jordan (WHC, 2016; USAID, 2014).

2. Petra archeological park

Since 1968, many schematic park boundaries were suggested to protect the archeological site (Gibbs, R. and et al., 1968). In 1993, Petra was also declared a “Protected Site” by a decree of the Council of Ministers, thus establishing it as a park, with protection further reinforced in 1996. In 2007, the area of 264 square kilometers was established as the ‘Petra Archaeological Park’. Also in that year, Petra was designated as one of the ‘New 7 Wonders of the World’, which has further raised its international acclaim, and site popularity.

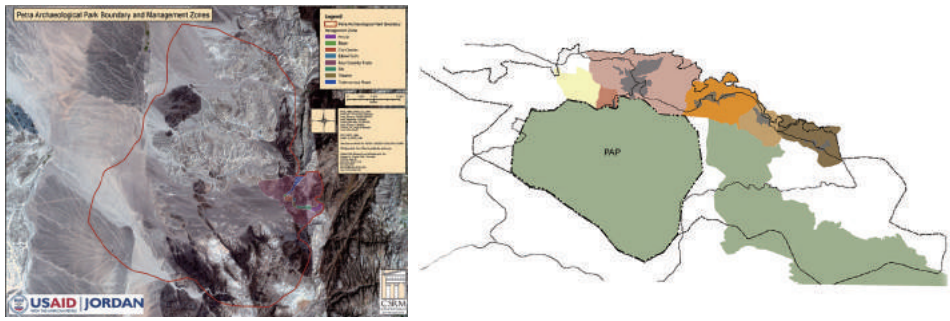

Fig. 1 The Petra Archeological Park Boundaries and Attributes

The Park hosts a lot of attributes within its boundaries and a along the tourists trials (Fig. 1), Table 1 show the most important Petra archeological park’s attributes, the types of these attributes and their associated value.

Table 1 Most Important Petra Archeological Park's Attributes, Types and Values

Attributes of your Site	Type of attribute	Associated Values
Siq	Natural, Tangible, Cultural	Natural , Aesthetic, Visual Historical , economical
The Treasury	Tangible, Cultural	Aesthetic, Visual, Historical, Economical
Carving façade & Theatre	Tangible, Cultural	Aesthetic, Visual, Historical
Central Area	Tangible, Cultural	Aesthetic, Historical, Cultural, economical
Monastery & Altar	Tangible, Cultural	Aesthetic, Historical, Cultural, economical
Water system (channels and dams)	Tangible, Immovable (livelihood heritage system)	Historical
The Bedouin Life Style	Intangible, Cultural	Historical, Livelihood value Economical
Central Area Museum	Tangible, Movable	Historical, Economical

3. Stakeholders and Local community:

Besides the Petra Development and Tourism Region Authority, there are many stakeholders involved in the region, each with their own set of priorities. Among these stakeholders are governmental institutions, which in specific areas have a strong say (e.g. archaeological protection or use of land), as well as protective bodies such as UNESCO, PNT and RSCN. of great importance are the local populations of the six communities, the Bedouin tribes with their traditions and all stakeholders involved in the regional tourism industry. Special attention must be paid to the 19 associations and cooperatives located in the region, which already present an encouraging basis for an increasingly active engagement of the regional population in planning for their future well being (ATC, 2011).

4. Disaster Risk Identification and Climate change

According to many studies, Petra is facing a lot of natural and human- made risks, which have impacted the heritage values and the site users as well. UNESCO, RLICC and University of Leuven (2011) created a Core Risk Mapping (CRM) to identify all the risk effects the monuments and people within the archeological Park, they categorized the risks regarding to their impacts on human and natural, these categorizes include subcategories to natural or human agents (see table 1). Phenomenally, three main natural hazard might effect on the monuments and people in the future; Seismic hazards, Flooding hazards and landslides and rock falls hazards (UNDB and et al., 2012)

Most of Jordan's territory is classified as desert. The data for the period 1961-2005 of 19 meteorological stations all over Jordan were evaluated with the following results (UNFCCC, 2009): The minimum temperature increased by 0.4-2.8°C, decreasing total annual precipitation by 5-20%, rainy days decreased by 3-10% in most of the stations. In most stations, relative humidity decreased while evaporation increased incidents of flash flooding have claimed the lives of a few hundred in Jordan over the years and affected the lives and livelihoods of thousands.

5. Seismic hazards in Petra and scenarios

Earthquake hazard has a 10% chance of being exceeded in 50 years, many researchers suggests that m the seismic events in the past (A.D. 110-114, 363, 749, 1068, 1212, 1458, and 1588) likely caused damage in the region of southern Jordan and Aqaba, the location of the archeological site is close to many active faults in addition to the small faults within the site will increase any seismic activity impact in the future (Fig. 2) (UNDB and et al., 2012).

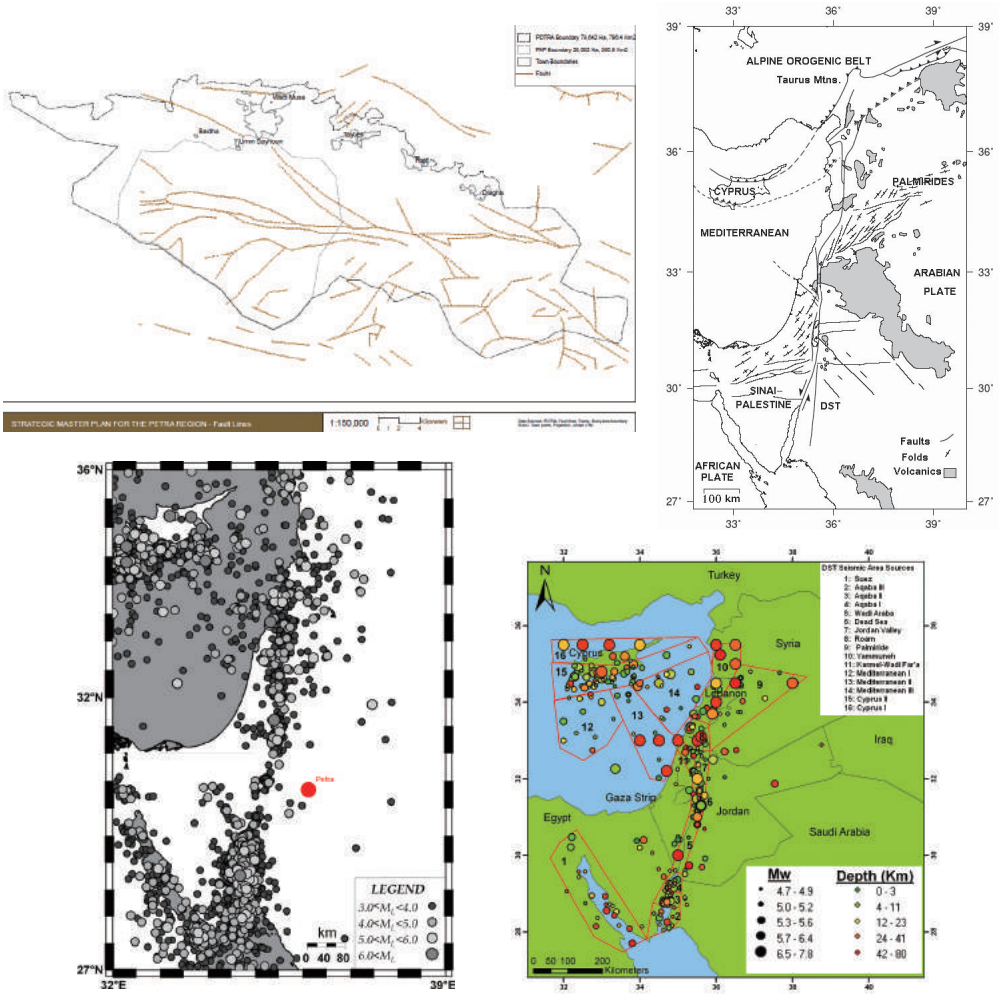

Fig. 2 The Tectonic Map of the Region (Main Faults) and the Historical Earthquake Along the Dead Sea Fault

The geological features of Petra and unplanned facilities formed the most seismic activity vulnerabilities and scenarios; the Fragile Rock, lot of debris and Steep cliffs will increase the rock falling risk in the time of earthquakes, Risky Overlooking view place and Wooden shop position increase the users and tourists' exposure to the rock falling risk, the Local transportation facilities and Narrow roads will obstruct any evacuation works, stone monuments will be effected by rock falling as well as the seismic activity which will increase the monuments damaged, moreover there are no earthquakes evacuation plan.

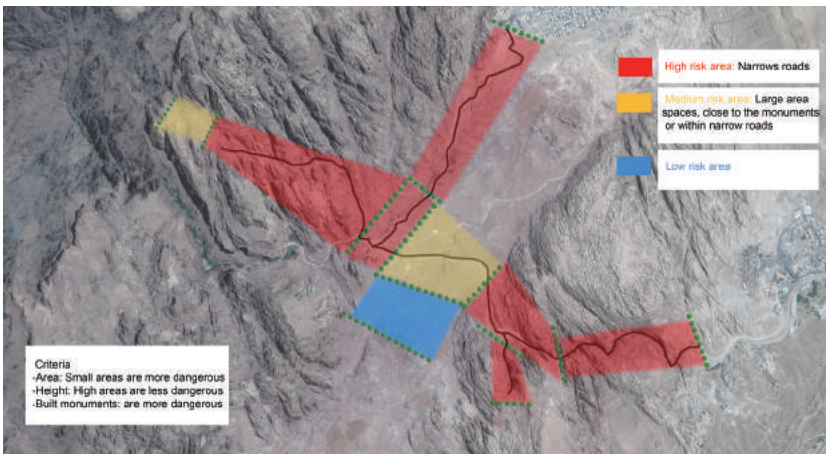

Fig. 3 The Earthquake Risk Predicted Impact on the Main Trails in Petra

6. Earthquake disaster management plan

Three main stages create a good and efficient disaster management plan: Preparedness stage, emergency response and recovery and rehabilitation plan.

6.1 preparedness stage

According to the earthquake scenarios analysis, there are a lot of mitigation strategies should be considered by stakeholders and management institutes, the first countermeasure of the rock-falling risk is making Survey to find the critical areas on the top of the mountains and cliffs that are facing the tourists, this survey will identify the risky debris, loose blocks and cracks areas, after creating this risk map and survey, the following strategies mitigate the rock falling risk:

1) Remove the debris in critical area annually
2) Stabilize the huge block which can't be removed by anchoring or fences, nets …etc.
3) Dislodge the small and medium blocks from the steep cliffs by professional climbers and stabilize the risky huge blocks annually

On the other hand, the unplanned facilities risk in the park need to re-planned, create New land-use map, and relocate the facilities in saver places. Regarding to Built monuments collapse risk in the time of earthquake, the stone structure monuments should reinforce by using appropriate conservation methods.

6.2 Emergency Response stage

The response for any emergency situation depends on the areas that exposed to any predicted impacts inside the park- in particular the fourth main touristic trails, as well as to the main road (back road) which is the only road inside the park and connected with Turkmanyiah- trail. The main preparedness strategies in any emergency response in Petra archeological park post - earthquake disaster are; the assembly points where the people should be gathered in the time of earthquake, avoiding any blockage will happen inside the narrows roads and the temporary shelters location inside and outside the park. The Following table shows the most important emergency plan preparedness in the main three categories area in the park (high risk area, medium risk area and low risk area) (Table 2).

Table 2 The Preparedness Emergency Strategies and Planning Should be Done to Help the Emergency Team in Time of Earthquake

Location	Preparation
Narrow roads	Survey to set the best gathering points and implement the setting work
	Install Alarm signage system
Large space area	Define Accessible alternative routes in case of blockage main trails roads for emergency team
	Set Emergency team (professional team+ local transportation, horses, camels … etc.)
Safe area	Create evacuation station and shelter in blue zone (safe areas): using Reversible structure inside the park
	Use many empty caves as storage of emergency response machines and tools
Emergency Team	Accessibility Team + Evacuation Team Stakeholders: Government institutes DOA, PAP, MOTA, UNESCO, Police Tourism, Civil Defense, Local Community Association, local community (workers in the field)
Training and awareness (brochures for tourists)	

Relating to the emergency preparedness strategies, the emergency response will concentrate on avoiding blockages in the main roads and finding the best way and safe shelter place to evacuate tourists. The alarm signage systems will guide people to the safe gathering points, then the accessibility team and evacuation team will work together, where the accessibility team will create the possible way for evacuation in case of road's blockage, but should just work in one way to avoid any conflicts between their work and evacuation team. The evacuation team will firstly evacuate people to the temporary shelters inside the park, then evacuate them to closer town outside the park (Fig. 4).

Fig. 4 The Proposed Evacuation plan Elements on the Petra Archeological Park's Map

6.3 Recovery and Rehabilitation plan

The recovery work (short-term) will focus on the situation after the earthquake time and monuments deterioration, the supposed recovery works in Petra includes: Rabid risk and damage assessment, Blockage Dislodgment work, First Aid stage and Stabilization work, these tasks need to create three teams and contribution from all stakeholders in the site, the following diagram shows the most important aspects of recovery plan in sequence:.

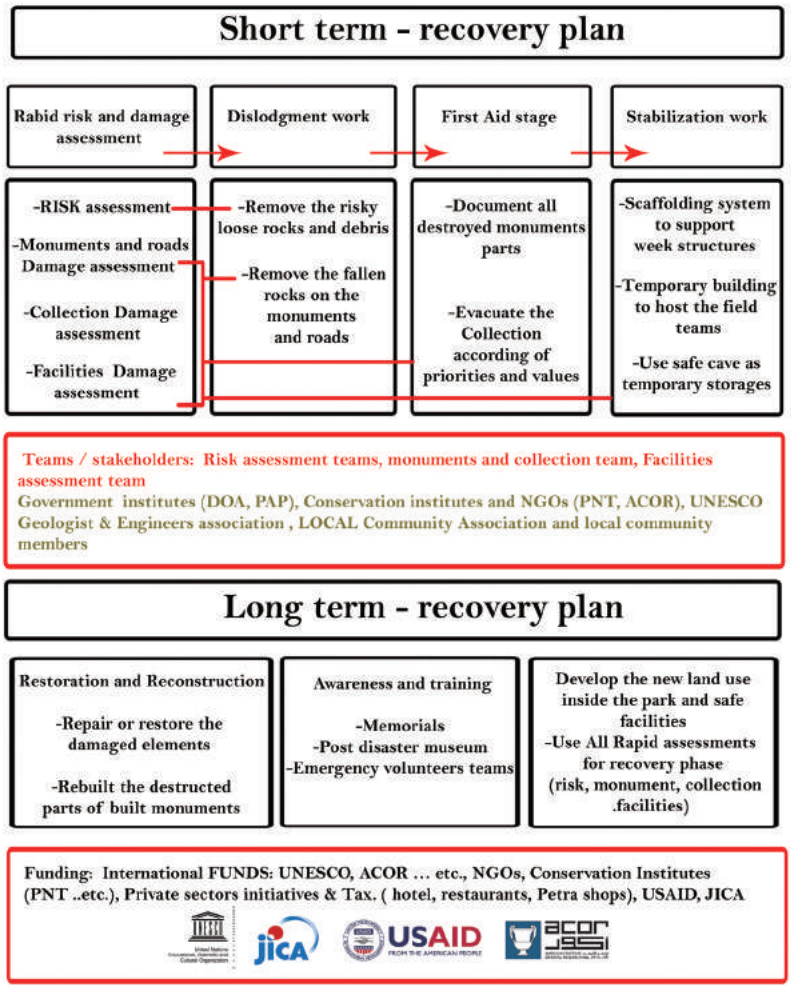

Fig. 5 The Most Important Aspects of Recovery Plan (Short Term and Long Term) in Sequence

The diagram above shows the relations between the recovery works are needed in the post-earthquake situation. The short term creates a clear idea about the damages and does the first needed intervention to save the monuments and collection. Thereafter we have to set a long term plan with main three aspects: restore all damaged parts, build back better all the facilities with new land use in the site, and more concentration on the local community and stakeholders' awareness and training; by creating memorials and post disaster museum, providing a serious training for Petra stakeholders and create volunteers teams. Concerning the funding resources, many of these might be involve in recovery stages, such as the international institutes which work in Petra, in addition to the possibility of collaborating with the private sectors by initiatives and additional taxes.

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2.14 Case Study Project - Rio de Janeiro World Heritage: Tijuca National Park / Tijuca Forest Sector, Brazil

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1. Introduction

Brazil belongs to the South American continent, with 7.491km of coastline, 26 states and the Federal District, its capital, Brasilia. As one of the most significant bio-diversities in the world, the country's environment is expressed by six biomes: Pampas, Atlântic Forest, Cerrado, Pantanal, Amazon and Caatinga. The Brazilians geographical features, climatological, meteorological, geological and geomorphological, besides the location and size, contribute greatly to the occurrence of disasters. The improper land use and occupation increase the population's vulnerability to natural events and therefore the damage and impacts of the disaster.

By 2010, 84% of Brazilians were living in cities[1)]. Therefore, Brazil had the third highest number of deaths caused by disasters in 2011 and is among the nine countries with the highest record tragedies. Floods in Brazil killed 900 people in 2011 - 3% of the world total. Only the tsunami in Japan and the rains in the Philippines left superior balance. After the 2011 floods, the Ministry of National Integration thru the National Center for Risk Management and Disaster, establish in April 2012 a new National policy on Protection and Civil Defense, composed by the National Council for the Protection and Civil Defense and an Information System and Disaster Monitoring. However, no specific DRM policy was created to protect the large number of Brazilian Cultural and Natural Heritage.

2. The Case Study Project Area

This case study, rather than a technical report, aims to draw the attention of the institutions directly involved with the preservation of the Brazilian cultural and natural heritage to the need of studies to develop specific procedures and practices for the disaster risk management of cultural heritage. Buildings, natural and cultural areas and their buffer zones need extra care, taking into account the preservation of their attributes and values, which made them legally protected and become important for all Brazilians.

The Tijuca National Park (TNP)- Tijuca Forest Sector was the object of study, chosen from the need to think of the Park as a cultural landscape, as it was classified when inscribed in the World Heritage List of UNESCO in July 2012[2)]. It was one of the most important attributes of Rio de Janeiro's property, because it counted with the participation of landscape architects Glaziou and Burle Marx. The case study area includes spaces intended for picnics, children's recreation and leisure. Some of these points are now in a certain degree of deterioration, and need to be restored and requalified, such as Açude da Solidão (Burle Marx's design) and Cascatinha Waterfall touristic area, as well as the historic buildings, affected by multiple hazards.

Fig. 1

The following chart was developed according to Rio's WH OUV, showing the value's assessment from attributes and stakeholders, listed as the main agents to promote the preservation of the WH property and the prevention of risks.

Table 1

ATTRIBUTE	TYPE OF ATTRIBUTE	ASSOCIATED VALUES	STAKEHOLDERS
WORLD HERITAGE RIO CULTURAL LANDSCAPE	IMOVABLE AND TANGIBLE CULTURAL HERITAGE	CULTURAL, HISTORICAL, SOCIAL, VISUAL: Landscapes features, historic buildings, aqueducts, archaeological sites, point views, historic transportation system	. UNESCO - WHC . MINISTRY OF CULTURE / IPHAN-RJ . MINISTRY OF THE ENVIRONMENT / ICMBIO . CITY OF RIO GOVERNMENT . FRIEND'S ASSOTIATION OF TNP . COMMUNITIES ASSOCIATIONS . VISITORS
	IMOVABLE AND TANGIBLE NATURAL HERITAGE	NATURAL: Atlantic Forest, fauna and flora, rivers, peaks, waterfalls, geological sites	
	INTANGIBLE HERITAGE	ASSOCIATIVE: Inspiration for arts, music, poetry; contribuite to the carioca identity: Images of the Mountains with the Sugar Loaf and Christ Redemeer, beachs, peaks and forests	

3. Rio WH Disaster Risk Assessment

Located within one of the Atlantic Forest remainings of the Brazilian coast, the Rio's Cultural Heritage property is affected by a large number of hazards related with two major ones: Global Warming/Climate Change and Urban Development. As a result of Rio's geographical, climatological (tropical weather), meteorological, geological and geomorphological features, most of the secondary hazards - heavy rain, thunder storms, flooding and slope failure has been historically reported and are aggravated in the last decades due to the climate change.

The urban development on the other hand has been made enormous pressure on the property boundaries and over its buffer zone, causing deforestation and pollution and increasing the occurrence of fire and drought. As a touristic city, the increasing of the number of visitor and lack of proper infrastructure has also been causing a great damages to natural and cultural features, such as suppression of vegetation, graffiti and pollution caused by vehicles and shuttles, which are increasing on the park's' roads.

The scheme - **MULTI-HAZARD MAP** - shows the relationship between the main / secondary hazards and the Rio's WH attributes' vulnerabilities.

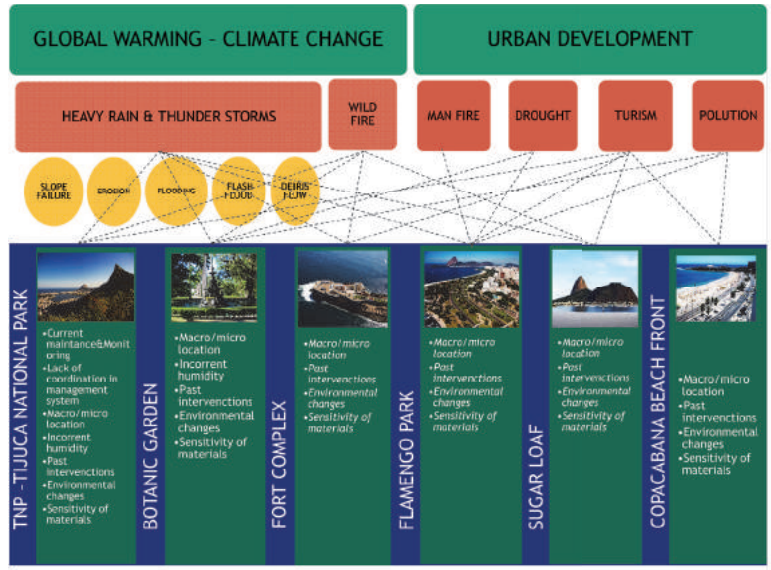

Fig. 2

4. Disaster Risk Management

As an initial strategy, a detailed DRM Plan was carried out for the TPN Tijuca Forest Sector, establishing the risk prevention goals and mitigation measures. The RISK PREVENTION GOALS respond for the lack of DRM policy, coordination and conservation of the cultural heritage within the TPN, which are:

- To establish a specific policy for Rio's WH DRM. Since the last decade the city has been improving its DRM plan. Inaugurated on December 31, 2010, Rio Operations Center house 30 agencies which monitor 24 hours a day, the everyday of the city. They are integrated into all stages of a crisis management from the anticipation, reduction and preparedness, to the immediate response to events such as heavy rains, landslides and traffic accidents. Although the effectiveness of the existing DRM system, the special care for cultural heritage is not comply on the recovery plans and construction works that has been done among historic areas.
- To reinforce the DRM coordination with the existing management agencies (ICMBIO - natural environment agency, IPHAN - cultural heritage agency and RIO's PREFECTURE), the members of the WH Committee and leaders of communities located within the property's buffer zone;
- To address a need for the conservation of historic buildings and infrastructure for risk. The inventory of the cultural heritage are not updated regarding its state of conservation. A conservation programme has to be drawn, and has to be develop in stages according to the fund raising schedule.

The **MITIGATION MEASURES** shown as follow were divided into short, medium and long term actions, and the stakeholders listed.

Table 2

SHORT TERM 0-1	Improve coordination and communication system between the management institutions and communities for emergency response	ICMBIO, IPHAN, PCRJ, COMMUNITIES
	Prepare a hazard map and evacuation plan	ICMBIO
	Engage and train communities and WH Committee members	ICMBIO, IPHAN, PCRJ
MEDIUM TERM 1-5	Update the Inventory and Mappin of CH within the WHS AND Design a DRM Plan for the WHS	ICMBIO, IPHAN, PCRJ
	Improve Maintenance and monitoring of CH buildings and landscape features	ICMBIO, PCRJ, IPHAN
	Improve forest preservation and re-forestation in the core and buffer areas	ICMBIO, PCRJ, COMMUNITIES
	Improve water level and rain fall observation systems and install a flooding and landslides warning and alarm system	ICMBIO, PCRJ
	Introduce the CH DRM into the land use plan in the buffer zone considering relocation from the risk areas	PCRJ
	Improve control and monitoring of land use in the buffer zone	PCRJ
	Improve Visitors control to make them out of risk áreas	ICMBIO
LONG TERM 5-10	Improve flooding control, such as river dams and levees	ICMBIO, PCRJ
	Improve drainage system such as rain water infiltration on concrete roads, permeable paving on parking lots and facilities	ICMBIO, PCRJ
	Execute de land use plan for the buffer zone and relocation from risk áreas	IPCRJ

An **EMERGENCY RESPONSE PLAN** was drawn for the predicted scenario of a major event based on the 1996 occurrence of a summer thunder storm, which reach the Tijuca Forest, causing flooding, debris flow, erosion and slope failures, devastating the forest vegetation, roads, picnic spaces and destroying historic areas, such as the Açude da Solidão[3].

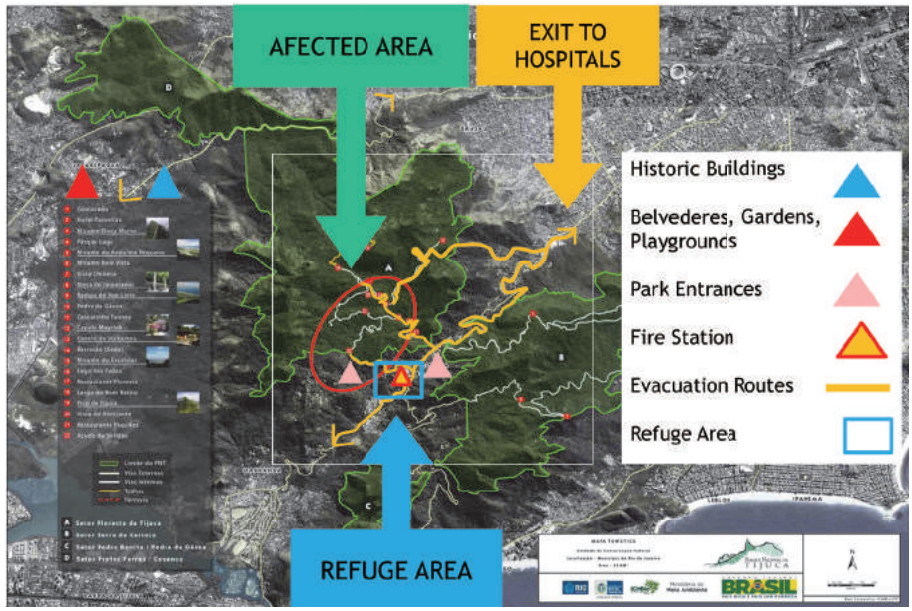

Fig. 3

A **DAMAGE INVENTORY AND RECOVERY PLANNING** was developed as follow; focus on the needs of conservation and/or restoration of cultural heritage and of infrastructure improvements for risk prevention and mitigation. A fundraising campaign was point to be carry out by private and public agencies to promote the execution of the recovery plan.

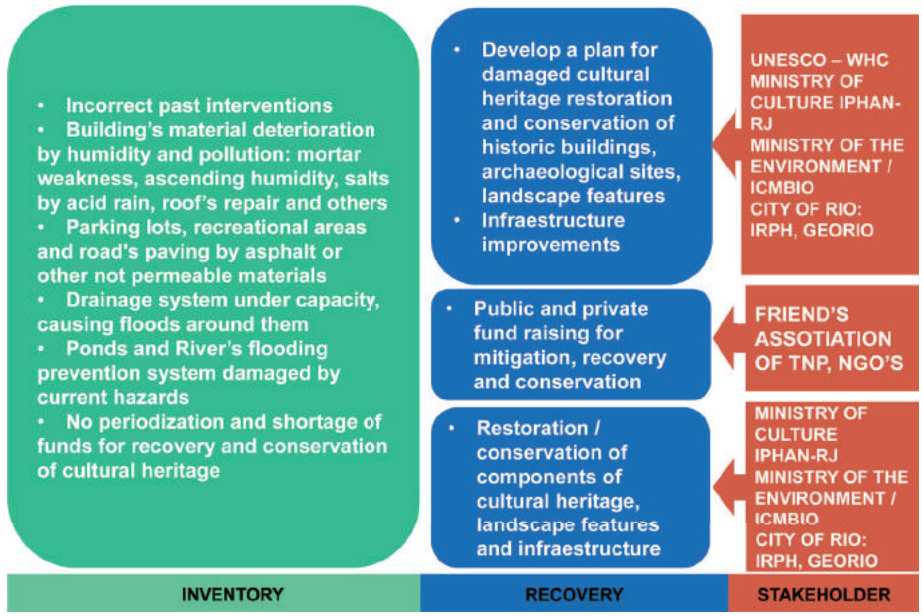

Fig. 4

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3 Activities Undertaken after The International Training Course by Former Participants

3.1 Cultural Heritage and Mitigation of Risk, Experience after ITC 2014, Ecuador

Juan Diego BADILLO REYES
Architect. Assistant professor, Ecuador

1. Introduction

In the last years, the management of risk has been included in agendas and treated to different scales worldwide, the word resilience seems to replace the word sustainability in the political speech.

The 2008 Constitution of Ecuador contemplates the protection of people and goods from nature and anthropic disasters as a responsibility of the State and so it is the conservation of the cultural heritage.

For this reason, institutions related to the two themes have been created in the last decade and in general many attempts to modify the institutional model.

However, in spite of these efforts, the deterioration of the heritage, with high destruction figures, is undeniable, according to the Ecuadorian Information System of Cultural Heritage (SIPCE), 47% of the national heritage is in deterioration or ruin.

Thus, in spite of the existence of these responsibilities of the State, local development plans include, in a limited way, the management of cultural heritage within its axes of action, and, likewise, cultural budgets remain low or nonexistent.

2. Projects

After ITC I participated in two cultural projects in which the topic of risk mitigation could be included and gained importance for all the information collected.

2.1 Museum of Zaruma (Zaruma – Ecuador)

Zaruma, a city located in the south of the country, is characterized by its particular location where its inhabitants are in constant danger with the risk due to their geography and illegal mining activities.

Fig. 1 Zaruma (Photo: C. Hirtz 2011)

The objective of the contract was to carry out the studies for the implementation of the new museum of the city, using existing collections and looking for new topics that would reinforce the territorial value of Zaruma.

In a city like Zaruma gold mining, historically, through all meanings has been part of the identity and daily life of the inhabitants of the city; it is perceived as the "wealth and misfortune".

It was therefore imperative to include the “living with the risk” topic in this museum, as a first attempt to create a policy of prevention and awareness of mitigation of risk.

Under the consideration that the city is consider itself a living museum, the objective is to include the management of risk within the city and not only inside the museum and within all the programmes that the museum plan to have.

- To create a museum that goes beyond the building. The city is a museum itself.
- To implement a strong awareness programme for disaster and risk management
- Awareness programmes using memory and art.

Three approaches have been defined with certain projects to consider in each one:

(1) Urban

- *Stairs as safe connectors in emergency*.- Due to the topography of the city, there are many tiers connecting streets, these spaces will be used to sensitize citizens about the vulnerability of the city and will also be used to create a relation with emergency unit and safety spots.
- Square / entrance.- a photo of the first fire extinguisher system was found and the first extinguisher of the city was found in the warehouse of the museum and both will installed outside of the museum as part of the side entrance.

Fig. 2 Zaruma (Photo: C. Hirtz 2011)

(2) Architectural

- *Evacuation Routes*.- Signaling and location plans. Staff and disaster relief agencies trained to evacuate works of cultural interest.
- *Construction Technics / Materials*.- Research of the techniques used as well as the materials used for the construction of houses in the center of the city. Diffusion of the same and search for improved techniques.

(3) Collection

- *Living with risk*.- An important chapter will be to show the risk at the cities and how they can be prevented. Implementation of games in the exhibition. Games nor only for children but for any visitor
- *Don't be afraid be prepared*.- Recovery of data for an exhibition in the safe zones of the city where some art and photography work will be displayed. We try to gather information found in files and old archives that could help to create awareness.
- *INPC educational programme*.- National Institute of Cultural Heritage (INPC) will give awareness courses and use the museum as their main focal point in the city.

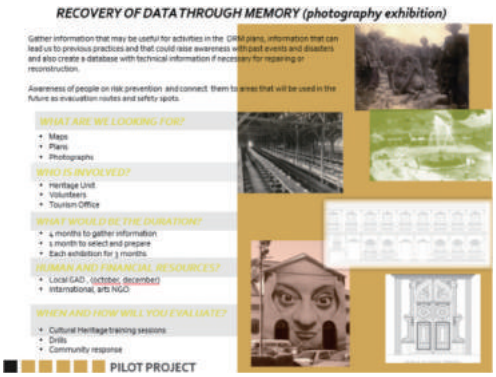

Fig. 3 Urban proposal (Badillo 2016)

At the moment, the INPC tries to work within the region with disaster mitigation and the museum will implement periodically courses for inhabitants and schools to be prepared as part of the awareness programme,

2.2 Cultural Heritage Planning Agenda of the Canton of Riobamba (Riobamba – Ecuador)

Located in the center of the country, the city of Riobamba, at 2743 masl, is surrounded by snow and near areas of natural protection such as the Sangay National Park and the Chimborazo Fauna Reserve. The main economic activities, according to the last national census of 2010, are: agriculture, trade and textile production.

Of the total of 225,740 inhabitants, about 50% of the region (canton) has no basic needs and 18%

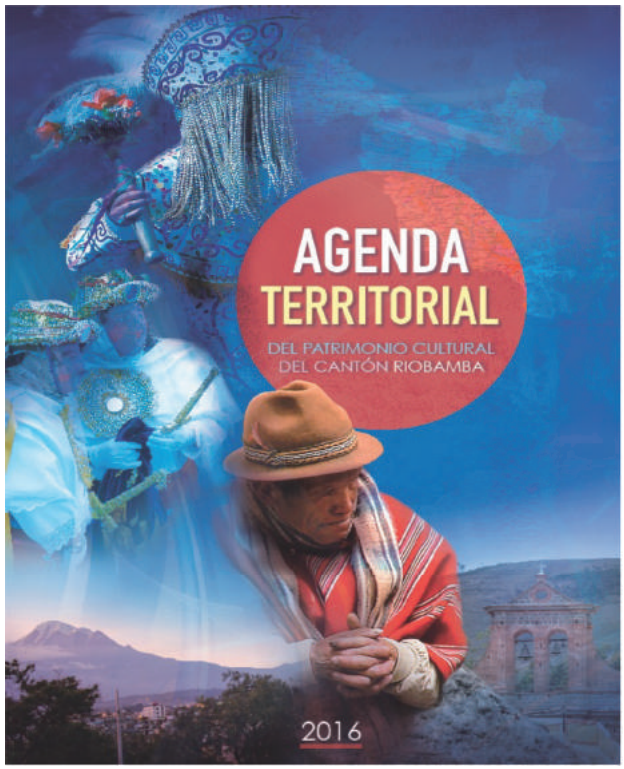

Fig. 4 Cover of the new planning agenda. GAD Riobamba (BOOM design 2016)

live in extreme poverty. 32% of the total are indigenous groups.

According to figures from the national information system of cultural heritage (SIPCE), Riobamba has 62% of the province's assets and has been identified, mainly, built, movable and intangible heritage.

The municipality must face problems of management with low budgets in culture, focused on generation of short-term events and problems of linkage between the different units, not so much for the capacity of the same but for the existence of many units that coincide in their competences. Some of them are: risk management, culture, tourism and sport, rural development and cultural heritage.

It is the first agenda of planning of cultural heritage in the country, not only inclusion of the cultural theme within the planning plans, on the contrary, seeks the hierarchy of cultural heritage management as an opportunity for local development.

The information found in the history and in the risk maps were mainly analyzed in order to define four general politics for the territory:

- Authenticity / Integrity
- Protection of natural landmark
- Propitiate the compact population
- Risk Management and Resilience

Fig. 5 Cultural Heritage in Riobamba. Badillo 2016

It served also to propose policies on future occupation in the area and, above all, prioritization of the projects, understanding the vulnerability of heritage sites but also of the containers of museums and archives.
The history contributed with important information regarding knowledge used in the past, the usage of water channels, the vegetation for agricultural terraces to prevent landsliding, but mainly it provided valuable information of the reconstruction of the new city of Riobamba after the old one was destroyed in the year of 1797 due to a mudslide provoked by the seismic movement. For the planning of the new city, and with the idea of preventing another disaster, there were three guidelines defined:

- Wide roads to help evacuation
- Increment number of squares to be used as gathering areas
- Limited height (two stories) of the dwellings to prevent damage in case of collapse.

Unluckily these guidelines, as the criteria of prevention, were not used again in the urban planning of the city and this is why the agenda tries to recover previous facts for the future.
Different to the many existing proposals for intervention in urbanism, this agenda sought the implementation of new strategies that start from the reinforcement of the potentials found in history linked to the development of micro economies.
It is important to propose strategies such as: digitalization of documentation of cultural heritage, cultural history and media, tourism, city brand, nature – culture relation and cultural industries, but on the other hand it is necessary to reinforce the revitalization of traditional handcrafts, historical reconstruction, interpretation and experience. In this case the community participation is still active. The mingas, tuminas and jochas are still used for different activities at different levels with common objectives and should be kept and related to mitigation of risk and cultural heritage management.

3. Conclusions

Even though risk management seems to be understood, there is still a lot of work to be done in order to have it applied at a local level; it is still difficult to consider the importance of the values of the cultural heritage when it comes to work in the preparedness of urban planning.
Undoubtedly, the story already contains proposals that could be reused but they should be reviewed and adapted to the reality of the moment without detracting from the considerations that were taken from the beginning.
The inclusion of cultural heritage and awareness of risk mitigation within education would facilitate a better and more efficient management of the territory in the future.
This work shows that the past is soon forgotten and learnings fade over time. Solutions become provisional or emerging without a future.
It is the responsibility of the public entities to define policies and be the head in the processes of inclusion of the themes previously treated, however from any position in the private company it is possible to propose and include the necessary considerations for a conscious and inclusive territory management with intangible heritage

Reference

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4 Report of the 10 years Anniversary Symposium of the UNESCO Chair International Training Course on Disaster Risk Management of Cultural Heritage / Accomplishing Report of the TOYOTA Foundation 'Initiative Program'

4.1 Background and Objectives

The Institute of Disaster Mitigation for Urban Cultural Heritage at Ritsumeikan University has implemented the UNESCO Chair Program on Cultural Heritage and Risk Management, the International Training Course (ITC) since it was established in 2006. During 10 years, we have engaged to 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 various sites.

In this anniversary symposium, we invited specialists from the international organizations including UNESCO, ICCROM, and UNISDR as well as the former participants in order to review our previous activities and discuss the future vision on the 'Disaster Mitigation for Cultural Heritage' for protecting our heritage from the disasters risks.

In addition, we reported on the follow up initiatives which have been funded by TOYOTA Foundation 'Initiative Program' since 2014 to 2016.

4.2 Programme

10:00 **Address 1 : President of Ritsumeikan University, Mikio YOSHIDA**

10:10 **Address 2 : Former director of Rits-DMUCH, Kenzo TOKI**

10:20 **Address 3 : Managing Director of Toyota Foundation, Hiroshi ITO**

10:30 **Introduction of Key note speech and Follow up activity report**

10:35 **Key note speech 1 : Rohit JIGYASU (Ritsumeikan University)**

11:05 **Video Message 1 : Giovanni BOCCARD (UNESCO)**

11:10 **Key note speech 2 : Joseph KING (ICCROM)**

11:40 **Video Message 2 : German Tiangco VELASQUEZ (UNISDR)**

11:50 **Follow up activity report Kai WEISE (Nepal, ITC 2008)**

12:10 **Lunch Break**

13:30 **Introduction of Progress activity report and Panel discussion**

13:35 **Progress activity report <part 1>**

Juan Diego BADILLO REYES	(Ecuador, ITC2014)
Sang sun JO	(South Korea, ITC2012)
Barbara CARANZA	(taly, ITC2013)

14:50 **Short break**

15:00 **Progress activity report <part 2>**

Hatthaya SIRIPHATTHANAKUN	(Thailand, ITC2013)
Zeynep GUL UNAL	(Turkey, ITC2010)
Abdelhamid SAYED	(Egypt, ITC2014)

16:15 **Short Break**

16:35 **Panel Discussion <Past, Present and Future>**

A moderator : Joseph KING
Panelists : 7 former participants

17:50 **Closing : Director of R-DMUCH, Takeyuki OKUBO**

18:00 **10 years Anniversary ceremony (Taking a photograph)**

4.3 Summaries and Outlines of Presentations

Address 1 : President of Ritsumeikan University, Mikio YOSHIDA

Fig. 1 Address 1: Mikio Yoshida

Ritsumeikan University was authorized as a UNESCO chair in the year 2006 in the field of cultural heritage and disaster mitigation. This symposium is being held to commemorate the 10th anniversary of this recognition. For ten years, our Institute of Disaster Mitigation for Urban Cultural Heritage has been organizing the international training program under the UNESCO Chair program on cultural heritage and risk management. We, at Ritsumeikan University, are extremely proud that this international training program has received highly favorable reviews outside Japan, as well. In 2003, we established the Research Center for Urban Cultural Heritage Disaster Mitigation, which is the predecessor of the Institute of Disaster Mitigation for Urban Cultural Heritage that we have today, and since then, we have actively promoted academic research on cultural heritage and disaster mitigation of historic cities, which is of unparalleled importance to humanity, by merging the fields of humanities and social sciences with science and engineering. Kyoto boasts of rich cultural heritage. Ritsumeikan University also traces its roots back to the Kinugasa Campus in Kyoto, where it was first founded and is surrounded by various cultural heritage sites, including Kinkaku-ji, Ryōan-ji, Tōji-in and Ninna-ji. We are blessed with such a campus; therefore, we believe it is our natural responsibility to endeavor to promote disaster mitigation of cultural heritage.

We are currently in the process of drawing up the midterm academic plan for the year 2020, and one of our goals is to become a global research university. Today, though I have heard that participants who took up the training program in the last few years will be presenting their activity reports, I am very glad that you have taken the learning from Ritsumeikan University back home and are actively leading disaster mitigation of cultural heritage in your respective countries. This is one of the outcomes of “Globalization of research” that we have been aiming to achieve.
Starting with this institute, Ritsumeikan will continue promoting the advancement of research and globalization in various fields, with the aim of contributing to society not just in Japan, but also on a global scale in Asia, Europe, and the United States.

Address 2 : Former director of Rits-DMUCH, Kenzo TOKI

The international training program is a kind of lecture, but since it is a project, it is different from a regular department lecture and is bound to start somewhere and end somewhere. I will introduce the past ten years of the international training program as briefly as possible.

・About Mr. Herb Stovel

Mr. Herb Stovel visited us shortly after our Institute of Disaster Mitigation for Urban Cultural Heritage was established and spoke on this topic. He explained the importance of having an international

training program for people across the world, and we were extremely motivated by his talk. At that point, we decided that we should design something along these lines. Though Mr. Herb Stovel was not directly involved, he gave us the inspiration to initiate this activity, and so in that sense, we regard him as the father of the international training program. Without the Nara Document, Japanese wooden buildings would not have become world heritage, and thanks to Mr. Herb Stovel, various structures made of wood, paper or mud in Japan were listed under world heritage. He has been hugely inspiring to all of us.

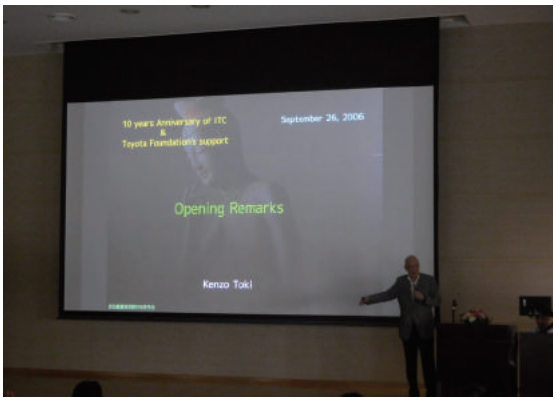


Fig. 2 Address 2: Kenzo Toki

・The three people who designed the international training program

I will next introduce the three people who designed the international training program. Mr. Joe King took over from Mr. Herb Stovel at ICCROM. We are extremely grateful to him for attending the international training program every year. Mr. Rohit Jigyasu is leading our training project here and is a leader in the true sense of the word. Mr. Masuda Kanefusa, though not in the Ritsumeikan University now, was the first person who invited Mr. Stovel here, and it was the both of us who suggested that we need to hear his views. The initial actual operations of the center will be overseen by both of us.

・COE and Toyota Foundation

There are few circles outside ITC. The outermost circle is a project called COE from the Japanese Government, for which we were receiving about 1 million dollars annually. Based on this cost, we set up the Institute of Disaster Mitigation for Urban Cultural Heritage (Rits-DMUCH). One of the projects amongst these is ITC, and the cost of this project is approximately 100,000 dollars. We have used approximately one-tenth of the amount received from the Government and have reached the current stage. The Government project came to an end in the year 2012. Therefore, the Institute of Disaster Mitigation for Urban Cultural Heritage (R-DMUCH) had to become an independent unit. Ritsumeikan is providing us the required funds to become independent. However, this amount is not 1 million dollars annually, but around 200,000 dollars, so currently half of this fund is being used for ITC.

With 100,000 dollars, we cannot do what we want. For example, we have had several requests for increasing the number of international trainees, but we have only this much budget right now. We also have limited manpower to manage any increase in the number of participants, so we could not accommodate this request. After the Toyota Foundation came to our rescue three years ago, the international training program has made great strides.

In the year 2006, the number of applicants from other countries was about eight participants from four countries, but this number grew quickly. We had very few applicants when we had the Tohoku Earthquake in 2011, but we received several applications the following year. This year, we had about 150 applications. Initially, we were able to accommodate very few participants in the program due to cost and manpower constraints, but with the help of Toyota Foundation, we have been able to increase that number. I think you can understand how effective the Toyota Foundation has been in promoting this program.

・Follow-up training

We have had requests for follow-up training from the start. However, it was not possible so far

to organize a follow-up training due to manpower and cost constraints, but thanks to the Toyota Foundation, this has also become possible. We have been organizing it for the last three years, and we are planning to have one more session this year. We will most likely be receiving the Toyota Foundation grant, but we are doing a follow-up seminar in India before we start receiving funds from the Toyota Foundation. I would like you to understand how much we wanted to do something like this. We have been able to do such activities thanks to the Toyota Foundation.
More than anything else, we are happy that today mostly in the afternoon session, the trainees will be sharing their experiences on how our training has helped them in their home countries. These kinds of discussions have led to the follow-up training, and since they will be organizing it on their own, they have requested Ritsumeikan University to support them. These very people have gathered amongst us today, and in the afternoon, they will be sharing what kind of activities they are carrying out in their home countries. This is what we are happy and proud of more than anything else.

Address 3 : Managing Director of Toyota Foundation, Hiroshi ITO

Fig. 3 Address 3: Hiroshi Ito

This international training program is a very important program under the UNESCO Chair Program on Cultural Heritage and Risk Management.
I would also like to thank Professor Toki, Former Center Director, and Professor Yoshida, President of Ritsumeikan University. We have been carrying out various kinds of supervision (support). The Toyota Foundation is located in the Shinjuku area of Tokyo. Although Toyota is a car manufacturer, the Toyota Foundation was established in 1974, and since then, it has supported a large number of academic and academic-related activities. Particularly in Japan, the neighboring countries, and in Pan-Asian countries, our Foundation has been supporting a large number of such engagements. Even in the past, we have been providing flexible support. Also, in 2013, Japan's Mount Fuji was listed as a UNESCO World Heritage Site. To commemorate this achievement, the Toyota Foundation wanted to do their bit and offered additional support to UNESCO. This is the international training program under the UNESCO Chair program activity aimed at protecting cultural heritage. At Toyota Foundation, this is an ideal opportunity for us, and we are extremely happy to be involved in this international collaboration.
Also, first of all, we have been providing the required support for these last three years, and in order to address the needs more comprehensively, we are providing extended support. Extremely priceless and valuable cultural heritage sites have suffered damage due to foolish acts by people, and these actions inflict damage to the assets and property of mankind. This may be triggered by political intent. Our foundation would like to support this challenge in its own way. We hope to continue this kind of contribution to the international community in the future, as well. Also, the Toyota Foundation is extremely thankful to be able to participate in such valuable activities. Therefore, I will pray for the successful completion of this program. Thank you.

Key note speech 1 : Rohit JIGYASU (Ritsumeikan University)

I am thankful to the Toyota Foundation, Ritsumeikan University for giving us this opportunity.
We are happy that we can carry out UNESCO Chair programme on disaster mitigation and risk management of cultural heritage.

Firstly, I would like to give some examples of damage to cultural heritage sites. In the Myanmar earthquake on August 24, 2016, cultural heritage sites suffered extensive damage, and more than 120 Pagodas were damaged. In the earthquake in Italy on 24th August 2016, there was serious damage to a residential historic site. In the Nepal earthquake about one year ago, Kathmandu, which is a world heritage site, suffered serious damage and apart from historic sites, several museums were also damaged and not only the buildings but the artifacts inside the museums were also destroyed.

Fig. 4 Key note speech 1: Rohit Jigyasu

The National Museum of Natural History in Delhi (India) suffered extensive damage due to fire in April 2016. Similarly cultural heritage has suffered damage due to floods in Balkans and to Ayutthaya historical park due to 2011 Thailand floods. In 2013, widespread destruction was see in the Himalayas in India that were ravaged by cloud burst and floods.

It has become impossible to cope with climate change, and damage to cultural heritage has become a serious challenge. According to UNISDR, disasters such as floods, droughts, windstorms, and cold waves that are largely due to climate change, are on rise.

We must consider the impact of urbanization on increasing vulnerabilities of cultural heritage. Kyoto has been witnessing rapid urbanization in these last hundred years. China and India account for one-third of the world's population growth.

Cultural heritage is also at risk due to human acts such as war and terrorism as in the case of Syria. In order to protect cultural heritage from disasters, it is important to carry out interdisciplinary training, management of cultural heritage, restoration and undertake risk management in an integrated manner by understanding where risks are concentrated and comprehensively manage these risks. We need to come up with a risk management plan based on an integrated approach.

・Principle outcomes of ITC

Building of a powerful global network for disaster risk management of cultural heritage. It should consist of people committed to scientific interaction and support for protecting cultural heritage from disasters. International organizations, as well as local staff.

The ITC trainees are taking back home their learnings from the training course and leading various initiatives in their respective regions and home countries. And we have involved to develop the case study project tool.

Through the international training course, we are not just thinking about disaster response plan but also pre disaster mitigation and preparedness by linking theories and methodologies with actual case studies through lectures, site visits and workshops. Participants also get chance to discuss and share their experiences and through this, we can learn not just about Japan's efforts but also learn about the initiatives of other countries.

・Challenges in the future

Synergy is important while conceptualizing what needs to be designed for the future. This means synergy in risk management of immovable and movable cultural property, synergy in risk management of cultural and natural heritage. Also there needs to be greater focus on response and recovery of cultural heritage following a disaster. Last but not the least, it is important to recognize the complexity of the crisis situation that includes both natural and human-induced disasters.

Fig. 5 Key note speech 1 and the audiences

Also, it is important to strengthen the scientific network among professionals who are trained in the area of disaster risk management of cultural heritage.

Video Message 1 : Giovanni BOCCARDI (UNESCO)

Over the past ten years, this program has become popular all over the world as a platform for innovative experiences and experiments, and for implementing new challenges and ways of working. By collaborating with numerous cultural heritage preservation experts and disaster mitigation experts, we have tried to strengthen our capabilities for disaster mitigation of cultural heritage in many countries across the world. We have achieved wonderful results in a comparatively short span of time. I think this is the result of the enormous and tremendous effort put in by several people. Mr. Yoshida, President of Ritsumeikan University, Professor Toki, Professor Masuda, Professor Jigyasu, Director Okubo, the list of names is endless. I feel extremely proud that UNESCO has been able to collaborate with this international program so far.

The link between cultural heritage and disaster risk management is increasingly important in today's world. We initially focused on cultural heritage, especially preserving architectural structures under cultural heritage. Today, we play an important role in enhancing the disaster mitigation capabilities of cultural heritage, and in reducing disaster-related risks. Due to tragic events and disputes in the Middle East and Africa in the last few years, the link between cultural heritage and the identity of the community living there, or their resilience to disasters and traumatic experiences has come to light. This shows us the roadmap to the future. This means that we should collaborate to promote the preservation of cultural heritage not just with technological advancements and innovations, and though this is also very important, it is also necessary to respond from a social, humanitarian and safety standpoint. We must think about how cultural heritage can contribute to enhancing the disaster mitigation capabilities of our society. In this regard, UNESCO intends to collaborate closely with Ritsumeikan University and various other institutions in UNESCO Chair.

Fig. 6 Video Message 1 Giovanni Boccardi

Key note speech 2 : Joseph KING (ICCROM)

As ICCROM director, I think that this training program contributes to disaster mitigation of cultural heritage and risk management. I would like to thank the President of Ritsumeikan University,

Professor Toki, Professor Okubo, Professor Jigyasu, and Professor Masuda. I think that this kind of partnership is very important.

I am also extremely thankful to the Toyota Foundation for their excellent contribution. Initially, we had only eight trainees in ITC. Thanks to the Toyota Foundation, we have doubled that strength and also expanded the scope of our activities. I would like to use this opportunity to thank everybody who made this happen.

Fig. 7 Key note speech 2 Joseph King

ICCROM has its headquarters in Rome. At the last meeting, after hearing Professor Yoshida's talk on the fire after the earthquake, we continued to discuss this issue at ICCROM. It is important to have close tie-ups and collaborations with universities as part of risk management of cultural heritage. It was in the Hyogo framework that the topic of risk management of cultural heritage was brought up for the first time.

Since 2006, ICCROM, ICOMOS, and Ritsumeikan University have collaborated to organize this course for the 11th year. We are designing the curriculum for the 11th round of the course. ICCROM has provided various kinds of support. Why is ICCROM supporting us? We need to think what kind of needs and responsibilities we have. Firstly, we need to enhance our understanding of cultural heritage. We must make a disaster mitigation plan for the world's cultural heritage. Initially, we had only a regular management plan and not a large-scale plan. With such needs, we had to incorporate world cultural heritage under overall risk management, and under this, we were able to formulate damage response measures. Secondly, we need to include risk management of cultural heritage in the additional risk management framework and formulate an extensive risk management plan. It is necessary to stress the importance of this activity. ITC has been this link. ITC became the bridge linking cultural heritage and disaster mitigation. The concept of building resilience and enhancing disaster mitigation capabilities was emphasized. We were able to educate the people in the communities on the importance of building resilience.

Under political, societal, and economic circumstances, technology and its design have changed. Traditional beliefs and sensibilities no longer exist. At the time of starting ITC, we thought about what is most important. We wanted to make use of traditional methods and thought about how we can make use of traditional knowledge and manage traditional technology and building materials to respond after a disaster and felt that it is important to create a sustainable community.

The other need is to focus on people and the community. As part of this, the importance of bottom-up approach can be considered. We need people for disaster mitigation. However, it is not enough if we just write about it in books and leave them on the shelf. It is also important to know how to respond when a disaster occurs and incorporate the community. Based on these needs, Ritsumeikan University has come to play a central role as an academic institution in this overall context. In the process, ICCROM also learned about disasters and could share its knowledge and experience on protecting cultural heritage through brief trainings.

There are conflicts happening in so many places. Disaster mitigation management, risk management, and introduction of respective case studies are important resources to know what we should do and take stock of the situation. It is important to have training guidelines. Using the ITC experience, you can contribute to activities after returning to your home country.

There are more opportunities for dialogues. Architects and experts on cultural heritage should not talk about only their areas but instead, discuss with each other how to examine risk management of cultural heritage. What was different in the Sendai meeting in 2015 as opposed to the Hyogo meeting of 2005 was that they understood the importance of risk management of cultural heritage.

Importance of integration: I would like you to pay attention to the damage caused by disasters to cultural heritage and natural heritage. Many disasters have occurred after 2005 such as the Nepal earthquake last year, the earthquake in Italy after that and so on. Damage to cultural heritage caused by such disasters requires international attention, and for past disasters, we need to focus not only on damages but also on restoration following the event.
This international training course of Ritsumeikan University has been through a very long journey. We need to respond to not only climate change but also natural disasters or man-made disasters. When such events happen, we should not be unprepared with our response, but we should provide sustainable and universal training. The reason the ITC training has been successful is because of its close tie-ups and the collaboration of participants as a team to achieve great results. It is important for people to collaborate, and large groups such as UNESCO, ICCROM need to be involved.
Professor Toki, Professor Okubo, Professor Jigyasu, instructors, and the administrative staff have supported us greatly. Professor Toki, in particular, has played a central role. I am very happy that I have been able to contribute as a structural engineer and use Professor Toki's resources. I think I have learned a lot from Professor Toki and this learning has made me wiser.

Video Message 2 : German Tiangco VELASQUEZ (UNISDR)

The Sendai framework or agenda that will be finally adopted focuses on what events have occurred in the last ten years? It is a summary of the risks, number of casualties, and population affected.
The number of casualties and victims affected by climate change seems to be increasing. In reality, it has reduced, and the resilience capability of people has improved with the securing of evacuation routes and so on.

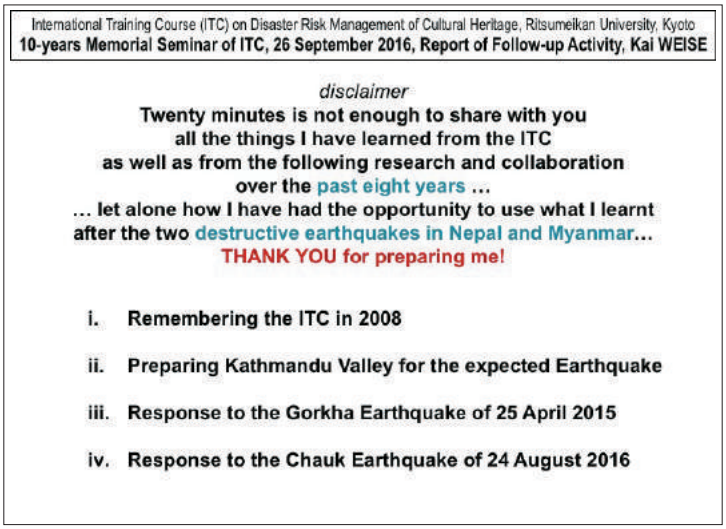
Fig. 8 Video Message 2: Jerry Velasquez

Also, in the last few years, the economic damage has increased. Countries with large losses are developed countries such as Japan and Europe. Cultural heritage sites are areas that are vulnerable to natural disasters such as floods. The direct economic impact of damage to cultural heritage in the Nepal earthquake is 80 million dollars.
The Sendai Framework has been adopted, and as part of the disaster mitigation framework over the next fifteen years, the important thing for cultural heritage is Goal No. 3 and 4. The goal is to reduce the economic loss due to disasters to less than half by 2030.
The Hyogo framework did not address cultural heritage completely.
Promoting culture of disaster mitigation from both direct and indirect standpoints and aiming for disaster mitigation with disaster resilience of cultural heritage towards a sustainable future.

Follow up activity report : Kai WEISE (Nepal, ITC 2008)

Since completing the ITC in 2008 I have been involved in various activities with Ritsumeikan in Kathmandu in preparation for the next large earthquake. The Kathmandu Symposium on Disaster Risk Management was held in February 2009. This was followed by the ITC in 2009 being carried out partially in Kyoto and partially in Kathmandu. A research project on community disaster preparedness and structural analysis of historical buildings was carried out in the Jatapur area of Patan. These activities led to the integration of Disaster Risk Management into the draft amendment of the Integrated Management Plan of the Kathmandu Valley World Heritage site. The “Revisiting Kathmandu” symposium was organized in November 2013 in preparation for the next large earthquake.

A 7.8 magnitude earthquake struck Nepal on 25 April 2015 followed by numerous aftershocks devastating hundreds of villages and a large number of the historical monuments. The destruction was extensive and the response in respect to cultural heritage needed to be coordinated. The preparation did have an impact on the response to the earthquake and on rehabilitation planning. This presentation sets out to provide an overview of the preparations, the response and the rehabilitation of cultural heritage linked to the 2015 Gorkha Earthquake.



International Training Course (ITC) on Disaster Risk Management of Cultural Heritage, Ritsumeikan University, Kyoto
10-years Memorial Seminar of ITC, 26 September 2016, Report of Follow-up Activity, Kai WEISE

i. Remembering ITC in 2008

International Training Course (ITC) on Disaster Risk Management of Cultural Heritage, Ritsumeikan University, Kyoto
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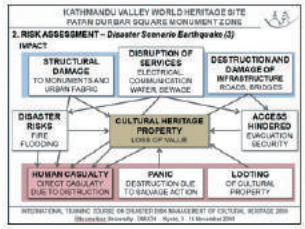
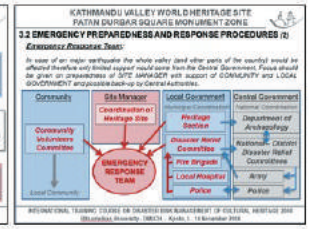
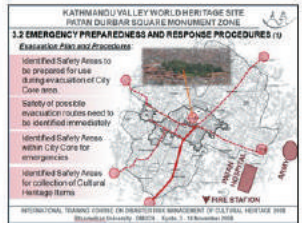
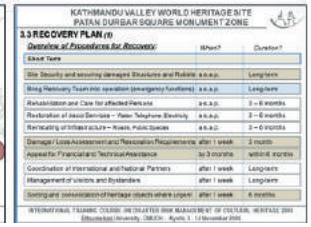
i. Remembering ITC in 2008









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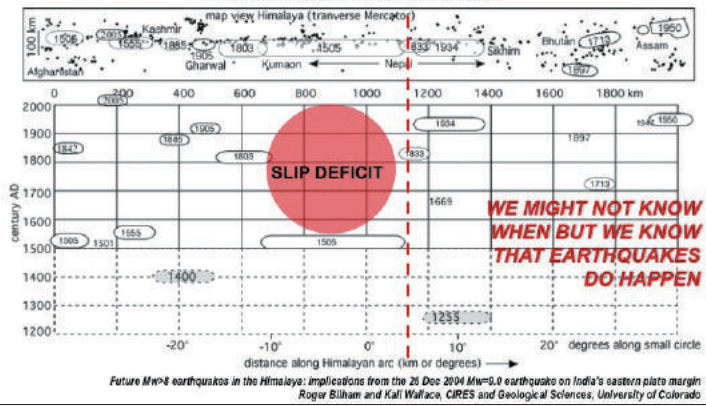
10-years Memorial Seminar of ITC, 26 September 2016, Report of Follow-up Activity, Kai WEISE

ii Preparing Kathmandu Valley for the expected Earthquake

SLIP DEFICIT IN WESTERN NEPAL

THE CENTRAL HIMALAYAN GAP



Future Mw>8 earthquakes in the Himalaya: implications from the 26 Dec 2004 Mw=9.0 earthquake on India's eastern plate margin
Roger Bilham and Kafi Wallace, CIRES and Geological Sciences, University of Colorado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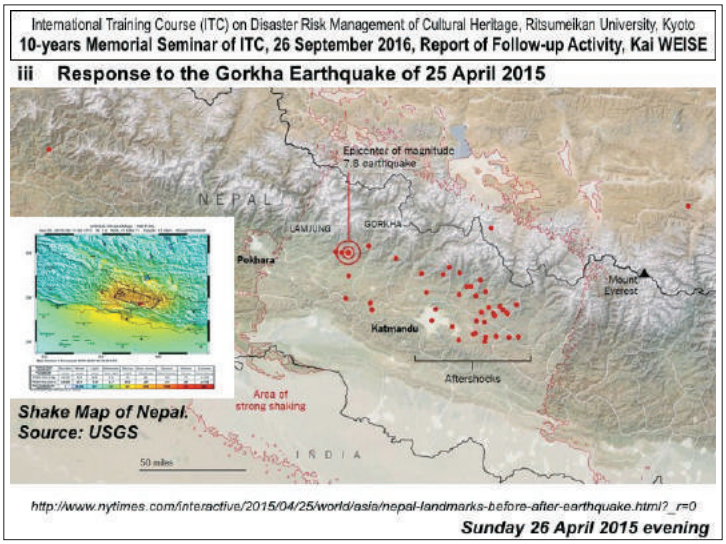
10-years Memorial Seminar of ITC, 26 September 2016, Report of Follow-up Activity, Kai WEISE
ii Preparing Kathmandu Valley for the expected Earthquake
PREPARING FOR NEXT EARTHQUAKE
Activities linked to International Training Course on Disaster Risk Management of Cultural Heritage, Ritsumeikan University
COMMUNITY WORKSHOP ON REDUCING DISASTER RISKS TO CULTURAL HERITAGE AT PATAN
Date: 25 Nov 2010
Venue: Rajbhandari House, Patan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10-years Memorial Seminar of ITC, 26 September 2016, Report of Follow-up Activity, Kai WEISE
iii Response to the Gorkha Earthquake of 25 April 2015
Epicenter of magnitude 7.8 earthquake
NEPAL
LAMJUNG
GORKHA
Pokhara
Mount Everest
Kathmandu
Aftershocks
Area of strong shaking
INDIA
50 miles
Shake Map of Nepal.
Source: USGS
http://www.nytimes.com/interactive/2015/04/25/world/asia/nepal-landmarks-before-after-earthquake.html?_r=0
Sunday 26 April 2015 evening


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iii Response to the Gorkha Earthquake of 25 April 2015
Collapsed while blood donation camp was going on
The Guardian Photograph:Xinhua/Landov/Barcroft
Dharahara Tower collapses killing over 100
http://news.nationalgeographic.com/2015/04/150427-nepal-earthquake-damage-temples-buddhism-hinduism-world-heritage-monuments-unesco/
Sunday 26 April 2015
AFTERSHOCK
Tuesday 12 April 2015
Khumbeshwor Temple
Lesson from Murakami-san
(Hyogo Prefecture) from Kobe Earthquake
first week is for humanitarian search and rescue
cultural heritage will have to wait for second week

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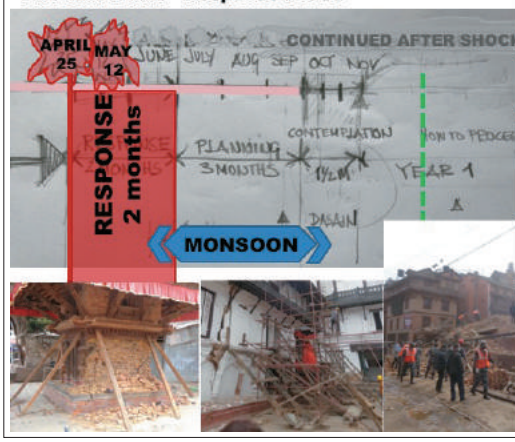
iii Response to the Gorkha Earthquake of 25 April 2015

THE TIME LINE – Response Phase



PRELIMINARY ASSESSMENT
State of monument and required immediate response

SECURITY
Does the site need security and if so has this been provided?

SALVAGE
Are there artefacts, part of monuments or other objects that need to be salvaged and put under protection? Has this been done?

SUPPORT
Are any structures damaged and need supports (shoring)

DETAILED ASSESSMENT
For those structures that require further technical assessments

MONSOON READY
Are the monuments ready to withstand the monsoon?

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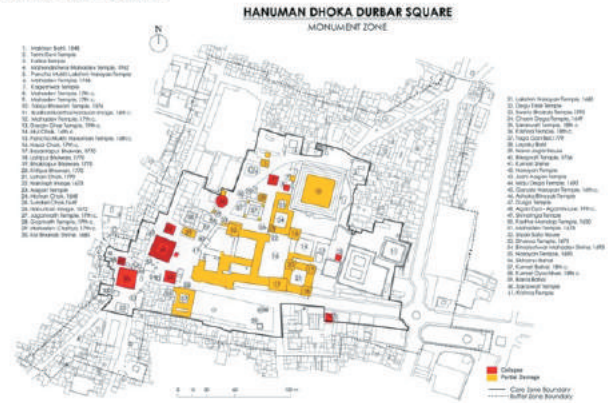
iii Response to the Gorkha Earthquake of 25 April 2015

Response Phase



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iii Response to the Gorkha Earthquake of 25 April 2015

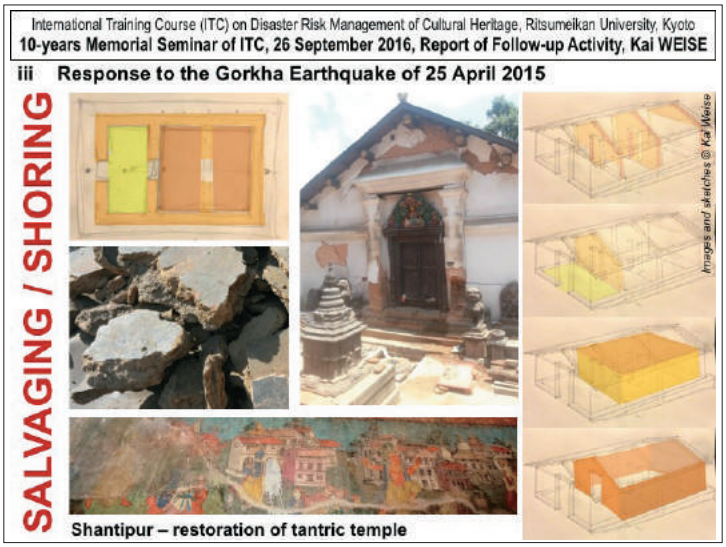
Response Phase

Image © Kai Weise

SALVAGING MUSEUM

Hanuman Dhoka Palace Museum
Kathmandu
partial collapse of King Tribhuvan exhibition –
two thrones, a coffin and a canon
could not implement International
recommendations
local resources and trained armed forces

both photos courtesy Saraswoti Singh, DOA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iii Response to the Gorkha Earthquake of 25 April 2015
SALVAGING / SHORING
Images and sketches © Kai Weise
Shantipur – restoration of tantric temple


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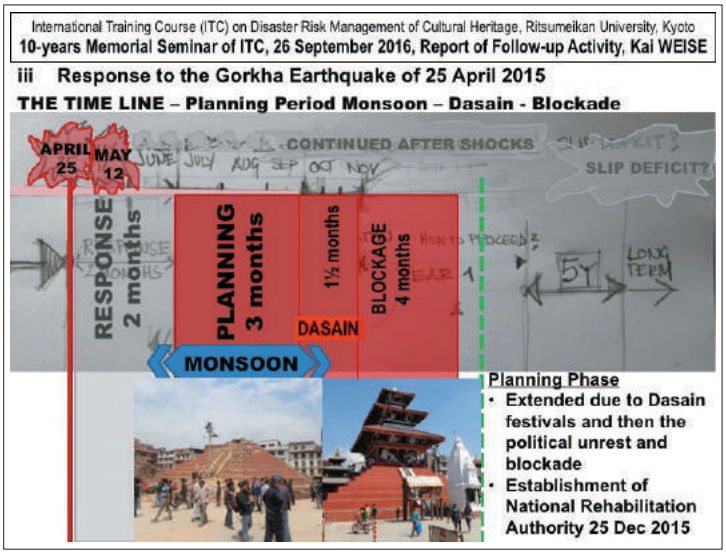
iii Response to the Gorkha Earthquake of 25 April 2015
Response Phase
SEALING
acrylic cracks filling paste with three layers of elastic polymer coating
Images © Kai Weise
Swayambhu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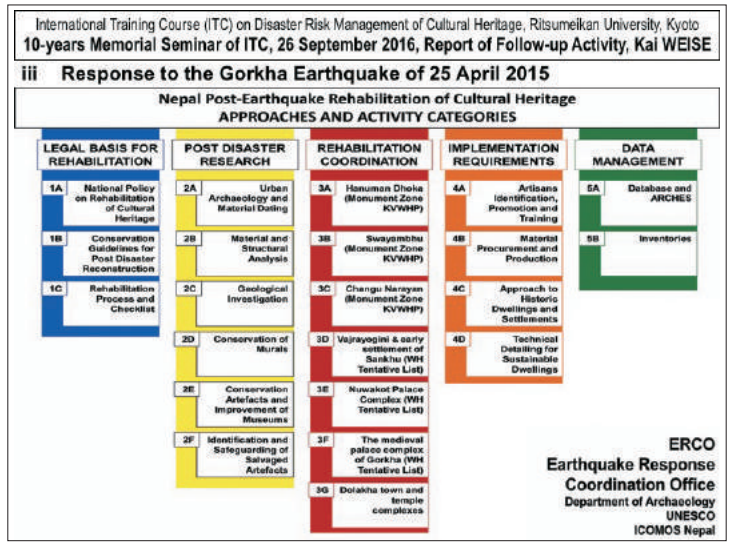
iii Response to the Gorkha Earthquake of 25 April 2015
THE TIME LINE – Planning Period Monsoon – Dasain - Blockade
APRIL 25
MAY 12
CONTINUED AFTER SHOCKS
SLIP DEFICIT?
RESPONSE 2 months
PLANNING 3 months
1½ months
BLOCKAGE 4 months
DASAIN
MONSOON
5Y
LONG TERM
Planning Phase
• Extended due to Dasain festivals and then the political unrest and blockade
• Establishment of National Rehabilitation Authority 25 Dec 2015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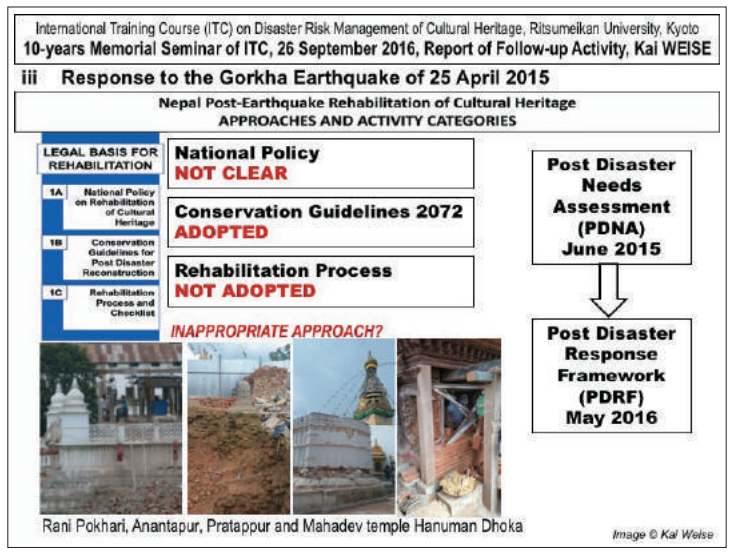
10-years Memorial Seminar of ITC, 26 September 2016, Report of Follow-up Activity, Kai WEISE
iii Response to the Gorkha Earthquake of 25 April 2015
Nepal Post-Earthquake Rehabilitation of Cultural Heritage
APPROACHES AND ACTIVITY CATEGORIES
LEGAL BASIS FOR REHABILITATION
1A National Policy on Rehabilitation of Cultural Heritage
1B Conservation Guidelines for Post Disaster Reconstruction
1C Rehabilitation Process and Checklist
POST DISASTER RESEARCH
2A Urban Archaeology and Material Dating
2B Material and Structural Analysis
2C Geological Investigation
2D Conservation of Murals
2E Conservation Artefacts and Improvement of Museums
2F Identification and Safeguarding of Salvaged Artefacts
REHABILITATION COORDINATION
3A Hanuman Dhoka (Monument Zone KVWHP)
3B Swayambhu (Monument Zone KVWHP)
3C Changu Narayan (Monument Zone KVWHP)
3D Vajrayogini & early settlement of Sankhu (WH Tentative List)
3E Nuwakot Palace Complex (WH Tentative List)
3F The medieval palace complex of Gorkha (WH Tentative List)
3G Dolakha town and temple complexes
IMPLEMENTATION REQUIREMENTS
4A Artisans Identification, Promotion and Training
4B Material Procurement and Production
4C Approach to Historic Dwellings and Settlements
4D Technical Detailing for Sustainable Dwellings
DATA MANAGEMENT
5A Database and ARCHES
5B Inventories
ERCO
Earthquake Response Coordination Office
Department of Archaeology
UNESCO
ICOMOS Nepal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APPROACHES AND ACTIVITY CATEGORIES
LEGAL BASIS FOR REHABILITATION
1A National Policy on Rehabilitation of Cultural Heritage
1B Conservation Guidelines for Post Disaster Reconstruction
1C Rehabilitation Process and Checklist
National Policy
NOT CLEAR
Conservation Guidelines 2072
ADOPTED
Rehabilitation Process
NOT ADOPTED
INAPPROPRIATE APPROACH?
Post Disaster Needs Assessment (PDNA) June 2015
Post Disaster Response Framework (PDRF) May 2016
Rani Pokhari, Anantapur, Pratappur and Mahadev temple Hanuman Dhoka
Image © Kai Weise


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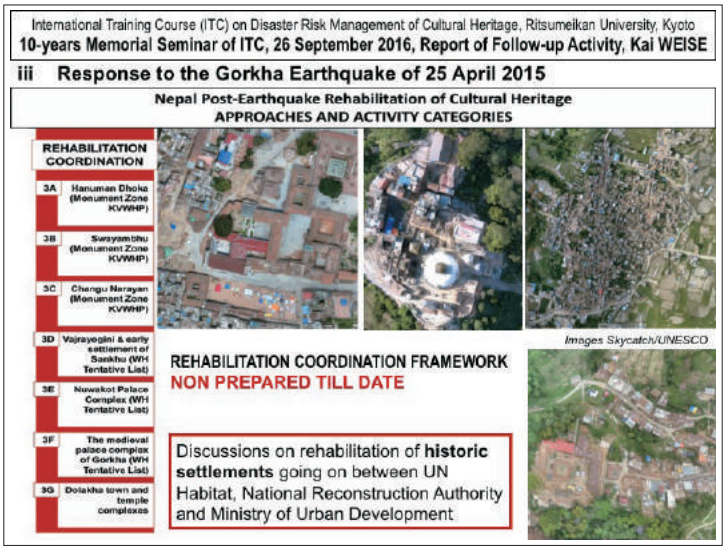
2B Material and Structural Analysis
2C Geological Investigation
2D Conservation of Murals
2E Conservation Artefacts and Improvement of Museums
2F Identification and Safeguarding of Salvaged Artefacts
Kastamandap
URBAN ARCHAEOLOGY
Swayambhu
MATERIAL AND STRUCTURE
Swayambhu
MURALS
Hanuman Dhoka
SAFEGUARDING ARTEFACTS
Image © Kai Weise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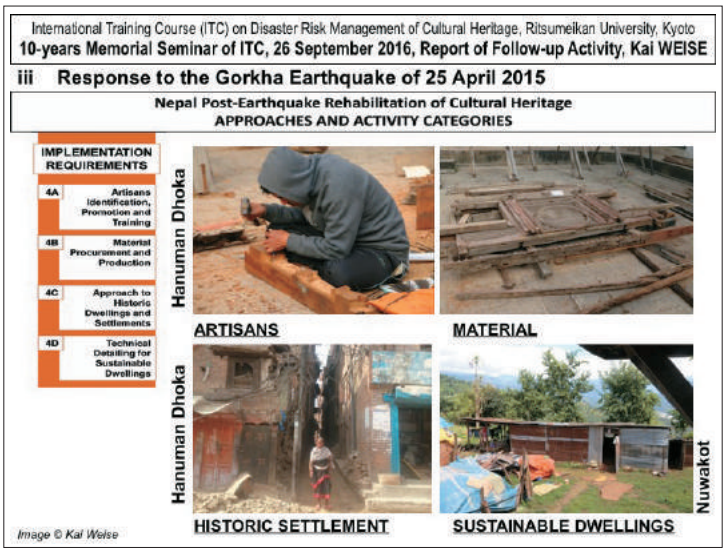
3E Nuwakot Palace Complex (WH Tentative List)
3F The medieval palace complex of Gorkha (WH Tentative List)
3G Dolakha town and temple complexes
Images Skycatch/UNESCO
REHABILITATION COORDINATION FRAMEWORK
NON PREPARED TILL DATE
Discussions on rehabilitation of historic settlements going on between UN Habitat, National Reconstruction Authority and Ministry of Urban Development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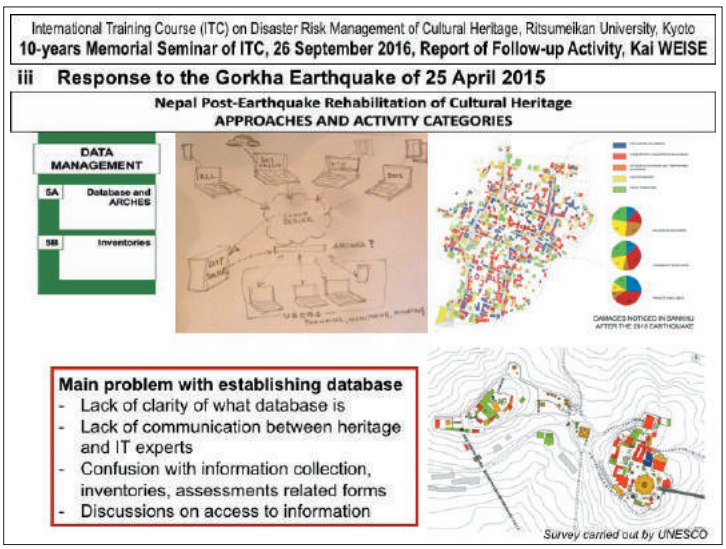
4C Approach to Historic Dwellings and Settlements
4D Technical Detailing for Sustainable Dwellings
Hanuman Dhoka
ARTISANS
MATERIAL
Hanuman Dhoka
Nuwakot
HISTORIC SETTLEMENT
SUSTAINABLE DWELLINGS
Image © Kai Weise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APPROACHES AND ACTIVITY CATEGORIES
DATA MANAGEMENT
5A Database and ARCHES
5B Inventories
Main problem with establishing database
- Lack of clarity of what database is
- Lack of communication between heritage and IT experts
- Confusion with information collection, inventories, assessments related forms
- Discussions on access to information
Survey carried out by UNESCO

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iii Response to the Gorkha Earthquake of 25 April 2015

How to continue? – but not danger listed yet!

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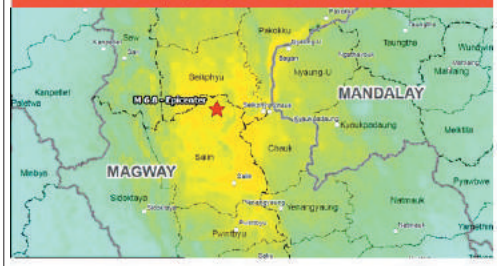
iv Response to the Chauk Earthquake of 24 August 2016

Magnitude 6.8 earthquake
19 km from Seikphyu, Myanmar (Burma) · Aug 24, 4:19 PM



Immediate response:
Short write-up on appropriate response (Does and Don'ts)
Prepared and translated within 18 hours and presented to the President of Myanmar
Set the tone for further response

State Counselor Daw Aung San Suu Kyi has sent notice to officials in the Bagan archaeological zone not to "rush" the restoration of the damaged pagodas, and to seek technical assistance from UNESCO.

http://m.irrawaddy.com/burma/bagan-after-the-quake-concerns-over-manhandling-of-debris.html

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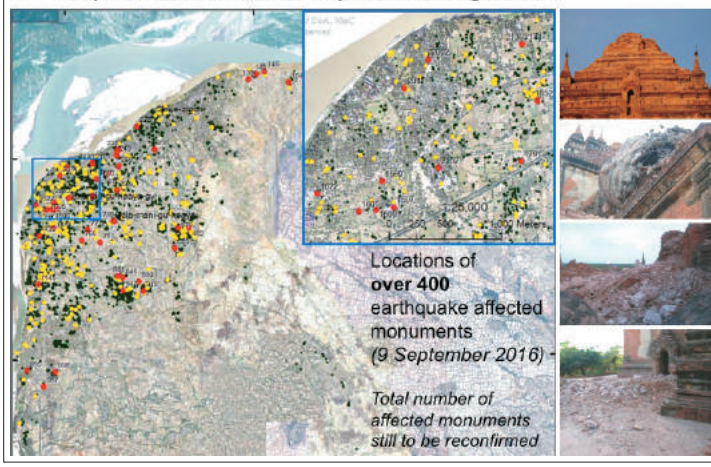
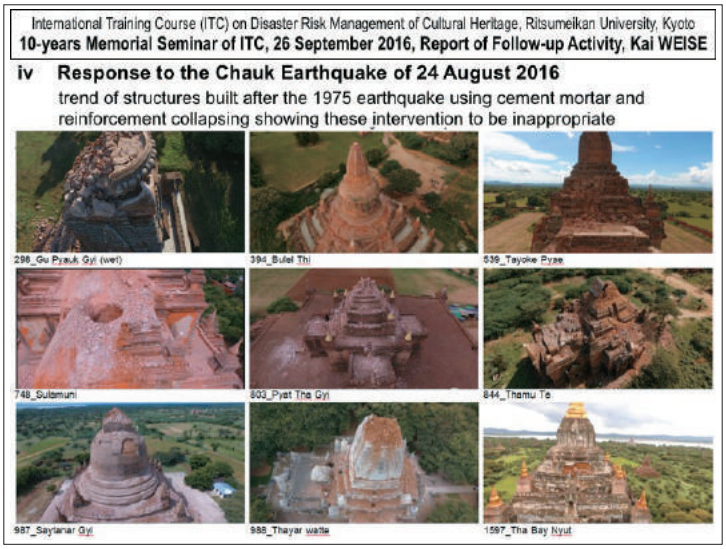
10-years Memorial Seminar of ITC, 26 September 2016, Report of Follow-up Activity, Kai WEISE

iv Response to the Chauk Earthquake of 24 August 2016

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iv Response to the Chauk Earthquake of 24 August 2016
trend of structures built after the 1975 earthquake using cement mortar and reinforcement collapsing showing these intervention to be inappropriate
286_Gu Pyauk Gyi (wet)
394_Bulei Thi
539_Tayoke Pyae
748_Sulamuni
803_Pyat Tha Gyi
844_Thamu Te
987_Saytanar Gyi
988_Thayar watte
1597_Tha Bay Nyut


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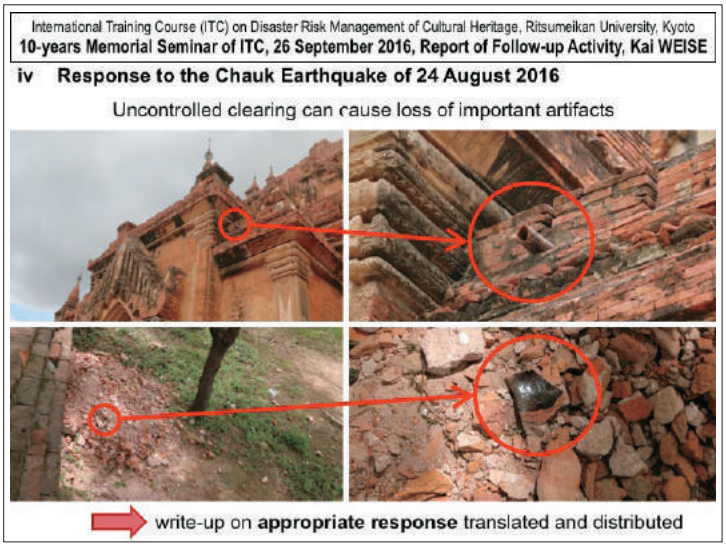
iv Response to the Chauk Earthquake of 24 August 2016
Comparison: after 1975 earthquake – reconstruction – after 2016 earthquake
(Sitana-gyi-hpaya and Sula-mani-gu-hpaya prepared by Manithaphone Mahaxay)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Uncontrolled clearing can cause loss of important artifacts
write-up on appropriate response translated and distributed

iv Response to the Chauk Earthquake of 24 August 2016

Response Phase **1**
(3 months – till End November 2016)
Focus on assessment, salvaging and protection
Preparation for Prioritized Rehabilitation Phase

Prioritized Rehabilitation Phase **2**
(2 years – till November 2018)
prioritized structures based on highest significance and degree of damage will be rehabilitated based on adopted post-earthquake rehabilitation guidelines and processes
Continued preparation of World Heritage nomination dossier to be completed and submitted on 1 Feb 2018

Overall Rehabilitation and Management **3**
(5 years)
This long-term rehabilitation plan will be carried out together through the integrated management system that is being established for the heritage site of Bagan.

International Training Course (ITC) on Disaster Risk Management of Cultural Heritage, Ritsumeikan University, Kyoto
10-years Memorial Seminar of ITC, 26 September 2016, Report of Follow-up Activity, Kai WEISE

iv Response to the Chauk Earthquake of 24 August 2016

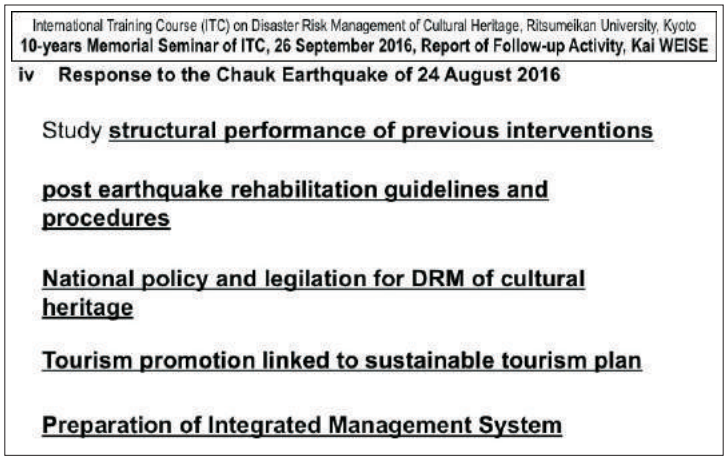
1 ASSESSMENTS	2 SALVAGING	3 PROTECTION
Initial Assessment to determine damage	Artifacts to be carefully separated and tagged	Rain protection covering of damaged monuments
Immediately carried out by **DOA**	Old material-bricks and mortar–stored separately	Carried out by **DOA** - ongoing
Detailed Assessment of prioritized monuments	To separate new material as actual debris	Structural stabilization though shoring / props
Being carried out by **DOA** on prioritized monuments	**Salvaging training by ICCROM team: Mission 6–16 Sept 2016**	**Training by Dr. Arun Menon from IIT Madras Mission 6–16 Sept 2016**
Link to database and management system		Specific types of protection as required
GIS expert, Dr. Mahaxay (Noi) will assist Mission 6–11 Sept 2016		*studied during the coming weeks and required expertise sought*

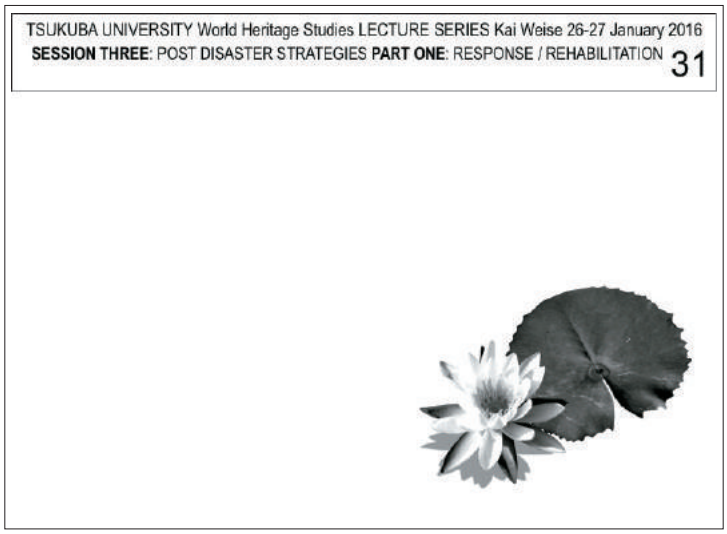
Earthquake Response Coordination Office (**ERCO**)
Bagan Heritage Centre (**BHC**)

International Training Course (ITC) on Disaster Risk Management of Cultural Heritage, Ritsumeikan University, Kyoto
10-years Memorial Seminar of ITC, 26 September 2016, Report of Follow-up Activity, Kai WEISE

iv Response to the Chauk Earthquake of 24 August 2016

1. Legal Basis	2. Research/Training	3. Coordination Plans	4. Implementation	5. Database
1A National Policy	2A Archaeology and Dating	3A: Sulamani 3B: Lokananda 3C: Dammayangyi 3D: Ananda 3E: Thatbyinnyu 3F: ... 3G: ... 3H: ... 3I: ... 3J: ... 3K: ... 3L: ... 3M: ... 3N: ... 3O: ... 3P: ... 3Q: ... 3R: ... *This list will be finalized after the prioritization has been finalized through detailed assessment*	4A Artisan Management	5A Mapping
1B Rehabilitation Guidelines	2B Material / Structural Analysis		4B Material Management	5B Inventory
1C Rehabilitation Process	2C Geological Investigations		4C Supervision / Monitoring	5C GIS Database
	2D Conservation of Murals		4D Community Involvement	
	2E Displaced Artefact Mgmt			
	2F Museum Improvement			





Progress activity report : Juan Diego BADILLO REYES (Ecuador, ITC2014)

Though risk management is generally understood, there is still a lot of work to be done in its application at a local level. There is still difficulty taking into account the real value of cultural heritage assets when it comes to integration of disaster risk reduction in urban planning.

After the DMUCH training, I had the opportunity to work on two projects where risk management was a serious issue. They were:

1. Museum of Zaruma

Given that the city is regarded as a living museum, the objective is to incorporate risk management as part of city planning and not just within the museum and its planned programmes.

Three approaches were defined: Urban, Architectural and Collection

2. Cultural Heritage Planning Agenda for the city of Riobamba.

After a landslide in 1797 when the whole city was destroyed, three principles were implemented for new cities in order to mitigate disasters:

A) Roadway width to aid evacuation.

B) Several plazas to be designated as safety areas to gather people in case of evacuation

C) Height of houses should be limited to three stories.

These principles, among others, were highlighted in the agenda and proposed as guidelines for new urban development.

EXPERIENCES AFTER ITC DRMCH 2014

JUAN DIEGO BADILLO
Ecuador

Ecuador

AREA:
283,560 km2

INHABITANTS:
16.144.000

DENSITY:
54.49 hab./km2

OFFICIAL LANGUAGES:
Spanish / Kichwa

1 **Zaruma** *(El Oro)*
City Museum

2 **Riobamba** *(Chimborazo)*
Cultural Heritage
Planning Agenda

1 Local Museum in Zaruma - 2015

Photo: Chriz

INHABITANTS
First Order 3548
Buffer zone 5732
Total 9280

0-19 39%
20-49 60%
50 -> 29%

24% of inhabitants in the region (canton) lives in extreme poverty

WHS indicative list since 1998

To create a museum that goes beyond the building. The city is a museum itself.

To implement a strong awareness programme for disaster and risk management

Awareness programmes using memory and art.

To consider the city, the building the collections and the inhabitants.

EXHIBIT
Living with risk.
Don't be afraid be prepared
INPC educational programme

ARCHITECTUR
Evacuation Routes
Materials
Construction Technics

URBANISM
Stairs as safe connectors in emergency
Squares / entrance
Relation with emergency unit and safety spots


EXHIBIT
Living with risk
Don't be scared, be prepared
INPC educational programme


ARCHITECTURE
1


URBAN
1

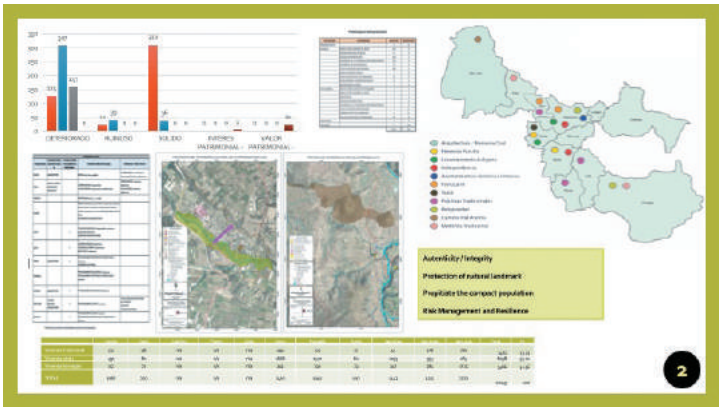

Art and memory used in the "safety road" to create awareness
1

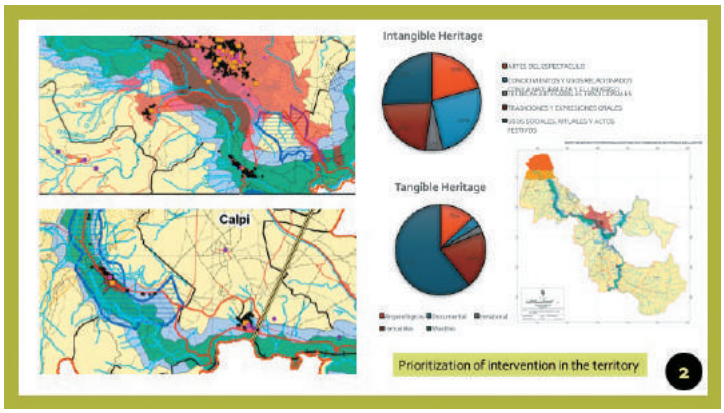

¿Quiénes son y donde viven?
470x240cm
1

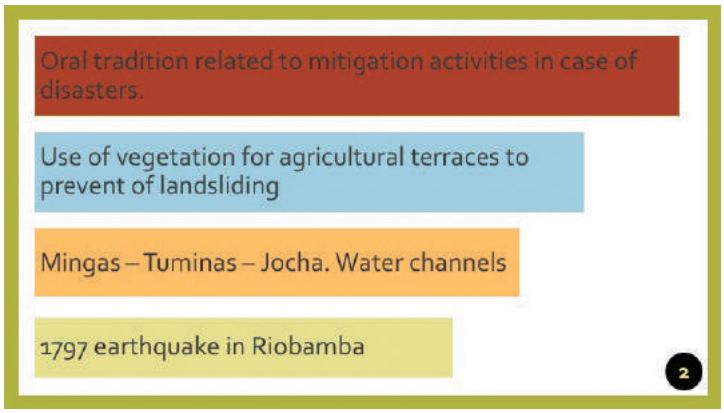

2
Cultural Heritage Planning Agenda
Riobamba 2016-2019
INHABITANTS
Canton 225.740
ACTIVITIES
Agriculture
Commerce (small scale)
Textil *
34% indigenous groups
50% of inhabitants in the region (canton) Not satisfied basic needs
18% extreme poverty
National Heritage since 2008
Opportunity for local development
Tourism, city brand, nature – culture relation and cultural industries
Digitalization of documentation of cultural heritage
Popular history
Cultural history and media
Revitalization traditional handicrafts
Historical reconstruction, interpretation and experience

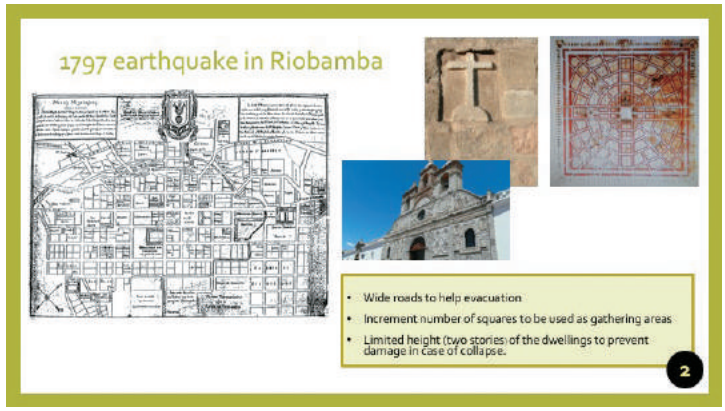

Plan de Desarrollo Cantonal
Riobamba 2025
BUDGET
USD 11.000. 000 – USD 250000
Culture / Rural Development / Social Development / Tourism / Cultural Heritage / Risk Management
2

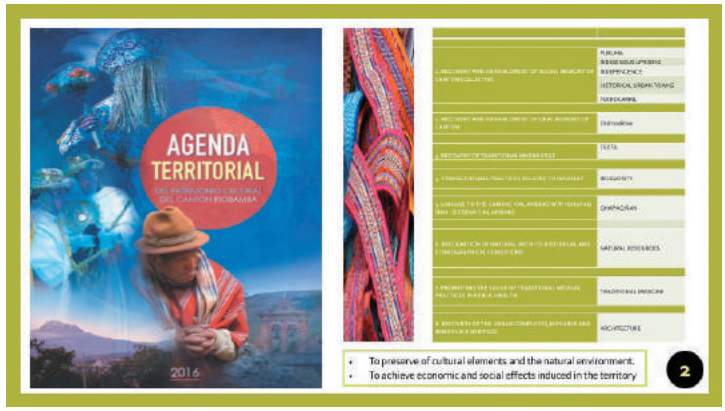

2


Autenticity / Integrity
Protection of natural landmark
Propitiate the compact population
Risk Management and Resilience


Intangible Heritage
Tangible Heritage
Calpi
Prioritization of intervention in the territory


Oral tradition related to mitigation activities in case of disasters.
Use of vegetation for agricultural terraces to prevent of landsliding
Mingas – Tuminas – Jocha. Water channels
1797 earthquake in Riobamba





Progress activity report: Sang sun JO (South Korea, ITC2012)

As a trainee of ITC 2012, the program was very helpful to achieve my professional task at that time. After the program, I had applied my experience on planning and installation of disaster prevention system at Sungnyemun site. This heritage was damaged severely by arson in 2008 and restored in 2013. And I have adapted useful knowledge gained from the course to that restoration project. As I learnt during the course, I developed a scenario of fire and according to its result, I and my restoration team have set an evacuation route and arranged disaster mitigation facilities. Accordingly, we also developed an adequate manual.

Based on this training, I suggested basic principles for disaster prevention and prepared disaster mitigation plan for the gates of Seoul city wall. Based on this, Seoul municipal authority is now preparing a management plan for these heritages.

Since March 21th, I have worked in Research division of architectural heritage in NRICH(National Research Institute of Cultural Heritage) and I am a leader of stability inspection team. There are 2 research associates and 3 research assistants in my team and we execute a minute inspection on heritages which have structural or weathering problem. Also we conduct various researches on structural behaviour of cultural heritages. The goal of these activities is to protect cultural heritage and to prevent disaster.

10 years Memorial Seminar of the UNESCO Chair International Training Course / Sep. 26th, 2016

Follow up activity report after ITC 2012

Experiences about reconstruction, stability inspection and recent activity related with earthquake

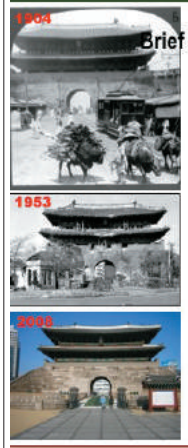
JO, Sang sun / Senior Researcher
Stability Inspection Team, Research Division of Architectural Heritage
NRICH(National Research Institute of Cultural Heritage), Rep. of KOREA

Contents

1. Reconstruction after Disaster : Sungnyemun(崇禮門)
2. Research/Inspection on structural stability and disaster mitigation of Cultural Heritage
3. Recent activity : condition assessment on damage and stability inspection caused by recent earthquake in Gyeongju(慶州) city, the oldest historic city
4. Conclusion

Reconstruction after Disaster : Sungnyemun(崇禮門)

News clip about Sungnyemun arson



Brief history of Sungnyemun and values as a cultural heritage

- The main south gate of Seoul city wall, old capital city, during 1396~1910
- Damages by Korean war : 1950~1953
- Restoration : 1961 ~ 1963
- **Arson : 2008, 10th, Feb**
- **Reconstruction : 2008~2013**

- Main south gate of Seoul city wall.
- The oldest wooden pavilion in city wall
- National treasure no1 since 1962
- Symbol of Seoul, Representative cultural heritage of Korea

Responses, results

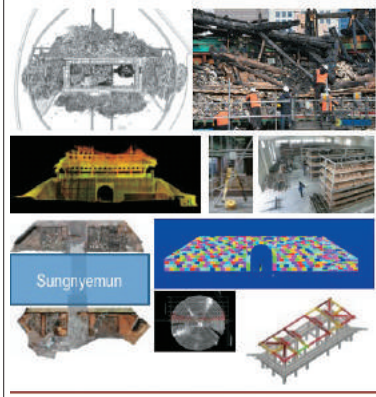
Equipments and human resources used in extinguishment
: fire fighters 330, policemen 20, electricity expert 5, etc.
: fire engines 37, water tanks 33, ambulances and other 25, etc

- Section drawing of 2nd floor and estimated path of fire

- Result : loss of 90% of 2nd floor

- Reason 1 : Lack of knowledge on structure of traditional architecture
- Reason 2 : Cultural Heritage, Value
- Reason 3 : System and Regulation
- Reason 4 : Lack of social acknowledgement on value of cultural heritage

Preparation for reconstruction, 2008~2009



- Site survey, Documentation
- Reconstruction planning
- Storage for carbonized woods

- Publication of official report
- Excavation
- Structural analysis
- Historical research
- Chronological research on wood


1. Reconstruction after Disaster : Sungnyemun(崇禮門)
Process of reconstruction, 2010~2013
• Research on traditional tools, materials and techniques
• Advisory meetings
• Dismantling and reassembly
• Participation in ITC 2012
• Disaster and Risk Management planning
Follow up activity report after ITC 2012
: Experiences about reconstruction, stability Inspection and recent activity


1. Reconstruction after Disaster : Sungnyemun(崇禮門)
Facilities for fire prevention and safety
Fire engine route
Automatic detection cam.
Guard post
Management office
Restroom
CCTV : 16
Other facilities
Fire-fighting facilities


1. Reconstruction after Disaster : Sungnyemu
Follow up activity report after ITC 2012
: Experiences about reconstruction, stability Inspection and recent activity

Consideration about the principle of cultural heritage conservation

- Installation of new material in case of disaster(fire)
  - Fire retardant fabric, etc.

- Management plan about Seoul city wall(2013)
  - Analysis on circumstance, vulnerability
  - Risk management plan

Examples of disaster on cultural heritage

Naksansa temple ▸
Disaster : Fire(2005)
Result : Destruction of 22 wooden buildings
Reconstruction : 2007

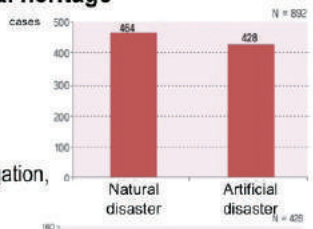
Dorimsa temple ▸
Disaster : Typhoon (2006)

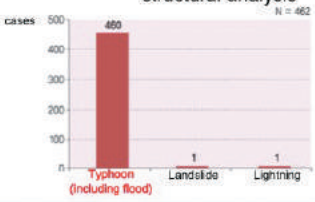
Jagyeseowon ▸
Disaster : Subsidence of ground (2014)

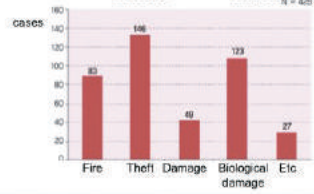
2. Research/Inspection on structural stability and disaster mitigation of Cultural Heritage

Statistics on disaster of cultural heritage

- Period : 1936 ~ 2013
- Cases : 892
- Disaster : weathering, ageing, natural disaster
- Response : monitoring, disaster mitigation, structural analysis







Follow up activity report after ITC 2012
: Experiences about reconstruction, stability Inspection and recent activity

2. Research/Inspection on structural stability and disaster mitigation of Cultural Heritage

Result of nation wide investigation on cultural heritage(2014)

Classification	Objects	Grades A	B	C	D	E	F	其他
Nation-designated	1,684	500 (29.7%)	350 (20.8%)	501 (29.8%)	30 (1.8%)	282 (16.7%)	19 (1.1%)	2 (0.1%)
Province-designated	5,305	1,324 (25.0%)	1,349 (25.4%)	1,370 (25.8%)	143 (2.7%)	1,044 (19.7%)	67 (1.3%)	8 (0.2%)
Registered(Modern)	404	184 (45.5%)	52 (12.9%)	67 (16.6%)	10 (2.5%)	87 (21.5%)	1 (0.2%)	3 (0.7%)
Amount	7,393	**2,008** (27.2%)	**1,751** (23.7%)	**1,938** (26.0%)	**183 (2.5%)**	**1,413 (19.1%)**	**87 (1.2%)**	**13** (0.2%)

Architectural heritage : Cases 738

grade	Condition	content
A	Good	Cases which has been repaired recently. Overall condition and management are in sound state.
B	Need minor repair	Such as small cracks can be repaired by non-expert easily. Local authorized corporation is in charge.
C	Need monitoring	Cases which has significant contaminations or cracks and need conservational treatment
D	**Periodical/constant Monitoring**	Cases which has serious problem but need not immediate intervention or treatment Monitoring on risk factors such as unequal settlement, deformation, serious cracks
E	**Need intervention** (conservation, repair, etc)	**Cases which has serious problems and need comprehensive plan including precise inspection (mainly to decide intervention methodology such as repair, partial dismantling, etc.)**
F	Immediate intervention	Cases which has serious and complicated problems and need immediate intervention

Follow up activity report after ITC 2012
: Experiences about reconstruction, stability Inspection and recent activity

2. Research/Inspection on structural stability and disaster mitigation of Cultural Heritage

Research/Inspection on structural stability and disaster mitigation of Cultural Heritage

- Back ground
  - Sungnyemun arson (2008)
  - Official issue about inappropriate management on cultural heritage and nation wide investigation (2014)
- Research division of architectural heritage in NRICH
  - Periodical condition investigation on nation-designated architectural heritages : cases 738, per 3 year
  - **Intensified stability inspection on architectural heritage of priority management : cases 56, 2~4 times per year**
    - **Traditional architecture + Conservation + Biology**

Follow up activity report after ITC 2012
: Experiences about reconstruction, stability Inspection and recent activity

2. Research/Inspection on structural stability and disaster mitigation of Cultural Heritage

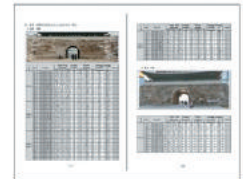
Termite detection dog

Follow up activity report after ITC 2012
: Experiences about reconstruction, stability Inspection and recent activity

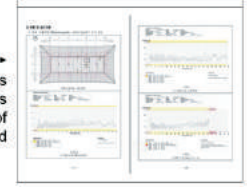
2. Research/Inspection on structural stability and disaster mitigation of Cultural Heritage

Example of stability report : wooden gate, 崇禮門

State inspection and recommendations



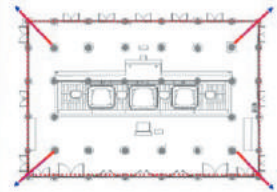
Variation data of cracks and sensors
Resistance graph of drilled wood



Follow up activity report after ITC 2012
: Experiences about reconstruction, stability Inspection and recent activity

2. Research/Inspection on structural stability and disaster mitigation of Cultural Heritage

Example of stability analysis : Buddhist temple, 華嚴寺 覺皇殿



Measurement	east-south	east-north	west-south	west-north
Angle 1	3.59°	1.46°	0.37°	5.57°
Angle 2	3.10°	1.55°	0.19°	4.23°

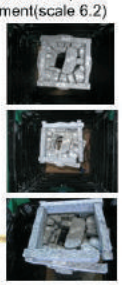
- Result of monitoring curvatures for 2 years : minute changes
  - Intervention(replacement) are scheduled in this year.

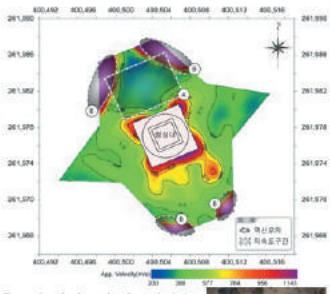
Follow up activity report after ITC 2012
: Experiences about reconstruction, stability Inspection and recent activity

2. Research/Inspection on structural stability and disaster mitigation of Cultural Heritage

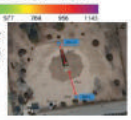
Example of structural research : observatory, 瞻星臺

Artificial earthquake experiment(scale 6.2)





Result of electrical resistivity
And elastic wave velocity



Follow up activity report after ITC 2012
: Experiences about reconstruction, stability Inspection and recent activity

2. Research/Inspection on structural stability and disaster mitigation of Cultural Heritage

List of recent special study by NRICH, Korea

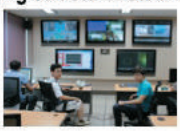
- Development of **Disaster Damage Mitigation Technology** for Stone. & Wooden Cultural Assets 2008
- Research Planning on the Disaster Mitigation of Architectural Heritage 2008
- Development of **Hazard Estimation System** for Preservation of Stone Relics 2009
- **Flood and Seismic Risk Assessment** for Seoul Historic Areas 2011
- **Monitoring Technology** for Cultural Heritages based on Vibration Measurements 2011
- Constructing the Platform of the Safety Disaster Prevention System for Architectural Heritage II 2013
- Development of earthquake, flood, and **natural disaster assessment and management system** for an architectural cultural heritage of a historical city 2013
- **Medium-and long-term planning research of harmful organism** for outdoor timber cultural assets at climate change response 2013
- Research development work of **structural safety performance evaluation** in traditional wooden pagoda and ancient tomb 2013

Follow up activity report after ITC 2012
: Experiences about reconstruction, stability Inspection and recent activity

2. Research/Inspection on structural stability and disaster mitigation of Cultural Heritage

Current activities (2016)

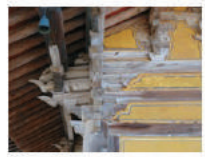
- **Intensified stability inspection**
  - Mandatory object : nation-designated cultural heritage 33 cases
  - Request by municipal authorities : 5 cases
- **Research about Monitoring and Disaster Damage Mitigation**
  - Basic research about displacement measurement method by using periodic 3D scanning on important wooden cultural heritage
  - Research planning for establishing criteria for stability of stone monument
- **Building construction : Research facility for testing structural stability**



Follow up activity report after ITC 2012
: Experiences about reconstruction, stability Inspection and recent activity

Example : cultural heritage and its problem



Earthquake(magnitude 5.8), Sep. 12th Gyeonju, KOREA

- Number of Earthquake during last **2 week** : **428** times
  - Magnitude1.5~3.0 : 412 / 3.0~4.0 : 14 / 4.0~5.0 : 2
- Number of Earthquake during last **7 years** : **396** times

3. Condition assessment on damage and stability inspection caused by recent earthquake in Gyeongju(慶州) city

Earthquake(scale 5.8), Sep. 12th Gyeonju, KOREA

News clip about earthquake and activity of inspection team, NRICH

Follow up activity report after ITC 2012
: Experiences about reconstruction, stability Inspection and recent activity

3. Condition assessment on damage and stability inspection caused by recent earthquake in Gyeongju(慶州) city

Response and activities of Cultural Heritage Administration

- Period : 9.12~9.21, no collapse or casualties
- Damaged cultural heritages : 97
  - Nation-designated 51, Province-designated 46
  - 234 technicians(carpenter, mason, etc) work on sites
- Condition assessment on damaged cultural heritage
- **Analysis of structural stability and movement**
  - **Intensified inspection object : 6**



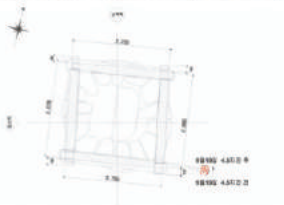




Follow up activity report after ITC 2012
: Experiences about reconstruction, stability Inspection and recent activity

3. Condition assessment on damage and stability inspection caused by recent earthquake in Gyeongju(慶州) city





Follow up activity report after ITC 2012
: Experiences about reconstruction, stability Inspection and recent activity

A turning point of research and policy about earthquake

- Korea is not a safe area from earthquake anymore.

Reinforcement of structure after hansin-awaji earthquake : Moegi-no Yakata. (ITC2012)

Reinforcement example in case of earthquake: Johkohji
「Basic Seismic Risk Assessment for cultural heritage」(2013, CHA)

1. Reconstruction after Disaster : Sungnyemun(崇禮門)
2. Research/Inspection on structural stability and disaster mitigation of Cultural Heritage
3. Recent activity : condition assessment on damage and stability inspection caused by recent earthquake in Gyeongju(慶州) city, the oldest historic city

4. Conclusion

- During ITC 2012
  - Importance of Disaster Risk Management
  - How to respond to disasters : from methodology to facility
  - Consideration about principles of conservation and maintenance
- After ITC 2012
  - DRM planning on heritage site
  - Strategic DRM plan suggestion on another heritage
  - International network between experts related with disaster risk management
- Mid-long term plan

Progress activity report: Barbara CARANZA (Italy, ITC2013)

ITALY: CHIEF- CULTURAL HERITAGE INTERNATIONAL EMERGENCY FORCE

In Italy, to rescue cultural heritage in case of disaster, it was common practice, to employ only volunteers, who are not trained. Until CHIEF ONLUS foundation, a body of professionals for the emergency situations (conservators, archaeologists, architects, engineers …) didn't exist in Italy.

Training of heritage professionals as first aiders is important for the preservation of cultural heritage in areas of crisis and for saving cultural goods as well as the communities. In this regard, the first aiders training has to focus on a wide range of topics: from the study on material characteristics of the cultural properties, risk assessment, documentation, securing the site, stress management, evaluation of the resilience potential of the site.

With these objectives, CHIEF has been founded in 2014 as a non-profit association of Civil Protection; it involves and links together professionals from the field of Cultural Heritage and risk management, in order to maximize the synergy between these two realities for the protection of the territory and promotion of sustainable development.

The activities of CHIEF ONLUS are forecasting, prevention, education and rescue. In peacetime our operators work with the communities performing special courses, forecasting and prevention activities. On October 2014 CHIEF ONLUS has been authorised by the Municipality of Genoa and by the Superintendence for the Architectural and Artistic Heritage of Liguria to rescue and to give first aid to the flooded monumental part of the cemetery of Staglieno in Genoa.

One year later, the 19th september 2015 CHIEF ONLUS organized a conference in Genoa at the Museo Luzzati entitled: *"Protection of cultural heritage in crisis areas. Resilience and culture of Civil Protection. Institutions, tools and training, the role of the specialized volunteer. Who, how, where, why: case histories and comparing experiences"*.

At the moment CHIEF ONLUS has been authorised together, with Cesmar7, our associated partner, by the Italian Civil Protection for a possible intervention of first aid in areas of central Italy hit by the earthquake on 24th August. A pre call for the selection of volunteers has been disseminate for any future interventions in these areas. Moreover, Chief Onlus offered to collaborate with Ms. Aparna Tandon of ICCROM to create a Crowdmap of the territories affected by the earthquake for cultural heritage monitoring through active community involvement.

We firmly believe that promoting an active participation of the local communities is fundamental since they are the real beneficiaries of any intervention carried out in their territories and they often work volunarily due to their close association with heritages. For this reason the cultural property could become the actual place where people can build resilience and it can also take on new values. When it comes to the protection of the cultural goods, the community has to be involved in the practical works and also in the decision making process and through these actions people could recover positively from the tragedy.

FROM THE ITC DRMCH 2013 TO THE CREATION OF A CULTURAL HERITAGE INTERNATIONAL EMERGENCY FORCE

Caranza Barbara
10years Anniversary Symposium
UNESCO Chair International Training Course on Disaster Risk Management of Cultural Heritage

Convention for the Protection of Cultural Property in the Event of Armed Conflict The Hague, 14 May 1954

Venice: The handling of the four horse, San Marco facade. During the Zww. By Italian Army.

Coat-of –arms- sappers-

Article 7. Military measures

...

2. The High Contracting Parties undertake to plan or establish in peace-time, within their armed forces, services or specialist personnel whose purpose will be to secure respect for cultural property and to co-operate with the civilian authorities responsible for safeguarding it.

EARTHQUAKES (2009) L'Aquila:

In the July - December 2009 I went as a Cultural Heritage restorer in Abruzzo in a cooperative effort with the Civil Defence and Corps of Fire-fighter, assigned to recover mobile works in the ruins of the churches of the Anime Sante and Santa Maria di Paganica and to recover archival materials and libraries in the area.

EARTHQUAKES (2012) Emilia Romagna

In the may 2012 i was assigned for the Ligurian and Emilia Romagna regions to organise emergency interventions in the area. Identification of affected sites, plan of action, organitation of human resources , logistics.

EARTHQUAKES (2012) Emilia Romagna

Oratorio Ghisilieri, San Carlo (Fe)

Magnitude: 5,9

EARTHQUAKES (2012) Emilia Romagna

Oratorio Ghisilieri, San Carlo (Fe)

THE CRITICAL ASPECTS DURING THE AQUILA AND EMILIA EARTHQUAKE

UNTIL THE CREATION OF THE CHIEF ONLUS

- Volunteers were not experienced and a body of professionals for the emergency situations (conservators, archaeologists, architects, engineers ..) inscripted to the list of associations of civil protection, didn't exist.

- Volunteers were not properly trained (often simply students or people outside the world of the Cultural Heritage) and they were not recognized by the institutions and especially they were not coordinated.

- The intervention occured when there was a state of emergency never before and prevention activities on cultural heritage didn't exist. (DRMP, drills...)

- In Italy there was sort of a policy that addressed, in case of disaster, **the engagement of non-resident volunteers in the disaster area**

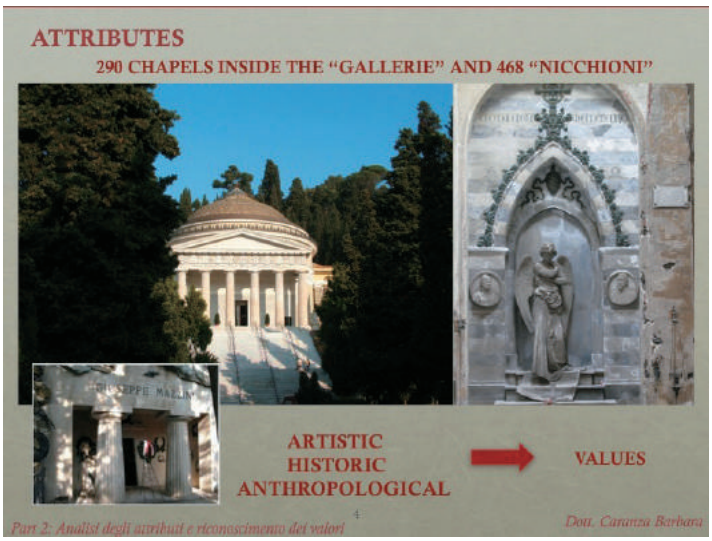
- The state of emergency, (extended beyond measure) , means that you plan to **organize the reconstruction with the emergency procedures**, with commissioners and ordinances. Which leads to confusion, lack of transparency, lack of control and clarity on the rules.




MY PARTECIPATION TO THE ITC DRMCH 2013

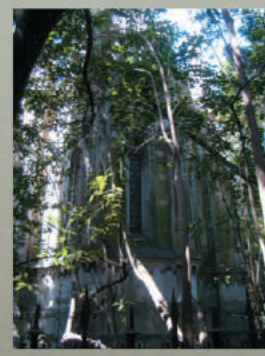

ATTRIBUTES
MORE THAN 300 MARBLE SCULPTURES
ARTISTIC (FINE ARTS)
HISTORIC
ANTHROPOLOGICAL
VALUES
Part 2: Analisi degli attributi e riconoscimento dei valori
Dott. Caranza Barbara


ATTRIBUTES
Dott. Caranza Barbara


ATTRIBUTES
290 CHAPELS INSIDE THE "GALLERIE" AND 468 "NICCHIONI"
ARTISTIC
HISTORIC
ANTHROPOLOGICAL
VALUES
Part 2: Analisi degli attributi e riconoscimento dei valori
Dott. Caranza Barbara

ATTRIBUTES

THE HISTORICAL GARDEN



LANDSCAPE
HISTORIC
ECOLOGICAL → VALUES

Worst Case Scenario:
Monumental Cimitery of Staglieno Area
Heavy Rainfall-Flood-Landslide

HAZARD

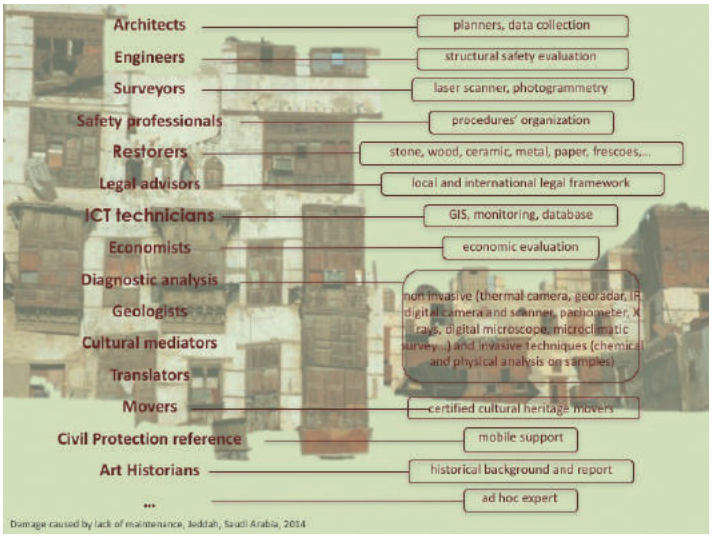
1° PHASE : HEAVY RAIN FALL-FLOOD
FLOODED CEMETERY

2° PHASE : LANDSLIDE
MUD AND DEBRIS FALL ON THE STRUCTURE OF CEMETERY, LATER COLAPSE.

Because of cultural items' importance and fragility, experts and prepared professionals only should be employed in rescue operations.

WITH THESE PREMISES CHIEF HAS BEEN FOUNDED IN 2014 AS A NON-PROFIT ASSOCIATION OF CIVIL PROTECTION.

It involves and links professionals from the field of Cultural Heritage and risk management in order to maximize the synergy between these two realites for the protection of the territory and the promotion of this sostainable development, which increases the level of resilience of both environment and populations.


Architects
planners, data collection
Engineers
structural safety evaluation
Surveyors
laser scanner, photogrammetry
Safety professionals
procedures' organization
Restorers
stone, wood, ceramic, metal, paper, frescoes,...
Legal advisors
local and international legal framework
ICT technicians
GIS, monitoring, database
Economists
economic evaluation
Diagnostic analysis
Geologists
Cultural mediators
Translators
non invasive (thermal camera, georadar, IR digital camera and scanner, pachometer, X rays, digital microscope, microclimatic survey...) and invasive techniques (chemical and physical analysis on samples)
Movers
certified cultural heritage movers
Civil Protection reference
mobile support
Art Historians
historical background and report
...
ad hoc expert
Damage caused by lack of maintenance, Jeddah, Saudi Arabia, 2014


different professionals combining their **skills and expertise** on field...
Damage caused by lack of maintenance, Jeddah, Saudi Arabia, 2014


OUR ACTIVITY
Prevention-Rescue-Communication
The association develops studies and scientific researches in the field of risk management for cultural heritage , information campaigns, educational activities in school, training events for citizens.
The association aims to promoting regional and national teams, organized and fully trained through ad hoc designed courses; they will intervene only in the state of emergency, without interfering with the reconstruction phase.
The association is committed to disseminate the results of its own projects and activity through conferences, publications and exhibitions.


CULTURAL HERITAGE INTERNATIONAL EMERGENCY FORCE
CHIEF
PROFESSIONALS VOLUNTEERS:
approximately 300


CULTURAL HERITAGE INTERNATIONAL EMERGENCY FORCE
CHIEF
HEADQUARTERS : TORINO
GENOVA
FERRARA


CULTURAL HERITAGE INTERNATIONAL EMERGENCY FORCE
CHIEF
COMPAGNIA UNICA dei LAVORATORI
delle MERCI VARIE del PORTO
GENOVA
SHELTER: GENOA
In the port area, CHIEF , thanks to the partner ship with the COMPAGNIA UNICA, keeps the materials and equipment needed to intervene in a time of crisis. The port area is safe and accessible 24h a day. The Compagnia Unica give to us the possibility to move with truck, containers and boat. WE ARE ABLE TO INTERVENE FOR THE EMERGENCY IN LIGURIA, PIEMONTE EMILIA ROMAGNA AND IN THE OTHER REGION WITHIN 24 H.

- ITHACA : Information Tecnology for Humanitarian Assistance- Politecnico di Torino
- CESMAR7- Centre for the Study of Materials for Restoration
- GEAmb- Seismology and Geophisics. University of Genoa

- CENTRO FABIO MANISCALCO- BLU SHIELD
- SIPBC- Italian Society for The Protection of Cultural Heritage- Blue Shield

- Frati e Livi – Soccorso Archivi
- COMPAGNIA UNICA- Harbour of Genoa
- Radio Club CB Genova Est - Associazione di Volontariato di Protezione Civile

OUR PARTNER

where you can find us?

Web site: WWW.CHIEF-ONLUS.IT and on FACEBOOK : CHIEF ONLUS

The event: Flood Genova





On site Survey





CHIEF
ALLUVIONE GENOVA
COMPAGNIA UNICA FRA I LAVORATORI DELLE MERCI VARIE DEL PORTO GENOVA


CHIEF


CHIEF


Our Courses
Sabato 10 settembre 2016
LA PROTEZIONE DEI BENI CULTURALI IN AREA DI CRISI


Our drills

Our Conference

EARTHQUAKES (2016) Centro Italia

MULTINATIONAL CIMIC GROUP (MNCG)

Multinational CIMIC Group is the NATO CIMIC specialized unit, projected for the civil-military cooperation at tactical and operational level. MNCG HQ can be tasked by SACEUR with Collective Defense Operations under Article 5 of the North Atlantic Treaty and Crisis Response Operations under non-Article 5 in support of peace and international security.

MNCG is envisaged to engage in the civil and military cooperation sphere giving full support to the NATO military Commanders. Furthermore MNCG provides a wide range of NATO basic CIMIC courses and is the venue for expertise and consultancy on civil-military cooperation at tactical and operational level, constantly in contact with different stakeholders such as Governmental Organizations(GOs), Non-Governmental' Organizations (NGOs), international Organizations (IOs) and Host Nation Authorities.

SOP CULTURAL PROPERTY PROTECTION

CP ASSESSMENT

COURSES FOR OFFICERS AND SOLDIERS

Progress activity report: Hatthaya SIRIPHATTHANAKUN (Thailand, ITC2013)

Increasing Recognition of Disaster Risk Management for Cultural Heritage in Thailand and Southeast Asia

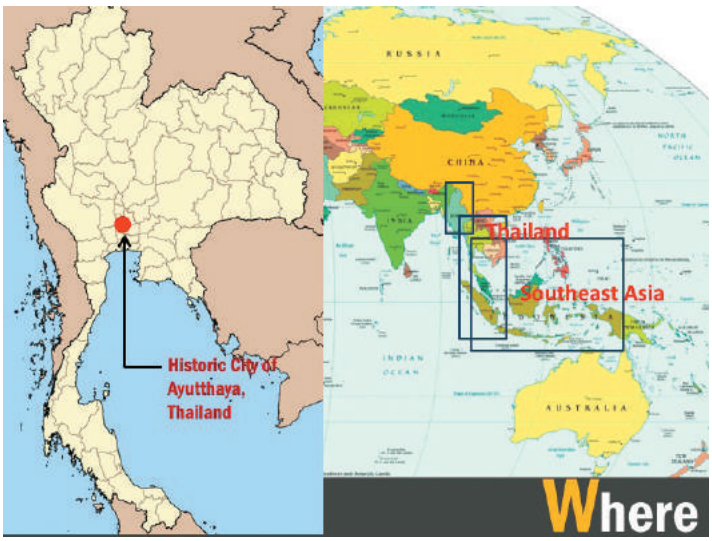
I am sharing my experience in disaster risk management for cultural heritage after attending International Training Course Institute of Disater Risk Mitigation for Urban Cultural Heritage, Ritsumeikan University (R-DMUCH) in 2013. It will comprise three parts as follow.

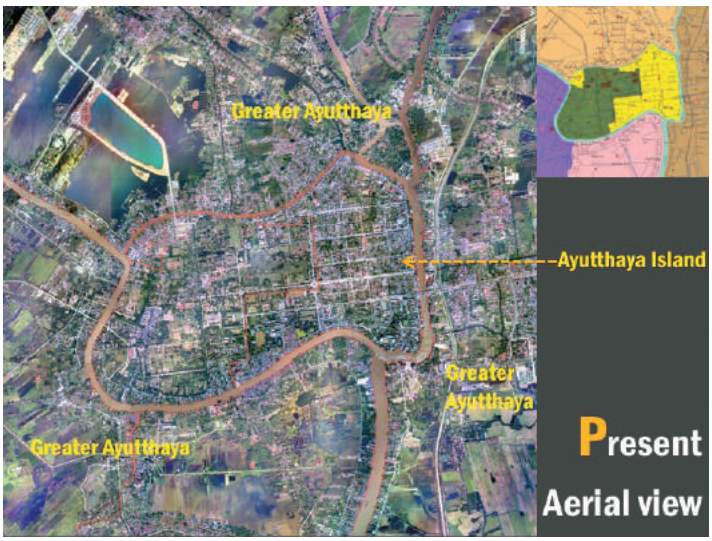
(1) Disaster Risk Management Plan for the Historic City of Ayutthaya, Thailand. The development, implementation and challenges of the project under the Fine Arts department, Ministry of Culture, Thailand will be explained to clarify why capacity building activities are intrinsic needed for Thailand and Southeast Asia region.

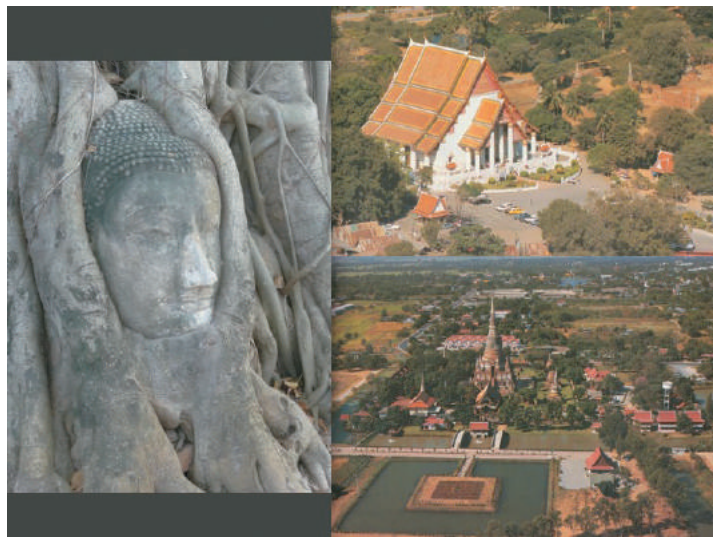
(2) Capacity building activity in order to advance the understanding in disaster risk management for cultural heritage. According to the content 1, I have been developing workshop/training course for conservation practitioners in Southeast Asia. This initiative is being carried forward as a five-year programme (2017/2018-2021/2022) of Southeast Asian Ministers of Education Organisation Regional Centre for Archaeology and Fine Arts (SEAMEO-SPAFA) in collaboration with Institute of Disater Risk Mitigation for Urban Cultural Heritage, Ritsumeikan University (R-DMUCH) and International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM). In April 2016, the consultative meeting to develop this workshop/ training course was held at Bangkok, Thailand. The presentation will also provide the result and progress of the meeting.

Promoting fundamental knowledge and concept of cultural heritage conservation in relation to disaster risk for school children. Additionally I will discuss a research project that focussed on other beneficiary groups. This project will be an example of how I attempt to adapt cultural heritage conservation and disaster risk management principles to the younger generation.

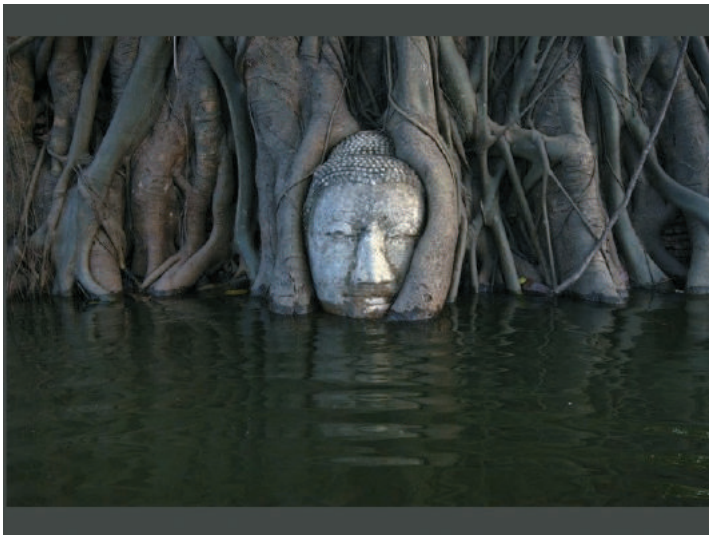

Outline
I. Disaster Risk Management Plan for the Historic City of Ayutthaya, Thailand.
II. Capacity building activity in order to advance the understanding in disaster risk management for cultural heritage.
III. Promoting fundamental knowledge and concept of cultural heritage conservation in relation to disaster risk for school community.

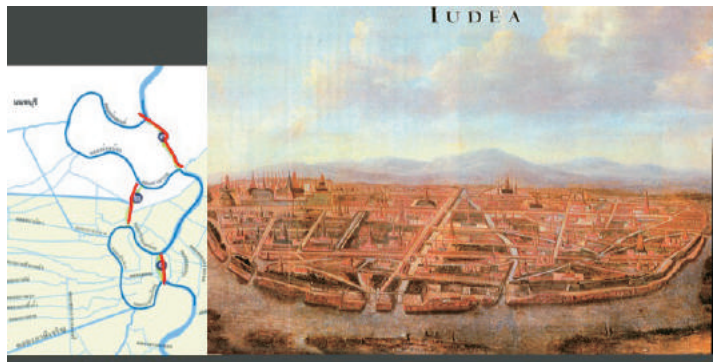

RUSSIA
CHINA
INDIA
INDIAN OCEAN
AUSTRALIA
Thailand
Southeast Asia
Historic City of Ayutthaya, Thailand
Where


Greater Ayutthaya
Ayutthaya Island
Greater Ayutthaya
Greater Ayutthaya
Present
Aerial view




Ayutthaya
Bangkok
October 2011



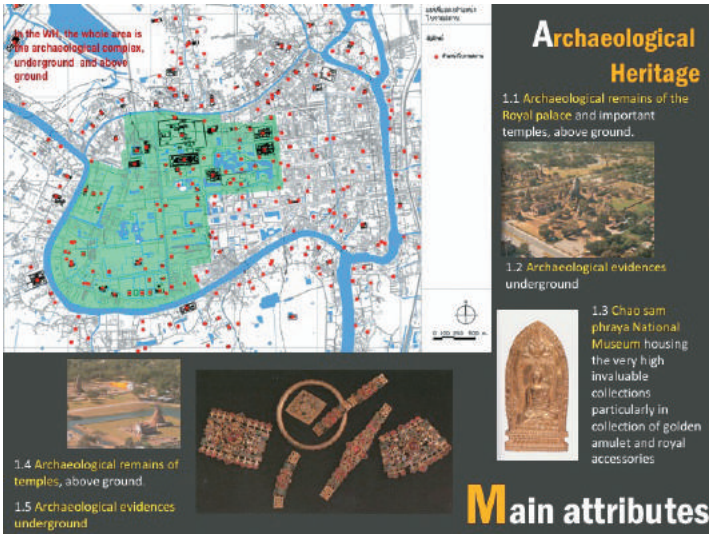


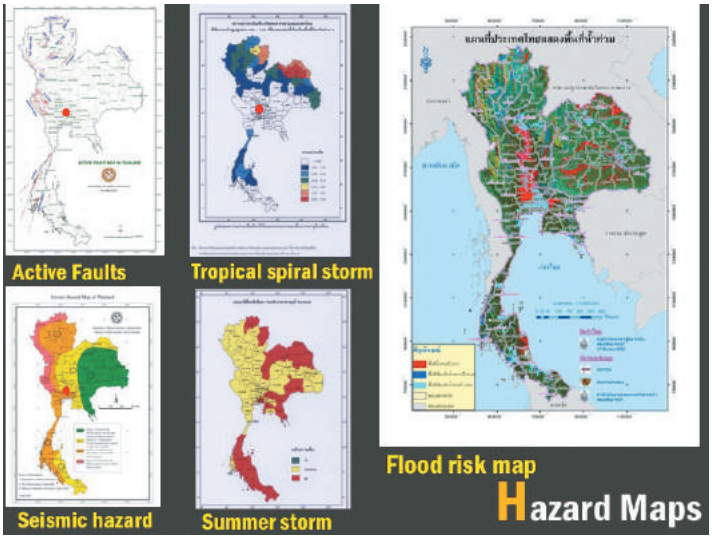
Well-known from contemporary sources and maps, Ayutthaya was laid out according to a **systematic and rigid city planning grid, consisting of roads, canals, and moats around all the principal structures.** The scheme took maximum advantage of the city's position in the midst of three rivers and had a **hydraulic system for water management which was technologically extremely advanced and unique in the world.**

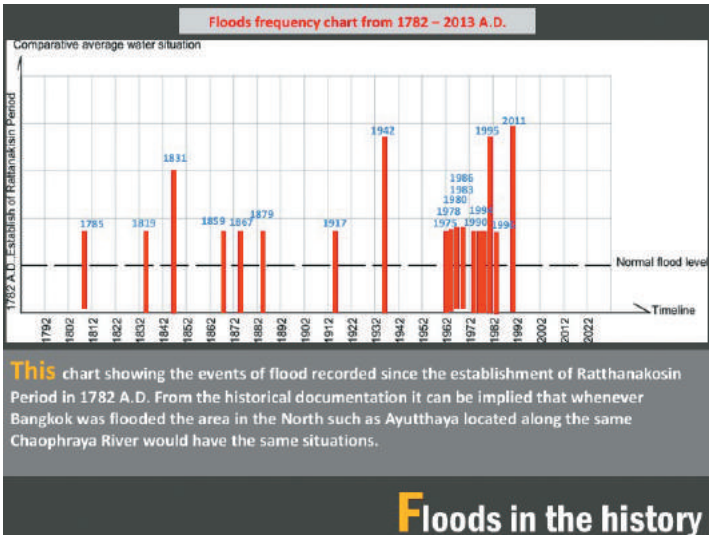
Statement of Outstanding Universal Value

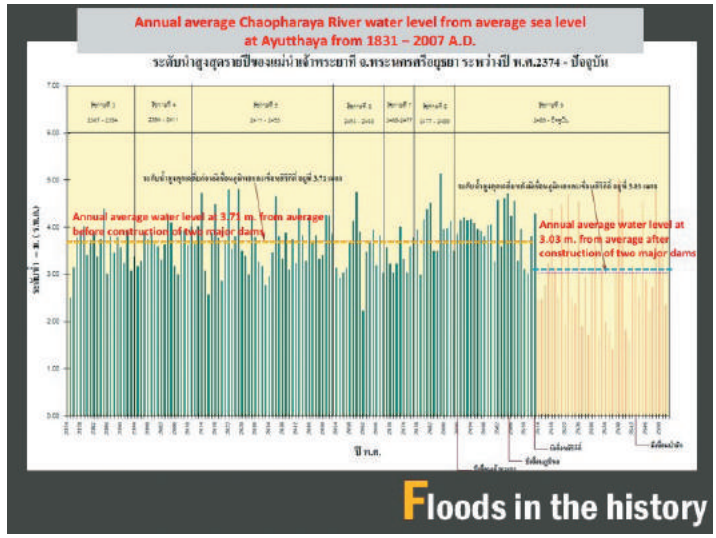
Values assessment

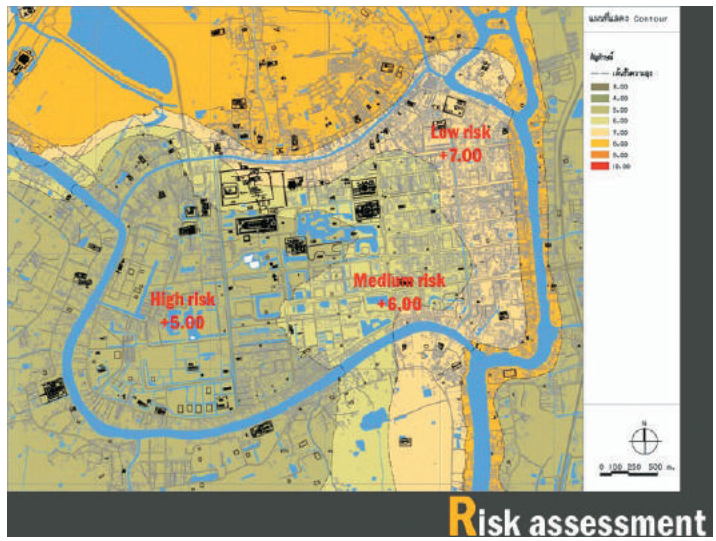
Significance	Attributes	Contribution of Attribute to Significance of Property
The world's largest and most cosmopolitan urban areas and a center of global diplomacy and commerce	1. Location-an island surrounded by 3 rivers connecting the city to the sea 2. Extensive archaeological site the remains of tall *prang* and Buddhist monasteries	1.Very high (Urban Heritage) 2.Very high (Archaeology Heritage)
Water management which was technologically extremely advanced and unique in the world.	1.Systematic and rigid city planning grid, consisting of roads, canals, and moats around all the principal structures	1.Very high (Urban Heritage)
Ingenuity and the creativity of the Ayutthaya civilization as well as its ability to assimilate a multitude of foreign influences	1.The surviving art in the architectural ruins. 2.The large palaces and the Buddhist monasteries	1.Very high (Architecture/Intangible Heritage) 2.Very high (Architecture /Intangible Heritage)
Emulation the perfection of the mythical city of Ayodhaya	1.Pattern of urban replication is in keeping with the urban planning concept (Bangkok)	1.Very high (Urban Heritage)

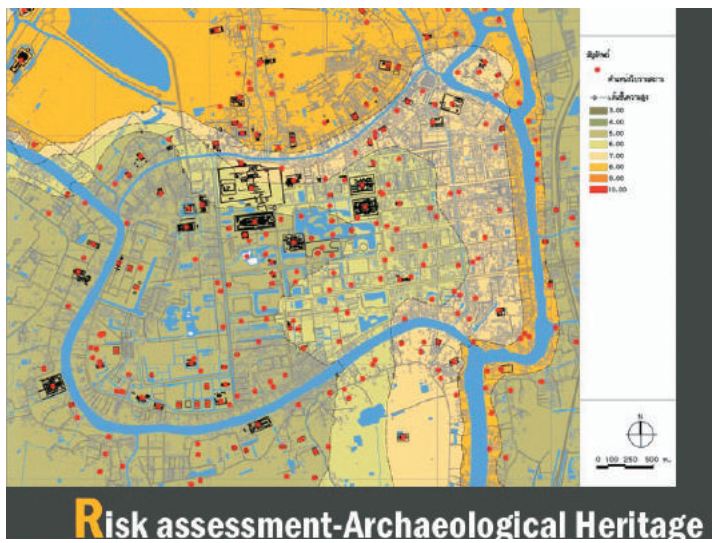

In the WH, the whole area is define archaeological complex, underground and above ground
Archaeological Heritage
1.1 Archaeological remains of the Royal palace and important temples, above ground.
1.2 Archaeological evidences underground
1.3 Chao sam phraya National Museum housing the very high invaluable collections particularly in collection of golden amulet and royal accessories
1.4 Archaeological remains of temples, above ground.
1.5 Archaeological evidences underground
Main attributes

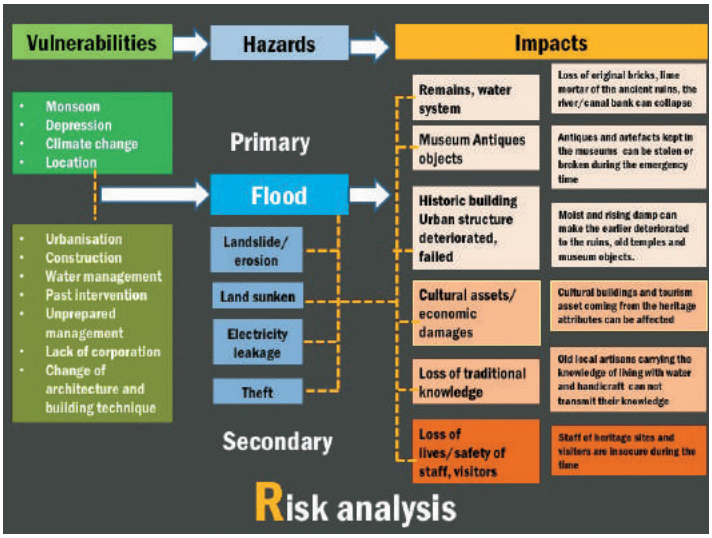

Active Faults
Tropical spiral storm
Flood risk map
Seismic hazard
Summer storm
Hazard Maps

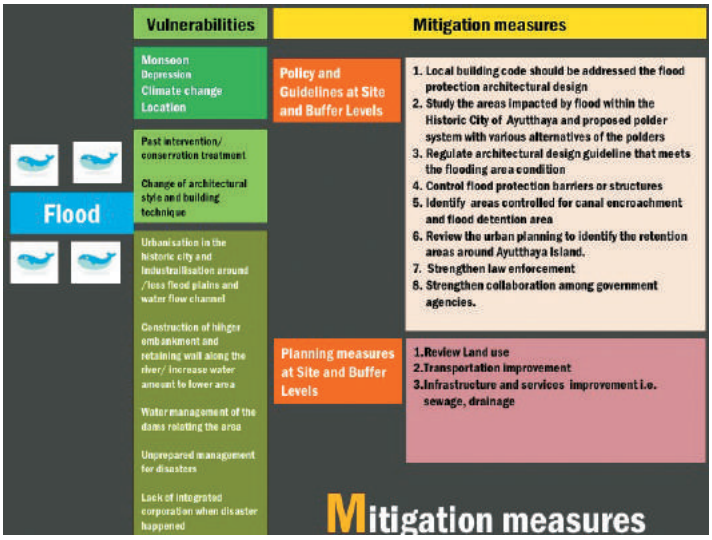

Floods frequency chart from 1782 – 2013 A.D.
Comparative average water situation
1782 A.D. - Establish of Rattanakosin Period
Normal flood level
Timeline
1785
1819
1831
1859
1867
1879
1917
1942
1975
1978
1980
1983
1986
1990
1995
2011
This chart showing the events of flood recorded since the establishment of Ratthanakosin Period in 1782 A.D. From the historical documentation it can be implied that whenever Bangkok was flooded the area in the North such as Ayutthaya located along the same Chaophraya River would have the same situations.
Floods in the history

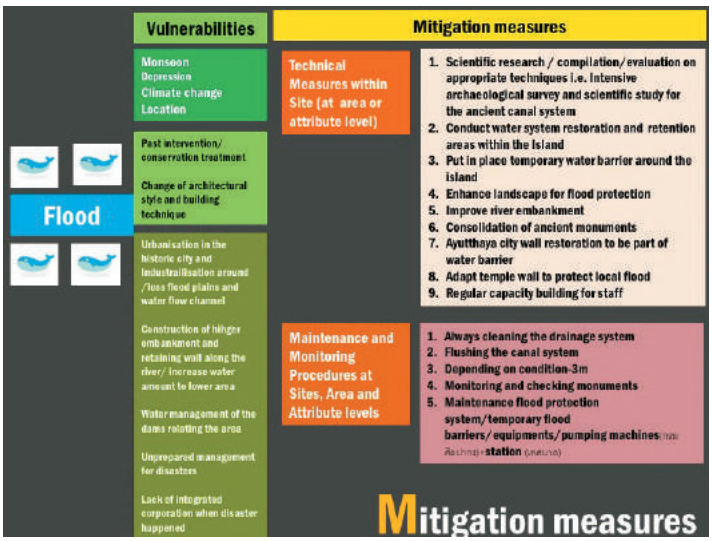

Annual average Chaopharaya River water level from average sea level
at Ayutthaya from 1831 – 2007 A.D.
ระดับน้ำสูงสุดรายปีของแม่น้ำเจ้าพระยาที่ จ.พระนครศรีอยุธยา ระหว่างปี พ.ศ.2374 - ปัจจุบัน
Annual average water level at 3.71 m. from average before construction of two major dams
Annual average water level at 3.03 m. from average after construction of two major dams
ปี พ.ศ.
Floods in the history


Low risk
+7.00
Medium risk
+6.00
High risk
+5.00
Risk assessment


Risk assessment-Archaeological Heritage


Vulnerabilities
Hazards
Impacts
Monsoon
Depression
Climate change
Location
Primary
Flood
Urbanisation
Construction
Water management
Past intervention
Unprepared management
Lack of corporation
Change of architecture and building technique
Landslide/ erosion
Land sunken
Electricity leakage
Theft
Secondary
Remains, water system
Loss of original bricks, lime mortar of the ancient ruins, the river/canal bank can collapse
Museum Antiques objects
Antiques and artefacts kept in the museums can be stolen or broken during the emergency time
Historic building Urban structure deteriorated, failed
Moist and rising damp can make the earlier deteriorated to the ruins, old temples and museum objects.
Cultural assets/ economic damages
Cultural buildings and tourism asset coming from the heritage attributes can be affected
Loss of traditional knowledge
Old local artisans carrying the knowledge of living with water and handicraft can not transmit their knowledge
Loss of lives/safety of staff, visitors
Staff of heritage sites and visitors are insecure during the time
Risk analysis


Vulnerabilities
Mitigation measures
Monsoon
Depression
Climate change
Location
Past intervention/ conservation treatment
Change of architectural style and building technique
Flood
Urbanisation in the historic city and Industrialisation around /loss flood plains and water flow channel
Construction of hihger embankment and retaining wall along the river/ increase water amount to lower area
Water management of the dams relating the area
Unprepared management for disasters
Lack of integrated corporation when disaster happened
Policy and Guidelines at Site and Buffer Levels
1. Local building code should be addressed the flood protection architectural design
2. Study the areas impacted by flood within the Historic City of Ayutthaya and proposed polder system with various alternatives of the polders
3. Regulate architectural design guideline that meets the flooding area condition
4. Control flood protection barriers or structures
5. Identify areas controlled for canal encroachment and flood detention area
6. Review the urban planning to identify the retention areas around Ayutthaya Island.
7. Strengthen law enforcement
8. Strengthen collaboration among government agencies.
Planning measures at Site and Buffer Levels
1.Review Land use
2.Transportation improvement
3.Infrastructure and services improvement i.e. sewage, drainage
Mitigation measures


Vulnerabilities
Mitigation measures
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Urbanisation in the historic city and Industrialisation around /loss flood plains and water flow channel
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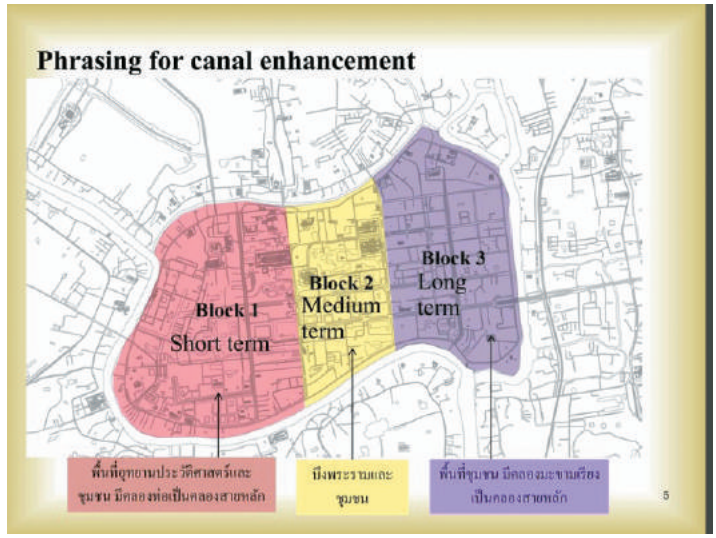
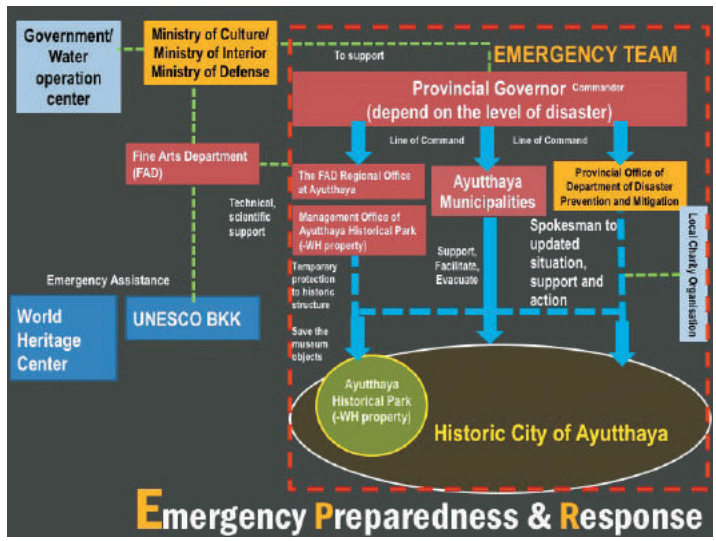
Water management of the dams relating the area
Unprepared management for disasters
Lack of integrated corporation when disaster happened
Technical Measures within Site (at area or attribute level)
1. Scientific research / compilation/ evaluation on appropriate techniques i.e. Intensive archaeological survey and scientific study for the ancient canal system
2. Conduct water system restoration and retention areas within the Island
3. Put in place temporary water barrier around the island
4. Enhance landscape for flood protection
5. Improve river embankment
6. Consolidation of ancient monuments
7. Ayutthaya city wall restoration to be part of water barrier
8. Adapt temple wall to protect local flood
9. Regular capacity building for staff
Maintenance and Monitoring Procedures at Sites, Area and Attribute levels
1. Always cleaning the drainage system
2. Flushing the canal system
3. Depending on condition-3m
4. Monitoring and checking monuments
5. Maintenance flood protection system/temporary flood barriers/ equipments/pumping machines
station
Mitigation measures


Phrasing for canal enhancement
Block 1
Short term
Block 2
Medium
term
Block 3
Long
term
พื้นที่อุทยานประวัติศาสตร์และ
ชุมชน มีคลองท่อเป็นคลองสายหลัก
บึงพระรามและ
ชุมชน
พื้นที่ชุมชน มีคลองมะขามเรียง
เป็นคลองสายหลัก
5


Government/
Water
operation
center
Ministry of Culture/
Ministry of Interior
Ministry of Defense
To support
EMERGENCY TEAM
Provincial Governor Commander
(depend on the level of disaster)
Line of Command
Line of Command
Fine Arts Department
(FAD)
The FAD Regional Office
at Ayutthaya
Ayutthaya
Municipalities
Provincial Office of
Department of Disaster
Prevention and Mitigation
Technical,
scientific
support
Management Office of
Ayutthaya Historical Park
(-WH property)
Support,
Facilitate,
Evacuate
Spokesman to
updated
situation,
support and
action
Local Charity Organisation
Emergency Assistance
Temporary
protection
to historic
structure
World
Heritage
Center
UNESCO BKK
Save the
museum
objects
Ayutthaya
Historical Park
(-WH property)
Historic City of Ayutthaya
Emergency Preparedness & Response


How to implement


SEAMEO Regional Center for Archaeology and Fine Arts SPAFA
Archaeology
Cultural Heritage
Fine arts
Advancing Archaeology in Southeast Asia
Conservation in the Tropics
Sacred Universe
Initiative on Disaster Risk Management for SEA Cultural Heritage


Consultative Meeting on Developing Capacity-Building Disaster Risk Management for Southeast Asian Cultural Heritage
19th - 21st April 2016, Bangkok
Initiated series of training workshops on Disaster Risk Management for Southeast Asian Cultural Heritage.
Memorandum of Understanding concluded among SEAMEO SPAFA, R-DMUCH, and ICCROM
21 participants including experts from Ritsumeikan University, ICCROM, 6 SEAMEO Member Countries, UNESCO Bkk and Asian Disaster Prepared Center (ADPC).

Activities

Activities

1. Presentations from 6 SEAMEO member countries
2. Brainstorming discussion
3. Site visits
   - Heritage Corridor of Banglumphoo Community
   - Chaophraya Development Project

Outcome

1. **ESTABLISHED** framework for training workshop on disaster risk management for Southeast Asian cultural heritage starting from 2017/2018 3- 2021/2022
2. **DEVELOPED** Southeast Asian network for collaborative disaster risk management.

Research on School-based Approach in Promoting Disaster Risk Mitigation for Cultural Heritage

Beneficiaries

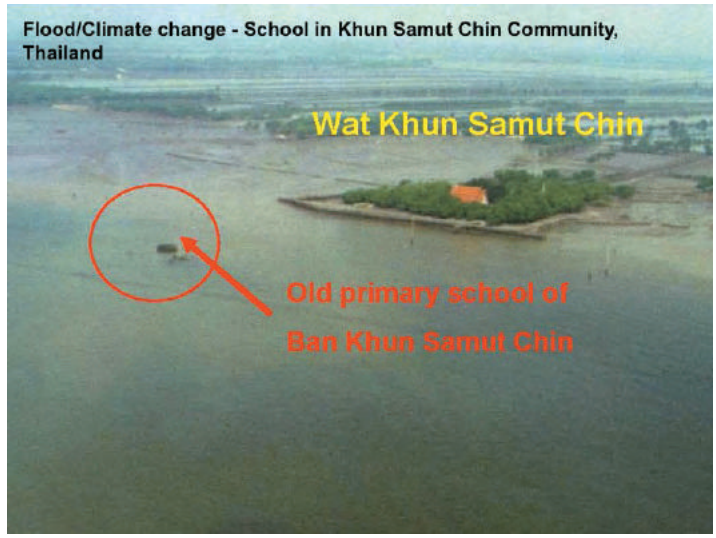
School children
Teachers and school staff
Communities surrounding

Methodology

Year 1 Desk-based study using SEAMEO INNOTECH project on Emergency Situations for SE Asian School Heads
Year 2 Training school children in selected countries as case studies
Year 3 Educational materials to be produced and tested then re-evaluation (if needed)

SEAMEO – 7 PRIORTY EDUCATION AGENDA (2015-2030)
Priority 3 Resiliency in the face of emergencies (e.g., conflicts, extreme weather and natural disasters

Fire- Kampong school(s) in Kampong Ayer, Brunei Darussalam



SUSTAINABILITY

This project will build the fundamental understanding and awareness of children in their cultural heritage as well as the necessity of the protection from disasters through the distribution of output of this project including educational tools, manuals or guidelines. As a result we can ensure that our next generation will be ready to receive the heritage we preserve and pass it to them.

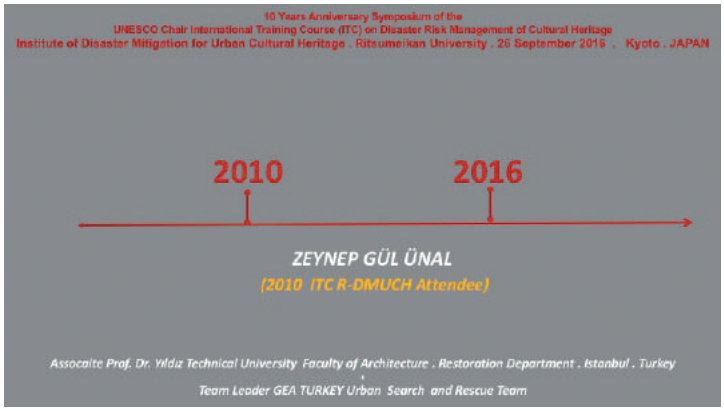
Progress activity report: Zeynep GUL UNAL (Turkey, ITC2010)

As a result of this session, participants should be able to:

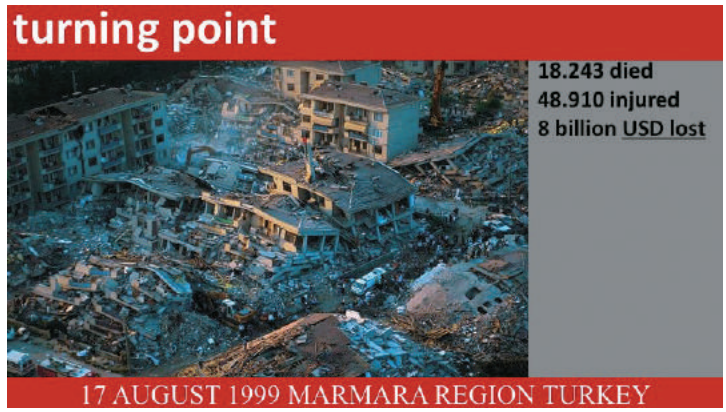
- Importance of First Response to Cultural Heritage in Golden Hours
- Main points of bringing different organizations and professions together under a single initiative for increasing the resilience of historic sites, building and users in case of a disaster
- Identifying institutions working during different phases of a disaster management
- Lessons taken from the disaster response phase; Nepal Earthquake Case

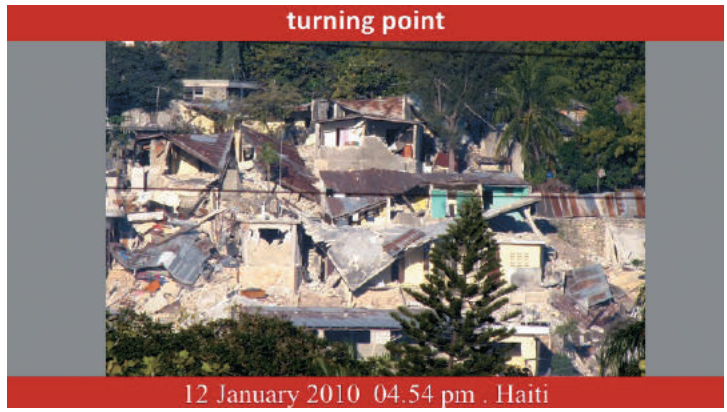
The topics below will be introduced in the speech.

- Short information regarding YouCanRescue Heritage Initiative and It's latest projects; Exhibition in UN Fist World Humanitarian Summit, UNESCO 40Th WHC, Heritage in My Memory, B-Care (CHWB) Course-Albania.
- Representing disaster response stage with various examples
- Roles of architectural design, urban planning, heritage conservation and designers of these disciplines for disaster risk mitigation
- Giving a message to the society via the project and perception control

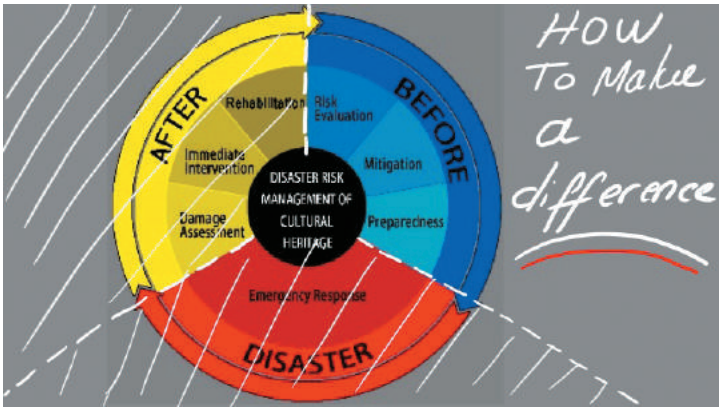



2010
2016


turning point
18.243 died
48.910 injured
8 billion USD lost
17 AUGUST 1999 MARMARA REGION TURKEY

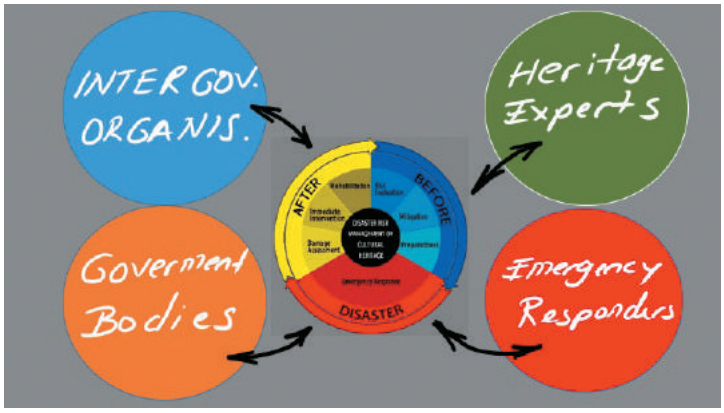

turning point
12 January 2010 04.54 pm . Haiti

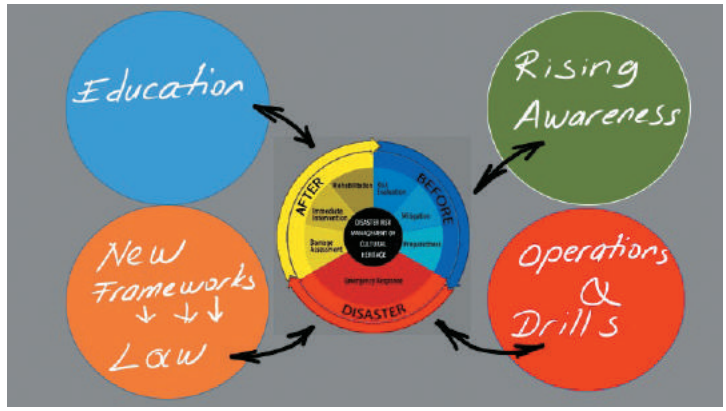

ITC 2010 . DMUCH . Kyoto . Japan

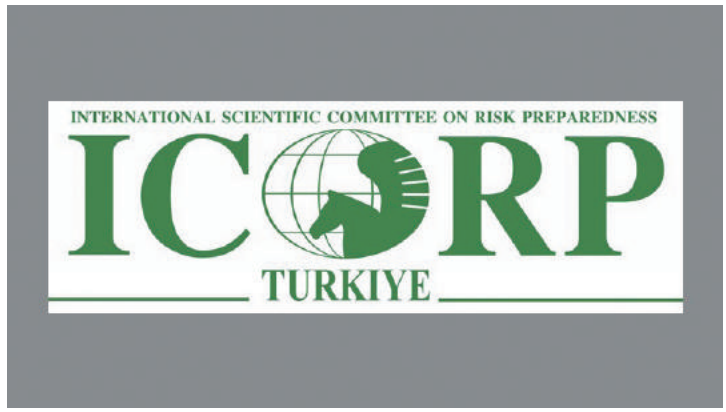

How
To Make
a
difference
AFTER
BEFORE
DISASTER
Rehabilitation
Risk Evaluation
Immediate Intervention
Mitigation
Damage Assessment
Preparedness
Emergency Response
DISASTER RISK MANAGEMENT OF CULTURAL HERITAGE


New Vision
DRM on Cultural Heritage
Expert network - DRM CH
CAMARADE

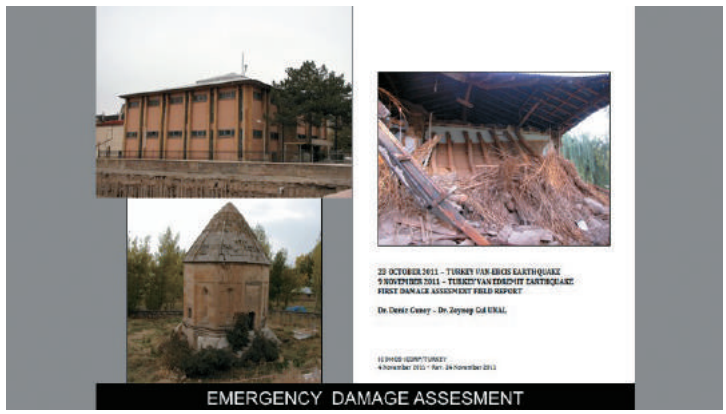

WE!
. ICORP . GEA SAR . YTU
. UNESCO TR . ICOMOS_TR


INTER GOV. ORGANIS.
Heritage Experts
Government Bodies
Emergency Responders
AFTER
BEFORE
DISASTER


Education
Rising Awareness
New Frameworks
Law
Operations & Drills
AFTER
BEFORE
DISASTER


INTERNATIONAL SCIENTIFIC COMMITTEE ON RISK PREPAREDNESS
ICORP
TURKIYE


HUMAN SEARCH AND RESCUE OPERATION STAGE GFA SAR ARCHIVE OC 2011


EMERGENCY DAMAGE ASSESMENT

2012 - Ph D. COURSE

Disaster Risk Management on Cultural Heritage

YTÜ . ISTANBUL

- 15 week x 4 = 60 Hour
- 35 Students
- 2 master thesis
- 3 Ph.D. Thesis
- Papers - Articles

HERITAGE & RISK SYMPOSIUM – ICORP . YTÜ . IPKB 2012

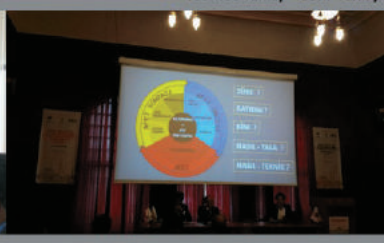
DISASTER MANAGEMENT STRATEGY PAPER OF TURKEY 2015

1. Prevent Loss of Life
2. Reduce the Number of Effeceted Population
3. Reduce the Economic Loss
4. Protect Cultural Heritage and Critical Infrastructue

GUIDELINE FOR EARTHQUAKE RISK MANAGEMENT OF ARCHITECTURAL HERITAGE 2016 -2017

Non heritage Legal Frameworks is effect the heritage

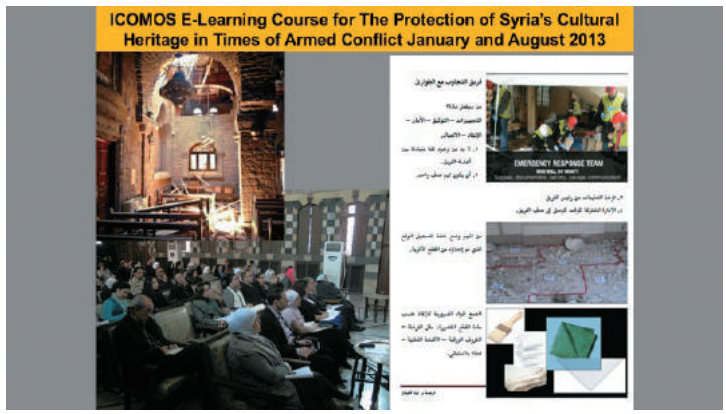
Turkis Ministry of Culture and Tourism
Turkish Prime Ministry Directorate General of Foundations
IPKB – Governor of Istanbul Project Coordination Unit
ICOMOS Turkey - ICORP Turkey

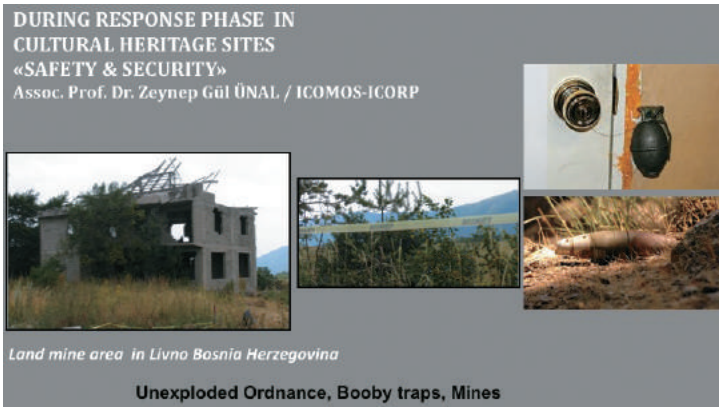


March 2016 September 2016

COLLABORATION OF

HERITAGE EXPERTS - EMERGENY RESPONDERS - SECURITY EXPERTS




DURING RESPONSE PHASE IN
CULTURAL HERITAGE SITES
«SAFETY & SECURITY»
Assoc. Prof. Dr. Zeynep Gül ÜNAL / ICOMOS-ICORP
Land mine area in Livno Bosnia Herzegovina
Unexploded Ordnance, Booby traps, Mines

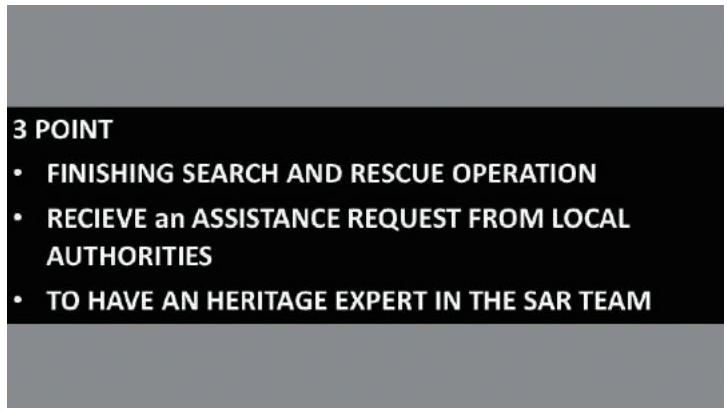

Balkan Flood Operation . 2014 (GEA SAR Archive)


Balkan Flood . May 2014
Death : 40 , Affected Population : 1.000.000.000
Photos & Videos GEA SAR Archive . May 2014 .


Photos & Videos GEA SAR Archive . May 2014 . Z.G.Ünal – U. Dinçsoken . GEA SAR - ICORP


COLLABORATION - Bosnia & Herzegovina Civil Defence - GEA SAR
Experience Sharing
Bosnia & Herzegovina Civil Defence
GEA SAR August 15-16 2014
Experience Sharing
Bosnia & Herzegovina Civil Defence
GEA SAR August 30 2014
CURRENT SITUATION
Mine Awareness – Mr. Suad Baljak
Special Conditions & Sensitivities in SAR Operatons
Hertiage Sites and Buildings - Zeynep Gül Ünal


kazazede ihbarı alındı ve
gidilerek çalışmalara başl
6 saat süren kurtarma çal
27 Nisan sabah saat 03:0
Bikram Chepang Deprem
enkazdan canlı olarak kur
At around 09:00 p.m a possi
reported in the Sitapalla reg
rescue operation immediate
site.
After a 6 hour rescue operat
Bikram Chepang was rescue
rubble in the morning of Apr
39 hours after the earthquak
NEPAL GORKHA EARTHQUAKE OPERATION 2015 (GEA SAR Archive)

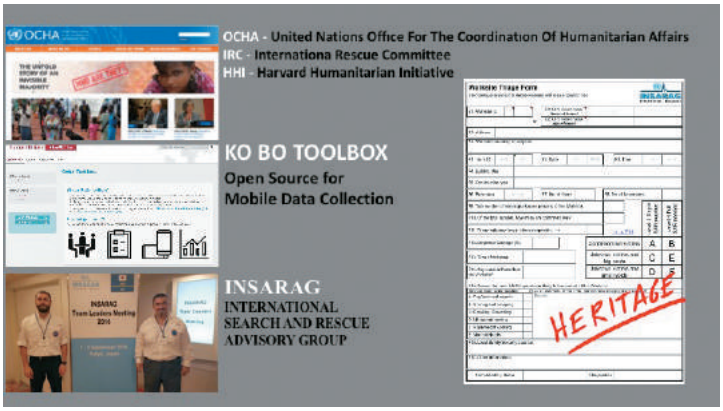

3 POINT
• FINISHING SEARCH AND RESCUE OPERATION
• RECIEVE an ASSISTANCE REQUEST FROM LOCAL AUTHORITIES
• TO HAVE AN HERITAGE EXPERT IN THE SAR TEAM


CULTURAL HERITAGE WITHOUT BORDERS ALBAIAN B-CARE . Training 2016
Resource Persons : Kadir Erkan, Mehmet Ünal , Zeynep Gül Ünal (ICORP Turkey&GEA SAR)


TOILET IS
DAMAGED
DUE TO
EARTHQUAKE


CULTURAL HERITAGE WITHOUT BORDERS ALBAIAN B-CARE Training . 2016
ITC 2010
ITC 2016
ITC 2014
ITC 2014


77.th GEA SEARCH AND RESCUE GROUP INTERNATIONAL DRILL
AUGUST 2016 ISTABUL TURKEY - TURKEY . JAPAN . TAIWAN
We think Italy and Myanmar GEA SAR


OCHA - United Nations Office For The Coordination Of Humanitarian Affairs
IRC - Internationa Rescue Committee
HHI - Harvard Humanitarian Initiative
KO BO TOOLBOX
Open Source for
Mobile Data Collection
INSARAG
INTERNATIONAL
SEARCH AND RESCUE
ADVISORY GROUP
HERITAGE


AWARENESS RISING


POWER OF COLLABORATION
YOUCANRESCUE INITIATIVE
YCR Exhibition Opening . Ankara
President of Republic of Turkey Prime Ministry Disaster Emergency Management Presidency*

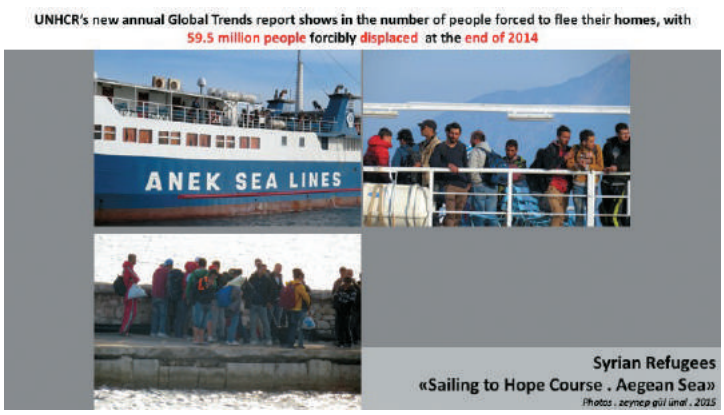

KURTARABİLİRSİNİZ
YOUCANRESCUE
WES LEY CHEEK . TULANE UNIVERSITY

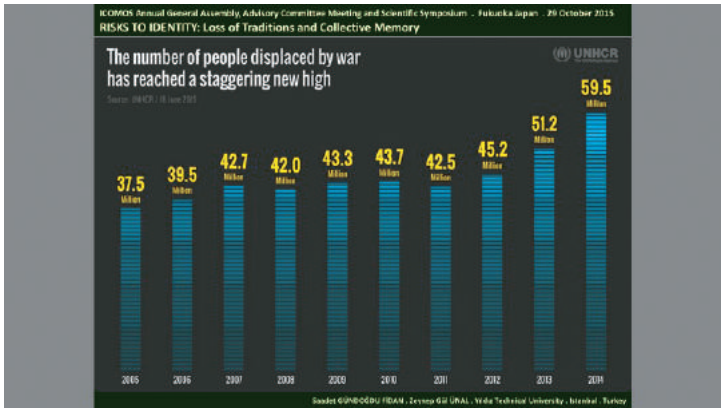

KURTARABİLİRSİNİZ
YOUCANRESCUE


YOUCANRESCUEHERITAGE
SENDAI 2015

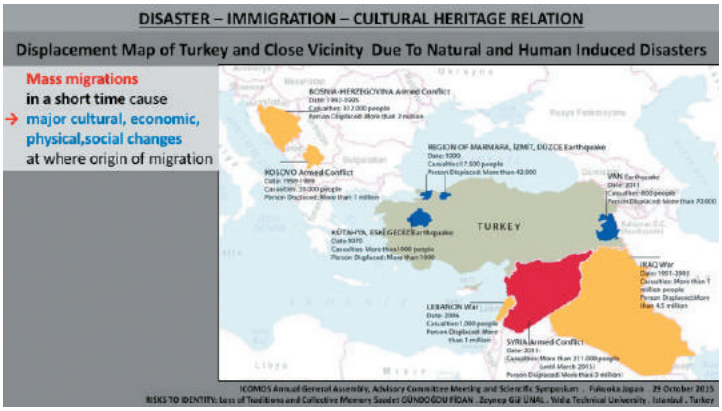

YOUCANRESCUEHERITAGE
2nd International Children's City Congress
Marmara Municipalities Union . 29 April 2016 . Istanbul . TURKEY
WORKSHOP
Our Cultural Heritage ... Our Collective Memory
ذاكرتنا ... تراثنا الثقافي
المشتركة


By the end of the World War II more than 20 million people had been displaced.
ICOMOS Annual General Assembly, Advisory Committee Meeting and Scientific Symposium . Fukuoka Japan . 29 October 2015
RISKS TO IDENTITY: Loss of Traditions and Collective Memory Saadet GÜNDOĞDU FİDAN . Zeynep Gül ÜNAL . Yıldız Technical University . Istanbul . Turkey

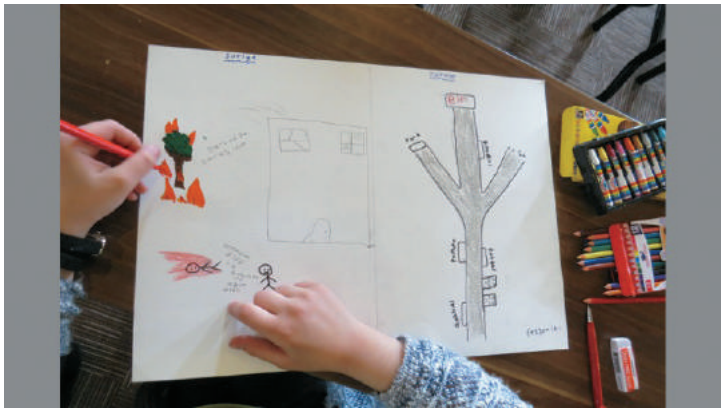

UNHCR's new annual Global Trends report shows in the number of people forced to flee their homes, with 59.5 million people forcibly displaced at the end of 2014
ANEK SEA LINES
Syrian Refugees
«Sailing to Hope Course . Aegean Sea»
Photos . zeynep gül ünal . 2015


ICOMOS Annual General Assembly, Advisory Committee Meeting and Scientific Symposium . Fukuoka Japan . 29 October 2015
RISKS TO IDENTITY: Loss of Traditions and Collective Memory
The number of people displaced by war has reached a staggering new high
UNHCR
37.5 Million
39.5 Million
42.7 Million
42.0 Million
43.3 Million
43.7 Million
42.5 Million
45.2 Million
51.2 Million
59.5 Million
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Saadet GÜNDOĞDU FİDAN . Zeynep Gül ÜNAL . Yıldız Technical University . Istanbul . Turkey

More than four million people have migrate from Syria since the start of the conflict, most of them women and children. It is one of the largest refugee exoduses in recent history.


DISASTER – IMMIGRATION – CULTURAL HERITAGE RELATION
Displacement Map of Turkey and Close Vicinity Due To Natural and Human Induced Disasters
Mass migrations
in a short time cause
major cultural, economic,
physical,social changes
at where origin of migration
TURKEY
ICOMOS Annual General Assembly, Advisory Committee Meeting and Scientific Symposium - Fukuoka Japan - 29 October 2015
RISKS TO IDENTITY: Loss of Traditions and Collective Memory Soudet CUNDIOGLU FIDAN . Zeynep Gül ÜNAL . Yıldız Technical University . Istanbul . Turkey


Our Cultural Heritage ... Our Collective Memory
تراثنا الثقافي ... ذاكرتنا المشتركة



YOUCANRESCUEHERITAGE

UNESCO . WORLD HERITAGE YOUTH FORUM 2016
JUNE 2016 . TURKEY

WORKSHOP
WARS OVER WATER & WATER HERITAGE
AT THE HISTORICAL CENTER OF
21st CENTURY CITIES

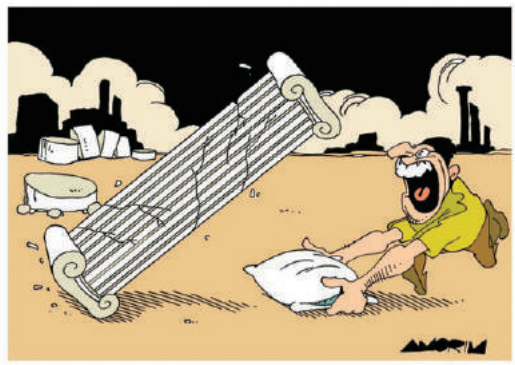

© Alamy
INTANGIBLE HERITAGE WATER


DRY
UP!
AUGUST 1989
AUGUST 2008
LAKE ARAL


DOES PROTECTING THE CULTURAL HERITAGE
HELP / SUPPORT
PROTECTING THE NATURAL WATER SOURCES?

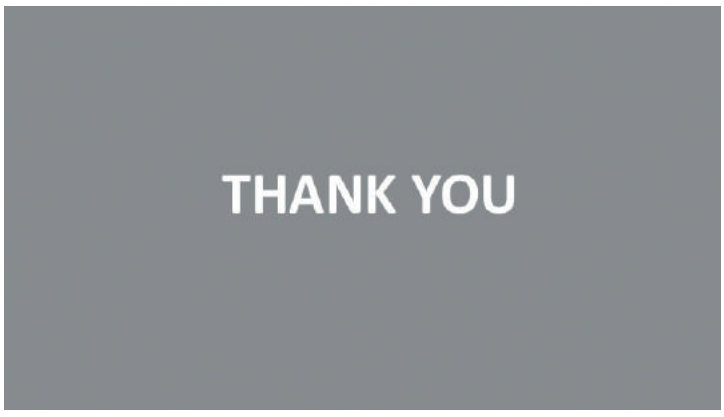

YOUCANRESCUEHERITAGE
CULTURAL HERITAGE
is increasingly at risk from natural and human induced disasters
YOUCANRESCUE
is helping to protect cultural heritage through disaster preparedness, mitigation, response and recovery
YOUCANRESCUE HERITAGE
is an initiative launched by
ICOMOS - ICORP
ICORP TURKEY
GEA SAR TURKEY
YTU ICUS
aimed at raising awareness for protecting our cultural heritage from disasters by taking proactive actions
UNESCO 40th Session of the Committee

INTERNATIONAL CARTOON FESTIVAL 2016 . «HERITAGE AT RISK»
YENİ YÜKSEKTEPE . GEA SAR . UNESCO TURKEY




terrorism
conflict


27 APRIL 2015 . Gongabu Balaju KATHMANDU NEPAL
21-year-old John Keisi was contacted in the debris after the day-long work and the first medical aid was provided in the debris. After 13 hour rescue operation, he was rescued alive from the rubble at 02:05 a.m. local time, 62 hours after the earthquake.

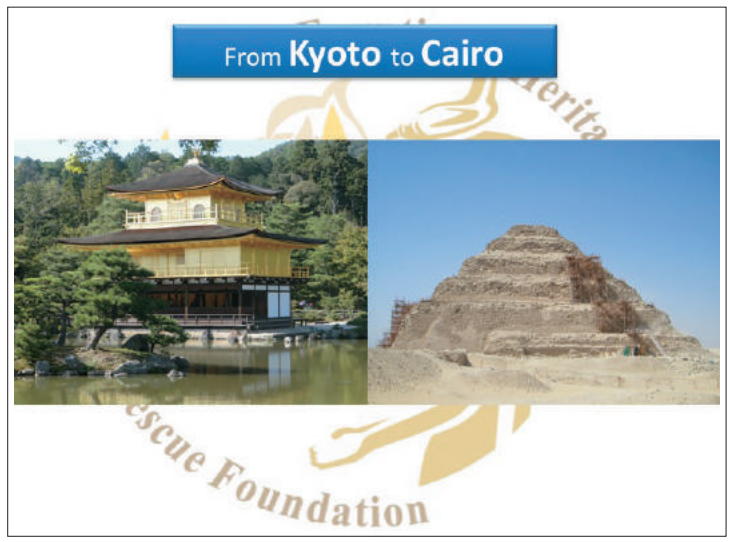

THANK YOU

Progress activity report: Abdelhamid SAYED (Egypt, ITC2014)

ITC was a starting point for me to spread the valuable knowledge that each participants gain by participating in this great course and collecting information and tips from each resource person to construct his/her case study project back home. Starting from developing the DRM plan for Historic Cairo that I drafted within the course and disseminating this experience to other sites in Egypt such as Tuna el-Gabal and Pharaonic Island and to establish the Department of Disaster Risk Management for Heritage in the Ministry of Antiquities for the first time are some of the achievements following my participation in the ITC.

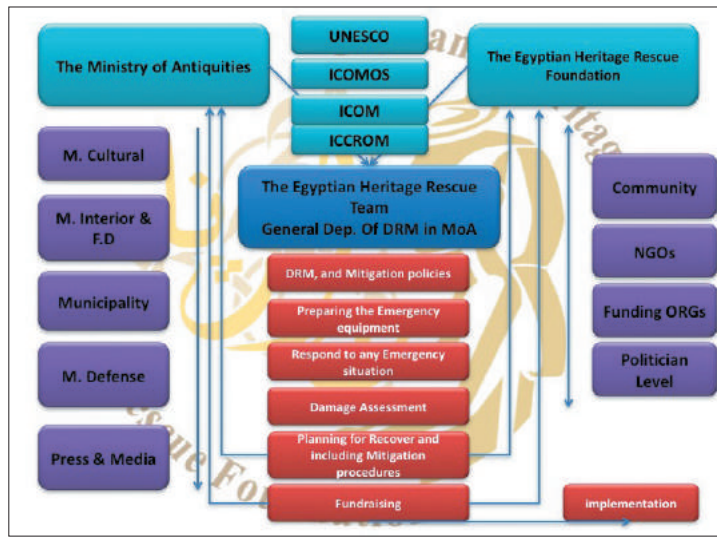
From Kyoto to Cairo, many benchmarks have been established to transfer the knowledge of DRM through this course. The first benchmark was enhancing the capacity of the Egyptian Heritage Rescue Team to develop DRM plans in other sites in Egypt, another benchmark was in Tunis to share that knowledge with other colleagues from Libya as well as in Erbil, Kurdistan – Iraq to build the capacity for colleagues from the Iraq region. And another stop was in Namibia to train colleagues from 7 countries in Africa present nine WHS and to work with them closely to draft DRM for their respective sites.

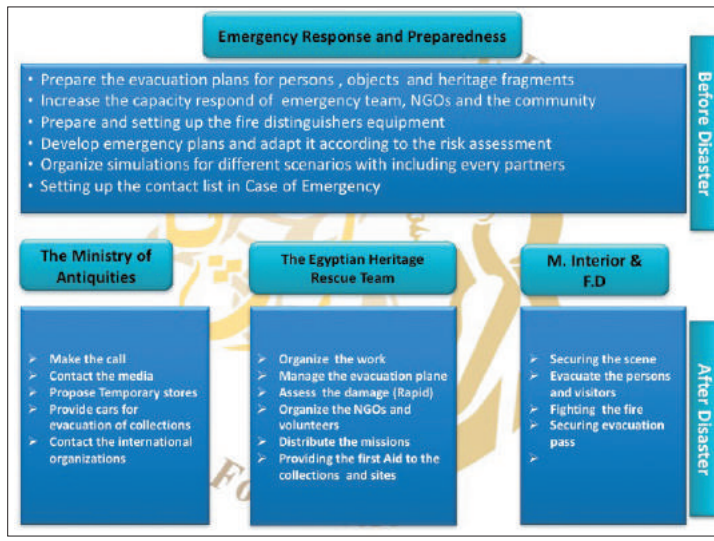
Finally, ITC is not just a course for providing knowledge; it empowers us to protect our Heritage.

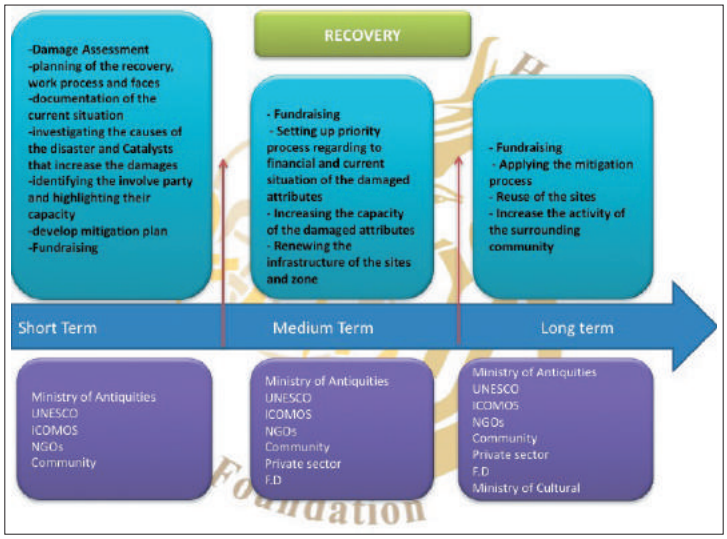



ITC
2014
Members
of great
ITC family


Stops after Kyoto (Responsibilities)
First: Starting the Disaster Risk Management Department in the Ministry of Antiquities


The Ministry of Antiquities
UNESCO
ICOMOS
ICOM
ICCROM
The Egyptian Heritage Rescue Foundation
M. Cultural
M. Interior & F.D
Municipality
M. Defense
Press & Media
The Egyptian Heritage Rescue Team
General Dep. Of DRM in MoA
DRM, and Mitigation policies
Preparing the Emergency equipment
Respond to any Emergency situation
Damage Assessment
Planning for Recover and including Mitigation procedures
Fundraising
implementation
Community
NGOs
Funding ORGs
Politician Level

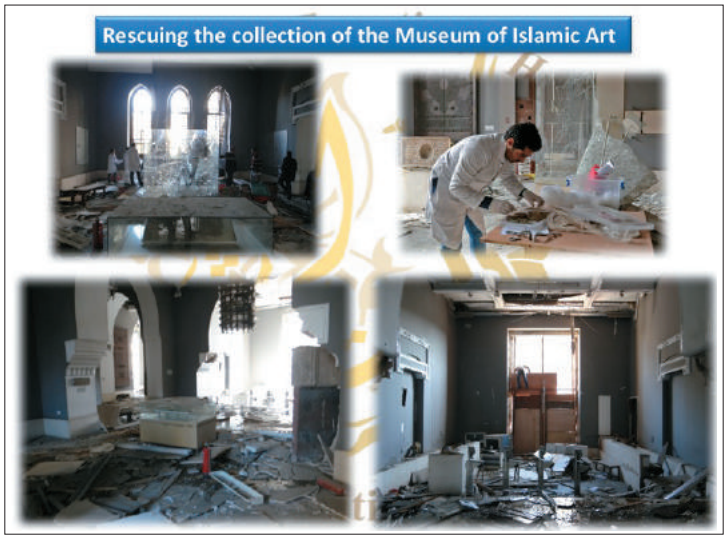

Emergency Response and Preparedness
• Prepare the evacuation plans for persons , objects and heritage fragments
• Increase the capacity respond of emergency team, NGOs and the community
• Prepare and setting up the fire distinguishers equipment
• Develop emergency plans and adapt it according to the risk assessment
• Organize simulations for different scenarios with including every partners
• Setting up the contact list in Case of Emergency
Before Disaster
The Ministry of Antiquities
The Egyptian Heritage Rescue Team
M. Interior & F.D
Make the call
Contact the media
Propose Temporary stores
Provide cars for evacuation of collections
Contact the international organizations
Organize the work
Manage the evacuation plane
Assess the damage (Rapid)
Organize the NGOs and volunteers
Distribute the missions
Providing the first Aid to the collections and sites
Securing the scene
Evacuate the persons and visitors
Fighting the fire
Securing evacuation pass
After Disaster


RECOVERY
-Damage Assessment
-planning of the recovery, work process and faces
-documentation of the current situation
-investigating the causes of the disaster and Catalysts that increase the damages
-identifying the involve party and highlighting their capacity
-develop mitigation plan
-Fundraising
- Fundraising
- Setting up priority process regarding to financial and current situation of the damaged attributes
- Increasing the capacity of the damaged attributes
- Renewing the infrastructure of the sites and zone
- Fundraising
- Applying the mitigation process
- Reuse of the sites
- Increase the activity of the surrounding community
Short Term
Medium Term
Long term
Ministry of Antiquities
UNESCO
ICOMOS
NGOs
Community
Ministry of Antiquities
UNESCO
ICOMOS
NGOs
Community
Private sector
F.D
Ministry of Antiquities
UNESCO
ICOMOS
NGOs
Community
Private sector
F.D
Ministry of Cultural

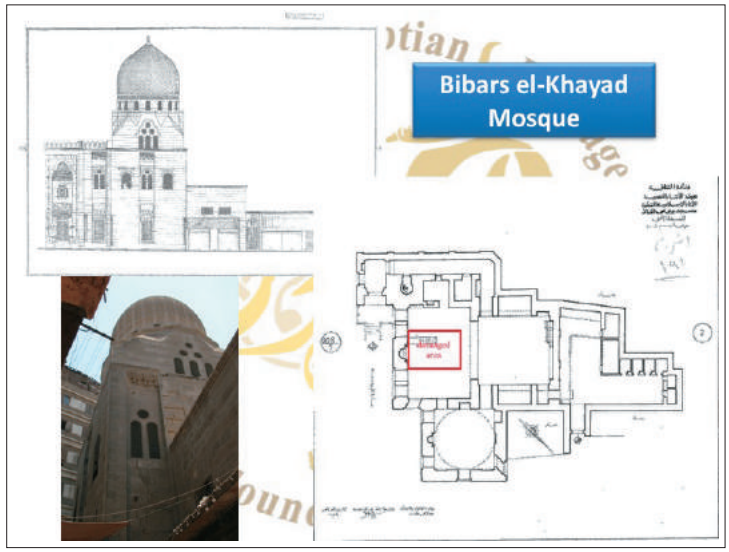

Cairo Museum


MALLAWI MUSEUM


The MUSEUM of ISLAMIC ART


Rescuing the collection of the Museum of Islamic Art


Coptic Museum


Bibars el-Khayad
Mosque

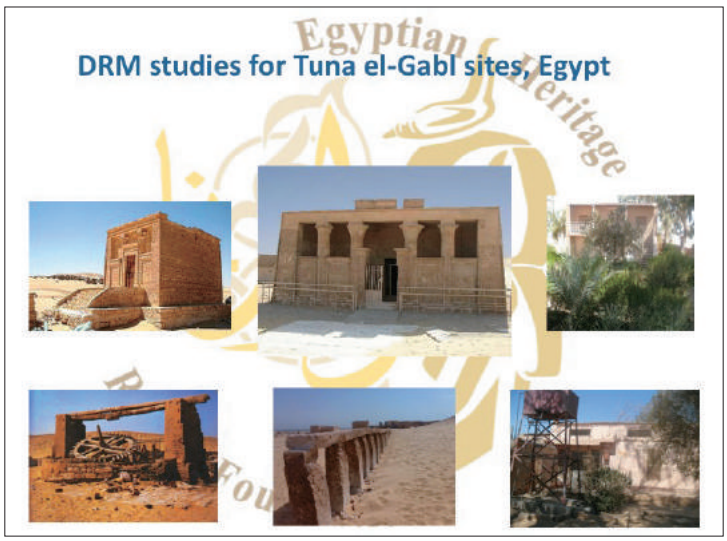

Villa Casdagli

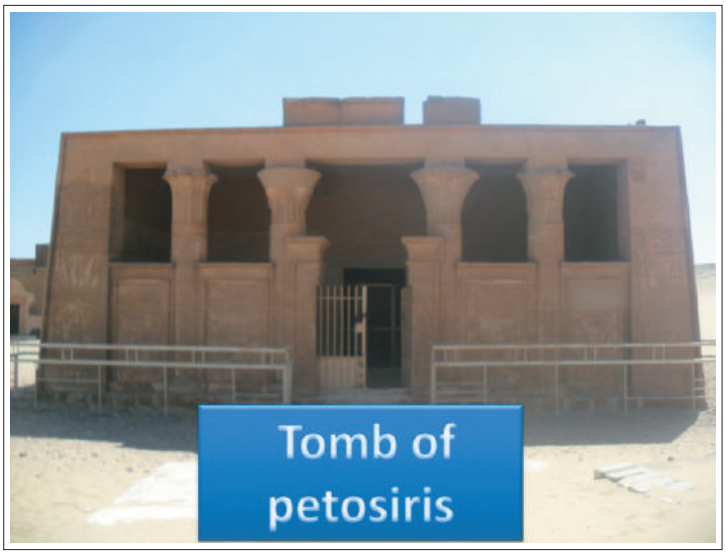

The National
Theater


ptian Heritage
Rescue Fou


Cairo Office
Fonds
Prince Claus Fund for Culture and Development
datiICCROM


Egyptian
HSBC
Cairo Office
ICCROM


DRM studies for Tuna el-Gabl sites, Egypt


Tomb of
petosiris

Impact	Source	Vlu.	Position	Level of Impact
Stone Blocks Displacement	Soil Displacement (N/S)	*Nature of Soil *lack of Maintenance	Western wall of the tomb	Medium

Impact	Source	Vlu.	Position	Level of Impact
Lose colors	lights (M.M/F)	*professional Error	Lower part of all walls	Medium

Impact	Source	Vlu.	Position	Level of impact
Cracks	Soil displacement (N.M/F)	*nature of soil *Lack of maintenance	Foundations , walls	High

Impact	Source	Vlu.	Position	Level of impact
Deformation	Wind Sand (N ¥F)	*nature of Area *Lack of maintenance	Funeral Houses	High

Source	Mitigation	Suggestion	Priority of Intervention
Sand ¥ wind	•Block	Build a Wall around the funeral houses	Medium

Historic Cairo


Volunteer Training on First Aid for Cultural Heritage
Gjirokastra, Albania 14 - 18 March 2016
udc
Urban Development Center – Belgrade
SWEDEN
CHWB
Fonds
ICCROM


The Regional Course on
"Building National Capacities for Managing Risks to Cultural heritage in Case of Emergency"
18-29 January 2015
Egypt, Iraq, Palestine, Yemen, Libya and Sudan
UNESCO
United Nations Educational, Scientific and Cultural Organization
ATHAR

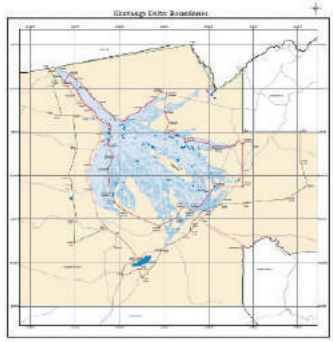

EMERGENCY PREPAREDNESS AND DISASTER RESPONSE COURSE
The Iraqi Institute for the Conservation of Antiquities and Heritage
Delivered by the University of Pennsylvania Museum's Cultural Heritage Center
IRAQI INSTITUTE


Disaster Preparedness and First-Aid for Artifacts
COURSE
The Iraqi Institute for the Conservation of Antiquities and Heritage
Erbil 2016
IRAQI INSTITUTE
Smithsonian Institution


Disaster Risk Preparedness workshop
Branberg, Namibia – 19th February - 3rd March 2016
NORWEGIAN MINISTRY OF FOREIGN AFFAIRS

Brandberg – Namibia

Botswana, the Okavango Delta World Heritage Site



Okavango Delta is a World Heritage Site because of the Delta's global outstanding value, on the basis of the following UNESCO ecological criteria:

vii: contains superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

ix: is an outstanding example of significant on-going ecological and biological processes.

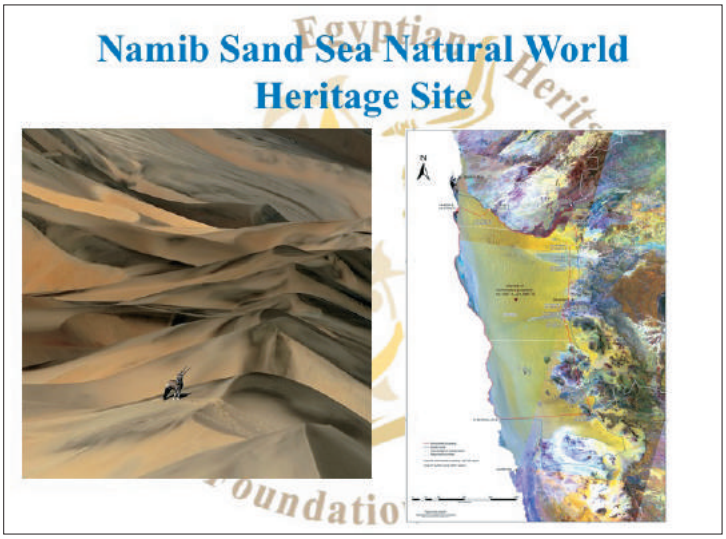
X: contains the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

*core area of app.2,650,000ha, buffer of app. 3,480,000ha

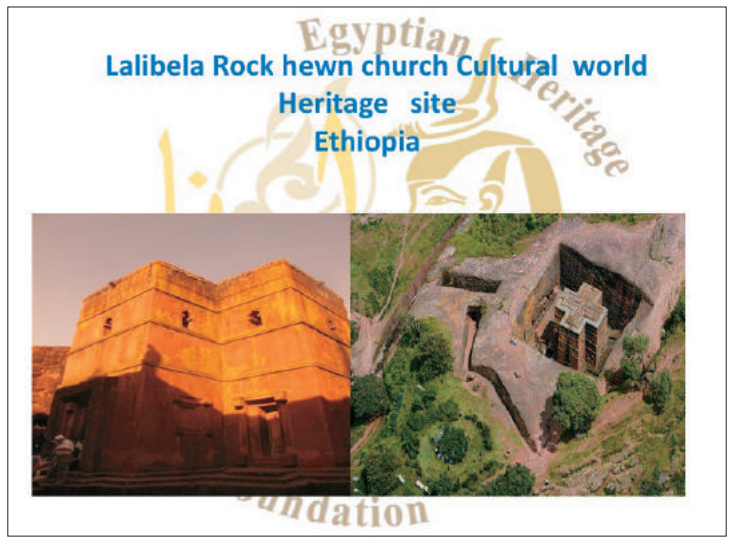
55


FORT JESUS WORLD HERITAGE SITE,
NATIONAL MUSEUMS OF KENYA


ROBBEN ISLAND MUSEUM AND
WORLD HERITAGE SITE. South Africa


Namib Sand Sea Natural World
Heritage Site


RUINS OF KILWA KISIWANI AND RUINS SONGO MNARA WHS, TANZANIA
Gereza fort 15th C
Great Mosque 11th – 16th C


Lalibela Rock hewn church Cultural world Heritage site Ethiopia

Closing Address: Director of R-DMUCH, Takeyuki OKUBO

I would like to say a few words to commemorate the 10th anniversary symposium of the international training course and the closing of the Toyota Foundation initiatives. I would like to thank all of you who have taken time off from your busy schedule to participate in the symposium, and for spending so much time with us today. We have received a lot of valuable inputs from the President - Mikio Yoshida, Former Center Director - Kenzo Toki, Dr. Ito of the Toyota Foundation, Professor Rohit Jigyasu, Professor Giovanni Boccardi of UNESCO, Mr. Joseph King from the International Center for the Study of Preservation and Restoration of Cultural Property, Mr. German Tiangco Velasquez from the United Nations International Strategy for Disaster Reduction (UNISDR) secretariat, Mr. Kai Weise, who has been working on the follow-up relief activities in Nepal, and from everyone who has worked on the presentations and discussions on the latest initiatives.

In the afternoon session, there were presentations by all the trainees, who have participated in ITC, on their latest activities. Mr. Juan Diego Badillo Reyes explained about disaster mitigation and art as part of the museum project, the new initiative of increasing awareness on disaster preparedness through games, and combined initiative on cultural property preservation and disaster mitigation under the Riobamba 2025 project. Mr. Sangsun Jo from Korea talked about how the disaster mitigation plans and evacuation plans have been proposed for all castle gates along with the Namdaemun restoration project, and his active involvement as safety inspection lead in activities such as structural surveys, and how such activities can also be useful for one's career development. Ms. Barbara Caranza from Italy spoke about the 300 volunteers that are currently active in the field with the setting up of "CHIEF", working with the port and dock volunteers on creating an environment that facilitates restoration work, initiating a training course for this, and making efforts to broaden their scope to meet the needs of various regions. Ms. Hatthaya Siriphatthanakun explained the developments

Fig. 9 Closing by Takeyuki Okubo

in the Ayutthaya's risk management plan that she had worked on during the training, the local training arrangements being made in ASEAN countries over the next five years, and also the school-based education approach to disaster preparedness education by leveraging the strengths of "SEAMEO-SPAFA" in the education space. Ms. Zeynep Gul Unal from Turkey explained about her active involvement in the field as a member of the rescue team, particularly about initiating a new PHD course at the University, including cultural property preservation as part of the disaster mitigation strategy in the national policy, and other practical initiatives. Mr. Abdelhamid Salah el-Sharief from Egypt talked about setting up the Disaster Risk Management Office in the Department of Archaeology of Egypt after the training, independently carrying out trainings while receiving ICCROM support, developing relief teams in different regions, and expanding the scope of their activities outside Egypt, as well.
Based on the presentations, a panel discussion was conducted. The management team received some valuable inputs that would be very beneficial and informative. As for the feedback on areas of improvement, points such as learning from past failures, probably having a guide that would give participants an opportunity to prepare thoroughly for the course, having more mathematical-based research as well as social science based research, activity design going forward, future approach, and so on. Especially, we think that the point that was raised on including a holiday between the course is also a very important suggestion. I would like to thank Mr. Joseph King and all the panelists once again for consolidating all the discussion points.

I would like to express my heartfelt gratitude to all of you. It has reaffirmed my belief that this theme of overcoming disasters to preserve the world's cultural heritage and historic cities is extremely important, and a topic of great interest to all of us. I sincerely hope that all of you who are here with us here today will make the best use of the results of the discussions that we have had so far, and continue to play a key role in leading initiatives on cultural heritage disaster mitigation in your respective regions and organizations. We would like to take this opportunity on the 10th year anniversary to strive for further improvement and growth of our initiatives, and therefore, we request your continued support and cooperation.

Last but not the least, I would like to express my heartfelt gratitude to the Toyota Foundation for their extraordinary support, Professor Kenzo Toki, Professor Kanefusa Masuda, Professor Naoko Itaya, the office staff, the student staff, and all those of you who have contributed in laying the foundation for this training course. Thank you once again.

Fig. 10 ITC Family

Appendix

List of Resource Persons

(As of 2016 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)

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

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

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

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

Shinta YOSHITOMI
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

Yoshinori MACHIDA
Citizens Safety Director,
Citizens Safety Section,
Safety and Ambulance Division,
Kyoto City Fire Department

Tomoki NAKAYA
Professor,
Department of Humanities,
Geography Major,
College of Letters,
Ritsumeikan University

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

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Cultural Asset Division, Board of Education,
Kyoto Prefecture

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

Yasumichi MURAKAMI
Senior Administrator,
Hyogo Pref. Board of Education

Tomo UEKI
Project General Manager,
Cultural Asset Division, Board of Education,
Sasayama City

Ichizo KOBAYASHI
President,
Sasayama Townscape Preservation Society

Kan MORIMOTO
Sasayama Townscape Preservation Society

Yonezo KITAYAMA
Sasayama Townscape Preservation Society

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

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

Ken KANAI
Senior Cultural Properties Specialist,
Cultural Properties Department,
Agency for Cultural Affairs

Joseph Allan KING
Director of the Sites Unit, ICCROM

German Tiangco VELASQUEZ
Chief of Section, Advocacy and Outreach
UN Office for Disaster Risk Reduction
(UNISDR)

Giovanni BOCCARDI
Chief,
Emergency Preparedness and Response
Unit (CLT/EPR),
Culture Sector, UNESCO

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

Juan Diego BADILLO REYES
Architect,
Assistant professor

Zeynep Gül ÜNAL
Professor,
Faculty of Architecture,
Restoration Department,
Yildiz Technical University

Sang sun JO
Senior Researcher,
Research Division of Architectural Heritage
National Research Institute of Cultural
Heritage

Barbara CARANZA
President of CHIEF,
(Cultural Heritage International Emergency
Force) Onlus

Hatthaya SIRIPHATTHANAKUN
Specialist in Cultural Heritage Conversation,
SEAMEO SPAFA,Regional Centre for
Archaeology and Fine Arts

Abdelhamid Salah Abdelhamid SAYED
Chairman,
Conservator in the Ministry of Antiquities,
Egyptian Heritage Rescue Foundation
(EHRF);
Training & Capacity Building Unit Manager,
Egyptian Earth Construction Association
(EECA)

Mingji CUI
Senior Researcher,
Kinugasa Research Organization,
Ritsumeikan University

Go TANIBATA
Senior Researcher,
Kinugasa Research Organization,
Ritsumeikan University

List of Participants

Maria Cristina Vereza LODI
Architect Preservationist,
Rio de Janeiro Municipal Government / Rio World Heritage Institute

Fatma Saidi TWAHIR
Architect,
Sites and Monuments; & Mombasa Old Town Conservation Office,
National Museums of Kenya

Muhammad Fathi Hasan AL-ABSI
Associate conservator Architect,
Engineering and conservation department/ Department of Antiquities (DOA)

Dulce Maria GRIMALDI SIERRA
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)

Barbara MINGUEZ GARCIA
Consultant,
The World Bank

Vanessa Anne TANNER
Senior Heritage Advisor,
Wellington City Council,

Nermina KATKIĆ
Associate for archaeology,
Commission to Preserve National Monuments of Bosnia and Herzegovina

Mihaela HĂRMĂNESCU
Lecturer, PhD Architect,
Ion Mincu University of Architecture and Urbanism,
Faculty of Urbanism

Alberto Enrique PASCUAL
Director,
Fundation CoMunidad

Sherwynne Bagaoisan AGUB
Legislative Staff Officer IV,
Senate Economic Planning and Policy Office,
Senate of the Philippines

Mohamed ROUAI
Professor – researcher,
Earth Sciences Department,
Faculty of Sciences,
University Moulay Ismail, Meknes, Morocco.

Navneet YADAV
Associate Director,
Disaster Risk Management

Claudia Cecilia GONZÁLEZ MUZZIO
Partner at Ambito Consultores,
Ambito Consultores Ltda.

Amna SHUJA
Assistant Director -Recovery & Rehabilitation,
National Disaster Management Authority

Maria Elena ALMESTAR URTEAGA
Senior Auditor – Specialist in Culture Management and Cultural Heritage,
Contraloria General de la Republica

Photos of ITC 2016

The lecture by Cultural Asset Division, Kyoto Prefecture

Site visit of Kiyomizu-dera conservation place

Site visit for Kiyomizu-dera World Heritage site

Site visit of Preservation District (Citizen Hydrant)

Site visit of Ponto-cho where fire damaged

Field work for risk assessment at Ponto-cho

A lecture at R-DMUCH (Climate Change)

Discussion at R-DMUCH (Emergency response)

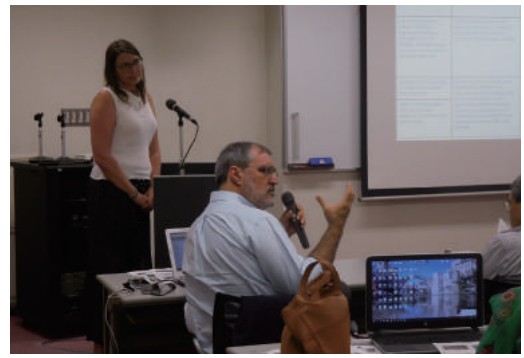
The lecture of firefighting facilities at Ninna-ji WHS

Testing of fire prevention system at Ninna-ji WHS

Discussion with local community`s stakeholders

Workshop for designing recovery process

Discussion for designing recovery process



Final presentation of case projects and discussioni

Farewell and certification

A group photo of 10 years` anniversary symposium

Caption for back cover photo: Ponto-cho Townscape Improvement Area. This attractive historical Geisha-district has been developed as one of main downtown area that has numerous numbers of restaurants. Disaster risk management needs to consider the risk of fire, floods and earthquake, and vulnerability of lack of visitors` evacuation route.

United Nations Educational, Scientific and Cultural Organization

UNESCO Chair on Cultural Heritage and Risk Management, Ritsumeikan University, Kyoto, Japan

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