Integrating traditional knowledge systems and concern for cultural and natural heritage into risk management strategies

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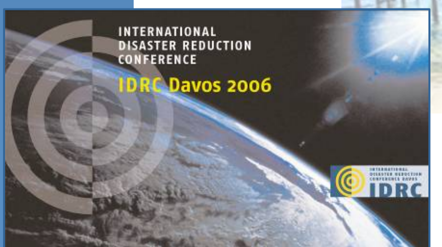

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Integrating traditional knowledge systems and concern for cultural and natural heritage into risk management strategies

International Disaster Reduction Conference (IDRC)

L'intégration des systèmes de connaissances traditionnels et l'intégration du patrimoine culturel et naturel dans les stratégies de gestion des risques

Conférence internationale sur la réduction des catastrophes (IDRC)

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Part 1: Background

Introduction

This electronic publication contains the proceedings of the special session on 'Integrating traditional knowledge systems and concern for cultural and natural heritage into risk management strategies', held at the International Disaster Reduction Conference (IDRC), in Davos, Switzerland, August 2006. The session was jointly organized by ICCROM and the UNESCO World Heritage Centre, with financial support from the World Heritage Fund.

In the recent past, ICCROM has taken various steps to promote risk management strategies in heritage conservation. One of its recent activities has been to develop in collaboration with the World Heritage Centre, a strategy for reducing risks from disasters at World Heritage sites. This work has taken place with inputs from both IUCN and ICOMOS (ICCROM, IUCN, and ICOMOS are the three Advisory Bodies to the World Heritage Committee).

The purpose of the special session in Davos was to relate back to the activities of this partnership in two ways; to promote the integration of the traditional knowledge systems into the risk management strategies, and to integrate concerns for cultural heritage into broader national and regional risk management plans. The IDRC 2006 provided a unique opportunity for deliberation and awareness-raising on both themes, not just with the heritage professionals, but with the delegates coming from many other sectors of the disaster reduction community. More than 1,000 participants from all over the world attended the conference.

Little research has been undertaken to date to understand the use of traditional knowledge systems, but some of the recent disasters have proven worthy of attention in this matter. Hence, this particular session – with participants from many parts of the world, some of whom had worked with recent disasters such as the 2004 Asian tsunami – can be considered as a step forward. The session also made an impact among all of the participants, who adopted the following resolution:

> *Concern for heritage both tangible and intangible should be incorporated into disaster risk reduction strategies and plans, which are strengthen through attention to cultural attributes and traditional knowledge'. ICCROM takes this opportunity to thank the organizers of Davos 2006, the World Heritage Centre, invited speakers, and participants.*

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Working Paper for Special Session on:

'Integrating traditional knowledge systems and concern for cultural and natural heritage into risk management strategies'

Background and Rationale:

This special session, jointly organized by ICCROM (the International Centre for the Study of the Preservation and Restoration of Cultural Property) and the UNESCO World Heritage Centre endeavours to discuss the integration of concern for the cultural and natural heritage into larger disaster reduction strategies and to assess the contribution that traditional knowledge systems could make to those strategies.

Concern for reducing risks from disasters has been motivated by the perception of increased incidences and impact of natural and man-made disasters in recent years. This has been confirmed and illustrated by the United Nations' designation of the 1990s as the International Decade of Natural Disaster Reduction and subsequent actions. Five years after the end of the International Decade, the Fifty-eighth session of the UN General Assembly (February 2004) adopted the *International Strategy for Disaster Reduction*[i], highlighting in particular, that long-term consequences of natural disasters are particularly felt in developing countries and thus hamper their sustainable development. The strategy also emphasized the need to strengthen community capability to cope with disaster risks, and the need for cooperation among Governments, United Nations bodies, international, regional and non-governmental organizations and other partners to effectively address the impact of natural disasters.

This resolution culminated in the convening of the World Conference on Disaster Reduction (WCDR), which took place in Kobe, Japan in 2005, with the aim of increasing the profile of disaster risk reduction. Objectives of the Conference were to review and ascertain achievements and good practice, identify challenges, needs and opportunities, and develop objectives and areas of action for disaster risk reduction in order to adhere to the objectives of the Johannesburg Plan of Implementation for Sustainable Development and the Millennium Development Goals. The result of this significant event was the *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters.*[ii]

Within the framework of the WCDR, ICCROM, the World Heritage Centre, and the Agency of Cultural Affairs of Japan, with the coordination of Ritsumeikan University, organized a thematic session on Cultural Heritage Risk Management. Participants represented seven countries from various regions of the world, and others participated on behalf of UNESCO, ICCROM, ICOMOS and ICOM. Through a series of presentations and case studies at this session and an earlier preparatory meeting sponsored by Ritsumeikan University, Japan ICOMOS, and the ICOMOS International Committee for Risk Preparedness, it became increasingly evident that disaster reduction and preparedness are closely tied to the effective management of cultural and natural heritage at all levels, and that safeguarding of heritage in times of disaster can provide an affected community with a sense of identity and continuity in addition to a sustainable social and economic resource. This was demonstrated through the discussion of the following issues:[iii]

- the systematic integration of cultural heritage and traditional technology, skills and local knowledge systems within the general development framework as an effective means of reducing the impact of disasters;
- the integration of cultural heritage into existing sustainable development goals and disaster reduction policies and mechanisms at international, national and local levels;
- the mobilization of local communities and civil society by actively involving them in the preparation and implementation of risk management plans, and all stages of disaster recovery;
- the development of scientific research, and academic, education and training programmes incorporating cultural heritage in both its tangible and intangible manifestations, into risk management and disaster recovery;
- the strengthening of existing networks on cultural heritage risk management and the need to link them to larger networks for disaster management.

The integration of the concern for cultural heritage into general disaster management policies is therefore of great importance, and the potential contribution to disaster planning by local communities holding traditional knowledge could be greatly beneficial. Unfortunately, however, consideration of cultural and natural heritage across disciplines and organizations continues to be slow.

Notable efforts to catalyze this recognition by UNESCO, ICOMOS, ICOM, IUCN, and the International Committee for the Blue Shield (ICBS) ensure that attention within the heritage sector will continue to be paid through publications, meetings and workshops, the establishment of networks, and awareness-raising. ICCROM, for example, has published a management guideline for risk preparedness at cultural heritage sites[iv], and has carried out a number of training workshops on the issue. ICOMOS has published regular reports on the Heritage@Risk to call attention to the problem, and the four partners of the Blue Shield continue to try to strengthen the networks of heritage professionals in this area.

At the level of the World Heritage Committee there has also been a strong commitment to disaster risk reduction. The issue was most recently discussed at its 30th Session in Vilnius, Lithuania in July 2006. At this meeting, a Strategy jointly proposed by ICCROM and the World Heritage Centre for reducing Risk to World Heritage Properties was proposed within the framework of the WCDR, the resulting Hyogo Framework for Action, and the special session mentioned above.[v] The purpose of this Strategy is to both strengthen the protection of World Heritage, contributing to sustainable development, and provide guidance to States Parties, both of which would be achieved by integrating disaster risk reduction into management, planning, and national policies. Within the strategy, a list of objectives and priority actions to be taken by various governing bodies and organizations on global, national, regional and local levels is presented. Among the priorities is the need to create a culture of disaster prevention at World Heritage properties, and in particular, "promote and develop research programmes, drawing both from modern sciences and traditional knowledge systems, to identify means of preventing and reducing disasters at heritage properties as well as existing or past traditional knowledge and skills that could contribute to disaster reduction strategies and sustainable development, and disseminate their results in usable forms" (section 2.7).

Objective:

The objective of the Davos special session is to expand the concern for cultural and natural heritage in larger risk management strategies, particularly on the contribution that traditional knowledge systems could make in this context. This will be achieved by bringing together international experts and institutions involved in risk management in the field of cultural and natural heritage, as well as representatives from other organizations working in the area of risk reduction and traditional knowledge in general. The heritage field, especially cultural heritage, has often worked in relative isolation on these issues, and would greatly benefit from exchanges of experiences, methodologies and best-practices that could be applied to its area of expertise. On the other hand, main actors in the field of risk reduction would benefit from integrating concern for heritage and traditional knowledge systems in their policies and procedures. It is hoped that the conference session, as well as the resulting publication, will heighten the awareness of actors and decision-makers in different areas of risk management to the importance of traditional knowledge systems and heritage, thus encouraging their conservation as a vital resource for sustainable development.

The eventual publication will be produced in electronic form, which will include an introduction to the issue and working paper (in English and French), proceedings of the meeting, papers submitted by participants, desired outcomes of the session as well as a synthesis of the main conclusions reached (in English and French).

Discussion of the Session Topic:

The focus of this special session is threefold:

1. present the aforementioned World Heritage Strategy for Reducing Risks from Disasters at World Heritage Properties to a wider audience as part of the consultation process;
2. discuss the need to promote and integrate concerns for heritage into wider disaster planning, response and mitigation, particularly at the national;
3. highlight and better understand the use of traditional knowledge systems in disaster risk reduction for cultural and natural heritage properties.

WORLD HERITAGE STRATEGY FOR REDUCING RISK FROM DISASTERS AT WORLD HERITAGE PROPERTIES:

In preparation for the Thirtieth Session of the World Heritage Committee in Vilnius, Lithuania (8-18 July 2006), a document dedicated to introducing a Strategy for Reducing Risk from Disasters at World Heritage Properties was drafted for review and adoption. (This strategy is included in the documents for this Special Session.) Considerations taken into account in the creation of the Strategy included:

- acknowledgement that loss or damage to cultural heritage by disaster can negatively impact local and national communities by compromising cultural identity and knowledge of the past, and sustainable development;
- the World Heritage Operational Guidelines identify risk management as a factor in World Heritage Site management plans and training strategies.
- the Hyogo Framework for Action 2005-2015, a global policy for risk reduction adopted at the United Nations World Conference on Disaster Reduction (WCDR) in Kobe 2005, presents a series of recommendations for all UN agencies, including UNESCO, to consider;
- current efforts by the heritage sector to address risk management and disaster preparedness through meetings, workshop and awareness-raising within the international community.

The aim of this Strategy can be considered twofold. On one hand, it aims to increase protection of World Heritage and contribution to sustainable development through the integration of heritage concerns into national disaster reduction policies and World Heritage management plans. On the other it seeks to provide guidance to all of the stakeholders of World Heritage properties regarding the integration of disaster risk reduction into strategic planning and management systems.

Five objectives have been identified for the Strategy by taking into consideration the Hyogo Framework for Action while reflecting the concerns and nature of World Heritage. Each objective has been matched with a series of actions. The five objectives are:

1. Strengthen support within relevant global, regional, national and local institutions for reducing risks at World Heritage properties
2. Use knowledge, innovation and education to build a culture of disaster prevention at World Heritage properties.
3. Identify, assess and monitor disaster risks at World Heritage properties.
4. Reduce underlying risk factors at World Heritage properties.
5. Strengthen disaster preparedness at World Heritage properties for effective response at all levels.

The actions which correlate to each objective have been classified into those which should take place at a global, national, regional and local level and by whom. The World Heritage Committee approved the objectives of the Strategy at it 30th session, and asked that their corresponding actions be prioritized.

During the Special Session, some of the following questions may be addressed

1 *Which actions, contained within the Strategy, should be given the highest priority in order to meet the five objectives?*
2 *Are there any additional actions, not already identified within the Strategy which would significantly contribute*

to the realization of the five objectives?

INTEGRATING HERITAGE CONCERNS INTO NATIONAL LEVEL DISASTER RISK REDUCTION STRATEGIES:

This part of the special session will provide an opportunity for participants to define possible actions that could be taken to overcome the apparent gap between national disaster risk reduction strategies and concern for the cultural and natural heritage.

Efforts to develop overall, sustainable disaster risk reduction strategies at the national level have become stronger in the recent past, with more and more countries trying to develop proactive approaches. Unfortunately, most of these strategies have either ignored or failed to integrate concern for the cultural and natural heritage. At the same time, a few countries have developed disaster risk reduction strategies for their heritage. These strategies, in most cases, are administered by heritage agencies outside the mainstream disaster reduction infrastructure, and therefore, have a limited value in responding to disasters when they occur. Problems of integration even exist at the level of terminology with heritage planners using different terms that are not well understood by the larger disaster reduction community.

Acknowledging that the primary importance that should be placed on protection of human lives, professionals in the heritage field feel that the positive role of heritage as a factor for sustainable development, including in reducing risks from disasters, is not adequately recognized within the global disaster reduction policies and objectives. The deprioritization of cultural and social concerns and repercussions may indeed add to the existing vulnerability of affected communities. Recent examples such as the aftermaths of earthquakes in Flores, Indonesia in 1992 and the Marathwada, India earthquake in 1993, demonstrate that in overlooking the importance of heritage and cultural continuity, communities are left debased and can actually experience further disaster vulnerability during the reconstruction process[vi].

Heritage professionals feel that consideration of these factors prior to disasters occurring would have the double effect of strengthening community by conserving cultural heritage and identity, while preventing or reducing damage in the response and recovery phases.

The question for the special session is, therefore, where to begin the integration process, what implications and perceptions are involved, and what kind of convincing evidence is there to prove the importance of cultural heritage in disaster risk reduction. Cooperation between Governments, NGOs, IGOs and other relevant organisations is a start; however sustainability also begins at the local level, building capacities and raising awareness within communities, and making use of their existing knowledge base.

During the session, some of the following questions may be addressed

1. *Is the importance of integrating heritage concerns into risk reduction strategies at the national level a perception shared by all?*
2. *If we are convinced that heritage can play a positive role, what evidence can we*

bring forward to demonstrate this?

3 *Is it important that heritage professionals adopt the standard terminologies of the disaster reduction community? If so, what can we do to ensure that this happens?*
4 *What concrete steps can be taken in the short and medium term to move forward this agenda of integration and by whom?*
5 *What can be done to create a stronger network between the cultural heritage sector and other agencies concerned with disaster?*

INTEGRATING TRADITIONAL KNOWLEDGE SYSTEMS INTO RISK MANAGEMENT STRATEGIES:

One of the suggested approaches in reducing risks from disasters is to integrate traditional knowledge systems into disaster risk reduction strategies. This part of the special session will be dedicated to exploring the potentials and challenges of using traditional knowledge systems (TKS) as one approach for reducing risks from disasters in all phases of the process. Through a review of current initiatives taking place in different parts of the world and of the work carried out by various professionals and academic institutions in the form of case studies, it is expected to establish the benefits of using TKS for preventing or mitigating the impact of disasters, and explore the possible methods for capturing these benefits within wider disaster risk reduction strategies. Issues connected to the exploration of TKS include a look at what they are, an identification of stakeholders, their compatibility with scientific knowledge, and how they are best used in larger strategies of disaster risk reduction.

Traditional knowledge is an important resource that has proven its usefulness and sustainability through its development and survival over time. Unfortunately, it is often overlooked in the face of a rising dependence on modern technology and scientific methods. Whereas western science is "truth focused, certainty-seeking knowledge technology", traditional knowledge can be considered as value-based and decision oriented, relying on know-how and social behaviour.[vii] Given that traditional knowledge has a firm standing within many cultures as a result of centuries of trial and error, refinement, and accurate prediction, it deserves to be seen as an important tool to complement modern technologies and provide nations with a useful asset for disaster prevention and mitigation without either of the two substituting each other.[viii]

Traditional knowledge pertains to many aspects of a society, existing in the form of rules, beliefs and customs created to protect populations and enable them to harness nature for their survival. Hence, TKS have been developed to combat regular environmental factors such as rain or droughts, diseases, and to predict disasters.

One example of TKS helping in disaster risk reduction is the study of animal behaviour as a warning sign for natural phenomena such as earthquakes. Changes in animal behaviour were also noted in areas that were stricken by the 2004 tsunami. Countless instances have been recorded of both domesticated and wild animals behaving erratically prior to a disaster occurring. As a result, this has become a topic of research at several institutions around the world. In 2003 a Japanese medical doctor conducted a study which demonstrated that irregular behaviour in dogs could be used to forecast earthquakes. [ix] Moreover, applications of TKS regarding animal behaviour are widely used in Africa countries such as Swaziland, where the height of birds' nests can predict floods and moth numbers help predict drought. [x]

Traditional knowledge systems also determine the built environment, whereby traditional or historic structures in disaster-prone areas are resistant due to long-established techniques and use of certain materials. Communities have traditionally settled in locations that were as safe as possible from immediate dangers, and that were adapted to local conditions. Structures were, therefore, more often than not, resistant, movable, or easily rebuilt. Twentieth-century activities have had serious consequences on traditional settlements and building methods due to political, social, economic and technological implications such as resettlement programmes or modern building designs. Consequences not only include loss of life or damage to the living environment, but through time, a loss of many traditional beliefs and customs that can actually be used to save lives and conserve culture.

Lessons can be learned from prior incidents, and integrating TKS into management strategies can prove cost effective, timely, and could help prevent damage to cultural and natural heritage properties. The study and application of TKS could also be an effective means of bringing the community into planning process, not only for disaster risk reduction, but also for overall management planning for heritage sites.

Consideration must be given to determine the most appropriate means in which to apply TKS to broader disaster plans and thus their most appropriate use for beneficiaries and other stakeholders. Of particular importance for the heritage is how TKS, in particular building materials and techniques as well as town planning issues, can be integrated into the recovery phase in order to ensure that rebuilding done after a disaster has struck will lead to sustainable communities that are more resilient to future disasters.

During the session, some of the following questions may be addressed:

1. *Is the importance of traditional knowledge in disaster risk reduction a perception shared by all?*
2. *If we are convinced that traditional knowledge systems can play a positive role, what evidence can we bring forward to demonstrate this?*
3. *What additional research needs to be carried out to better understand traditional knowledge systems and their relation to disaster risk reduction?*
4. *What concrete steps can be taken in the short and medium term better understand and integrate traditional knowledge systems into the larger disaster risk reduction framework and by whom?*
5. *What are the best ways to involve local communities in the process of understanding traditional knowledge systems and their relation to disaster risk reduction?*

NOTES

[i] See United Nations *A/RES/58/214*, 2004, retrieved 11 August 2006, <www.unisdr.org/eng/about_isdr/bd-ga-resolution-eng.htm>.

[ii] ISDR, *Hyogo Framework for Action: Building the Resilience of Nations and Communities to Disasters*, 2005, retrieved 11 August 2006, <www.unisdr.org/eng/hfa/hfa.htm>

[iii] Draft report for the thematic session on Cultural Heritage Risk Management as well as papers presented are found at http://www.unisdr.org/wcdr/thematic-sessions/cluster3.htm#c3-3 (retrieved 11/08/06)

[iv] Herb Stovel: Management Guidelines for Risk Preparedness for World Cultural Heritage. (UNESCO-ICOMOS-ICCROM - 1998).

[v] WHC-06/30.COM/7

[vi] Boen, T. and R. Jigyasu, 'Cultural Considerations for Post-Disaster Recovery: Challenges for Post-Tsunami', *Asian disaster management news*, vol. 11, no. 2, 2005, pp. 10-11, retrieved 11 August 2006, < www.adpc.net/Infores/newsletter/2005/4-6/02.pdf>.

[vii]Dowie, J., *Western science and traditional knowledge – no gap to bridge*, The Environment Times, 2004, § 2, retrieved 11 August 2006, <www.environmenttimes.net/article.cfm?pageID=31>.

[viii] Ibid.

[ix] Mott, M., 'Can Animals Sense Earthquakes?', *National Geographic News*, 11 November 2003, retrieved 28 June 2006, <http://news.nationalgeographic.com>.

[x] Kamara, J., *Indigenous knowledge in natural disaster reduction in Africa,* The Environment Times, 2005, retrieved 11 August 2006, < www.environmenttimes.net/article.cfm?pageID=132>.

Document de travail pour une session spéciale sur

« L'intégration des systèmes de connaissances traditionnels et l'intégration du patrimoine culturel et naturel dans les stratégies de gestion des risques »

Contexte et justification :

Cette session spéciale, organisée conjointement par l'ICCROM (le Centre international d'études pour la conservation et la restauration des biens culturels) et le Centre du patrimoine mondial de l'UNESCO, s'efforce de discuter de l'intégration de la question du patrimoine culturel et naturel dans des stratégies plus larges de réduction de catastrophes, et d'évaluer la contribution potentielle des systèmes de connaissances traditionnels à ces stratégies.

L'intérêt concernant la réduction des risques représentés par les catastrophes a été motivé par la perception de l'augmentation ces dernières années des incidences et de l'impact des catastrophes naturelles et technologiques. Cette tendance a été confirmée et illustrée par les Nations Unies qui ont désigné les années 1990 comme la Décennie internationale de la prévention des catastrophes naturelles, et mis en place des activités subséquentes. Cinq ans après la fin de la Décennie internationale, la Cinquante-huitième session de l'Assemblée générale des NU (en février 2004) adoptait la *Stratégie internationale pour la prévention des catastrophes* [xi], soulignant en particulier que les conséquences à long terme des catastrophes naturelles se font particulièrement ressentir dans les pays en développement et entravent ainsi leur développement durable. La stratégie met également l'accent sur la nécessité de renforcer la capacité de la communauté à faire face aux risques des catastrophes, et la nécessité de coopération entre les gouvernements, les organes des Nations Unies, les organisations internationales, régionales et non gouvernementales, et autres partenaires, afin de traiter efficacement l'impact des catastrophes naturelles.

Cette résolution a culminé lors du rassemblement de la Conférence mondiale sur la prévention des catastrophes naturelles (WCDR), qui s'est tenue à Kobe (Japon) en 2005, dans le but d'attirer davantage l'attention sur la réduction des risques liés aux catastrophes. Les objectifs de la Conférence étaient d'examiner et de déterminer les réalisations et la bonne pratique, d'identifier les défis, les besoins et les opportunités, et de développer des objectifs et zones d'action concernant la réduction des risques liés aux catastrophes afin d'adhérer aux objectifs du Plan de mise en œuvre de Johannesburg pour le développement durable et aux Objectifs de développement pour le millénaire. Cet important événement a eu pour résultat le *Cadre d'action de Hyogo 2005-2015 : Développer la résilience des nations et communautés face aux catastrophes*[xii].

Dans le cadre de la WCDR, l'ICCROM, le Centre du patrimoine mondial, et l'Agence pour les affaires culturelles du Japon, avec la coopération de l'Université Ritsumeikan, ont organisé une session thématique sur la Gestion des risques pour le patrimoine culturel. Les participants représentaient sept pays de diverses régions du monde, et d'autres ont participé au nom de l'UNESCO, de l'ICCROM, de l'ICOMOS et de l'ICOM. A travers une série de présentations et d'études de cas lors de cette session, et d'une réunion préparatoire en amont, sponsorisée par l'Université de Ritsumeikan, ICOMOS Japon et le Comité international de l'ICOMOS pour la préparation aux risques, il est devenu de plus en plus évident que la réduction des risques et la préparation aux risques sont étroitement liées à une gestion efficace du patrimoine culturel et naturel à tous les niveaux, et que la sauvegarde du patrimoine en temps de catastrophes naturelles peut apporter à la communauté affectée un sentiment d'identité et de continuité, en plus d'une ressource sociale et économique durable, comme démontré au cours de la discussion sur les questions suivantes[xiii] :

- l'intégration systématique du patrimoine culturel et de la technologie, des compétences et des systèmes de connaissances traditionnels locaux dans le cadre de développement général comme moyen efficace de réduire l'impact des catastrophes ;
- l'intégration du patrimoine culturel aux objectifs de développement durable existants et aux politiques et mécanismes de réduction des catastrophes aux niveaux international, national et local ;
- la mobilisation des communautés locales et de la société civile en les impliquant activement dans la préparation et la mise en œuvre des plans de gestion des risques, et à chaque étape de la reprise après la catastrophe ;
- le développement de recherches scientifiques et de programmes académiques, d'éducation et de formation incorporant le patrimoine culturel, sous ses formes à la fois matérielles et immatérielles, à la gestion des risques et à la reprise après une catastrophe ;
- le renforcement de réseaux existants sur la gestion des risques pour le patrimoine culturel et la nécessité de les relier à d'autres réseaux plus vastes consacrés à la gestion des catastrophes.

L'intégration de la question du patrimoine culturel aux politiques globales de gestion des catastrophes relève donc d'une grande importance, et la contribution potentielle des communautés locales détentrices d'un savoir traditionnel à la planification des catastrophes pourrait s'avérer grandement bénéfique. Cependant, la prise en considération du patrimoine culturel et naturel par les différentes disciplines et organisations continue malheureusement à être faible.

Les efforts notables de l'UNESCO, l'ICOMOS, l'ICOM, l'IUCN et du Comité international du bouclier bleu (ICBS), visant à catalyser cette reconnaissance, garantissent qu'une attention continue sera prêtée au secteur du patrimoine, à travers des publications, des réunions et ateliers, l'établissement de réseaux, et la sensibilisation. L'ICCROM, par exemple, a publié un manuel de gestion pour la préparation aux risques sur les sites du patrimoine culturel[xiv] et a conduit des nombreux ateliers sur ce thème. L'ICOMOS a publié des rapports réguliers sur le thème *Patrimoine en péril* afin d'attirer l'attention sur le problème, et les quatre partenaires du Bouclier bleu continuent de s'efforcer à renforcer les réseaux de professionnels du patrimoine dans ce domaine.

Au niveau du Comité du patrimoine mondial, un fort engagement envers la réduction des risques liés aux catastrophes a également été pris. La question a été soulevée tout récemment lors de sa 30ème session à Vilnius, en Lituanie, en Juillet 2006. Lors de cette réunion, une Stratégie proposée conjointement par l'ICCROM et le Centre du patrimoine mondial en vue de réduire les risques sur les biens du patrimoine mondial a été proposée dans le cadre de la WCDR, du Cadre d'action de Hyogo qui en résulte, et de la session spéciale mentionnée plus haut [xv]. Le but de cette Stratégie est à la fois de renforcer la protection du Patrimoine mondial, contribuant ainsi au développement durable, et de fournir des orientations aux Etats parties, ces deux objectifs pouvant être atteints en intégrant la réduction des risques liés aux catastrophes à la gestion, à la planification et aux politiques nationales. La stratégie présente une liste d'objectifs et d'actions prioritaires à adopter par les divers organes directeurs et organisations aux niveaux international, national et local. Parmi ces priorités figure la nécessité de créer une culture de la prévention des catastrophes pour les biens du Patrimoine culturel et, en particulier, de «promouvoir et développer des programmes de recherche, en s'appuyant à la fois sur les sciences modernes et les systèmes de connaissances traditionnels, permettant d'identifier les moyens de prévenir et de réduire les catastrophes sur les biens du Patrimoine mondial, ainsi que les connaissances et compétences traditionnels présents ou passés pouvant contribuer aux stratégies de réduction des catastrophes et au développement durable, et de disséminer les résultats sous des formes utilisables» (section 2.7).

Objectif :

L'objectif de la session spéciale de Davos est d'élargir la question du patrimoine culturel et naturel aux stratégies plus vastes de gestion des risques, en particulier sur la contribution que les systèmes de connaissances traditionnels pourraient apporter dans ce contexte. Cet objectif pourra être atteint en rassemblant les institutions et experts internationaux impliqués dans la gestion des risques dans le domaine du patrimoine culturel et naturel, ainsi que les représentants d'autres organisations travaillant dans le domaine de la réduction des risques et des connaissances traditionnelles en général. Le domaine du patrimoine, en particulier du patrimoine culturel, a souvent travaillé de manière relativement isolée sur ces questions, et bénéficierait grandement de l'échange des expériences, méthodologies et meilleures pratiques qui pourraient s'appliquer à son domaine d'expertise. D'autre part, il serait bénéfique aux principaux acteurs du domaine de la réduction des risques d'intégrer la question du patrimoine et des systèmes de connaissances traditionnels à leurs politiques et procédures. Outre la publication qui en résultera, les retombées espérées de cette session de la conférence concernent un renforcement de la sensibilisation des acteurs et décideurs des différents domaines liés à la gestion des risques envers l'importance des systèmes de connaissances traditionnels et du patrimoine, dans le but d'en encourager la conservation en tant que ressource vitale pour un développement durable.

La publication prévue sera produite sous forme électronique, et inclura une introduction à la question et un document de travail (en anglais et en français), le procès-verbal de la réunion, les communications soumises par les participants, les résultats souhaités à la suite de la session ainsi qu'une synthèse des principales conclusions tirées (en anglais et en français).

Discussion sur le thème de la session :

Le sujet principal de cette session spéciale est traité selon les trois points suivants :

1. présenter la Stratégie du patrimoine mondial pour la réduction des risques liés aux catastrophes naturels sur les biens du patrimoine mondial, mentionnée précédemment, à une audience plus large dans le cadre du processus de consultation ;
2. discuter de la nécessité de promouvoir et d'intégrer la question du patrimoine dans un cadre plus large de planification des catastrophes, de réponse et d'amélioration, notamment au niveau national ;
3. souligner et mieux comprendre l'utilisation des systèmes de connaissances traditionnels dans la réduction des risques liés aux catastrophes naturelles sur les biens du patrimoine culturel et naturel.

STRATEGIE DU PATRIMOINE MONDIAL POUR LA REDUCTION DES RISQUES LIES AUX CATASTROPHES NATURELLES SUR LES BIENS DU PATRIMOINE MONDIAL :

En prévision de la Trentième session du Comité du patrimoine mondial à Vilnius, en Lituanie, (8-18 juillet 2006), un document consacré à la présentation de la Stratégie de réduction des risques liés aux catastrophes naturelles sur les biens du patrimoine mondial a été rédigé, en vue d'être soumis pour révision et adoption. (Cette stratégie compte parmi les documents de la présente session spéciale.) La création de cette Stratégie a entre autres pris en considération :

- la reconnaissance que la perte ou l'endommagement du patrimoine culturel par une catastrophe peut avoir un impact négatif sur les communautés locales et nationales en compromettant leur identité culturelle et la connaissance du passé, et le développement durable ;
- les Orientations du patrimoine mondial identifient la gestion des risques comme un facteur des plans de gestion des sites du patrimoine mondial et des stratégies de formation.
- le Cadre d'action de Hyogo 2005-2015, politique internationale de réduction des risques adoptée à la Conférence mondiale des Nations Unies sur la réduction des risques (WCDR) à Kobe en 2005, présente une série de recommandations adressées à toutes les agences des NU, y compris l'UNESCO ;
- les efforts actuels du secteur du patrimoine pour faire face à la gestion des risques et à la préparation aux catastrophes à travers les réunions, les ateliers et la sensibilisation au sein de la communauté internationale.

L'objectif de cette Stratégie peut être considéré double. D'une part, elle vise à accroître la protection du Patrimoine mondial et la contribution au développement durable à travers l'intégration de questions patrimoniales aux politiques nationales de réduction des catastrophes et aux plans de gestion du patrimoine mondial. D'autre part, elle cherche à guider toutes les parties prenantes des biens du patrimoine mondial quant à l'intégration de la réduction des risques liés aux catastrophes dans les systèmes de planification stratégique et de gestion.

Cinq objectifs ont été identifiés pour la Stratégie, qui prennent en considération le Cadre d'action de Hyogo tout en reflétant les préoccupations et la nature du Patrimoine mondial. Chaque objectif a été associé à une série d'actions. Les cinq objectifs sont :

1. Renforcer le soutien envers la réduction des risques sur les biens du patrimoine mondial au sein des institutions internationales, régionales, nationales et locales.
2. Utiliser les connaissances, l'innovation et l'éducation pour bâtir une culture de la prévention des catastrophes sur les biens du patrimoine mondial.
3. Identifier, évaluer et contrôler les risques liés aux catastrophes sur les biens du patrimoine mondial.
4. Réduire les facteurs sous-jacents aux catastrophes sur les biens du patrimoine mondial.
5. Renforcer la préparation aux catastrophes sur les biens du patrimoine mondial pour une réponse efficace à tous les niveaux.

Les actions liées à chaque objectif ont été classées en fonction de leur nécessité de se dérouler à l'échelle internationale, nationale, régionale et locale, et de l'acteur les devant mettre en place. Le Comité du patrimoine mondial a approuvé les objectifs de la Stratégie lors de sa 30ème session, et demandé un classement des actions qui leur correspondent en fonction de leur degré de priorité.

Au cours de la Session spéciale, certaines des questions suivantes pourront être abordées :

1. *1. Quelles actions de la Stratégie devraient bénéficier de la plus haute priorité afin d'atteindre les cinq objectifs ?*
2. *Existe-t-il des actions supplémentaires, n'ayant pas encore été identifiées par la Stratégie, pouvant contribuer de manière significative à la réalisation des cinq objectifs ?*

INTEGRER LA QUESTION DU PATRIMOINE AUX STRATEGIES DE REDUCTION DES RISQUES LIES AUX CATASTROPHES NATURELLES AU NIVEAU NATIONAL:

Cette partie de la session spéciale donnera aux participants l'opportunité de définir des actions possibles pouvant être conduites pour combler le fossé apparent entre les stratégies nationales de réduction des risques liés aux catastrophes et la question du patrimoine culturel et naturel.

Les efforts visant à développer au niveau national des stratégies globales et durables de réduction des risques liés aux catastrophes se sont récemment renforcés, et de plus en plus de pays cherchent à développer des approches proactives. Malheureusement, la plupart de ces stratégies ont ignoré ou manqué d'intégrer la question du patrimoine culturel et naturel. Dans le même temps, quelques pays ont développé des stratégies de réduction des risques liés aux catastrophes pour leur patrimoine. Ces stratégies, dans la plupart des cas, sont administrées par des agences patrimoniales se trouvant en-dehors de la principale infrastructure de réduction des catastrophes, et ont ainsi une valeur limitée quant à leur réponse aux catastrophes lorsqu'elles se produisent. Les problèmes d'intégration existent même au niveau terminologique, les urbanistes patrimoniaux utilisant des termes différents qui ne sont pas très bien compris par la communauté plus vaste de réduction des catastrophes.

Tout en reconnaissant qu'une importance primordiale doit être accordée à la protection des vies humaines, les professionnels du domaine du patrimoine pensent que le rôle positif du patrimoine comme facteur du développement durable, y compris pour réduire les risques liés aux catastrophes, n'est pas reconnu comme il devrait par les politiques internationales de réduction des catastrophes et les objectifs qui s'y rapportent. Le fait de minimiser la question culturelle et sociale et ses répercussions peut en effet renforcer la vulnérabilité existante des communautés affectées. Des exemples récents, comme à la suite des tremblements de terres à Flores, en Indonésie en 1992, et à Marathwada, en Inde, en 1993, démontrent que le fait de négliger l'importance du patrimoine et de la continuité culturelle laisse les communautés meurtries et à même de faire montre d'une plus grande vulnérabilité à la catastrophe durant le processus de reconstruction.[xvi]

Selon les professionnels du patrimoine, prendre en considération ces facteurs, en amont des catastrophes, aurait l'effet double de renforcer la communauté en conservant son identité et son patrimoine culturels tout en prévenant ou en réduisant les dégâts lors des phases de réponse et de reprise.

La question posée par cette session spéciale est, par conséquent, de savoir où commencer le processus d'intégration, quelles sont les implications et les perceptions y relatives, et quel type de preuve convaincante pourra démontrer l'importance du patrimoine culturel dans la réduction des risques liés aux catastrophes naturelles.

Au cours de la session, certaines des questions suivantes pourront être abordées :

1. *L'importance d'intégrer la question du patrimoine aux stratégies de réduction des risques au niveau national est-elle perçue par tous ?*
2. *Si nous sommes convaincus que le patrimoine peut jouer un rôle positif, quelle preuve pourrait-on utiliser pour le démontrer ?*
3. *Est-il important que les professionnels du patrimoine adoptent la terminologie standard de la communauté de réduction des risques ? Si c'est le cas, que peut-on faire pour garantir la mise en place de cette mesure ?*
4. *Quelles mesures concrètes peuvent être prises, à court et à moyen terme, pour faire avancer cette question d'intégration, et par qui ?*
5. *Que peut-on faire pour créer un réseau plus solide reliant le secteur du patrimoine culturel et les autres agences concernées par les catastrophes ?*

INTEGRER LES SYSTEMES DE CONNAISSANCES TRADITIONNELS AUX STRATEGIES DE GESTION DES RISQUES :

L'une des approches suggérées pour la réduction des risques liés aux catastrophes naturelles est d'intégrer les systèmes de connaissances traditionnels aux stratégies de réduction des risques liés aux catastrophes. Cette partie de la session spéciale sera consacrée à examiner les possibilités et les défis offerts par l'utilisation des systèmes de connaissances traditionnels (SCT) comme approche de réduction des risques liés aux catastrophes durant toutes les phases du processus. A travers une étude des initiatives en cours dans différentes parties du monde, et du travail effectué par divers professionnels et institutions académiques sous la forme d'études de cas, il est prévu d'établir les bénéfices relatifs à l'utilisation des SCT pour prévenir ou diminuer l'impact des catastrophes, et d'étudier les méthodes possibles pour intégrer ces bénéfices au sein des stratégies plus larges de réduction des risques liés aux catastrophes. Les thèmes liés à l'étude des SCT incluent une définition de ce qu'ils sont, l'identification des parties prenantes, leur compatibilité avec les connaissances scientifiques, et comment les utiliser aux mieux dans le cadre plus large des stratégies de réduction des risques liés aux catastrophes.

Les connaissances traditionnelles constituent une ressource importante qui a prouvé son utilité et sa durabilité à travers son développement et sa survie au fil du temps. Malheureusement, elle est souvent ignorée face à la dépendance croissante à la technologie moderne et aux méthodes scientifiques. Tandis que la science occidentale est « une technologie des connaissances se concentrant sur la vérité et recherchant la certitude », les connaissances traditionnelles peuvent être considérées comme basées sur la valeur et orientées vers la décision, s'appuyant sur le savoir-faire et le comportement social.[xvii] Etant donné que les connaissances traditionnelles bénéficient d'une position solide au sein de nombreuses cultures, à la suite de siècles d'essais et d'erreurs, de modifications et de prévisions précises, elles méritent d'être considérées comme un outil important complétant les technologies modernes et fournissant aux nations un atout utile à la prévention et à la diminution des risques sans qu'aucun des deux ne se substitue à l'autre[xviii].

Les connaissances traditionnelles concernent de nombreux aspects d'une société, existant sous la forme de règles, de croyances et de coutumes créées pour protéger les populations et leur permettre d'exploiter la nature en vue de leur survie. Ainsi, les SCT ont été développés pour combattre les facteurs environnementaux habituels comme la pluie ou la sécheresse, les maladies, et pour prévoir les catastrophes.

Un exemple où le SCT aide à la réduction des risques liés aux catastrophes est l'étude du comportement animal comme signal d'alarme quant aux phénomènes naturels comme les tremblements de terre. Les changements dans le comportement animal ont été également observés dans des zones qui ont été frappées par le tsunami de 2004. Un nombre infini d'exemples ont été rapportés concernant des animaux domestiques ou sauvages se comportant de manière erratique avant l'arrivée d'une catastrophe. En conséquence, plusieurs institutions de par le monde en ont fait un sujet de recherche. En 2003, un médecin japonais a conduit une étude qui démontre qu'un comportement inhabituel chez les chiens pourrait être utilisé pour prévoir les tremblements de terre. [xix] En outre, la mise en pratique des SCT concernant le comportement animal est largement répandue dans les pays africains comme le Swaziland, où la hauteur des nids d'oiseaux permet de prévoir les inondations et où le nombre de mites aide à prévoir la sécheresse[xx].

Les systèmes de connaissances traditionnels déterminent également l'environnement bâti, avec des structures traditionnelles ou historiques résistantes dans des zones prônes aux catastrophes, grâce à des techniques établies depuis longtemps et à l'utilisation de certains matériaux. Les communautés se sont traditionnellement installées dans des lieux à l'abri, dans la mesure du possible, des dangers immédiats, et adaptées aux conditions locales. Les structures étaient donc, le plus souvent, résistantes, mobiles, ou facilement reconstruites. Les activités du vingtième siècle ont eu des conséquences graves sur les habitats traditionnels et les méthodes de construction en raison d'implications politiques, sociales, économiques et technologiques comme les programmes de réinstallation ou les constructions de bâtiments modernes. Les conséquences n'incluent pas seulement la perte de vies ou la dégradation du cadre de vie environnemental, mais également, au fil du temps, la perte de nombreuses croyances et coutumes traditionnelles qui peuvent en réalité être utilisées pour sauver des vies et conserver la culture.

On peut tirer des leçons d'incidents passés, et l'intégration des SCT aux stratégies de gestion peut s'avérer rentable, opportune, et pourrait aider à prévenir la dégradation des biens du patrimoine culturel et naturel. L'étude et la mise en pratique des SCT pourraient également constituer un moyen efficace d'amener la communauté à planifier le processus, non seulement de réduction des risques liés aux catastrophes, mais aussi de planification de la gestion globale des sites patrimoniaux.

Il est nécessaire de décider de déterminer les moyens les plus adaptés permettant d'appliquer les SCT à des plans de catastrophes plus larges et leur utilisation la plus adéquate pour les bénéficiaires et autres parties prenantes. Est d'une importance plus particulière pour le patrimoine la manière d'intégrer les SCT, en particulier les matériaux de construction et les techniques ainsi que les questions de planification urbaine, dans la phase de reprise, afin de garantir que la reconstruction effectuée après une catastrophe conduira à des communautés durables et ayant plus de ressort face aux futures catastrophes.

Au cours de la session, certaines des questions suivantes pourront être abordées :

1. *L'importance des connaissances traditionnelles dans la réduction des risques liés aux catastrophes est-elle partagée par tous ?*
2. *Si nous sommes convaincus que les systèmes de connaissances traditionnels peuvent jouer un rôle positif, quelle preuve peut-on utiliser pour le démontrer ?*
3. *Quelles recherches supplémentaires doivent être conduites pour mieux comprendre les systèmes de connaissances traditionnels et leur relation avec la réduction des risques liés aux catastrophes ?*
4. *Quelles mesures concrètes peuvent être prises à court et moyen terme pour mieux comprendre et intégrer les systèmes de connaissances traditionnels au cadre plus large de réduction des risques*

liés aux catastrophes, et par qui ?

5. *Quels sont les meilleurs moyens d'impliquer les communautés locales dans le processus de compréhension des systèmes de connaissances traditionnels et de leur relation avec la réduction des risques liés aux catastrophes ?*

NOTES

xi Voir Nations Unies A/RES/58/214, 2004, récupéré le 11 août 2006, <www.unisdr.org/eng/about_isdr/bd-ga-resolution-eng.htm>.
xii ISDR, Cadre d'action de Hyogo : Développer la résilience des nations et communautés face aux catastrophes naturelles, 2005, récupéré le 11 août 2006, <www.unisdr.org/eng/hfa/hfa.htm>
xiii Le Rapport provisoire de la session thématique sur la Gestion des risques pour le patrimoine culturel ainsi que les documents présentés sont disponibles sur http://www.unisdr.org/wcdr/thematic-sessions/cluster3.htm#c3-3 (récupéré le 11/08/06)
xiv Herb Stovel: Management Guidelines for Risk Preparedness for World Cultural Heritage. (UNESCO-ICOMOS-ICCROM - 1998).
xv WHC-06/30.COM/7
xvi Boen, T. et R. Jigyasu, 'Cultural Considerations for Post-Disaster Recovery: Challenges for Post-Tsunami', Asian disaster management news, vol. 11, no. 2, 2005, pp. 10-11, récupéré le 11 août 2006, < www.adpc.net/Infores/newsletter/2005/4-6/02.pdf>.
xvii Dowie, J., Western science and traditional knowledge – no gap to bridge, The Environment Times, 2004, § 2, récupéré le 11 août 2006, <www.environmenttimes.net/article.cfm?pageID=31>.
xviii Ibid.
xix Mott, M., 'Can Animals Sense Earthquakes?', National Geographic News, 11 novembre 2003, récupéré le 28 juin 2006, <http://news.nationalgeographic.com>.
xx Kamara, J., Indigenous knowledge in natural disaster reduction in Africa, The Environment Times, 2005, récupéré le 11 août 2006, < www.environmenttimes.net/article.cfm?pageID=132>.

A Strategy for Reducing Risks from Disasters at World Heritage Properties

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Introduction

World Heritage properties[xxi], as with all heritage properties, are exposed to natural and human-made disasters which threaten their integrity and may compromise their values. The loss or deterioration of these outstanding properties would negatively impact local and national communities, both for their cultural importance as a source of information on the past and a symbol of identity, and for their socio-economic value.

Recent studies, moreover, have suggested that the heritage, in both its tangible and intangible forms, is not simply a passive entity exposed to potential damage in the event of a disaster, but has often a significant positive role to play in reducing risks, before, during and after disasters occur.

Despite this, most World Heritage properties, particularly in developing areas of the world, do not have any established policy, plan or process for managing risks associated with potential disasters. Existing national and local disaster preparedness mechanisms usually do not take into account the significance of these sites and do not include heritage expertise in their operations. At the same time, traditional knowledge and sustainable practices that ensured a certain level of protection from the worst effects of natural or human-made hazards are being progressively abandoned.

As a result, hundreds of sites including heritage significance are virtually defenceless with respect to potential disasters. Conversely, communities worldwide are not exploiting to their full potential opportunities for reducing disasters' risk associated to their tangible and intangible heritage.

Improving the management of risks for properties inscribed in the World Heritage List, therefore, is necessary to preserve their cultural and natural values and prevent or reduce damage from disasters, thus protecting an essential support for the social and economic well-being of their communities.

With an aim to contributing to address these challenges, in 2004, the World Heritage Committee had requested the World Heritage Centre and the Advisory Bodies of the 1972 Convention, i.e. IUCN, ICOMOS and ICCROM, to elaborate a "risk-preparedness strategy". The Strategy, eventually renamed "Strategy for Reducing Risks from Disasters at World Heritage Properties" (hereinafter called "the Strategy"), was presented at the 30th Session of the World Heritage Committee, held in Vilnius (Lithuania) in July 2006.

The present paper intends to clarify the background against which the Strategy was elaborated, and present succinctly its main objectives, structure and contents. This paper draws heavily from the working document submitted to the 30th Session of the World Heritage Committee (Vilnius, 8-16 July 2006), prepared jointly between the World heritage Centre and ICCROM, in consultation with the other Advisory Bodies ICOMOS and IUCN, and other concerned parties[xxii]. In particular, I would like to express my gratitude to Joseph King and Gamini Wijesuryia, from ICCROM, who have co-authored the Strategy.

Risk reduction in the cultural heritage field and within the World Heritage Convention in particular

The issue of risks from disasters (in this case human-made) for cultural heritage was initially addressed by UNESCO through the *Convention for the Protection of Cultural Heritage in Time of Armed Conflict* [xxiii] (The Hague Convention -1954).

Numerous international, regional, national and local meetings were subsequently organised by the heritage sector on the subject of risk reduction, preparedness and response since at least 1977 (ICOMOS meeting in Antigua Guatemala on the subject of earthquake risks). As part of an Inter-Agency Task Force lead by ICOMOS with a steady participation of the World Heritage Centre and ICCROM, definitions were articulated of disasters in the context of World Heritage that "stressed the distinct character of disasters as generating substantial and significant damage in a short timeframe and as such, affect both the heritage and the systems and organisations in charge of its care and protection"[xxiv].
From 1992, because of the high and visible incidence of disasters and armed conflict on television in the early 90s, UNESCO and other partner institutions such as ICCROM, ICOMOS, IUCN, and ICOM, intensified initiatives aimed at strengthening the capacity of managers to address risk management for cultural and natural heritage properties.

Besides a number of international meetings, workshops and Declarations, these initiatives included the preparation of guidelines for integrating risk preparedness in the management of World Cultural Heritage [xxv] and more recently the development of a *Training Kit on Risk Preparedness* by ICCROM. In parallel, ICOMOS, ICOM, the International Federation of Library Associations and Institutions (IFLA) and the International Council on Archives (ICA) established in 1996 the *International Committee for the Blue Shield*, a partnership and coordinating mechanism among the main international NGOs in the heritage sector[xxvi].

More recently, the World Heritage Centre, ICCROM, and the Agency of Cultural Affairs of Japan co-organized a special thematic session on "Risk Management for Cultural Heritage" during the UN *World Conference on Disaster Reduction*, held in Kobe, Hyogo, Japan in Jan. 2005. This Session, in which representatives of ICOMOS also participated, resulted in an Outcome Document[xxvii] containing some recommendations which brought forward relatively new perspectives on risks as related to heritage, by shedding light on aspects that had been previously somehow neglected.

For example, where previously emphasis was mostly placed on protecting physical heritage *from* disasters, the Kobe Outcome Document recognized that heritage, together with the traditional knowledge that created it, could be a fundamental resource *for* reducing risks from disasters for lives and properties, and therefore could contribute actively, and directly, to sustainable human development. It was also reiterated that heritage, given its prominent place in the community, could be used to make a significant contribution during the response phase of a disaster.

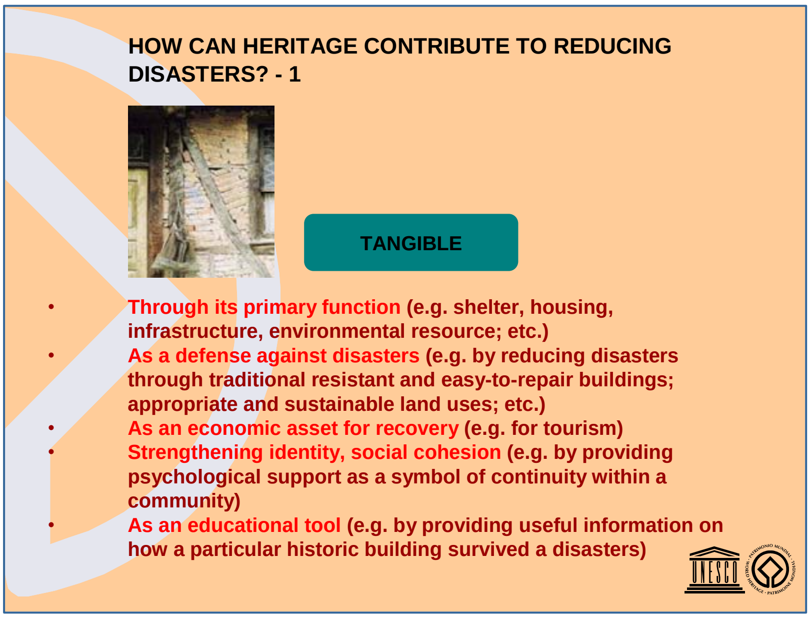
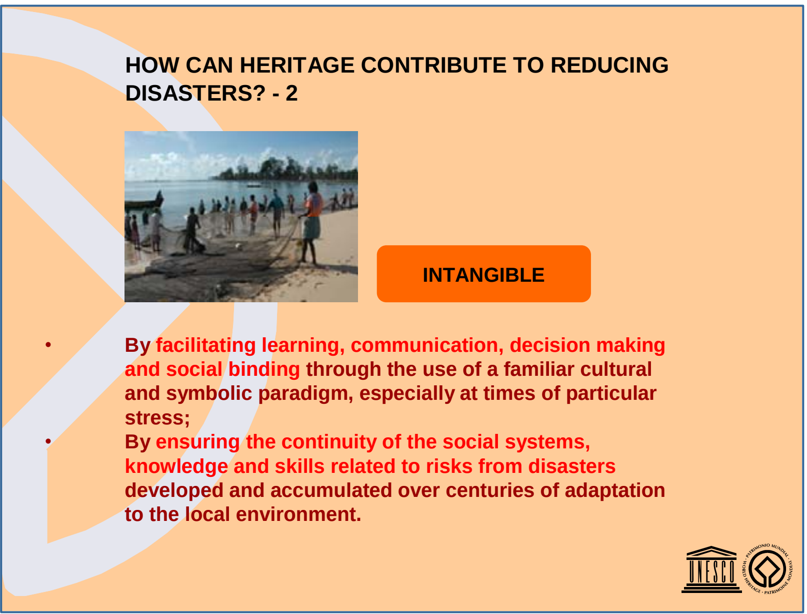


Fig. 1 & 2 – Tangible and intangible heritage can contribute to reducing disasters in several ways, some of which are indicated in these illustrations.

If these new approaches were applied by heritage professionals and endorsed by the international community, this would greatly facilitate the integration of concern for heritage into general policies and practices for disaster mitigation, and the consideration of heritage as a legitimate beneficiary of development aid in preparation for or following major disasters. This is unfortunately not the case today, as shown by the Flash Appeal launched



in January 2005 by the UN following the tsunami of South Asia[xxviii]. Of the 977 million dollars requested to the international donor community, in fact, not one concerned the rehabilitation of the heritage.

The participants in the thematic session of Kobe, therefore, stressed the need to mainstream these ideas in the policies and processes of national governments and global players in the development field. One way of achieving this, it was suggested, was to work through the *World Heritage Convention*[xxix]. The 1972 Convention, in fact, has often played a pioneering role in introducing concepts and standards drawn from international best practices in conservation within national contexts.

Following a rapid review, however, it appeared that the current guidance provided by the *World Heritage Convention* in the specific field of risk reduction offers room for considerable improvement.

The procedures dealing with the issue of risk from disasters in the framework of the World Heritage Convention are defined by the *Operational Guidelines for the Implementation of the World Heritage Convention*[xxx], i.e. the main policy document assisting States Parties to the Convention in its practical application. Paragraph 118 of the *Guidelines* states that: "*The Committee recommends that States Parties include risk preparedness as an element in their World Heritage site management plans and training strategies*". Section 4b of the format for the nomination of a property (Annex 5), includes an item on "*Natural disasters and risk preparedness (earthquakes, floods,* *fires, etc.)*", requesting States Parties to: "*Itemize those disasters which present a foreseeable threat to the property and what steps have been taken to draw up contingency plans for dealing with them, whether by physical protection measures or staff training*". Paragraphs 161 and 162, moreover, refer to the procedure for Emergency Nominations, reserved for properties that: "*have suffered damage or face serious and specific dangers from natural events or human activities*", explaining that in such circumstances the Committee might consider inscription on the List of the World Heritage in Danger.

Currently (August 2006), however, the large majority of the 34 properties inscribed on the World Heritage List in Danger (with the exception of Bam and its Cultural Landscape (Iran), and of the five natural heritage properties in Congo, for example) were included on this list due to gradual, cumulative effects, i.e. not as a result of disasters.

Risks are also mentioned within the format of the questionnaire for the Periodic Reporting exercise [xxxi], notably in its Section II.5, "Factors affecting the property" (Annex 7 of the *Operational Guidelines*). Here, States Parties are requested to "*comment on the degree to which the property is threatened by particular problems and risks*", including by natural disasters. "*Relevant information on operating methods that will make the State Party capable of counteracting dangers that threaten or may endanger its cultural or natural heritage*" is also required, including earthquakes, floods, and land-slides.
Finally, the *Operational Guidelines* make reference to disasters within their policies for the granting of Emergency Assistance Funds [xxxii], described in paragraph 241.

According to this paragraph: "*This assistance may be requested to address ascertained or potential threats facing properties included on the List of World Heritage in Danger and the World Heritage List which have suffered severe damage or are in imminent danger of severe damage due to sudden, unexpected phenomena. Such phenomena may include land subsidence, extensive fires, explosions, flooding or man-made disasters including war. This assistance does not concern cases of damage or deterioration caused by gradual processes of decay, pollution or erosion. It addresses emergency situations strictly relating to the conservation of a World Heritage property (see Decision 28 COM 10B 2.c). It may be made available, if necessary, to more than one World Heritage property in a single State Party (see Decision 6 EXT. COM 15.2). The budget ceilings relate to a single World Heritage property.*

The assistance may be requested to:
- undertake emergency measures for the safeguarding of the property;
- draw up an emergency plan for the property. "

As it can be seen, besides general principles and a dedicated chapter within the (very limited) budget of the World Heritage Fund, not much in terms of policy guidance and best-practices is provided within the Convention for States Parties and managers responsible for the protection of World Heritage properties.

The main purpose of the Strategy was therefore to "strengthen the protection of World Heritage and contribute to sustainable development by assisting States Parties to the *Convention* to integrate heritage concerns into national disaster reduction policies and to incorporate concern for disaster reduction within management plans and systems for World Heritage properties in their territories"[xxxiii].

The Strategy aims also at improving the effectiveness of the Emergency Assistance programme under the World Heritage Fund, through the application of its principles and activities.

Integrating heritage within the global disaster reduction policies

Risks from disasters and how to reduce them is a huge field which involves hundreds of organizations and institutions across the world, including a UN Focal Point, i.e. the Secretariat of the International Strategy for Disaster Reduction (ISDR), based in Geneva. The heritage field (especially cultural), on the other hand, has in the past developed its own policies on risk-preparedness in relative isolation.

When drafting the Strategy, therefore, particular attention was paid to ensure that this document take stock of the global context of Disaster Reduction and its terminology, lest procedures for cultural and natural heritage should be cut off from the mainstream discourse on disaster procedures within the framework of sustainable development.

The first aspect that required harmonization was indeed the terminology used. For the purpose of the Strategy, it was proposed that risk should be intended as risk arising from disasters, commonly defined within the UN as "*a serious disruption of the functioning of society, causing widespread human, material or environmental losses which exceed the ability of affected society to cope using only its own resources*"[xxxiv]. The Strategy, therefore, does not cover gradual cumulative processes/factors affecting the state of conservation of a World Heritage property, such as pollution, tourism or urban encroachment.

Moreover, with an aim to conform to the universally accepted terminology, it was agreed to adopt the expression "disaster risk reduction", rather than "risk-preparedness". The former is indeed the term widely used by the UN system and international development agencies, to encompass all efforts at different stages to minimize vulnerabilities and disaster risks within the society, and to avoid (prevention) or to limit (mitigation) the adverse impacts of hazards, within the broad context of sustainable development.

Accordingly, the Strategy makes reference to the widely acknowledged distinction between preparedness (before a disaster), response (during a disaster) and recovery (post disaster) as the three main phases characterizing all risk reduction strategies.

Risk, moreover, is commonly defined as the product of a threat (likelihood of occurrence of hazard) by vulnerability (susceptibility of heritage to deterioration). Reducing risk, therefore, can involve either acting on the threats or the vulnerability or both.

For the purpose of the Strategy, risks are to be understood as risks that affect the cultural or natural heritage values of World Heritage sites or their integrity and/or authenticity, in line with the overall aim of the 1972 *Convention*. In practice, organizations and professionals concerned with heritage will have to work together with those institutions responsible for addressing the broader generic risks to lives and properties within the boundaries of World Heritage sites and attempt to integrate heritage concerns into the larger disaster risk framework. Among the risks to be considered, it was recognised that climate change may have both long-term, gradual effects on World Heritage sites, and may also be responsible for the occurence of more frequent or severe disasters.

It is important as well to underline that the protection from disasters of the Outstanding Universal Value of a World Heritage property may imply the reduction of risks to persons, objects and collections associated with it. These would include holders/carriers/keepers of intangible heritage; items located within the boundaries of a World Heritage property and which form an integral part of its significant physical attributes (such as archaeological collections or original collections or furniture within a historic building); and items which are outside of the boundaries of the World Heritage property, but that represent essential original records of its history and value (such as archival documents, historic photographs, etc.).

In terms of contents, the most recent and important global policy text on risk reduction was adopted at the UN *World Conference on Disaster Reduction* (WCDR), held from 18 to 22 January 2005 in Kobe, Hyogo, Japan. Taking place 11 years after the adoption of the seminal *Yokohama Strategy (1994),* and five years after the end of the *UN International Decade for Natural Disaster Reduction* (IDNDR, 1990-1999), the Conference resulted in the approval of a very important document called the *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters* (also known as HFA)[xxxv].

The recommendations contained in the HFA are addressed, among others, to all Organizations of the UN system, including of course UNESCO, which are called upon to implement them "*within their mandates, priorities and resources*" (HFA, page 16). The HFA identifies specific gaps and challenges in the following five main areas:

- Governance: organizational, legal and policy frameworks;
- Risk identification, assessment, monitoring and early warning;
- Knowledge management and education;
- Reducing underlying risk factors;
- Preparedness for effective response and recovery.

The objectives and related actions of the Strategy have been accordingly structured around the five main priorities for action defined by the Hyogo Framework for Action, but adapted to reflect the specific concerns and characteristics of World Heritage. They are the following:

1. Strengthen support within relevant global, regional, national and local institutions for reducing risks at World Heritage properties;
2. Use knowledge, innovation and education to build a culture of disaster prevention at World Heritage properties;
3. Identify, assess and monitor disaster risks at World Heritage properties;
4. Reduce underlying risk factors at World Heritage properties;
5. Strengthen disaster preparedness at World Heritage properties for effective response at all levels.

These objectives correspond to the spirit of Article 5 of the *World Heritage Convention*[xxxvi], requiring States Parties to take all necessary measures to ensure the protection, conservation and presentation of the cultural and natural heritage situated on their territory. They also fit within three of the four Strategic Objectives established by the World Heritage Committee through its *Budapest Declaration* [xxxvii], namely Conservation, Capacity-Building and Communication.

For each of the above mentioned Objectives, a series of specific actions were identified, in a table format, together with possible responsibilities for implementation. These concern mainly States Parties to the 1972 Convention, the World Heritage Centre and Advisory Bodies, extending to concerned inter-governmental and non-governmental organizations at international and regional levels and academic circles. Emphasis is placed in promoting the integration of heritage within global disaster reduction strategies, on one hand, and in including consideration for traditional knowledge systems, where relevant, and building a culture of prevention on the other hand.

It will not be possible to examine here all these action points, given their extensive number. The interested reader is therefore referred to the full text of the Strategy[xxxviii].

Conclusions

The Strategy for Reducing Risks at World Heritage Property constitutes, therefore, an attempt to bridge the gap between the heritage sector and the disaster reduction field. This is done by integrating heritage in the larger context of disaster reduction, while paying due consideration for its specificities.

The Strategy is founded on the recognition that the cultural and natural heritage, with their related technologies, practices, skills, and knowledge systems, can play an important positive role in reducing risks from disasters at all phases of the process (readiness, response and recovery), and hence in contributing to sustainable development in general. In this respect, heritage should be understood as one of the fundamental goods and services provided by the broader category of bio and cultural diversity to sustain human development.

It is hoped that this Strategy will achieve two important objectives. Firstly, sensitizing the partners of the World Heritage Convention and the heritage sector in general to the importance of giving priority to the development of risk reduction strategies and plans at World Heritage properties. Secondly, opening a fruitful dialogue and fostering concrete cooperation opportunities between he heritage field and the disaster management community, possibly to start implementing some of the actions included in the Strategy itself.

NOTES

xxi World Heritage properties are cultural and natural heritage sites whose significance "is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity". A list of World Heritage properties is maintained and up-dated every year by an inter-governmental Committee (also known as the World Heritage Committee) in the framework of the World Heritage Convention, adopted by the general Conference of UNESCO in 1972. More information on the Convention and its List of World Heritage properties can be found on the internet at: http://whc.unesco.org xxii This document is accessible on the web at: http://whc.unesco.org/archive/2006/whc06-30com-07.2e.pdf (August 2006)

xxiii The text of the Hague Convention is accessible online at www.icomos.org/hague (May 2006)

xxiv Dinu Bumbaru. Excerpt from Email message dated 2 May 2006.

xxv H. Stovel: Risk Preparedness: A Management Manual for World Cultural Heritage. ICCROM, Rome 1998

xxvi The Blue Shield is the cultural equivalent of the Red Cross. It is the symbol specified in the 1954 Hague Convention for marking cultural sites to give them protection from attack in the event of armed conflict. It is also the name of an international committee set up in 1996 to work to protect the world's cultural heritage threatened by wars and natural disasters. The founding partners of the International Blue Shield Committee include the International Council of Monuments and Sites (ICOMOS); the International Council on Museums (ICOM); the International Council of Archives (ICA); and the International Federation of Library Associations (IFLA). National Blue Shield Committees are defined and accredited by the ICBS as a national corresponding entity grouping the national committees of ICOMOS, ICOM and accredited representatives of the archives and libraries organizations. Further information can be accessed online at: http://www.ifla.org/blueshield.htm

xxvii Accessible on: www.unisdr.org/wcdr/thematic-sessions/thematic-reports/report-session-3-3.pdf (March 2006)

xxviii Accessible on: http://ocha.unog.ch/ets/Default.aspx (March 2006)

xxix Accessible online at: http://whc.unesco.org/en/175/ (May 2006)

xxx Accessible on: http://whc.unesco.org (August 2006)

xxxi The Periodic Reporting is a process taking place approximately every six years whereby States Parties to the Convention provide information on the implementation of the Convention and on the state of conservation of World Heritage properties in their countries.

xxxii Emergency Assistance can be requested by each State Party to the Convention within the framework of the World Heritage Fund.

xxxiii Page 8 of the Strategy (see footnote 2)

xxxiv Definition from the UN International Strategy for Disaster Reduction (UN/ISDR) – 2006 - http://www.unisdr.org/ (March 2006)

xxxv This document is accessible on the web at: http://www.unisdr.org/ (March 2006)

xxxvi Accessible online at: http://whc.unesco.org/en/175/ (May 2006)

xxxvii Accessible online at: http://whc.unesco.org/documents/publi_basictexts_en.pdf (May 2006)

xxxviii See footnote N. 2

Part 2: Integrating Traditional Knowledge Systems and Concern for Cultural and Natural Heritage into Risk Management Strategies

Traditional knowledge as a cultural heritage that can contribute to future risk management strategies - some remarks from the Moken community of the Surin Islands, Phang-nga Province, Thailand

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Abstract

Chao Lay or the former "sea nomads" of the Andaman Sea have been an "invisible" or "unrecognized" component of Thailand for a long time. While the December 26th tsunami brought a woeful destruction to many areas in the six southern provinces of Thailand, it has proven that several Chao Lay groups have survived the tsunami due to their traditional knowledge about settlement selection, the legend of the "seven waves", their boat maneuvering skill, etc.

During the post- tsunami period, local mass media have followed up on the plight of these marginalized groups and several non-governmental organizations have facilitated their recovery and rehabilitation. Several committees have been set up by the government to resolve various problems, ranging from land rights issue and marine resource conservation to nationality. However, relatively little has been done on the preservation of their dying cultural heritage which can contribute not only to strengthen their cultural identity and pride, but also to the development of future risk management strategies for their own communities as well as for the larger society.

The purpose of this paper is to present some remarks about the Moken, a group of sea nomads who are known to be the tsunami survivors, their traditional knowledge which contributed to their survival and how it can contribute to future risk management strategies.

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Many coastal communities in the six southern provinces of Thailand received devastated effects from the tsunami of 2004. These communities included the sea nomad or sea gypsy, whose name reflect close physical, social, and spiritual ties with the sea. Over 30 communities of sea gypsies – the Moken, the Moklen, and the Urak Lawoi are found in southwestern Thailand, bordering the Andaman Sea coast, and about half of the communities were either totally wiped out or badly damaged by the wave impact. However, the number of casualties was quite low in relations to other coastal communities.

I will focus my paper mainly on the Moken, the group which have retained much of the traits and characters of the sea gypsy or sea nomads compared to their counterparts --the Moklen and the Urak Lawoi. The two latter groups have adopted a more sedentary life and have gradually integrated into the mainstream society, hence the name "*Thai Mai*" or new Thais.

The Moken, along with their counterparts, was previously regarded to be a backward and poor tribe, with virtually nothing to offer to the larger society. For decades, these people have faced discrimination and marginalization. Yet the tsunami incident has proved that their indigenous marine knowledge and their almost forgotten "legend of the seven waves" have saved them and others (especially tourists and park staff) from the disaster.
The Moken did well in getting back to their normal lives. The recovery has been quick. It could be said that they have a resilient social system, because loss and death have been very common in their daily lives. Moreover, for the Moken of the Surin Islands, the tsunami brought only one death in the community (a sick man left on the Island while the entire community went to seek refuge on the shore).

Moken communities in Thailand

Large Moken communities can be found in the three provinces of Ranong, Phang-nga, and Phuket. Individual Mokens are also found in several Urak Lawoi communities like those of Sireh Village (Phuket Province), Phi Phi Island and Lanta Island (Krabi Province), and Lipe Island (Satun Province). The approximate number of the Moken in Thailand is over 800, and there is about 2,000-3,000 more in Myanmar.

TABLE 1: MOKEN COMMUNITIES AND APPROXIMATE POPULATION IN THAILAND

Province	Island/Town	Land ownership status	Approximate Population
Ranong	Lao Island and Sinhai Island	Private and public land	339*
	Payam Island	Private land**	80
	Ranong town and pier	Stayed with employers or in rental place	30
Phang-nga	Surin Islands	State land (national park)	323*
	Ra Island and Phra Thong Island	State (national park), private, and public land	
	Khuraburi Town (Chai Pattana Village)	Private land (the Thai Red Cross and Chai Pattana Foundation)	
Phuket	Rawai Village	Private land	50
Others	Several Urak Lawoi communities	Various status	20
Total			842

Source : The Andaman Pilot Project Census Counting 2006
*The result of census counting and collecting individual data by the Andaman Pilot Project in collaboration with Mirror Art Foundation
**The land was bought by a Christian church and allocated for the Moken. New huts were also constructed with the funding from the church.

In earlier days, the Moken had dual lifestyles. The term "amphibious" was very suitable for the Moken livelihood. In the dry season, the Moken resided in their boat in order to travel and pursue maritime subsistent activities such as fish spearing and diving for shells and sea cucumbers. They also traded with middlemen for rice and other necessities. The Moken are skillful divers and navigators who possess intimate knowledge about the sea and insular forest.

The Moken's "Warning sign" in the form of an old legend

The morning of December 26, 2004 seemed to be like any other ordinary morning for the Moken. However, some Moken elders were reminded about the legend of the seven waves and expected the coming of a disaster after they saw the waves and currents behaving abnormally, with the final and "obvious" sign of water receded.

On the Surin Islands, the Moken who stayed in the village shouted to others and quickly climbed to a higher ground. Those who worked as hired labor at the Park kitchen and campground helped the visitors who were not familiar with the terrain to find a way to a higher place. And those who worked as boatmen maneuvered the long-tailed boats to a deeper water when the waves hit the shore, and then steered the boats back to the Park ground after things began to calm down.

It could be said that the tsunami has brought "the Moken" on the social map, and they became practically a celebrity overnight. This was because a Thai pop star and a pop singer happened to be in the village on December 26, 2004. It was the Moken who signaled to them that some danger was coming their way and they climbed up a steep slope to seek shelter from that danger. The fans were worried about the stars, and when they returned safely to Bangkok, newspapers, radios, televisions made interviews. As a result, most people in Thailand as well as abroad got to know the Moken, the almost forgotten indigenous peoples of southwestern Thailand.

The Moken survived because of indigenous knowledge, which has been "imprinted" in many Moken about the "legend of the seven waves". When the seawater started to recede, the Moken knew that "*la-boon*" or tsunami was coming, so they ran up to a high ground. It becomes almost instinctive, even to children. A small boy who was rowing his boat noticed that the current got stronger and unusual, so he quickly row to the shore and ran up the hill. Tsunami warning sign is actually imprinted in their cognitive system, so they are all able to survived even though most have not even seen the tsunami before.

The legend of the seven waves is actually an unwritten "historical" record that has become internalized by the elder Moken. It enables the Moken to recognize the coming of the disaster and they could eventually escaped in time.

Traditional knowledge about settlement site selection

Moken traditional huts and village settlement on the Surin Islands National Park, Phang-nga Province, Thailand, could be considered the production of indigenous knowledge, which has been passed down for generations. Together, they represent an adaptation of a human settlement to suit the local marine and forest environment. This short article presents some remarks about Moken settlement, village lay-out, hut forms, hut building, and how these have changed markedly since the Moken have built their new village after the tsunami disaster of December 26, 2004.

The Moken and the Urak Lawoi who reside on different islands within Thailand's Andaman Sea carefully select appropriate site for their villages, that is, the area on the eastern part of the islands. It is obvious that traditional settlements, be they the Moken village at "Daya Eboom" or Mae Yai Bay on North Surin Island, Urak Lawoi villages at Sireh Island and Rawai Beach on Phuket Island and Hua Laem Klang (Middle Cape) Village on Lanta Island. These villages are all located on the eastern side of their respective islands. A comparative analysis of these indigenous settlements leads to the conclusion that each of the Moken and Urak Lawoi settlements share at least three common characteristics as indicated in the table below --

Characteristics of the Sites	**Rationale**
1. Beach area in protected bay, usually on the eastern side of the islands --this is because the islands in the Andaman Sea are influenced by two monsoons, southwest monsoon which brings rain, strong winds, waves, and storms; and northeast monsoon which brings drier weather and milder winds. Having settlements on the eastern side of the island means being well-protected from southwestern wind.	Protection from winds and waves, and easy to observe boats traveling from mainland towards the islands.
2. Area with fresh water source, sometimes this is a small stream from the forest or a small spring.	Convenience to fetch water to drink, cook, wash, bathe, etc.
3. Beach area with suitable degree of slope – if there is too little slope if the beach is rather flat, then it will be difficult to bring boats in and out at low tide. One will have to wait until high tide before taking boats in or out.	Convenience to bring boats in and out, to take care of them, and to transport things into and out of boats.

For the Moken, the villages usually consist of two or three rows of huts slightly staggered one another. This depends on the width of the beach and flat area suitable for settlement. The first row of huts is right on the beach slope. At high tide, sea water floods below the huts, thus these huts must have tall stilts to keep the floor well above water line. The second row is on the beach just beyond the reach of the high tide mark, and the third row is more towards inland. The latter huts do not use tall stilts, but are still tall enough for a person to stoop underneath.

Nowadays, the Moken still move their huts and village much intermittently. It is quite rare in comparison with earlier times when they had a more mobile life, and the community was often moved due to epidemics, deaths, or sickness and the choice of where they could live was not limited by coastal development or the declaration of protected areas.

Huts and village after the tsunami

The problem faced by numerous tsunami-affected communities in Thailand is rebuilding houses and community. The local government, out of their best intentions, tried to design and build houses quickly to accommodate affected people. However, this was often done without people's participation. As a result, house styles and community layout are not suitable.

As for the Moken of the Surin Islands, after their villages at Sai-En Bay and Small Bon Bay were swept away, they came to shore to take refuge in the local temple. Within two weeks, when they felt confident enough to move back to Surin Islands, the government sent them raw materials to build their huts.

Though the Moken have always designed and build their own huts and village, for the sake of speed and convenience, the government and an aid organization designed the village for the Moken. Local Thai volunteers were recruited and they willfully worked side by side with the Moken on building huts. All the Moken --- 194 persons, 52 huts[xxxix], now live in a large village at Large Bon Bay, the place where they previously had a settlement 11 years ago. Below is the table showing comparison of the old style huts and village with the new ones.

Moken traditional settlement, village, and huts, including beliefs and practices about hut construction are all reflection of traditional knowledge which enables the Moken to reside comfortably and safely in the coastal environment. In addition, a small village with long-stilted huts situated on the water has been a significant part of Moken cultural identity. After the Surin Islands villages were destroyed by the big waves, under the local government administration the Moken rebuilt their village in Large Bon Bay in February 2005. This marks the moment when the socio-spatial structure of their huts and village began to change significantly.

Although the indigenous knowledge, which served as a "tsunami warning system", has already been widely known through the media, the other knowledge like the selection and construction of the traditional huts were not recognized nor appreciated. There was no serious effort in consulting a community before rebuilding a new village. As a result, the new huts were built with a large setback space, and set in a tidy row, with little space between the huts. This is quite different from the pre-tsunami village where stilted huts were built right on the beach for the convenience of anchoring and boarding the boat. In addition, combining two communities together may lead to the deterioration of community health, social and physical well-being, and the deterioration of natural resources around the village.

A large village with a large population may create an impact on Moken physical health and hygiene, on the local natural resources, and on Moken social cohesion as follows:

Physical health and hygiene – due to increasing crowdedness, there will definitely be a problem with garbage, waste, and discharge in the future. And this will result in Moken physical health and hygiene problems. Grid-designed settlement prevents huts in the back row to get full ventilation, and the people in the huts are not able to observe the sea, the weather, the waves, or the boats approaching the village directly from their huts.

Natural resources – as the Moken usually forage on their "backyard", the exploitation of natural resources will become intensified in the patches nearby the village, which will result in the gradual degradation of local resources.

Social cohesion – previously the spread of the population and the frequent migration/travel serves as social mechanism against conflict and fights. Nowadays when the Moken live in a larger group, there is also a stronger tendency for conflict. At the same time, moving away to join the other village(s) within the Surin Islands is no longer an option for them.

It is unfortunate that Moken cultural identity expressed through huts and villages has been changed in the post-tsunami reconstruction phase in southern Thailand. Furthermore, the large new settlement may create social, environmental, and health impact in the future. Therefore, we should review the change and look back to the traditional knowledge to find solutions and preventions for the negative things that might come with the change.

It is unfortunate that several forms of traditional knowledge are now limited only to the Moken adults and the elderly. It is gradually forgotten and rarely passed on to the young generations. The fact is, these knowledge and skills are crucial to Moken cultural survival, they are a significant part of the culture as they reflect that the Moken are an ethnic group with their own knowledge and "technology".

This kind of "technology" or "know-how" is used for many purposes – to strengthen social relations and solidarity, to cure sickness, to prepare and help a mother to give birth, to select and use appropriate forest plants for medical ingredients, to build the traditional boat, or even to survive the tsunami.

Rebuilding the new village, rebuilding new lives

ROLES OF MEDIA

Mass media had a significant role during the post-tsunami period. They publicized the physical, social, and psychological effects of the disaster, and volunteers and other helps were recruited for emergency relief through mass media. The volunteer phenomenon during this period was very striking; perhaps it is a single occurrence that brought the greatest number of Thai and international volunteer together in the Thai history, as stated in "Tsunami Thailand, One Year Later", "Effective engagement of civil society and the private sector was a striking feature of the relief effort. The contribution of Thai civil society and the private sector, both nationally and in the affected areas, can hardly be overstated" (United Nations Country Team in Thailand, 2006).

The mass media have also followed up on human rights issues in the area, mainly among marginalized groups like the Moken, Moklen, Urak Lawoi, and Burmese migrant workers and their plight during the post-tsunami period. One news reporter of a national newspaper was even shot and injured by a firearm because his report uncovered a forceful land claim by a very influential person.

Thanks to such news coverage and the effort by local Non-governmental organizations and academic institutes, several committees have been set up by the government to resolve various problems, ranging from land rights issue and marine resource conservation to nationality. A sub-committee on land right issues has already identified solutions for 13 areas with land disputes, allowing over 1,000 households to secure their residence over the land that they used to live prior to tsunami destruction (Community Organization Development Institute (CODI) website, cited in "Tsunami Thailand, One Year Later", 2006).

It should be noted that many of these problems have existed prior to the tsunami incident, but they became widely exposed afterwards; for example, the problem of land ownership right in the former mining area nearby Tabtawan Community (Sub-committee on the Water and Mineral Rights, 2005). While the tsunami brought a tragedy, it also brought an opportunity to bring problems to the open and find ways to correct those problems.

Although the Moken need to be thankful of the media, their cultural integrity can be threatened by its intrusion. The annual lobong festival (the celebration of ancestor's spirits) in 2005 was joined by many film crews. Thom Henley, an environmental educator who visited the village during the time noted that, "They [the Moken] had the added stress of having to perform under the glare of camera lights and pushy foreign television crews" (2006).

Worse than that, tsunami volunteers and health officers stationed temporarily in the village also turned on karaoke and VCD loudly to show to the children and young adults while the elders sang, danced, and got into trance during the spirit ritual. The loud machine music blast on over midnight while the traditional music continued in the elder circle. It was very obvious that the spiritual value of such traditions was dying with the coming of a more attractive and exciting form of media. Therefore, the "roles" of the media during the post-tsunami rehabilitation period need to be praised as well as questioned in the Moken context.

PARTNERSHIP

Not long after the tsunami incident, disaster relief and rehabilitation projects have been underway to bring communities and businesses back to their own feet again. However, since there are various international, national, and local agencies, organizations, and foundations, many of which have different mission and goals, the earlier rehabilitation projects were not as successful as they aimed to be. Some communities became fragmented because of this. And many tsunami victims chose to be easy aid recipients instead of standing up and getting on with their lives and livelihood. Therefore, relief efforts should be well coordinated and harmonized, instead of "competing" for their own "target" groups. Partnership is an important recipe for the success of rehabilitation project.

In some situations, partnership with the government posed a constraint to the help and rehabilitation of the most marginalized and disadvantaged people in the society. Not only is the government procedure "bureaucratic", but the government offices usually need legal documents, papers, or proof of registration before carrying on with relief help. These forms of document are lacking in the most disadvantaged groups like the Moken and the Burmese migrant workers.

The most important component of "partnership" is the involvement of or partnership with the "third party" like academic institutes or independent units of government offices to a) conduct surveys to assess the process of aid distribution, and b) serve as a central registry and a coordinating point to direct rehabilitation effort.

These “surveys”, “central registry”, and “coordinating point” were a part of suggestion proposed by the the University of California Human Rights Center due to the many cases of arbitrariness in aid distribution which shows the local administrative office’s lack of accountability and transparency and the lack of integrity and honesty on the recipient’s side (Fletcher, 2005). Our own team even encountered a villager who offered us a sale of a donated long-tailed boat.

Another sound suggestion by the Human Rights Center is to establish an independent body in collaboration with government agencies, local non governmental groups, and aid organizations to monitor human rights during the reconstruction and rehabilitation period, to generate policy recommendations, and to bring cases of serious violations to the attention of authorities, international organizations, and the media (Fletcher, 2005).

The lesson learnt from the past was that there was little concerted effort by academic institutes which collected data in the tsunami affected areas. As a result, tsunami victims were victimized over and over again through set after set of questionnaires. Therefore, partnership and harmonized effort among different agencies and organization is really needed at the outset of the rehabilitation process.

CAPACITY BUILDING

Capacity building is another crucial strategy for rehabilitation project, which has been given a low priority or even totally neglected, because it takes so much effort and time, and may not yield a satisfactory output within one short project cycle.

However, it became apparent that the communities which have been through capacity building process especially participation, decision-making, and carrying out their own development projects are likely to be more successful in post-tsunami recovery and rehabilitation. On the other hand, the communities without that kind of experience, but with on-site facilitators for capacity building could also make quick recovery; for example, Tabtawan Community (Moklen community in Phang-nga province) and Pak Triam Community (Thai Muslim fishing community in Ranong Province).

As for the Moken of the Surin Islands, becoming a celebrity also attracted several forms of relief aid. They were given clothes, tools, building materials, kitchen utensils, rice, canned food, and medicine. In other words, all the “4 necessities” in life were provided for them. The two main things which are lacking have been the effort from a larger society to understand, recognize, and appreciate their entire culture and the effort to promote self-organization and build community capacity.

Experiences from around the world teach us that contacts between the indigenous or tribal communities and the larger society usually resulted in assimilation or segregation. These small communities either adopted the mainstream language and culture or became segregated in “reservation” or some wasteland. After the tsunami, the Moken have more frequent and intense contacts with different components of a larger society. Moken culture is very fragile. If we compare it to a tree, it is the one with weakened roots.

The help for the Moken of the Surin Islands included the building of two public structures – a “school” and an “all-purpose pavilion”. Certainly “school” as a structure is important, but what is more important is a continuous funding for teachers who understand Moken culture and who determine to build cultural confidence among the Moken children. "All-purpose pavilion" is also perhaps less important than political will and practical support towards self-organization and self-administration.

END NOTE

The next tsunami might come earlier than expected in the Moken legend (once every two generations) due to unstable geological conditions, less natural protection in the form of healthy ecosystem like mangrove forest and coral reefs, more extreme weather related to global warming and other human-made phenomenon. In addition, the next tsunami or other natural disasters may have a more devastation effect. The past tsunami and the relief/rehabilitation effort have become our lessons. Through these lessons, we could be wiser and better equipped to cope with similar thing next time around.

This text is adapted from the paper on "Capacity Building, Partnership, and Roles of the Media in the Post-Tsunami Rehabilitation Period -- Some Remarks on the Moken community on the Surin Islands, Phang-nga Province, Thailand" presented in The Workshop on Post-Disaster Assessment and Monitoring of Coastal Ecosystems, Biological and Cultural Diversity in the Indian Ocean and Asian Waters, held in Phuket, Thailand, 20-24 February 2006.

NOTES

xxxix This was the census count in February 2005.






References

Arunotai, Narumon. (2003) "Towards a better understanding of the Moken" In *Knowledge and Mystification about Ethnic Groups*. Bangkok: Office of the National Commission on Culture, Thailand. (In Thai language).

Ferrari, Olivier, Narumon Hinshiranan, Kunlasab Utpuay, and Jacques Ivanoff. (2006) *Turbulence on Ko Phra Thong*. Bangkok: Amarin Printing and Publishing, 2006.

Fletcher, Laurel E., Eric Stover, and Harvey M. Weinstein (eds.). (2005) *After the Tsunami : Human Rights of Vulnerable Populations.* California : Human Rights Center, University of California, Honolulu: East-West Center. (http://library.car.chula.ac.th/search/a East-West+Center./aeast+west+center/-2,-1,0,B/browse)

Henley, Thom. (2006) "The Moken and the Tsunami", *The Greater Phuket Magazine*, Vol. 16 No. 6: 36-43.

Na Pombejr, Paladej. (2003) *The World According to the Moken: Reflection from traditional ecological knowledge on marine environment.* Unpublished M.A. Thesis, Faculty of Political Science, Chulalongkorn University, Bangkok.

Sub-committee on the Water and Mineral Rights, the National Human Rights Commission (2005). *Summary on the inspection of human rights violation –the case of residential land and land to make a livelihood, Tab Tawan Village, Bang Muang Sub-district, Takuapa district, Phang-nga Province.* (In Thai language).

Theawchaturat, Aroon. (2000) *Moken Ethnobotany, Surin Islands, Phang-nga Province*. Unpublished M.A. Thesis, Faculty of Forestry, Kasetsart University, Bangkok.

UNESCO. (2001) *Indigenous People and Parks: The Surin Islands Project*. Coastal Region and Small Island Papers 8, Paris: UNESCO.

United Nations Country Team in Thailand, Office of the UN Resident Coordinator. (2006) *Tsunami Thailand, One Year Later. National Response and Contribution of International Partners*. Bangkok: UN.

Using Traditional Knowledge Systems for Post-disaster Reconstruction: Issues and Challenges following Gujarat and Kashmir Earthquakes

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Introduction

Disaster is no longer viewed as an isolated catastrophic event that merely results from momentary natural hazards such as earthquakes, floods, cyclones etc. The current understanding seeks to recognize the complex relationships between disasters and development. The Hyogo framework for action (2005-2015) resolves more effective integration of disaster risk considerations into sustainable development policies, planning and programming at all levels.

In order to achieve these objectives, the fundamental importance of transmission of traditional technology, skills, and local knowledge systems, and the conservation of cultural heritage has been recognized, thereby emphasizing the proactive role of cultural heritage during prevention, response and recovery phases of disaster management (WCDR 2005).

The paper will investigate the scope and nature of traditional knowledge in disaster mitigation, its present status and potential role in post disaster reconstruction by looking into the cases of Kashmir and Gujarat, which suffered devastating earthquakes in 2005 and 2001 respectively.

Why most structures failed?

According to official figures, the Northern Kashmir Earthquake on 8 October 2009 killed more than 87,000 people in Pakistan and 1,300 people in India and injured 1,00,00 people in Pakistan and 6,600 in India. The devastating earthquake that struck Kutch region of Gujarat in India on 26 January 2001 killed 20,083 people and injured 166,836.

In both cases, most structures whether 'modern' or 'traditional', suffered enormous damage causing such a great loss of life. Many 'modern' Reinforced Cement Concrete (RCC) constructions, which were largely perceived to be stronger in comparison to traditional structures, were of extremely poor quality. In Kashmir, it was found that many of these constructions were not even following the basic rules of construction in RCC. In many cases, roof slab was not resting on the beams. Rather it was cast on two or three courses of brick placed over the beams and in some constructions, these beams were not even at the same level (see Fig. 1).

Fig. 1

In other cases, the roof slab had virtually no reinforcement bars and layers of mud on top for terracing increased the vertical load. As a result, they simply cracked and collapsed like pack of cards due to the impact of earthquake (see Fig. 2).


Fig. 2

Even the columns had inadequate reinforcement in many structures. There were instances where RCC beams resting on the columns made of slender brick piers simply gave way due to lateral impact of earthquake.

Most of the traditional structures also did not perform well due to poor quality of stone masonry. Although many stone walls were clad with well laid out stone courses, their inner core was built of random rubble masonry laid in poor mud mortar. Due to improper bonding and absence of thorough stones, these walls simply collapsed due to earthquake (see Fig. 3).


Fig. 3

Inadequate corner joints between the perpendicular walls were also one of the reasons for poor behavior of these buildings. In historic structures with sloping roofs, free standing gable walls could not withstand lateral forces of earthquake and simply collapsed causing extensive damage.

One of the major reasons for the extensive damage sustained by buildings was incompatible structural and material additions, as a result of which they lost their structural integrity. For example, in several structures built of load bearing stone walls, the upper floors were added using RCC.

Needless to stay, lack of adequate knowledge and poor workmanship was the main reason for such an extensive damage of 'modern' RCC as well as traditional stone constructions. Strikingly similar issues were also observed in Gujarat, pointing towards a poor building culture in both the regions prior to the earthquakes. One wonders whether any traditional building knowledge for earthquake mitigation existed and if indeed it did exist, what were the reasons for its loss or degeneration?

The earthquake survivors – repository of traditional knowledge systems

On close inspection, we discover several examples of traditional constructions that did survive these devastating earthquakes, owing to their earthquake safe construction systems/ features.

The vernacular structures built using local Kashmiri building techniques of Taq (timber laced masonry bearing wall) and Dhajji Dewari (Timber Frame with Masonry Infill) performed much better than many poorly built 'modern' structures. Although there were cracks in the masonry infill, in most cases these structures did not collapse, thereby preventing loss of life (Fig. 4).

Fig. 4

Also several traditional constructions employing use of proper stone masonry with thorough stones and well designed arches and retaining walls / bastions around corners performed well against the earthquake. Other earthquake safe features found in several traditional constructions in earthquake affected Poonch region in Kashmir include ceiling with joists resting on wooden bands running all along the walls, well designed trusses, 'tongue and groove' joinery and balconies resting on projecting wooden joists. In other constructions, extensive use of wood on the upper floor (in the form of wall paneling, balconies, staircases etc.) significantly reduced the weight, thereby enhancing the earthquake performance of the structures (Fig. 5).

Fig. 5

Such earthquake safe construction systems have also been found in Gujarat. The typical traditional dwellings of the Kutch region; the bhungas, have withstood the test of time for centuries and have also withstood earthquakes, thanks to their circular form, which is very good in resisting lateral forces of earthquakes. Moreover, wattle and daub constructions especially where wood is used as reinforcement for the wall has proved to be very effective. Its worth mentioning that bhungas are not only earthquake safe, they also demonstrate sensitive understanding of locally available resources, climatic conditions and spatial requirements of people (Fig. 6).

Fig. 6

In fact, all these factors play an important role in the evolution of vernacular architecture at any given place.

In Gujarat, many structures built prior to 1950s had floor joists extending through the rubble stonewalls to support the balconies. They were more successful in stabilizing the walls than where joists terminate in pockets and therefore performed much better against the 2001 earthquake (Langenbach 2001). In fact, in Anjar, this kind of structure was one of the rare ones found standing amidst debris of collapsed houses (Fig. 7).

Fig. 7

Some traditional constructions employing wooden frames with masonry infill also performed well against lateral forces of earthquake due to their capacity to dissipate the energy. Several earthquake safe features are also to be found in many traditional constructions such as tie beams, knee bracing, tongue and groove joinery etc. (Fig. 8).

Fig. 8

Last but not the least, useful knowledge is also embedded in traditional management systems, which act as effective coping mechanisms during disaster situations. In Gujarat, local community networks, religious and philanthropic institutional structures played significant role in supporting post disaster recovery efforts.

Based on the above findings, we can safely conclude that traditional knowledge systems for earthquake mitigation as well as recovery did exist in earthquake prone Kashmir and Gujarat regions, although in most cases these had largely disappeared or degenerated due to several factors such as lack of maintenance, incompatible changes, poor workmanship, the underlying reasons for which are linked to the development process, which though worth investigating, is outside the scope of this paper.

Nature and Scope of Traditional Knowledge for Disaster Mitigation

In the light of above discussion, it is worth looking into the scope and nature of traditional knowledge systems.

Such systems are typically developed locally, are under local control and use low levels of technology. Many also lack bureaucratic organization. The main channels of communication of this knowledge are traditional performing arts (or 'folk media'), 'indigenous organizations', 'deliberate instruction' (child rearing, traditional schooling and apprenticeship), unstructured channels such as conversations at markets and in the field, written and memorized records and direct observation. This just goes to show that traditional knowledge encompasses the whole cultural context. Paul Sillitoe (1998) describes traditional knowledge as "by definition interdisciplinary; local people think of and manage their general environment as a whole system." Moreover it is experience-laden, practice oriented and culturally embedded, thus more holistically oriented.

Peter Schroder (1995) has aptly summarized the generally held consensus on traditional knowledge. According to him, "Traditional knowledge consists of knowledge and practical capabilities, which emerged from local conditions and natural and social surroundings, and which have often been tested over a long period of time and integrated into a larger cultural context" (translated from German by Schmuck, 2001).

For disaster mitigation, indigenous coping skills and capacities are also inherent part of traditional knowledge systems. These can be physical, social, economic and institutional. The term 'coping capacity' also carries significance in a post disaster situation. In every society, there are variety of internal social structures that help individuals and families through difficult periods. These are known as coping mechanisms and during disaster situations, they become collective instruments for organizing action on behalf of the disaster victims.

Post disaster Reconstruction in Kashmir

Following the recent earthquake in Kashmir, it was found that in most instances, the traditional constructions, which had in fact performed better against the earthquakes were abandoned by their owners due to widely prevalent perception that traditional buildings were 'old' and 'outdated' and therefore 'unsafe' and 'unlivable'. Many of these structures were also on the verge of demolition and proposed to be replaced by 'modern' reconstructions. In the absence of any proper technical assistance, people started rebuilding on their own using whatever resources were available at their disposal, including the compensation money being provided by the Government. Not many realized that the main problem did not lie with use of stone but the way it was being used.

Ironically, the new constructions after the earthquake were even poorer than before because with no technical assistance forthcoming, they were left with no option but to be able to have a roof above their head as soon as possible. Moreover, these new constructions were observed to be unsustainable in terms of available skills and resources. Stone is locally available material and is part of local building culture. Replacing it with concrete would prove to be economically unaffordable for the far flung villages located in a difficult terrain. As a result people started reconstructing in stone without employing earthquake safe practices (see Figures 9 and 10).

Fig. 9

Fig. 10

One of the reasons for these poor construction practices was the unavailability of trained local engineers and masons. In fact, most of the reconstruction was being undertaken by Masons from Bihar, who were not well conversant with local building techniques.

RECONSTRUCTION IN GUJARAT – FROM 'NATURAL' TO CULTURAL 'DISASTER'

Here the villagers were eventually left with two options – either to choose financial compensation offered by the government, or to let the donor agencies undertake full-fledged adoption and reconstruction. Finally, majority of people decided to go for financial compensation and expressed their desire to undertake construction on their own (Jigyasu 2001).

As a consequence of all this, many NGOs came forward to help local communities in deciding the design layout and structural system of new construction. Most of them promoted self-help construction by providing the beneficiaries with construction materials like wood, bamboo spread sheets or concrete blocks, reinforcement bars etc. according to the structural design advocated by the concerned NGO. The local communities were involved in providing labour for tasks such as curing, block-laying etc. Junior engineers were hired from other areas to coordinate the construction activity. As part of public-private partnership policy, the government made available the building materials in a subsidised way (ibid).

'ADOPTED' VILLAGES – CULTURALLY COMPATIBLE?

While the owner-driven approach was on the main agenda of the Government, it also paved the way for 'full-fledged adoption of villages' through contractor driven reconstruction programmes. In these villages, the labour was essentially hired from outside and local villagers had no say or role in the reconstruction process.

In many of these villages, the 'city-like' layout and the government criteria of house-size overlooking traditional spatial planning and design brought out the issue of 'cultural incompatibility' (Fig. 11).

Fig.11

In some villages, traditional circular structures (bhungas) were reconstructed by merely using the form but changing local materials and technology, bringing forward issues related to their authenticity and sustainability (Fig. 12).

Fig. 12

'ALTERNATE' TECHNOLOGY – HOW SUSTAINABLE?

Besides the 'modern' techniques, some NGOs also explored various options for 'alternative' design and technology for earthquake resistant construction. A consortium of NGOs promoted construction of structures using precast 'compressed soil blocks' with or without interlocking dry stacked masonry system, ring reinforcement and wooden rafters. It has also set up a laboratory to experiment and test 'new' technologies.

However, such alternate methods also required strict quality control and proper curing. During construction phase, the concerned NGO took care of this but since these technologies were not based on traditional knowledge and required proper curing (a difficult proposition in a drought prone area), there were questions regarding 'internalizing' them within the local community, once these organizations withdrew from the scene. Whether such technologies would take roots with the building culture of the area was highly doubtful.

UNSAFE PRACTISES IN SELF-HELP CONSTRUCTIONS

No matter how NGOs and to some extent the Government were facilitating reconstruction, earthquake safe features were not being employed in many self-help constructions, thanks to the general ignorance regarding them. The situation is strikingly similar to Kashmir.

The government and some NGOs advocated the concept of semi-permanent shelters as an intermediate solution, mainly to protect the victims from monsoons before they could move into their permanent houses. However, this did not materialise in time. As a result, by the time these could be erected, people had already started initiating permanent constructions by reverting back to unsafe building practices using stone. Over time, many semi permanent constructions were also made permanent by raising walls in stone, which again did not employ any earthquake safe features (Fig. 13).

Fig. 13

REPAIRS, STRENGTHENING AND RETROFITTING – CONTINUING MISPERCEPTIONS

Wrong repairs were also seen everywhere. People had filled up 'through cracks' with cement grout and then moved back to their houses. Some difficulties were experienced in implementing strengthening and retrofitting programme because of prevailing misperceptions against traditional buildings, which discouraged people from undertaking these measures. Moreover, the emphasis of decision-makers seemed to be on the number of new houses being reconstructed.

Wrong perceptions are also evident in the way traditional structures were being pulled down, even where they are still standing to make way for 'modern' structures, especially in historic towns such as Anjar, Bhuj and Morbi. Ironically, in most cases the new structures were not better, thanks to poor workmanship and undue costs.

The Underlying reasons - loss or degeneration of Local Knowledge

Therefore the key issue here is the loss or degeneration of traditional building systems over last few decades, which made the buildings vulnerable to disasters in the first place and reinforced and in some cases even increased the existing vulnerability during post disaster reconstruction. The underlying reasons for this loss or degeneration therefore need to be explored.

First, economy influenced owner's choice of materials and lowering of specifications before and after the disaster. For example, wood was one of the primary building materials for housing in several earthquake prone regions and its combination with stone masonry helped in better seismic performance. However, wood slowly became unaffordable and therefore people started making alterations to their structures, which in many cases made them more vulnerable to earthquakes. For example, in Kutch region of Gujarat as well as in Poonch region of Jammu and Kashmir, the walls were extended up to over 15 feet in unbraced height, simply to support the ridge of the roof to avoid the use of wood necessary to build a roof truss. Also in many instances, sophisticated joinery using tongue and groove joints got replaced with simple nailing of wooden members, which could easily give way in the event of an earthquake.

Secondly, overriding perceptions favored the use of new materials like cement while overlooking the traditional use of mud, which was perceived as 'weak' and 'outdated'. Needless to say, some of the new specifications needed with the introduction of new materials and technology were not feasible in many earthquake prone regions owing to the local unavailability of resources, for example appropriate curing of concrete is virtually impossible in the drought prone regions of Kutch. Moreover poor economy also forced people to make compromises in their constructions.

Thirdly, with the introduction of new materials, the original strength of the traditional materials could not be used effectively to make the buildings stronger in withstanding lateral forces of earthquakes. Materials such as brick and concrete, which where introduced later in some regions, were combined randomly with traditional materials of stone and wood even in post earthquake reconstructions, thereby affecting the structural integrity and adversely affecting their seismic performance.
Last but not the least, with changes in the materials and technology, the traditional craftsmen found themselves incapable of using their skills, for example, local masons, who were skilled to shape and lay stones were not trained to handle brick and concrete constructions. While on one hand, they found themselves incapable of using new materials, their own knowledge of stone masonry had degenerated to a considerable extent, primarily because of lack of demand (again linked to general misperceptions about traditional constructions) over last few decades, which forced them to move to other occupations and therefore successive generations could not imbibe the skills from their masters. Even those who could afford modern RCC constructions could not afford the level of workmanship required for these types of constructions due to unavailability of skilled workforce. Extensive role of outside craftsmen, who are unfamiliar with traditional construction practices, before and after the earthquake, have made matters more complicated.

Also, most of the post earthquake interventions from outside conceive earthquake resistant technology as a 'packaged product' for fast duplication and transfer. Ironically traditional knowledge systems are also in danger of falling in the same trap if they are looked in a static manner. This issue will be taken up in the next section.

It won't be wrong to conclude that the traditional knowledge has been lost or degenerated mainly because its process of evolution has been disrupted, thereby putting a stop to the 'creative' search for solutions through continuous trial and error. In fact, this evolutionary process is what defines the true essence of traditional knowledge.

Critical Challenges for Mainstreaming Traditional Knowledge

'HERITAGE' – ELITIST OR INCLUSIVE?

Predominant perception among professionals as well as local community is that cultural heritage is limited only to the select group of monuments or objects and in that sense is elitist. Therefore concerns for cultural heritage in disaster management are seen as secondary, with understandable logic that concern for saving lives and livelihoods should take precedence over preservation of cultural heritage.

However, the scope of cultural heritage has extended way beyond select monuments, group of buildings or objects to include vernacular houses, historic urban areas, cultural landscapes and even intangible dimensions of living heritage such as skills and cultural practices. This expanded scope of heritage needs to be integrated within various development and disaster risk management sectors through redefining and repackaging heritage concerns through regenerating traditional livelihoods, ecological planning, sustainable development etc.

RECOVERING 'SCIENTIFIC ASPECTS' OF TRADITIONAL KNOWLEDGE AND VICE-VERSA

A large part of the writing on local knowledge attempts to 'package' and 'market' traditional knowledge as something complete in itself by marking an artificial boundary between it and formalized, scientific knowledge (Schmuck 2001)

However, Richards (1994) rightly emphasizes experimentation as an important aspect of traditional knowledge, and thus makes a claim that traditional knowledge is scientific. According to him, "Traditional knowledge is knowledge that is in conformity with general scientific principles, but which, because it embodies place-specific experience, allows better assessment of risk factors in production decision. This kind of knowledge arises where local people undertake their own experimentation, or where they are able to draw inferences from experience and natural experiments."

The same emphasis is given by Flavier et al. (1995), who states that traditional information systems are dynamic, and are continually influenced by internal creativity and experimentation as well as contact with external systems. This continuous process of experimentation, innovation and adaptation enables traditional knowledge to blend with science and technology as well.

Therefore rather than categorizing traditional and Scientific Knowledge into mutually exclusive domains, attempts should be made to recover 'scientific' aspects of traditional knowledge and 'traditional' aspects of 'scientific knowledge'. While the former will enable traditional knowledge systems to be easily understood by professionals, the latter would demand that larger scientific concepts get translated into modes of communication that are locally understood. This process of rediscovering, recovering, encoding and decoding is an organized scientific activity in itself.

REPLACING, RESTORING OR EVOLVING?

Critical choices need to be made regarding the basic philosophy governing post disaster interventions and the role of traditional knowledge in developing these. Should we restore the traditional knowledge systems by recovering and reusing them in a manner they would have existed in their pristine glory? Or should we attempt to restore their essence by bringing back the creative process of evolution responding to changing needs, constraints as well as aspirations but at the same time maintaining local sense of identity and building on the accumulated experience of the past? The latter seems to be an obvious choice if we wish cultural heritage to play a proactive role in disaster mitigation and recovery.

If we want to protect cultural heritage in post disaster situation, we must prevent its replacement by seemingly 'modern' but culturally, climatically and economically unsustainable reconstructions. This requires us to address post disaster rehabilitation in two ways. Firstly, by developing workable alternatives for repair and retrofitting of traditional and historic structures, which may have got damaged but did not collapse rather than 'standard engineering recipes and design packages'(in cases, where this is a feasible option). Secondly, by engaging in a process of culturally sensitive reconstruction that builds on the accumulated knowledge of the past, fosters local identity but at the same time addresses new needs and aspirations including that of seismic safety. This may also require lowering the earthquake safe thresholds by establishing optimum acceptable standards for managing risks in response to local constraints and opportunities.

Last but not the least, this would demand real community engagement through empowerment and not merely the rhetoric of participation.

References

Flavier, J.M. et al. (1995)""The regional program for the promotion of indigenous knowledge in Asia", pp. 479-487 in Warren, D.M., L.J. Slikkerveer and D. Brokensha (eds) *The cultural dimension of development: Indigenous knowledge systems* (Intermediate Technology Publications, London)

Jigyasu, R. (2002), 'Reducing Disaster Vulnerability through Local Knowledge and Capacity', Dr. of Engineering thesis, Department of Urban Design and Planning, Norwegian University of Science and Technology, Trondheim.

Paul Sillitoe et. al (1998), 'Participating in Development. Approaches to Indigenous Knowledge', ASA Monographs 39 (Routledge, London)

Richards, P. (1985), *Indigenous Agricultural Revolution; Ecology and Food Production in West Africa* (Hutchinson, London).

Recommendations of "UNESCO-ICCROM-Agency for Cultural Affairs of Japan: Thematic Meeting on Cultural Heritage Risk Management", *World Conference on Disaster Reduction (WCDR), 18-22 January 2005, Kobe, Japan*

Schmuck-Widmann, H. (2001) Facing the Jamuna River – Indigenous and engineering knowledge in Bangladesh, *Bangladesh Resource Centre for Indigenous Knowledge*.

"The Hyogo framework for action (2005-2015): 'Building the Resilience of Nations and Communities to Disasters, *World Conference on Disaster Reduction (WCDR), 18-22 January 2005, Kobe, Japan*

Preventing Pancake Collapses: Lessons from Earthquake-Resistant Traditional Construction for Modern Buildings of Reinforced Concrete

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Abstract

It seems counter-intuitive to assert that simple, unsophisticated, non-engineered, timber and masonry structures might be safer in large earthquakes than new structures of reinforced concrete, but such has proven to be the case in a number of recent earthquakes, including the İzmit and Düzce earthquakes in Turkey of 1999, the Bhuj earthquake in India of 2001, and the Kashmir earthquake in Pakistan of 2005. The question of what lessons can be derived from this information in present times is even less obvious, as these buildings now seem so archaic as to be more easily associated with the medieval rather than modern world. However, in many different regions of the world, the earthquake record with contemporary structures of reinforced concrete frequently has been abysmal. Such buildings are even responsible for what has come to be called a "pancake" collapse – where heavy and unyielding floors collapse one atop the other with people trapped and crushed in between.

In fact, before the advent of the strong materials of reinforced concrete and steel, many societies had developed an approach to seismic resistance that is only slowly being re-learned in the present: that it is wiser to build flexible structures than to attempt to build ones that resist earthquakes only by their strength. This paper will explore the specifics of what can be learned from these historical construction practices, by describing the author's concept for "Armature Crosswalls," a concept based on Turkish and Kashmiri traditional construction adapted for reinforced concrete infill-wall construction. The value of this approach for Heritage Conservation is that when people understand historic structures not only as archaic and obsolete building systems, but also as repositories of generations of thought and knowledge of how to live well on local resources, societies can begin to rediscover the value of these traditions once again by seeing them in a new light – one that, at its most fundamental level, can save lives.

Fig. 1 Detail of traditional hımış construction in Turkey in mid-20th century house in Gölcük.

Fig. 1 LEFT: Collapsed apartment block, Gölcük.

Fig. 2 ABOVE: Aerial view of collapsed apartment blocks, Gölcük. (from UN-ISDR).

Introduction

In November 2000, one year after two devastating earthquakes struck near the Sea of Marmara in Turkey, a conference was convened by UNESCO, ICOMOS, and the Turkish Government in Istanbul called *Earthquake-Safe*, Lessons to be Learned from Traditional Construction. The 1999 earthquakes proved that in spite of all of the knowledge gained over the last century in the science and practice of seismology and earthquake engineering, the death toll in such events had continued to rise. At the time of the conference, few would have thought that "traditional construction" would provide any meaningful answers to confront the dilemma of death and destruction in modern buildings of reinforced concrete. Quite the contrary, historic preservation has long been viewed more as being in opposition to seismic safety – with efforts aimed at producing a compromise between the preservation of historic building fabric and its replacement with new structural systems of steel and concrete.

The 1999 earthquakes, however, provided an opportunity to re-visit this issue from a different perspective, as it was the newest buildings in the damage district that suffered the most damage. A new term had emerged in recent years to describe the problem – not with old buildings, but with new reinforced concrete buildings: *"pancake collapse."* The pervasive image of floors piled one on top of another with the walls fallen away completely was heart-wrenching when one realized that between those floors lay the bodies of the occupants – thousands and sometimes tens-of-thousands of people. (Figures 2 & 3)

At the 13th World Conference on Earthquake Engineering in August 2004, Fouad Bendimerad, Director of the Earthquakes and Megacities Initiative, reported that "*approximately 80% of the people at risk of death or injury in earthquakes in the world today are the occupants* *of reinforced concrete frame infill-masonry buildings."* Concrete frame buildings with masonry infill-walls (RC infill) are commonly constructed with brick or hollow block masonry partitions and exterior walls. Thousands have died in this type of building in earthquakes in different countries around the world, including recently in Turkey and Taiwan in 1999, India in 2001 (Figure 5 & 6), and Morocco in 2003. In Iran, where light steel frames are used instead of concrete, these infill wall buildings also fell down in the Bam earthquake of 2004 (Figure 7).

Fig. 3 Surviving *hımış* house next to a row of collapsed reinforced concrete buildings, Adapazari, Turkey, 1999.

How can a technology of building construction based on the new strong materials of steel and reinforced concrete be linked to such deadly catastrophes? At the beginning of the last century both steel and reinforced concrete held great promise for earthquake-safe buildings, yet in Turkey one hundred years later, the pre-modern buildings of timber and masonry remained standing surrounded by collapsed concrete buildings. Clearly the original promise of these new materials has not been fully realized.

After the 1999 earthquakes in Turkey, the world's scholars and engineers to descended on the ruins of the buildings that took the lives of 30,000 people, pouring over the wreckage and making frequent pronouncements that the collapses were caused by bad design and poor construction. (For examples, see Figures 8 & 9) "Inspection, quality control, better training, that was what was needed. If that was achieved, then all could be set right. The building codes were not at fault. It was all in the execution. If that is improved, then the promise of safety will be kept, and the magic of the new materials and modern engineering will be realized." A number even asserted that "nothing new can be learned" because the myriad observed faults were well documented – and the well engineered and constructed buildings had survived. They said that these surviving concrete buildings proved that reinforced concrete frame construction itself is not to blame. From their perspective it may seem that justice had been served, and that bad construction met its rightful fate. Contractors were arrested and developers chased out of town, and so, perhaps in the future people could be taught to pay attention to building codes, and graft and corruption would cease. Then – and only then – could we expect that earthquakes will not result in such massive mortality.



Fig. 4 Demolition workers on collapsed RC infill building in Bhuj, 2001 one month after the Gujarat Earthquake. Women work alongside men in heavy construction tasks in India.

Fig. 5 Bare frame of incomplete building next to partial collapse in Bhuj, 2001. Bare frames, even if weak and poorly constructed, often do better than expected in earthquakes that happen before the infill is installed because the buildings are lighter than when finished, and frame action can take place.

Fig. 6 Collapsed steel frame infill wall building in Bam, Iran, after the 2004 earthquake. Many light frame buildings with infill masonry collapsed in the Bam earthquake largely because of defective welding and poor layout that resulted in torsion.


Fig. 7 LEFT: House being reconstructed to replace one destroyed in Afyon earthquake. Concrete is being mixed on ground with garden hose and without slump test or measurements.

Fig. 8 RIGHT: Concrete column in new mosque being constructed on site of building destroyed in Afyon Earthquake showing rock pockets leaving re-bar exposed. Vibrators are not used in most Turkish construction.

The flaw in this reasoning is that, as anyone who has witnessed the rapid expansion of cities around the world knows, this will not happen because, realistically, it cannot ever be expected to happen. Given the pressures to produce so many housing units in a developing country, there will always be poorly built buildings, just as there will always be better ones, and the poor ones will more than likely outnumber the better ones. Thus, the problem of earthquake hazard reduction simply cannot be seen as exclusively, or even primarily as an *engineering* problem. It is fundamentally a *socio-economic* problem. As such, we cannot look to the high-quality reinforced concrete survivors to find the key to solving this problem. What the Kocaeli and Düzce earthquakes demonstrated is that we can look to those humble and unassuming survivors – the traditional buildings – because they have proved that the solution is not sophisticated construction, but, rather, *appropriate* construction.

While poor design and bad construction is indeed a good explanation for many of the concrete building collapses, there is something fundamentally wrong with a pervasive reliance on a construction system for conventional building projects that depends on a level of quality control that is so rarely achieved that large numbers of pancake collapses occur in every major earthquake. By contrast, the traditional buildings that survived the earthquake were not engineered and lacked steel or concrete. No plans for them were ever inspected because none were ever drawn. They were only rarely constructed by anyone who could remotely be characterized as a professionally trained builder or building designer, nor could many of them be characterized as having been carefully or robustly constructed – although the least damaged among them did meet basic levels of craftsmanship. On the contrary, they were constructed with a minimum of tools with locally acquired materials, using a minimum of costly resources, and were held together with a minimum of nails and fasteners. Often the timber was not even milled, being only cut and de-barked. It was sometimes nailed together with only a single nail at the joint, and then the interstitial spaces were filled with brick or rubble stone in clay or weak lime mortar.

Fig. 9: This three story house in Gölcük located less than one km from the fault was undamaged by the 1999 earthquake, while a number of reinforced concrete buildings on the adjacent blocks collapsed.[1]

Thus, the traditional buildings possess the kind of deficiencies in construction quality that are identified as reasons why the modern buildings fell down, yet they remained standing. It appears that we have one system constructed with the full benefit of strong materials that is subject to catastrophic failure in large seismic events if it deviates from a sophisticated level of design and construction perfection, and another considerably less sophisticated one constructed of comparatively weak materials by relatively untrained craftsmen that is, with few exceptions, robust enough to withstand major earthquakes.

From New England Factory Towns To The Hidden Mountain World Of Kashmir

The inspiration for this research on traditional construction in earthquake areas came from a combination of my earlier decades of research on the textile mill towns of New England and the discovery of the traditional architecture of Indian Kashmir. The mill towns demonstrated that the massive brick masonry walled buildings with timber floors were able to sustain the vibrations of the machinery every working day for sometimes more than a hundred years. This observation contradicted the conventional wisdom that masonry buildings inevitably will be destroyed by earthquakes, as one need only step onto a weave room floor with hundreds of looms oscillating back and forth to understand that the vibrations they impart to the structure are significant: the floor is literally bouncing. The looms, in fact, had to be carefully programmed to avoid being synchronized, or the kinetic energy they impart would throw the building over. But so long as that simple principle was observed, these buildings lasted in continuous use for a century or more.

The difference between the 19th Century mill construction technology in Britain and the United States was emblematic of a different approach. In Britain, where the floors as well as the walls in the mills were constructed entirely of masonry and iron to be fireproof, the looms were always placed in a separate one-story shed adjacent to the multi-story mill which contained all of the other machines. The looms, which were the only machine that generated large lateral force vibrations from the impact of the heavy shuttle, were placed in these separate "weave sheds" on rubber pads resting on the slab-on-grade. In the United States, the elevated timber floors of the mill itself were used to buffer the loom from the shuttle's destructive impact vibrations. The floors of the American mills were of what came to be called "slow burning" construction – widely spaced heavy timber beams and planks with no hidden pockets. These timbers, unlike the masonry of the fireproof construction, could withstand the forces and served to buffer the machines, but there is no mistaking the fact that the exterior walls of masonry laid in lime mortar also had to sustain a significant amount of lateral load. The looms were placed high up in the mill on the third or forth floor, to allow for a coherent linear work flow from the top floor where the raw material was processed in carding machines, then spun into yarn, which was then woven into cloth, that was then finished in the bleach and die rooms at the ground level (Langenbach 1968, 1979, 1981).

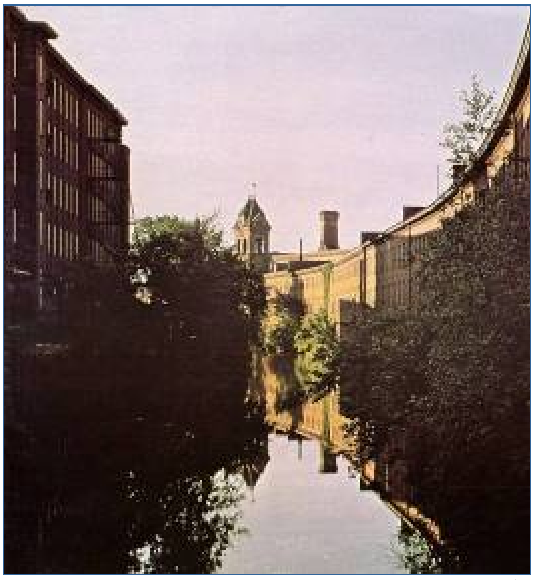


Fig. 10 Nineteenth century mills and canal of the Amoskeag Millyard, Manchester, New Hampshire, USA, 1968.

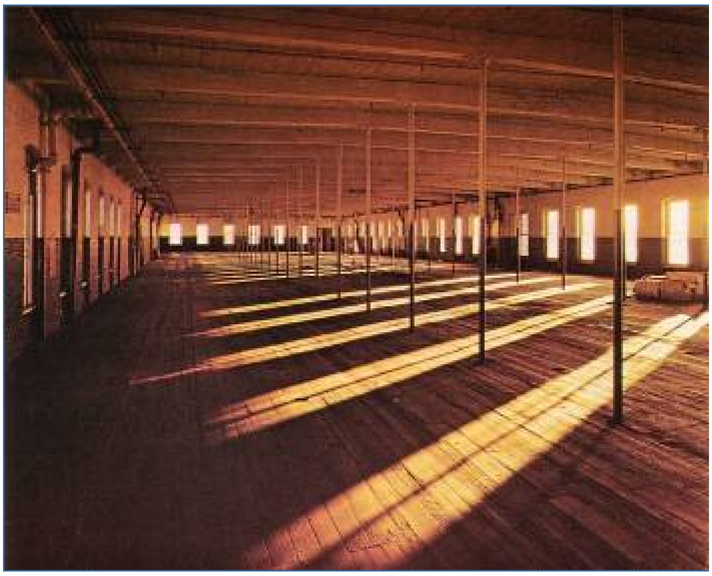


Fig. 11 Interior of an 1840 Amoskeag mill building constructed with heavy timber floors, iron columns, and brick exterior walls connected to the floors with iron anchors.

Did hundreds of looms on a single floor high up in a masonry-walled building replicate an earthquake's impact on unreinforced masonry buildings in general? Not entirely, but an understanding of how an entire industry that lay at the core of the country's industrialization could be engineered around an acceptance of daily lateral force vibrations on masonry walls does raise questions about the late 20th century conventional wisdom in California, and other earthquake areas, that masonry buildings as a class should be condemned as unsafe without distinguishing their inherent differences. (In fact, it was soon after beginning this research that California adopted a mitigation program for unreinforced masonry buildings and a new building code, the Uniform Code for Building Conservation (UCBC) Appendix, Chapter 1, that included the tying of the walls to the floors of masonry buildings with bolts and anchors – in exactly the same way that the early 19th century mills had been tied together in New England. This code evolved from the first local URM mitigation ordinances in Long Beach and Los Angeles, and from the 1984 ABK Methodology, for the names of the engineers and scholars who the research under a grant from the National Science Foundation: Agbabian Associates, S. B. Barnes and Associates, and Kariotis and Associates.)

Kashmir first became a subject of study because of the remarkable aesthetic quality of the indigenous architecture found in Srinagar. Srinagar has been and continues to be a city obscured to the world by the decades of regional civil strife. When first viewed in the 1980s, it appeared as a magical world – a city beside a mountain lake with a way of life that seemed unchanged for a thousand years. It was only later that the earthquake resistance of what by all appearances seemed to be fragile and vulnerable buildings was revealed in the historical record. The construction practices used for these Kashmiri buildings, which stand in contrast to today's codes and commonly-accepted practices, include (1) the use of mortar of negligible strength, (2) the lack of any bonding between the infill walls and the piers, (3) the weakness of the bond between the wythes of the masonry in the walls, and (4) the frequent (historical) use of heavy sod roofs. Just such buildings were observed almost a century earlier by Arthur Neve, a British visitor to Kashmir, when he witnessed the 1885 Kashmir earthquake:

> *Part of the Palace and some other massive old buildings collapsed ... [but] it was remarkable how few houses fell.... The general construction in the city of Srinagar is suitable for an earthquake country; wood is freely used, and well jointed; clay is employed instead of mortar, and gives a somewhat elastic bonding to the bricks, which are often arranged in thick square pillars, with thinner filling in. If well built in this style the whole house, even if three or four stories high, sways together, whereas more heavy rigid buildings would split and fall* (Neve 1913).

Fig. 12 Traditional timber and masonry buildings in Srinagar, Kashmir, 2005.

Fig. 13 View of Srinagar from across the river Jelum, 2005.

Even though it was remote from Srinagar, the earthquake that centered on the Pakistan portion of Kashmir on October 2005 provides a new source of data on the comparative performance of the traditional buildings in the regions. This opportunity has been obscured by the fact that most of the buildings in the most severely affected region did not share the resistive attributes reported on by Arthur Neve above; nevertheless, quoting from the structural engineering professors Durgesh Rai and Challa Murty of the Indian Institute of Technology-Kanpur:

> *"In Kashmir traditional timber-brick masonry [dhajji-dewari] construction consists of burnt clay bricks filling in a framework of timber to create a patchwork of masonry, which is confined in small panels by the surrounding timber elements. The resulting masonry is quite different from typical brick masonry and its performance in this earthquake has once again been shown to be superior with no or very little damage."*

They cited the fact that the "*timber studs…resist progressive destruction of the…wall…and prevent propagation of diagonal shear cracks…and out-of-plane failure."* They went on to recommend that: *"there is an urgent need to revive these traditional masonry practices which have proven their ability to resist earthquake loads."* (Rai & Murty, 2005)

Fig. 14 Example of *Taq* construction in Srinagar, Kashmir, 2005. The timbers in the masonry walls only run horizontally parallel to the wall and through the wall.

Fig. 15 Example of *Dhajji Dewari* construction in Srinagar, 2005. The timbers form a complete frame, and the masonry is inset into the frame.

There are two basic types of traditional construction with earthquake resistance capabilities found in Kashmir. One, of solid bearing-wall masonry with timber lacing, is known as "*taq"* a word derived from the proportional system used to layout the building, rather than the construction (but no other more appropriate word seems to exist), and the other, a brick-nogged timber frame construction, known as *"dhajji-dewari"* from the ancient Persian "carpet weaver's" language for "patch-quilt wall." Both use timber within the plane of the masonry wall to serve to hold the buildings together. *Dhajji-Dewari* is characterized by having a complete timber frame, with one wythe of masonry forming panels within the frame. For a lengthy description and illustration of these types, please see (Langenbach (1989 & 1992).

Colombage, Fachwerk, Half-timber, Hımış, Bahareque and Quincha:

In addition to Kashmir's *dhajji dewari*, regional manifestations found in both earthquake and non-earthquake areas alike are called "*colombage*" in France, "*fachwerk*" in Germany, "*half-timber*" in Britain, and "*hımış*" in Turkey. A variation that used loose earthen or stone filling in a bamboo or split-lath "basket" between the studs include *taquezal* and *bahareque* in Central America. Other variations that used earthen plaster and sticks or reeds (wattle and daub) include Turkish *Bağdadi* and Peruvian "*quincha*." Despite the ephemeral nature of the material, 5,000 year old *quincha* construction has been unearthed at the Peruvian archeological site Caral. In the United States, the masonry infill version can be found in New Orleans and other historic French settlements on the Mississippi derived from French colombage, and also in parts of Pennsylvania, derived from the German *fachwerk*. (Langenbach 2006c).

Opus Craticium

When archeologists dug up the port town of Herculaneum that had been buried in a hot pyroclastic flow from Mount Vesuvius in 79AD, they found an entire two story half-timber house which was identified as one of the masonry construction typologies described by Vitruvius as "*Craticii*" or "*Opus Craticium*" (Figure 4a). This example in Herculaneum presents the only surviving example of the form of construction that had been used in ancient Rome for the seven or eight story tenements (*insulae*) that filled that city of a million and a half people (Figure 19).

Fig. 16: *Bahareque* construction in San Salvador showing effects of 1986 earthquake. The loss of the stucco shows that the wall underwent deformations without loss of its underlying structural integrity.

Fig. 17: *Colombage* construction in the French Quarter of New Orleans, 2006.

Masonry bearing walls would have been too thick at the base to fit on the known footprints of these ancient buildings with space for rooms left over, so it is likely that the Romans constructed many of these tall buildings with timber frames with infill masonry.

After the fall of Rome, infill-frame construction became widespread throughout Europe. Timber-with-brick-infill vernacular construction is documented to have first appeared in Turkey as early as the eighth century (Gülhan and Güney, 2000). The question of whether timber-laced masonry construction evolved in response to the earthquake risk is an interesting one, but any answer is complicated by the fact that there were so many variations of timber and masonry infill construction in areas well outside of the earthquake regions of the world.

Where earthquakes do occur, the risk can be substantial, but the infrequency of the return period does temper a society's response, even in those areas where earthquakes occur more frequently than the human lifespan, as we can see from the frequency of the large death tolls from earthquakes in, for example, India, Turkey and Iran.

Fig. 18: The *Craticii* House at Herculaneum, 2003.

There are so many more immediate factors that influence building construction typology that it is not easy to segregate out the influence of earthquakes, but in some cases more than others that influence can be discerned, though the adoption and continued use of timber-laced systems until the present time was more likely the successful byproduct of a technology developed as much for its economy as for its strength, rather than specifically because of earthquake risk. However, when earthquakes have occurred, it is also clear that the post-earthquake observations on what survived and what did not have had an influence on the continued use of such systems that did well. This can be seen particularly in the adoption and promulgation of the Pombalino "*Gaiola*" system in Portugal after the 1755 Lisbon earthquake, and the *Casa Baraccata* system in Italy after the Calabria earthquake of 1783.

Reinforced Concrete Infill-wall Construction

With the rapid spread of reinforced concrete construction during the middle of the last century, the traditional vernacular was displaced from all but the most remote rural regions within a single generation. This was revolutionary in more than just technology. It was a transformation of the building process – from an indigenous one to one more dependent on outside contractors, specialists, and nationally-based materials producers and suppliers of cement and extruded fired brick and hollow clay tile. The resulting problem is that even the available "specialist" builders were often inadequately trained so as to know the seismic implications of faults in the construction – with the looming catastrophe hidden beneath the layer of surface stucco troweled over the myriad numbers of rock pockets and exposed rebars that characterized the usual construction done without the necessary equipment to do it properly, such as transit mix and vibrators.

Fig. 19: "Pancake" collapse in Mexico City, 1985.

Fig. 20 Partial collapse of RC Building, Gölcük , Turkey, 1999.

What occurred was that the new technology of reinforced concrete frame construction was introduced into a building delivery process that continued to exist much as in earlier times. The local, casual, rural system of local builders with a rudimentary knowledge of the science of materials had been sufficient only as long as the materials were timber and masonry; with the introduction of concrete moment frames, it has proved to woefully inadequate. And, once reinforced concrete became the default choice for almost all new residential and commercial construction, the problem has expanded exponentially. Concrete construction requires more than just good craftsmanship, it demands an understanding of the science of the material itself.

Because of the widespread absence of proper professional training in the use of the material and moment-frame system, this requirement has never communicated down to the actual building sites. The severity of this problem may be unique to concrete construction because it is a material that is widely available for use, and can be used with only a modicum of knowledge, but the difference in performance between its correct and incorrect use is profound. In fact, the celebrated robustness of reinforced concrete in earthquakes is lethally compromised even if just one of many different faults are introduced during construction – faults which remain hidden until, years or decades later, the next earthquake strikes. Further compounding the problem, concrete is most often used for high-density multi-story residential projects, where the risk of fatalities at any time, both day and night, is thus greatly amplified.

The introduction of reinforced concrete itself is not the only critical change in the building delivery process that has occurred in may places over the past century. The use of concrete itself did not mandate that it be used for moment frames rather than shear wall structures, but with a remarkably small number of exceptions, buildings in earthquake and non-earthquake areas alike have been constructed with moment frames rather than shearwalls. In some locales this may be more economical, but that may not be the reason why it is so common, especially when the track record for shearwall buildings in earthquakes is so much better. It is because of a transformation within the field of structural engineering.

Structural Engineering has gone through its own revolution over the past century. The 19th Century was an era of enormous ferment, producing engineering giants like Brunel and Eiffel, along with Jenny and the other engineers of the first skyscrapers. In the first decades of the 20th Century, buildings went from a height of 10 to 20 stories to over 100 stories. To accomplish this, engineering practice shifted from a largely empirical process to one of rigorous mathematics. Portal frame analysis based on the contraflexure methodology of isolating moments was invented and became the standard methodology for code conforming building design. This calculation method was both simple and accurate enough for it to have remained in use through the entire 20th Century, up until the present for the design of most skyscrapers (Robison, 1989). For short and tall buildings alike, the isolation of the structural frame from the rest of the building fabric has made the structural design a relatively straightforward process. The enclosure systems could then be treated simply as dead weight in the calculations, eliminating the need to deal with the complexity introduced by solid walls into the calculation of the linear elements of the frame. This also meant that the frame could be standardized into a simple system of rebar sizes and overall beam and column dimension, which in turn has served to allow for the construction of multi-story buildings that are not individually engineered.

As we have seen, the acceptance of the concrete moment frame as a standard form of construction, and of frame analysis as the basic engineering approach, fails to recognize the fact that most buildings end up as solid wall structures once the rooms and exterior enclosures are finished. If the enclosure and partition walls are of stiff and strong materials attached rigidly to the frame, as is the case with the infill masonry used in many countries of the world, the structural system can no longer be correctly defined as a frame. However, nearly all of the engineering that underlies the design of these buildings is based on it being modeled as a frame, with the infill masonry included in the calculations only as dead weight, rather than as a structural element. The collapse of so many residential structures of reinforced concrete has shown that there is a flaw with this approach: the irrefutable fact is that the infill corrupts the frame behavior under lateral forces on which the portal frame analysis method is based.

The seemingly reasonable explanation for this effect was that by including only its weight, the design would be more conservative than if the infill walls were included as part of the lateral resisting system. Walls then could be moved at will, and the frame (in theory) would be strong enough to carry all of the structural loads as was proposed by Le Corbusier with his publication of his famous "Domino House" in 1915 (Figure 24) which helped to promote the use of this system around the globe. This methodology was also a product of the well-recognized fact that the infill masonry is very difficult to quantify mathematically and does not conveniently fit with portal frame analysis.

Fig. 21 Typical Turkish RC building under construction showing the hollow block infill being installed.

Fig. 22 Typical hollow clay block infill as used in reinforced concrete residential construction in Turkey.

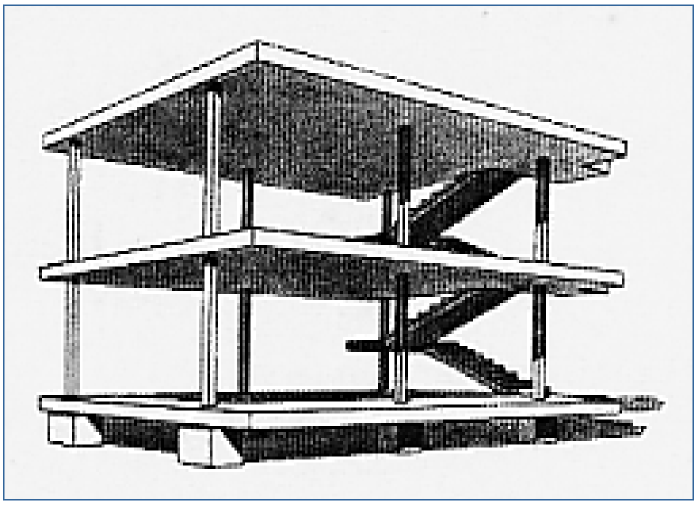


Fig. 23 "Domino" frame as ideal structural form by Le Corbusier, 1915. (Giedion, 1928)
Fig. 24 A massive RC frame in Golcuk, Turkey under construction at time of 1999 earthquake before installation of infill masonry walls. Much greater damage or collapse would have been likely had the infill walls been installed by the time of the earthquake.

While under all but the most severe wind loading, ignoring the effects of the infill rarely causes a failure because the load sharing that occurs in reality between the frame, and the infill can off-set any diminished performance of the frame resulting from the infill. In a "design level" or greater earthquake, however, the situation is very different because a building's structural system is expected to deflect into the nonlinear range. (More information on the establishment of the European "Modern Movement" and the invention of the "Chicago Frame" and the "skyscraper" on the evolution of the reinforced concrete moment frame can be found in (Langenbach, 2006a&b)

In other words, the structure of the building (that is, the skeleton frame together with the infill) will go inelastic in a design-level earthquake, which means that structural damage is expected to occur. For frames, this has been recognized in codes through the use of ductility factors which are assigned based on the individual elements that make up a structural frame. Such factors, however, are unresponsive to the conditions that exist when "non-structural" infill masonry is added to the system, as this masonry is usually a stiff and brittle membrane contained and restrained by the frame that changes the behavior of the frame, sometimes with catastrophic results. The standard analysis method for code-conforming design, which is based on linear elastic behavior, is too remote from the actual inelastic behavior of the infilled frame for the calculations to recognize the effects of the forces on it. This is true even without the problems introduced by the usual compromises in construction quality, despite the incorporation of safety factors and recognition of the variations in the ductility of the materials used.

The masonry infill commonly found in today's modern vulnerable buildings is weak and loosely packed into the frame, yet it is strong enough to interfere with the idealized performance of the frames by throwing stresses onto portions of buildings that are not capable of resisting, mostly because of asymmetrical loading resulting from the progressive loss of the infill masonry (Figure 21 & 27). The contraflexure methodology presumes that the column/beam flexure is free to take place throughout the full height of the building, and that the location of the points of contraflexure conforms to that defined in the methodology. The restraint on this motion caused by the insertion of the infill turns this widely accepted analysis method into a fiction. The actual forces no longer bear any relationship to those predicted in the analysis.

This phenomenon has long been identified as a problem. Research projects in the 1960s and 1970s identified what became known as the "equivalent diagonal strut" model for analyzing the structural effect of the so-called "non-structural" masonry infill walls – a name which draws attention to the profound structural role these walls have, a role that can serve at one and the same time to support an otherwise weak structure, or to precipitate its collapse by tearing apart its beam/column intersections as effectively as if they were a wrecker's ball and chain. The equivalent strut concept was first proposed by Polyakov (1960). Since then, Holmes (1961, 1963), Stafford Smith (1962, 1966, 1968) Stafford Smith and Carter (1969), Mainstone (1971 and 1974), Mainstone and Weeks (1971), and others have proposed methods and relationships to determine equivalent strut properties. Klingner & Bertero (1976) have found the method developed by Mainstone to provide reasonable approximation to observed behavior of infill panels (FEMA 1997: 7-27).

Fig. 25: Infill wall RC building in Mexico City damaged in 1985 earthquake. The infill masonry in this structure almost caused the collapse of the building. The damage to the corner column that left the building teetering on the edge of collapse can be seen on the right.
Fig. 26: Typical hollow block infill wall partially fallen out of the frame of a building under construction at the time of the İzmit earthquake in Turkey in 1999. The typical infill construction has no mechanical ties other than loosely packed mortar to hold the infill masonry from falling out of the frame. The subdivisions in *himiş* construction help hold the masonry together in the frame because the panels are much smaller.

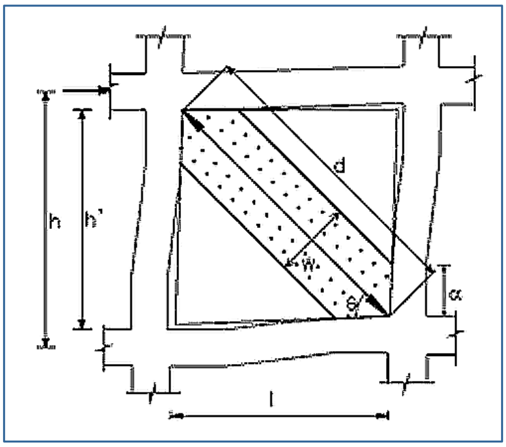


Fig. 27 The "Equivalent Diagonal Strut" of a masonry infill wall in an RC frame (Erberik & Elnashai 2003).

This research has continued in various forms over the last forty years but, as remarkable as it seems, the knowledge of the existence of severe problems with this form of construction has had little effect in stemming the massive proliferation of these buildings in earthquake areas worldwide. There have been attempts to find ways to separate the infill from the frame, or find other ways to buffer the frame, but these efforts have foundered on the problems of how to finish the enclosure and ensure the out-of-plane stability of the infill, while leaving a gap between it and the frame.

The research that one sees in university engineering labs around the world most often is focused on the how to strengthen this infill, to enable it to perform more like shear walls, but this aggravates the kind of problems that the equivalent strut model addresses. As many of these experiments have shown, improvements in performance by reinforcing the infill comes at a cost. Because the infill is stiff to begin with, strengthening schemes almost always further increase its stiffness, which in turn increases the forces. In addition, the stronger infill can increase the potentially destructive effects of the diagonal strut on the beam/column intersections of the frame, which can lead to the sudden catastrophic collapse of the building. This, of course, is especially true if the frame suffers from any of the construction flaws so commonly found in reinforced concrete construction.

An alternative to this approach is to convert the buildings from moment frames to shear wall structures (Figure 29 & 30). Shear wall buildings have a significantly better record of survival in earthquakes than moment frames, but the cost of retrofitting existing buildings with shear walls is prohibitive and involves the added costs of relocating the occupants for the duration of the project. Thus, the financial cost of this and other strengthening procedures is too high for widespread adoption in the economies where the vulnerability is greatest. In Istanbul, for example, mitigation schemes have recently been drawn up and promulgated with World Bank assistance, but retrofit of the vast numbers of reinforced concrete residential structures has been dropped from consideration despite the overwhelming need, simply because nothing other than demolishing and replacing the buildings has yet been identified as a way to solve this problem, and because the cost of the standard retrofit usually exceeds the value of the buildings.

A Lessons from Traditional *hımış* Construction - Armature Crosswalls

Returning to the aftermath of the 1999 Kocaeli earthquake in Golcuk, an answer to this problem may lie hidden behind the heaps of rubble from the collapsed concrete apartment houses. As different as they are from their concrete cousins, the *hımış* houses that remained standing amongst the ruins also have masonry infill confined within a frame (Figures 4, 10 & 31). It is their survival that has provided a source for an idea on how to keep reinforced concrete buildings from collapsing – "Armature Crosswalls."

Fig. 28 & 29: Five story building damaged in the 1999 Düzce earthquake in Turkey, being retrofitted with reinforced concrete shearwalls. No.30 shows the existing hollow clay block walls removed and steel being inserted for the construction of a reinforced concrete shearwall. These images illustrate the extent of the work, and disruption needed for earthquake strengthening using shearwalls. The occupants had to move out for the duration of this work as many existing walls were removed.

Fig. 30 Three story RC building next to a 2½ story *hımış* house near Düzce after the 1999 Düzce earthquake showing the repair of severe damage to the RC building (notice the size of the ground floor columns). The *hımış* structure has lost only stucco on the side. Almost all of the hollow clay block on the RC building has been reconstructed after the earthquake. This shows that even low rise RC buildings sometimes suffered more damage than nearby traditional buildings.

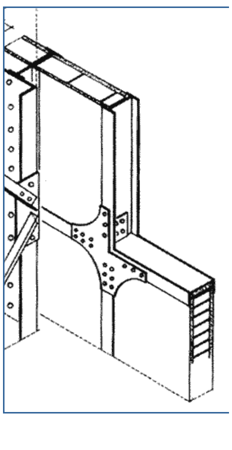
The name "*Armature Crosswalls*" is based on the use of the term "crosswall" in the *Uniform Code for Building Conservation* Appendix Chapter 1, which uses that term for walls that are not shear walls but nonetheless provide structural support and damping to unreinforced masonry buildings. Instead of the existing method of constructing infill walls in reinforced concrete buildings totally out of hollow clay tile or brick, the Armature Crosswall concept is that they are constructed with a timber, steel, or concrete sub-frame of studs and cross-pieces. These studs and cross-pieces (the 'armature') would be securely attached to the primary frame of concrete, and the bricks would be tightly packed into the 'armature.' The mortar to be used for this construction is intended to be a high-lime mix that is less strong, stiff, and brittle than ordinary cement mortar. When finished, the wall would be plastered as it would normally. The intention is that these walls would have less initial stiffness than standard infill masonry walls, and the studs would also serve to reduce the development of a single equivalent diagonal strut.

Thus, 'Armature Crosswalls' are intended to address the initial stiffness, diagonal strut formation, out of plane collapse, and energy dissipation issues that exist for RC infill buildings. The purpose is to make the infill walls into a productive part of the overall structural system, in a way that transforms what is now a problem into an advantage. This approach to mitigation is based on the assumption that low to mid-rise buildings will continue to be constructed with the same materials as are currently used, and that the RC frames themselves are most likely to continue to be unreliable. The benefits of the subdivision of the infill walls into panels by a sub-frame can already be seen in the examples in figures 32, 33 & 35 where the damage was reduced or prevented by the resistance provided by these armature-supported infill walls. In the case of Figure 33, the upper floors were prevented from collapsing by the infill walls despite it having suffered the soft-story collapse of its ground floor which was devoid of infill walls.

Fig. 31 Infill RC building in Mexico City after the 1986 earthquake collapsed many buildings nearby, including the one in Figure 20. Each infill wall is subdivided vertically and horizontally into 4 panels.
Fig. 32 A subdivided internal brick infill wall in San Salvador after the 1986 earthquake.

The Armature Crosswall system is based on an approach where all parts of a building's fabric are regarded as "structure," so that the ductile behaviour that cannot be assumed to exist in the underlying concrete frame can be achieved through the energy dissipation provided by the controlled degradation of the infill walls. The danger of a soft story collapse can be reduced or avoided using the Armature Crosswall system because (1) the crosswalls can be extended to the ground more conveniently than shearwalls because they do not have to follow such a rigid system of lining up with foundations below and the walls above, and (2) the reduction in the initial stiffness of the walls at all floor levels allows frame action to occur in the superstructure frame because it can sway within its elastic range before the crosswalls begin to bind. This sway is then restrained when the crosswalls begin to shift and crack along the interface with the 'armature,' which serves to dampen the building's response and dissipates energy. As they begin to yield they shed load to other crosswalls, so that all parts of the building function to support and supplement the frame.

Because the initial elastic strength is substantially lower than the ultimate strength of the walls (which is based on the crushing of the masonry units, rather than the initial cracking of the mortar between the units) the building should increase in stiffness as its deflection increases until its overall ultimate strength is reached. Even then, as the trajectory of the strength/deflection curve begins to descend, its descent should be gradual, with continued large amounts of damping which continues to serve to resist collapse. (Langenbach, 2003, 2006b)



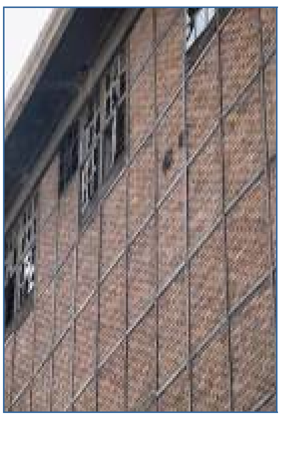


Fig. 33 Detail of masonry wall in Istanbul's Silahtarağa Powerplant showing brick infill with horizontal and vertical light-frame steel "I" sections. (Kiraç et al, 2003) This construction is similar to that shown in Figure 35 below.
Fig. 34 Detail of exterior wall of Mexico City power plant in the heart of the damaged district photographed after the earthquake in 1985 showing light steel frame and infill wall construction. The building had no visible damage, yet was next to reinforced concrete buildings that collapsed. It had a floorless open interior space that was approximately 20 meters high. This photograph provides an idea of how a building could be retrofitted with Armature Crosswalls by inserting steel channels or angles into existing hollow clay block infill walls to subdivide them.

There are two fundamental questions that are raised by this proposal: (1) why traditional buildings, with their seemingly weak and fragile construction, survive earthquakes that felled their newer counterparts, and (2) is it reasonable to expect that such a technology could be exported for use in multi-story concrete buildings, which are much heavier and larger than their traditional counterparts? In other words, if the infill masonry can damage modern reinforced concrete frames, then why does it not crush the much weaker timber frames?

The answer to these questions lies in the fact that the subdivision of the walls into many smaller panels with studs and horizontal members, and the use of low-strength mortar, combine to prevent the formation of large cracks that can lead to the collapse of an entire infill wall. As stresses on the individual masonry panels increase, shifting and cracking first begins along the interface between the panels and the sub-frame members, and then in the panels themselves (Figure 36). When the mortar is weaker than the masonry units, cracking occurs in the mortar joints, allowing the masonry units in the panel to remain intact and stable. Because the bricks themselves remain intact and held in place by the armature, the ultimate strength of the wall is determined by the crushing strength of the masonry after substantial deformation of the wall. This strength is well above its initial elastic strength. The resulting mesh of hairline cracking produces many working interfaces, all of which allow the building to dissipate energy without experiencing a sudden drop-off in resistance. By comparison, standard brittle masonry infill walls without an "armature" lose their strength soon after the initial development of the diagonal tension "X" cracks. With fully developed "X" cracks, the walls are unstable, as the top triangular section can easily fall from out-of-plane forces. (Figure 37)

By comparing the hypothetical strength and deformation curves in Figure 38, it can be seen that the improved performance of the Armature Crosswall is in the extended range between its elastic limit, and the ultimate strength that is established by the crushing of the masonry. It is expected that the computed elastic strength would be slightly lower than that of the standard wall because of the initial slippage between the panels and the armature - which is considered to be a benefit as it allows the overall structure to be more flexible, allowing the frame-action to occur on which the portal frame analysis is based. This kind of initial slippage can be seen in the *hımış* house in figures 39 & 40, where the mud plaster cracks can be seen to be along the frame.

This energy dissipation from the "working" of the materials against each other also serves to dampen the excitation of the building by the earthquake. This working of the composite structure during an earthquake can continue for a long period before the degradation advances to a destructive level, as demonstrated by the behavior of the *hımış* buildings in the epicentral region of the 1999 earthquakes in Turkey when compared with the surrounding RC buildings. While these structures do not have much lateral strength, they possess lateral capacity.

This explains why traditional infill-frame buildings are capable of surviving repeated major earthquakes that have felled modern reinforced-concrete buildings. The basic structural principle behind why this weak but flexible construction survives is that there are no strong stiff elements to attract the full lateral force of the earthquake. The buildings thus survive the earthquake by not fully engaging with it, in much the same way that a palm tree can survive a hurricane.

In other words, although the masonry and mortar is brittle, the system behaves as if it were ductile. Ductility is not a quality normally used to describe the structural behavior of unfired brick masonry, but in the 1981 published paper "Earthen Buildings in Seismic Areas of Turkey," Alkut Aytun credited the bond beams in Turkey with *"incorporating ductility [in]to the adobe walls, substantially increasing their earthquake resistant qualities."* (Aytun, 1981) While the scale of reinforced concrete buildings may be different, their performance with Armature Crosswalls is predicated on the same phenomenon. The scale issue is reasonably addressed by the fact that the larger residential buildings have more walls in each direction in direct proportion to their size, as the room sizes are very similar.

Since the Armature Crosswall system is based on flexibility and on a reduction in initial stiffness when compared to standard infill walls, the building's deflection in an earthquake is likely to engage all of the crosswalls parallel to its deflection in rapid succession. Because the initial cracking of each wall does not represent any loss of the ultimate strength of any given wall, the load shedding is interactive, with loads passed along from one wall to another and back again as the overall deflection increases until all of the walls have been engaged relatively uniformly.

While this concept may seem relatively easy to comprehend as written, few disaster recovery engineers and other personnel have understood its significance when evaluating the performance of traditional construction – with sad consequences in terms of the loss of cultural heritage. This failure, as I will demonstrate in the examples below, has even also seriously harmed relief efforts to provide safe and livable housing after earthquake disasters.

Figure 35: *Hımış* interior wall in house in Düzce earthquake damage district showing "working" of wall that caused loss of plaster.

Figure 36: Collapse of a brittle interior hollow clay block wall illustrating typical failure pattern for such walls lacking subdivisions.

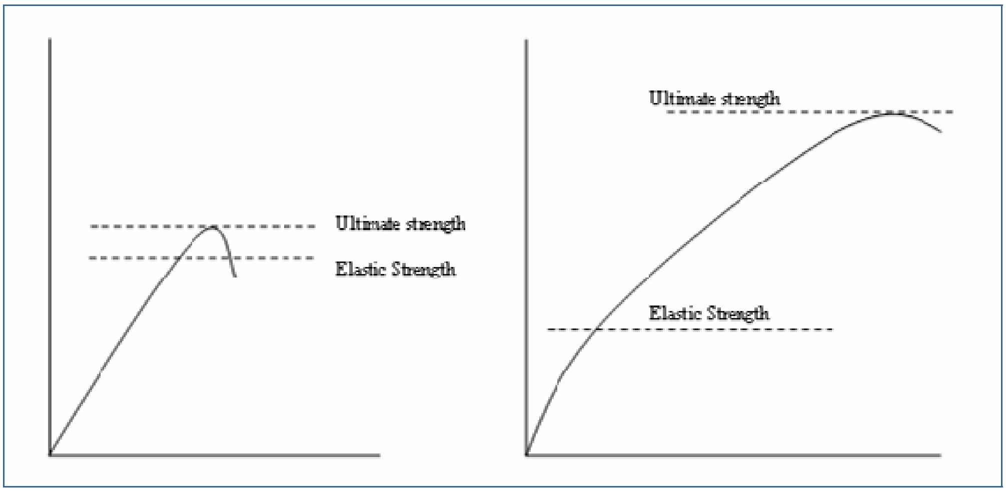


Fig. 37 Strength and Deformation Curves for standard infill walls (Left) and Armature Crosswalls (Right).

One of the reasons why engineers have failed to recognize the benefits of this inelastic behavior is that for most standard engineering analysis, linear elastic models have been used to represent the relative strength and progressive loss of strength of the elements of a building's structural system under earthquake loading. If the masonry is eliminated from the structural seismic analysis once it reaches its elastic limit (for example, at the onset of cracking along the mortar

joints, which is far short of collapse), then this post-elastic strength and energy dissipation behavior will remain unrecognized and unaccounted for in the analysis, with the result that their report will show an unrealistically high level of vulnerability. This then serves to put the building at risk of being "red tagged," requiring immediate evacuation, which so often results in eventual condemnation, leading to demolition or a disruptive and costly retrofit.

All too often, the post-earthquake inspection process is where cultural heritage takes an unnecessary hit, especially with unlisted and unofficially recognized cultural properties – namely vernacular buildings like the ones in figures 43 & 44. Because of the unrecognized lateral resistance provided by archaic structural elements, some historical buildings are often forced to meet a level of lateral resistance in excess of that required of fully code-conforming newly constructed buildings. The inspectors who are sent into areas after a disaster often have no training and even less sympathy for vernacular buildings and archaic construction, especially when buildings such as those with thin walls of light frame with masonry infill construction like that in Figures 41 & 42 are encountered, simply because they have no reference point in their training to understand how such buildings can competently resist earthquakes.

This phenomenon alone has been, and will continue to be, a serious problem for the preservation of historic resources that have suffered damage in earthquakes. There are many examples of where this has been the case in the United States and other countries, but one particularly graphic example from Turkey after the June 6, 2000 Orta earthquake in Central Anatolia, illustrates this problem from a Disaster Management perspective.

Fig. 38 Exterior of 1955 *hımış* house in Gocuk damage district one month after 1999 earthquake. Do damage is visible.

Fig. 39 Same wall as Fig.10 showing earthquake caused cracks in interior mud plaster.

Fig. 40 Partially demolished house in Golcuk showing the single brick wythe thickness of typical *hımış* wall. On the LEFT is the exterior and on the RIGHT is the interior face of the same wall.

Fig. 41 This house was abandoned and partially demolished at the time of the earthquake. Despite its condition, the earthquake had little affect on it. It was photographed in 2003.

Fig. 42 Large 3 story house in *hımış* construction, Safranbolu, Turkey, 2000. Safranbolu is now on the World Heritage List because of its unique collection of intact Turkish vernacular houses.

Fig. 43 *Hımış* construction on 3 story house in Safranbolu, Turkey, 2000.

The 2000 Orta Earthquake and the Meaning of Damage

At 5.9 on the Richter scale, the earthquake that struck near the rural town of Orta (100 km north of Ankara) on June 6 of the year following the great 1999 earthquakes did not seem particularly large. Indeed, the reinforced concrete buildings showed little damage, with cracks appearing through their stucco walls, but otherwise intact (Figure 51).

By contrast, many of the houses of traditional *hımış* construction showed damage, with much plaster fallen off, and with some partial collapses here and there (Figure 45 & 46). What was interesting to note was that the *hımış* damage appeared to be similar to that seen in Gölcük and around Düzce after the significantly larger 1999 earthquakes. Could this be evidence that the qualities of earthquake resistance attributed to this type of construction could not be relied upon?

Fig. 44 LEFT: House in Orta, Turkey one day after the 2000 Orta earthquake – showing plaster cracking that reveals the timber frame. There was no evidence of damage beyond that of the cracked plaster.

Fig. 45 RIGHT: Interior of *hımış* house after the Orta earthquake showing the "working" of the masonry panels. This view shows the inherent flexibility of the structures, but the inevitable disruption of the mud and lime plaster leads people, including both the owners and the government inspectors to assume that the buildings has lost strength when it has not.

On further study, it became clear that most of those buildings that suffered collapses had been abandoned years before and were in a heavily decayed condition. Wood, particularly the young sapwood that was often used for farm area construction, is vulnerable to fungal and insect decay, and this can advance rapidly when the buildings cease to be maintained. But this did not explain the pervasive damage to the finishes, which left piles of plaster on the floors and along the outside walls of most of the houses, together with some loose bricks and missing wall panels in a small number of places.

Following the earthquake, teams of government inspectors descended on the villages, and pronounced many of the houses "*destroyed*." The residents of one village, Elden, reported that *"95% of the houses were destroyed by the earthquake"* even as I looked about and could not see evidence of that level of damage. What I realized on inspecting several of these villages is that "*damage*" was not objectively defined. A "*destroyed*" house to the post-earthquake inspectors was one that merely had experienced the onset of damage, as demonstrated by the evidence after the 1999 earthquakes (Figures 47 & 48). It became increasingly clear that the government inspectors were already convinced that the traditional buildings were inherently weak and dangerous and not worth repairing or improving. They then easily convinced the owners that they would be better off in new houses of reinforced concrete and brick, a process made easier by the fact that the Turkish government subsidized the new construction by providing a much larger grant for replacement than for repair.

Once again, part of the problem is that standards appropriate for damage in reinforced concrete buildings were applied without modification to traditional *hımış* construction, ignoring the fact that one of the fundamental differences between *hımış* houses and concrete buildings is their flexibility. Thus, the onset of damage – particularly to the plaster and stucco finishes – is at much lower levels of shaking than in stiffer structures (Figures 45 & 46).

Fig. 46 Interior vestibule of house in Adapazari after the 1999 İzmit earthquake.

Fig. 47 Interior vestibule of house in Orta after the 2000 Orta earthquake.

A comparison of these views help illustrate that the damage in *hımış* buildings in the two earthquakes is similar despite the fact that the 1999 earthquakes were very much larger than the Orta earthquake. (The house in 42 was abandoned and in poor condition prior to the earthquake, while that in 42 was occupied and in good condition – so the difference seen would have been less if both had been the same.)

Looked at superficially, it appeared that *hımış* suffered significant damage, but this fails to take into account the essential mechanism by which the traditional construction is able to resist earthquakes – flexibility and energy dissipation, rather than strength and stiffness. Had a similar amount of plaster damage been found in a reinforced concrete building, the frame itself could no longer be safely relied on without substantial reconstruction, as for example in the example damaged in the Molise earthquake in Italy in 2002 see in figures 49 & 50. With *hımış* this is simply not the case. The level of damage observed is of a nature that can be repaired with no net loss of capacity in future earthquake events. The plaster, stucco and even the mortar is stiff, weak, and brittle, and so is easily shed from the walls in an earthquake, but it is also repairable to a pre-earthquake condition. When a reinforced concrete frame is broken in an earthquake, it is far more difficult to repair it to a pre-earthquake level of safety without an extensive amount of structural replacement of the damaged beams and columns.

Fig. 48 & 49 Interior and exterior of a damage reinforced concrete building in San Giuliano di Puglia after the Molise earthquake illustrating that the frame is on the verge of collapse. While this building will be difficult or impossible to repair to an earthquake-safe condition, the traditional house in Orta in Figure 46, with a similar amount of debris on the floor has lost a negligible amount of its total capacity, and can be easily repaired.

The 2000 Orta earthquake thus provides an excellent point of comparison with the much larger 1999 earthquakes. The survival of *hımış* buildings in the much larger and longer 1999 earthquakes illustrate that *hımış* is capable of maintaining stability over many cycles of shaking, regardless of the fact that the plaster and some of the infill masonry is disrupted right from the start. In fact, it is *because* of this damage and the friction damping that it produces, that the buildings as a whole are so much more resistant to collapse. The inelastic behavior which produces friction damping begins at the onset of shaking and can continue without much further degradation for many cycles. Thus the shedding of the plaster and stucco in both the large and small earthquakes was often found to be similar despite the vast difference in intensity and duration between the earthquakes. Although only lightly damaged in this smaller Orta earthquake, in the larger 1999 earthquakes the concrete buildings by comparison often suffered a rapid and catastrophic degradation of strength because of their lack of the kind of a reserve capacity of strength and energy dissipation found in the *hımış* structures. Their stiffness also served to attract increased loads in comparison to the comparative flexibility of the *hımış* structures. The brittle hollow tile block infill walls in the concrete frame buildings are initially very stiff, but, once cracked, they tend to collapse as can be seen in figure 37 and figure 52. (Langenbach, 2003)

Thus, the comparison between the performances of these two types of construction in the smaller and larger earthquakes has significant public policy implications. Viewed in isolation, the comparatively good performance of reinforced concrete in the smaller earthquake has served to falsely assure people that such buildings are safer. Each time this has happened, it covers up the consequences of poorly built reinforced concrete construction, which tragically are revealed only in the stronger earthquakes such as those in 1999, and subsequently in Bingöl in 2003 where 85 school children (out of about 150) were killed in a single concrete dormitory, when it suffered a complete pancake collapse. Had the earthquake happened during the day, the death toll among the children would have been higher, as many school buildings collapsed.

Fig. 50 LEFT: RC apartment building in Orta after 2000 earthquake shows cracking in the infill walls.

Fig. 51 RIGHT: Apartment building in Golcuk after 1999 earthquake shows extensive collapse of infill walls and damage to the RC frame.

An Un-learned Lesson in Disaster Management: The Story of Elden Village

There is one final story that serves to underscore the harmful consequences of disrespecting traditional methods of construction and rural ways of life during the recovery process. While this example throws the importance of traditional knowledge systems into high relief, it is not at all unique to Turkey. Similar experiences have been repeated in other countries with increasing frequency, as the vast size of the populations now living in modern buildings and the differences between traditional cultures and the modern urban way of life have become more acute, leading to less understanding between the two worlds. Disasters, which tend to thrust people together from the divergent backgrounds, also serve to shine a spotlight on such differences, as well-intentioned people from the government relief agencies and from non-governmental organizations are thrust into unfamiliar environments where their efforts to help can end up compounding the destruction.

Fig. 52 View of Buğuören from road to Elden.

Fig. 53 Road into the valley to Elden Old Village, with the village in the distance at the base of the valley.

Fig. 54 Elden New Village, a government constructed re-location settlement of 87 houses.

Fig. 55 Almost all of the houses are identical. There is no mosque or community services, and no provision for the construction of barns or water and fertile land for gardens or grazing.

While surveying Yuva, one of the villages damaged in the Orta earthquake, we were told of another village, Elden, where the government had condemned the houses and had undertaken the relocate the village to what was determined by geologists to be a site safer from landslides and earthquakes. When we set out to Elden to see the results, it was already four years after the earthquake. For several kilometers there was little evidence of settlement, but then we climbed a hill and passed through a sleepy small village consisting of a mixture of old and new houses alongside the road. The older homes were mainly constructed of timber and masonry in the local traditional vernacular, and the newer ones were of reinforced concrete, sometimes painted with gaudy colors, but the view from the distance was that of a characteristic Turkish rural settlement of rectangular tile roofed houses punctuated in the middle by the tall minaret of the mosque. We learned that this village was named Buğuören, and that Elden was further along the road. We then descended the hill and curved around almost in the opposite direction as we ascended another hill along the road that was now cut into the steeper hillside at an angle to allow a navigable grade. This hill was much higher than the one on which Buğuören sat, which afforded a picturesque view of it off to our left, with the characteristically Turkish tight cluster of boxy houses punctuated by the tall thin minaret of the mosque – and iconic view for this part of the world (Figure 53).

Gradually the road began to turn away from the view of Buğuören as we reached the crest of the hill, opening up a view in front of us across a wide but barren plateau of dry grassland that extended as far as one could see. This view was punctuated only by wooden telephone and electric utility poles that crisscrossed the view in front of us with no apparent order or direction, but it was not these that caught our attention – it was the distant view of another settlement. This view shared little with the one of Buğuören we had just seen only seconds earlier. This was not the characteristic view of a rural Turkish settlement that I had come to know and love. There was no minaret that in more time-honored settlements marked both the physical and cultural center; there was not even any evidence of a town center of any kind. The little one-story brick and concrete houses were lined up on the sloping hillside like the identical tombstones of a military cemetery. There was also no evidence of ordinary human life – no stone walls, no barns or sheds, no unique shutters or painted doorways, not even any hanging laundry. Surely this was not the "new" Elden, we thought – but that is exactly what it was (Figures 55-57).

Our initial destination was not this stark cluster, but the original Elden. The route to Elden first bisected this new cluster. As we drove slowly through the new subdivision, we could see evidence of human activity in only a handful of the 87 identical houses. Only one person, a woman, could be seen outside her home as we passed (Figure 57). After passing between the new houses, the narrow road hooked to the left around the side of the hill behind the new houses and began to descend from the plateau into a deep valley. As we turned this corner, the view changed dramatically from the barren plateau to a sylvan scene of rolling hills, with a higher peak in the distance that closed the view (Figure 54). Nestled in the middle of this view was a village marked by a minaret, the view of which was almost lost amongst the abundant green of the many trees that lined the road all the way down to the village. Moving from the dry open landscape of the plateau towards the sylvan valley was a study in contrasts – a contrast that was all the more remarkable because of the fact that it was the *new* village – a settlement deliberately established ostensibly to improve the life of the inhabitants – that stood on the exposed barren plateau, a site never before settled in this ancient land.

After proceeding down into the valley, we came into the original village of Elden, which consisted of a cluster of farm houses interwoven with connected barns and paddocks. From the vantage point of the small grass-covered yard to the left of the mosque that stood in the center of the village, one could look out over the houses that descended the hillside to a tree-lined creek-bed, beyond which was a steep incline of pastureland, which served as common lands for the whole village Figure 59). More houses climbed the hillside on the other side of the mosque.

As had been observed in the other villages in the district, the houses were a mixture of older timber and masonry structures, and newer dwellings of reinforced concrete. We were first greeted by the Imam and assistant Imam, and a number of the village elders. Some of these residents described for us the earthquake and its aftermath. A wizened bearded villager said as he gesticulated by moving his hands up and down that the earthquake *"came as a really big rumble."* The up-and-down motion he made with his hands helped to confirm the government's finding that this village was close to the epicenter, which tends to increase the vertical component of the shaking. He reported that his house developed "X" cracks and "some tiles fell." The earthquake managed to cause the death of some farm animals, but in this village no residents lost their lives.

We learned that in recent years Elden's population of approximately 100 families had reduced to about 35 families because of out-migration, which, more than the fact of the earthquake, explained why some of the houses were in such poor repair. This loss of population was not because of the earthquake, but had been part of a general trend in many of the villages resulting from a decline in farming in this region of Turkey and the infertility of the soil.

Fig. 56 The only occupant visible in Elden New Village at the time of this visit can be seen in this frame of a video.

Fig. 57 Old Elden Village showing the loose intertwined arrangement of barns and houses centered on the mosque and village store.

Despite having left, however, the former villagers retained their properties, and, after the earthquake, they applied to the government for new houses along with their former neighbors who still lived there, which served to explain the construction of the 87 new houses in the new village (Dikmen, 2005).

The conversation then turned to the question: *"why build the new village?"* The villagers described how, after the earthquake, government inspectors surveyed the damage and made the determination that "*95% of the houses had been destroyed,*" a figure that was not easy to believe based on what could be seen in the village in our visit. Albeit, some things could have changed over the course of four years, but there was little evidence in this case that much did.

The government then proposed to provide new houses on a new site, justifying the relocation based on their geologists' determination that the existing village was subject to risk of landslides, as well as the fact that the epicenter of the 2000 earthquake was right under it with other active faults nearby. The site chosen for the new village was on the top of the plateau, away from any landslide risk, and presumably subject to less earthquake vibrations because it does not lie on the alluvium one finds in the valley. The government provided the house plans for the new houses and hired the contractor. Most of the houses they said (and we could see from the exterior) were identical, and they were lined up in regular rows.

From our conversations with the residents it became clear that, while they had initially endorsed the relocation, they did not find it appealing now. At first it was an abstract concept backed up by the government's assertion that the existing site was unsafe and thus the new houses would be offered to the residents at a new location, whereas now that the new site was identified and the houses were constructed, they could see that there was no place for their animals, no gardens, and no mosque, nor community facilities of any kind. There was not even a reliable source of water, and the soil was not suitable for farming – not even for the grazing. At the time of our visit four years after the earthquake, they explained that only ten of the eighty-seven houses had been occupied. In fact, one of them had already been abandoned by a single older man who returned to the old village because, as they described, "there was no mosque" and he was lonely up there on the wind-swept ridge. He then simply constructed a shack for himself in the old village.

Fig. 58 Panorama view of Elden from the mosque. A creek runs through the valley at the base of the hill.

Fig. 59 Assistant Imam and community leaders of Elden Village

Fig. 60 Elden Village elders sitting after services at the gate to the Mosque

A year later, only seven houses were occupied in the new village, with some of the others used by former village residents who had moved to jobs in Turkey's cities, including Istanbul, for summertime visits. The others remained essentially abandoned, and the government had embarked on a new program of getting the residents of the old village to sign a statement taking responsibility for their own losses should there be another earthquake if they did not move. (Dikmen, 2005)

In summary, it appears that the government's well intended disaster relief efforts were a failure, and that the large sum of money spent on the new village had for the most part been wasted. In fact, over the long term there was evidence already that this failed plan may end up seriously harming what otherwise could have continued as relatively healthy village. Indeed, in spite of the general rural agrarian decline in this part of Anatolia, this village could have continued on with its small and increasingly elderly population with the ability to sustain itself in its remote valley setting with an intact core community. With the new village the community has been torn apart, with some people eking out a living on the windswept plateau, while the rest remained in the valley. The massive government investment in housing has flowed into the hands of an outside contractor (who was described by the residents as having done low quality work), while the local reinvestment in repairing and maintaining the houses in the village has all but ceased. The local store has closed, and community activities are on a decline. While it is too early to tell, the population of the village could reach a tipping point where neither the old nor the new village are socially or physically viable, and both may become abandoned or reduced to hamlets sustained only by family members who make their livings in Ankara or Istanbul.

While it is important to examine what led to the decision to relocate rather than rebuild in place, it is even more important to examine what first led to the consideration of such a decision – the flawed assessment of the damage to the houses themselves. Had the government *not* condemned the traditional houses, but had instead provided both technical and economic assistance to help the occupants to proceed with repairing them, then the government's largess would have been expended in the village itself, the earthquake recovery would have been much more rapid, and the social fabric of the village would not have been disrupted and divided. Equally important is the fact that the pre-existing local traditional building skills would have been sustained and enhanced.

A Repeat of Past Mistakes: The 1971 Bingöl Earthquake

Unfortunately, the experience in Elden is neither unique nor even new but stands as a classic verification of George Santayana's famous quotation: *"Those who cannot remember the past are condemned to repeat it."* It is one more example across decades of earthquake recovery efforts with similar results in Turkey and in other countries, such as Italy, with the reconstruction of San Giuliano di Puglia after the 2002 Molise earthquake. So many disaster recovery failures could have been avoided if people had simply made the effort to look at the compelling evidence in the historical record, but disasters are infrequent and disaster managers are rarely tutored or even sympathetic to cultural heritage values or traditional ways of life.

Whether one focuses on the prevention of harm or the responses to past earthquakes, the product of this ignorance is monumental, and has served to substantially reduce what could otherwise have helped people in need. It also precluded any attempt to empower residents to restore their own cultural heritage. For this to be avoided after future earthquakes, the government inspectors must be taught to understand that most traditional houses – despite all of the fallen plaster and loose infill masonry – are of a type of construction that, in contrast to reinforced concrete, is repairable, and that their ability to resist future earthquake shaking can be the same or better after such repairs.

A draft report dating from 1982 serves best to illustrate this point. This report was prepared by the Turkish National Committee on Earthquake Engineering and the Cambridge University Department of Architecture on the recovery operations after the Bingöl earthquake of 1971. The field staff included individuals from Middle East Technical University Departments of Architecture and Engineering, members of the Earthquake Research Institute, as well as from Cambridge University Department of Architecture. Called the Bingöl Province Field Study, Preliminary Report, this report covered the reconstruction of 25 villages. Three villages were studied in detail.

This report provides a detailed assessment of the failures and successes of recovery and reconstruction efforts after the 1971 Bingöl earthquake. As a combined effort by British and Turkish scholars and experts, it provides a good objective view of the situation. What makes this report remarkable is the strategies in the Bingol recovery effort that they describe as having failed were exactly what was repeated after the 2000 Orta earthquake, more than a quarter of a century later. Just as with the "new villages" of Yuva and Elden, the Field Study described how the decisions to relocate villages and the *"appraisal of the…possible alternative sites had [been] carried out with great speed and sometimes by inexperienced people…[consisting] of a geologist and a district surveyor."* They *"were required to collect certain information and present it on a protocol form for ratification by the Ministry of their decision on the location of the relief housing. This* *information is mainly concerned with the assessment of the geological situation, the cost of rebuilding in terms of accessibility of materials and contractors, acquisition of the required land and the cost of the provision of water both for the building process and for householders…and improve[ing] the accessibility of remote villages."*

What was missing in the skill set of the personnel and in their analysis was *"regard for the orientation or layout of the original settlement or its relation to crops and natural resources."* Ten years after the disaster when the report was prepared, the results were unambiguous. Of the four relocated villages studied, three were largely abandoned, with many of the new houses fallen to ruin or dismantled by their occupants and used for reconstruction at the old village sites.

The report goes on to make an even more radical observation. It states that had traditional timber and masonry construction been used (with some low-tech and low-cost anti-seismic modifications), the resulting reconstructed houses would have been <u>safer</u> than the government-designed and contractor-constructed concrete houses, primarily because this new construction was alien to the region and outside of the knowledge and skill set of the indigenous people who lived there. This then required that it be undertaken by contractors from outside of the area, which resulted in construction of particularly low quality. The authors of the report concluded that:

> *Instead of trying to re-house most of the population using reinforced concrete and other very expensive, and unfamiliar methods of building, which at the moment result in substandard construction, some attempt could be made to make the traditional methods become the basis of an improved building stock which is also earthquake resistant. The traditional building is well adapted to the lifestyle of its occupants, it is climatically sited to its environment, relatively cheap to construct and can be built extremely quickly (in some cases a number of weeks). With some technical modifications using the materials available and the building processes and skills already in use in the villages, it may be possible to make the traditional house form as strong against earthquakes, if not stronger than the concrete block and reinforced concrete houses at present under construction and at a fraction of the cost.*

They also observed that the *"provision of the prefabricated houses has…threatened the continuity of the building tradition in the area. The adoption of the buildings as semi-permanent means that fewer buildings are being built and renewed, making a gap of many years before the building practice in each village resumes its former level, and a gap in the experience and training of many village craftsmen."* While this report did not directly address the issue of cultural heritage in the context of rural settlements where building crafts are based on a pre-industrial local itinerant craftsman tradition, this observation gets to the very core of what cultural heritage preservation requires in the context of a living vernacular architecture tradition. It also embraces how the traditional knowledge must be understood and embraced for government assisted disaster recovery to be successful. To do otherwise will serve only to destroy the traditional knowledge system, slow down the recovery, and permanently harm the communities that are meant to be helped.

The avoidance of Past Mistakes, the Village of Aşağı Kayı, after 2000

The relevance of the 1981 report's recommendations were affirmed after the 2000 Orta earthquake in another village,. In this village, most of the still active farmers and their families rejected the government assistance which would have required them to tear down and replace their houses. After the earthquake, they immediately set about to repair their houses while living in tents in their yards until finished. They used mostly traditional methods to repair them, and when finished, they moved back in, and went on with their lives, as seen by the example of the family whose tent and house is shown in Figures 62-64. Within a year, there was little evidence of the earthquake remaining, and life was back to normal. This record must be compared with the fact that the villages with relocation plans were neither repaired nor resettled when re-visited four years after the earthquake.

Fig. 61 Aşağı Kayı farm family in a tent the day after the earthquake.

Fig. 62 Interior of house of family in tent in Fig. above the day after the earthquake in 2000.

Fig. 63 Same room six months later after they had repaired the house and moved back in. *Hımış* construction can be easily repaired, and, in contrast to damaged RC, when repaired, it retains its capacity.

Conclusion

One of the problems that plagues the assessment of existing buildings and the archaic structural systems used for non-engineered buildings is the basic problem of establishing a norm for earthquake safety and performance when "no damage" is not a viable objective. With wind, for example, one can establish the design wind speed, and add a safety factor. Then, lesser wind forces should not cause any structural damage. With earthquakes, that is not the goal even for new buildings, except for the most vital installations, because it is economically infeasible because the forces are so great, while the incidence is so infrequent. Thus, how does one evaluate the post-elastic performance of archaic non-engineered structural systems constructed of materials that do not appear in the codes, and for which there are no codified test results?

This problem is not just academic; it is integrally connected to the longer-term issues of post-disaster recovery and regional development. The evaluation of older structures after earthquakes can lead to broadly divergent views on the significance of the damage and the reparability of the structures, and in the Orta earthquake case it has led not only to the unnecessary destruction of traditional houses, but also spawned the relocation of entire villages – most of which have failed at tremendous social costs. This can have profound consequences for the owners and for the economic and social dislocation of the disaster as a whole, and it can also result in the unnecessary loss of buildings of historical and cultural value. Earthquake damage has often been looked at with little understanding of what it represents in terms of loss of structural capacity. The standards applicable to reinforced concrete, where a small crack can indicate a significant weakness, are often wrongly applied to archaic systems where even large cracks may not represent the same degree of degradation or even any loss of strength. This can result in the unnecessary condemnation of buildings.

Fig. 64 This house in Elden had been abandoned for years before the earthquake. Despite its deteriorated condition, the earthquake damage was limited to the collapse of some of its walls. The basic rough construction characteristic of a rural area without a saw mill or access to a kiln can be seen with the undressed logs used for the structure, and unfired adobe blocks used for the infill.

Modern construction materials and methods have brought with them extraordinary opportunities for new spaces, forms, and ways of building, and for lower-cost housing of great numbers of residents. But in many parts of the world they have also been disruptive of local culture, resulting in building forms and ways of building that are alien to the local society. The earthquake risk is just one way in which we can observe what this disruption represents in terms of a loss of cultural and technical knowledge and memory. Earthquakes have proven to be particularly unforgiving when the new ways of building are not sufficiently well enough understood or respected to be carried out to an acceptable level of safety. Moreover, by opening up to learning from indigenous pre-modern examples of earthquake resistant technologies, we can learn to preserve the surviving examples of these now seemingly ancient ways of building in a way that respects what these buildings are, not just how they look.

Recent catastrophes, with their sizeable death tolls, show there is much to learn about how to build in a safe and durable manner. Just as many have begun to rediscover the value of ancient Indian ayurvedic medicine or Chinese acupuncture, earthquakes can serve to reveal the value of forgotten indigenous knowledge as well as shortcomings in the modern methods. Well engineered and constructed modern buildings have fared well in earthquakes, but the effort to improve public policy challenges us to meet the needs of a broader range of rural and urban populations lacking access to well-trained engineers and builders. It is in this realm that the construction methods developed before the introduction of modern materials and modern computational tools have much to teach us, both before and after the inevitable earthquakes. Old ways of building that are based on an empirical wisdom passed down through the ages will probably defy most attempts to be rationalized into systems that can be fully calculated, but the evidence remains that some of these systems nevertheless have worked well. This was true despite the extreme and unpredictable forces experienced in earthquakes - forces that have continued to confound modern-day efforts protect the plethora of buildings that make up the contemporary city.

Fig. 65 & 66 After witnessing the destruction of RC buildings in Duzce while his father's *hımış* house survived undamaged, this resident of Düzce decided to stop construction of a new RC house and change it to *hımış* construction.

NOTES

[1] The reinforced concrete building visible on the left remained standing consistent with the general observation that those reinforced concrete buildings that were under construction at the time of the earthquake, as this one was, were less likely to collapse than buildings completed with all of the infill masonry in place.

References

Dikmen, Neşe (2005), A Provision Model And Design Guidelines For Permanent Post-Disaster Housing In Rural Areas Of Turkey Based On An Analysis Of Reconstruction Projects In Çankiri, A PhD Dissertation in Building Science in Architecture, Graduate School of Natural and Applied Sciences, Middle East Technical University, Ankara, Turkey.

Erberik, M. Altug, and Amr S. Elnashai (2003), 'Seismic Vulnerability Of Flat-Slab Structures,' Mid-America Earthquake Center Ds-9 Project (Risk Assessment Modeling) Technical Report, University Of Illinois At Urbana-Champaign, December 2003.
FEMA (1997), 'FEMA 274: Commentary on the NEHRP Guidelines for the Seismic Rehabilitation of Buildings,' (Federal Emergency Management Agency, Washington DC.

Langenbach, Randolph (1968), 'The Amoskeag Millyard, An Epic in Urban Design,' The Harvard Bulletin, 70:12, April 13, 1968. 21-28. (Available on www.conservationtech.com)

Langenbach, Randolph (1981), 'Lowell: From Building to Architecture,' Harvard Architecture Review, MIT Press, Cambridge, Vol 2, Spring 1981 (Available on www.conservationtech.com).

Langenbach, Randolph (1989), 'Bricks, Mortar, and Earthquakes, Historic Preservation vs. Earthquake Safety,' APT Bulletin, The Journal of Preservation Technology, The Association for Preservation Technology International, XXI, 3&4, Sept. 1989. (Available on www.conservationtech.com)

Langenbach, Randolph (1990), 'Of Taq and Dhajji Dwari; The Earthquake Resistant Mud Architecture of Kashmir,' ADOBE 90, International Conference on Earthen Architecture Proceedings, Las Cruces, New Mexico, November, 1990, re-published in Traditional Southwest Magazine, February 5, 1992. (Available on www.conservationtech.com)

Langenbach, Randolph (2006b) 'Saga of the Half-Timbered Skyscraper: What Does Half-Timbered Construction have to do with the Chicago Frame,' Proceedings of the Second International Congress on Construction History, Cambridge University, UK. (Available on www.conservationtech.com)

Langenbach, Randolph (2006c), 'From "Opus Craticium" To The "Chicago Frame: Earthquake Resistant Traditional Construction,' Proceedings (forthcoming), Structural Analysis of Historical Constructions (SAHC) Conference, (P.B.Lorenço, P.Roca, C.Modena, S.Agrawal, Editors) New Delhi. (Available on www.conservationtech.com)

Langenbach, Randolph, Khalid Mosalam, Sinan Akarsu, Alberto Dusi (2006a), 'Armature Crosswalls: A Proposed Methodology to Improve the Seismic Performance of Non-ductile Reinforced Concrete Infill Frame Structures,' 8th U.S. National Conference on Earthquake Engineering (8NCEE) Proceedings, EERI, San Francisco. (available on www.conservationtech.com)

Langenbach, Randolph, et al. (1979), Satanic Mills, The Conservation of the

Pennine Textile Mills (SAVE Britain's Heritage, London). (Available on www.conservationtech.com)

Langenbach, Randolph. (2003), 'Crosswalls" Instead Of Shearwalls: A Proposed Research Project for the Retrofit of Vulnerable Reinforced Concrete Buildings in Earthquake Areas based on Traditional Hımış Construction,' Proceedings of the Turkish Fifth National Conference on Earthquake Engineering, Istanbul.

Langenbach, Randolph. (2003). 'Crosswalls Instead of Shearwalls,' Proceedings of the Turkish Fifth National Conference on Earthquake Engineering, Istanbul, 26-30 May, 2003. (Available on www.conservationtech.com)

Neve, Arthur (1913), Thirty Years in Kashmir (Arnold, London).
Rai, Durgesh C. and Murty, C.V.R. (2005). Preliminary Report On The 2005 North Kashmir Earthquake Of October 8, 2005, Indian Institute of Technology, Kanpur, (available on www.EERI.org).

Robison, Elwin C. (1989), 'Windbracing: Portal Arch Frames and the Portal Analysis Method,' (Unpublished manuscript, Kent State University, Kent, Ohio, July, 1989).

Traditional Risk Management amongst African communities.

Herman Kiriama
Fort Jesus Museum, Mombasa, Kenya

Abstract

African communities have had well developed indigenous management systems. These communities used this knowledge to cope with disasters both man made and natural.

This knowledge was always expressed in various ways that included belief systems, taboos and rituals, but which eventually gave way to the actual practice. For instance a community may have taboos against cutting certain trees in a certain forest or entering into some gorges as this may be seen to be offending the ancestors. But in actual sense the real reason behind this is that the community wants to preserve the eco-system and thus prevent either soil erosion, preserve water catchment areas or protect the biodiversity of the area. In other words prevent the community from facing risks. To the outsider however, this may not be apparent.
This paper therefore presents some of these subtle traditional knowledge systems that various African communities have used in disaster prevention and management. It is argued that this knowledge can be incorporated with scientific knowledge for better disaster prevention, preparedness and mitigation.

***

Introduction

From time immemorial, risk management has been deeply rooted in Africa communities. These communities used their indigenous knowledge to monitor various disaster prone natural systems such as climate as well as potential human caused disasters and establish early warning indicators for their own benefit and future generations. For instance, the Mijikenda of coastal Kenya developed an elaborate system of values in order to prevent the degradation of their environment from both natural and man induced disasters

The Mijikenda of Kenya's Coast province

The Mijikenda or nine houses are the linguistically and culturally related Bantu speakers who live in the coastal and immediate coastal hinterland of the Kenya coast.
In their oral traditions, these groups who include the Agiriama, Akambe, Arihe, Aravai, Achonyi, Adigo, Aduruma, Adzihana and Akauma, claim that they migrated from their original homeland of singwaya, thought to be in modern day southern Somalia, to settle in their present day land. Initially, the ancestors of these groups settled in six individually fortified hilltop villages or *Kayas* along the ridge behind the Kenyan coast. Three more kayas were later added. Today, an avid conservation of this environment has resulted in residual patches of forests averaging between 10 to 400 hectares, of once an extensive diverse lowland forest found in Eastern Africa. These residual patches of forests represent human environment interaction showing a great initiative of the human conservation instinct. The Kayas therefore, represent a

living tradition (Spear 1978, Willis 1996).

In early 20th C conditions outside the Kayas became more secure and people cleared land outside the forests not just to farm but to build homes, the Kayas and surrounding vegetation were preserved by the local communities and became isolated forest patches in the cultivated countryside. The Kayas became shrines due to their powerful link with the past. They were the home of the ancestors, increasingly a ritual place where prayers were said in the event of serious threats or calamity, and places of refuge. Important elders were taken into the Kaya to be buried and their graves marked by *vigango* or carved grave posts and protected by *koma* (ancestral spirits).

Management System

The move outside Kayas however, led to Kayas facing many risks. These include:

- Demand for building timber
- Firewood for fuel
- Wild fires
- Demand for cultivation land
- Sand harvesting and associated erosion

To safeguard Kayas against such risks, the Mijikenda community developed a management system; a system composed of taboos and rituals that were/are (even today) enforced by special council of Elders. According to this system it is forbidden to cut trees, saplings or any other vegetation there as they have a spiritual value. The same protection goes for unique animals and singular landforms such as caves and limestone cliffs. Grazing cattle was forbidden-obviously to stop denudation- cattle straying were to be slaughtered and eaten by community. Special attires were to be worn in order to enter the kaya- traditional sarongs and shawls- seamless and wrap around. In those cases where deadwood was allowed to be taken away, strict rules were laid; women were allowed to carry as much as they could in their arms without use of a cord or rope. Cutting or metal implements were/are not allowed into the kayas- this ensures that one can only take as much as could be broken by hand or picked.

In each Kaya there are highly sacred sites accessible to only a select group 'the forest within a forest'. The area where the *fingo* (the group's protective charm) is believed to be hidden is still the most holy place. Criminal and anti-social acts or behaviour are also curtailed inside the forest such as murder and sorcery, adultery and incest. Many of these rules have had a direct implication on the vegetation structure, composition and regeneration and therefore survival of the Kayas (forests). For instance, within the Kayas, there are at least eight zones with varying degrees of access. These areas differ in their floristic composition and structure. These buffer zones are meant to minimise and control risks to the actual sacred forest (Tengeza 1999)

Fear of divine retribution also plays a significant role in the enforcement of these rules. For example people believe that transgression of the taboos may result in undesirable events such as illness or even death. In effect the site monitors are spiritual, allseeing. They do not need the 'indicators' that we talk of today of natural and cultural status!

Often the only remaining forested areas in their localities the Kayas importance for conservation of nature has been increasingly recognized. The coastal forests of Kenya are the most diverse in the country with over 50% of Kenya's rare plants. Seven out of the 20 sites with the highest conservation importance in the region in terms of plant species diversity and rarity are Kaya forests. Rare species of birds, butterflies and other life forms have been identified. The disproportionately large number of species rarity and endemism indicate that the surviving Kaya forests cover a broad range of habitat and micro-climatic conditions. Thus traditional values and beliefs of the Mijikenda have served to preserve important natural areas for posterity (Githitho 1998, Nyamweru 1998, Robertson and Luke 1993)

The adherence to these rules and regulations has meant that the ecological diversity of these areas has been maintained; there are no fires that would not only destroy the forests but affect the neighbouring communities; erosion that could have occurred if the forests had been cut has been minimised and the survival of the forest has meant that the moisture levels in the area is quite high.

Also as forest islands or fragments surviving in a largely cultivated environment, the Kayas help to enhance the variety and the natural beauty of the landscape The contrast between the surrounding farm monoculture and the luxuriant indigenous forest groves is vivid and the Makaya stand out conspicuously, alluring and mysterious.

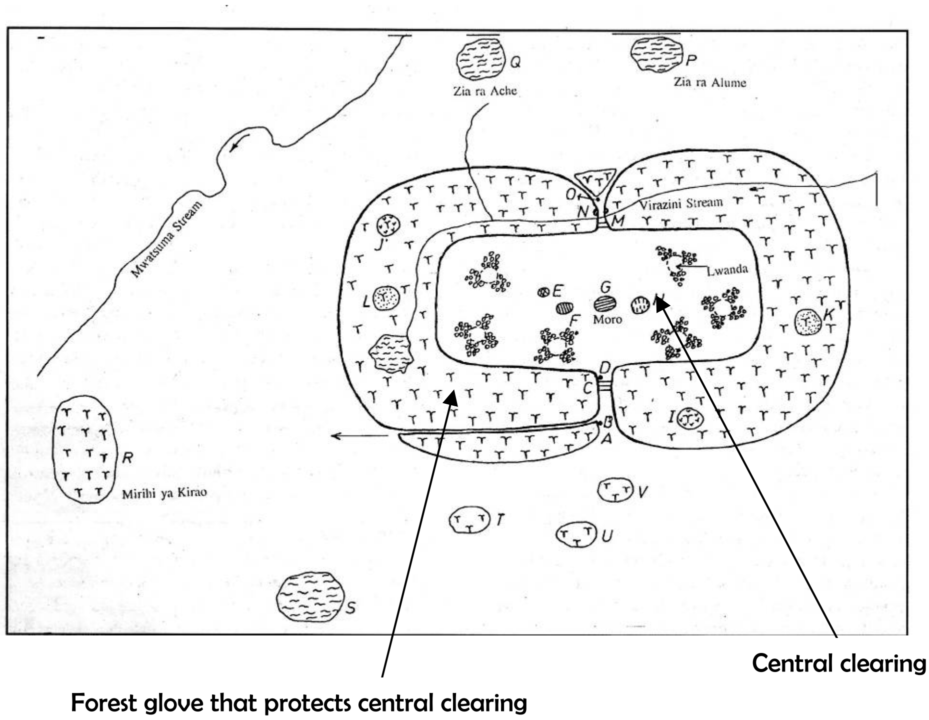


Fig. 1 Typical Kaya Structure

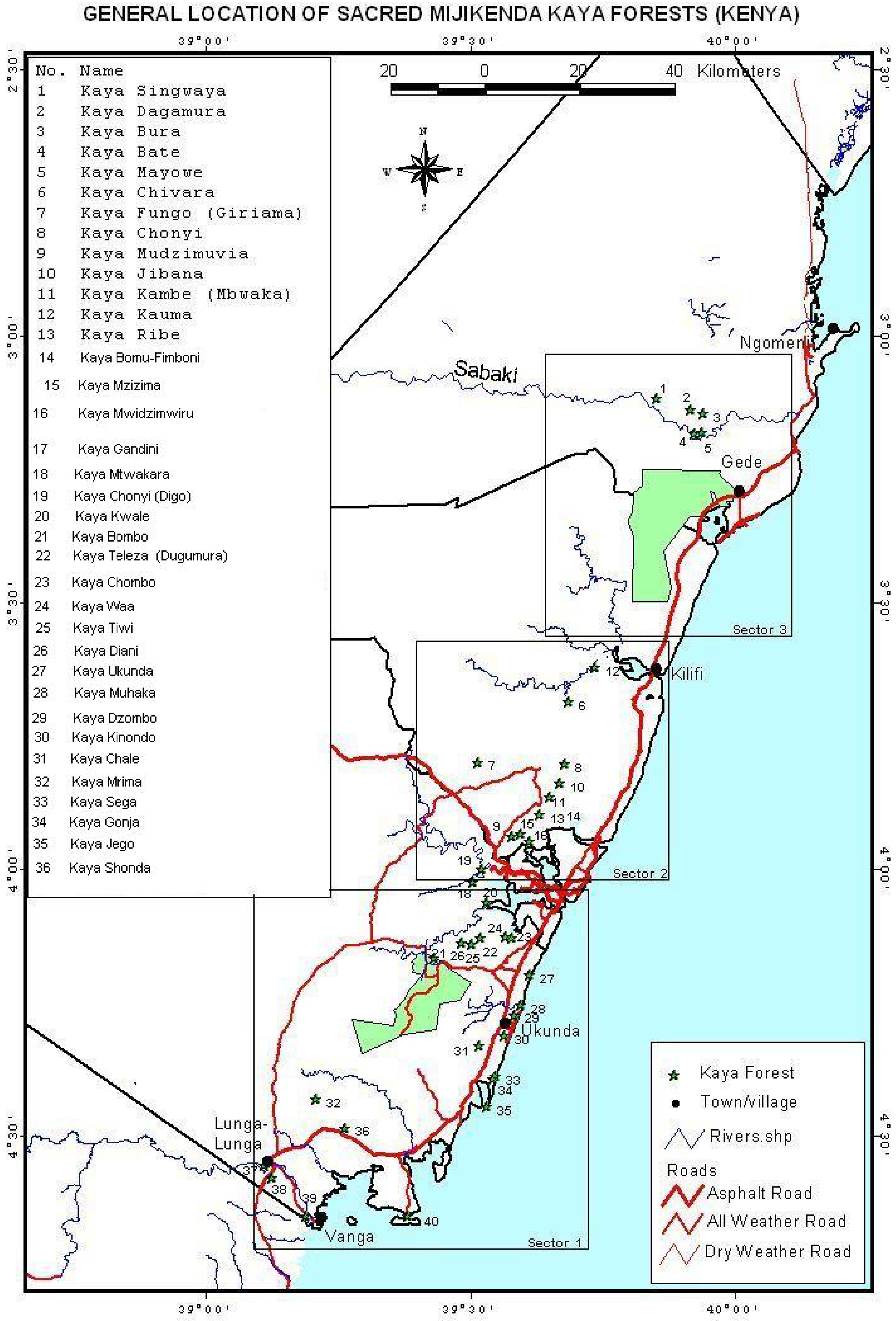


Fig. 2 General location of the Kayas

Fig. 3 The thick Kaya forest

Fig. 4 Kaya elders, custodian of the kayas

Lightening

Other communities in Kenya also use their indigenous system to avert or manage disasters. For instance within the Akamba community, lightening was averted by a traditional medicine man putting a knife with the cutting edge facing upwards somewhere around the compound of an individual who suspects that his house may be a target of bad eyes. The knife being metal could divert the electric current away from the houses in the compound.

Other Examples

FORECASTING

Rain availability or absence is essential for the survival of rural farming communities. Therefore rain forecasting/making is an important aspect of these communities. In Western Kenya, for instance, the Banyore and Luo communities have rainmakers. They have an exclusive forest shrine where a huge snake, used as an indicator of moisture levels in the atmosphere, lives. The shrine has particular tall trees, which are used to monitor and predict rain. The rainmakers have mastered the winds and associate good and bad rainfall seasons with particular wind direction (Okoola 1996) Plants in this shrine were also used as indicators of impending dry or rainy season. These include:
Manera (*Terminalia brownii*) a tree, which normally grows very big and shades the leaves to signal dry conditions.
Ngowo (Ficus sur) drops its leaves twice a year.
Waa (Tamarindus indica) also drops/ shades its leaves twice a year

The shading of leaves is an indication of water stress associated with dry conditions. The trees shade the leaves to reduce evapotranspiration and would put on the leaves when the rains approach. These indicators led the community to take measures to avoid disasters-such as lack of food due to drought.
Among the Luo community, daily rainfalls were predicted by the changing songs and cries of the Robin chat – *Cossypha caffra* or *Semirufa* (Hundhwe). Other birds that the Luo mention as indicators of wet / rainy season are the common swallows (*Hirundo abyssinica* and *Hinindo smithic*)locally known as Opija ; these birds make circular movements in the sky when rain is forming and when wind is blowing it towards the settlement or homestead.
The archaeological studies show that the pastoral Masaai of South-western Kenya had learnt to sustainably exploit their grazing zones based on sophisticated seasonal grazing rotations. The Masaai controlled access to grazing zones in order to prevent exploitation past the ecosystem's carrying capacity Therefore during the dry season, cattle were taken to the moist highland areas whereas the lowland, where moisture was less were left fallow and for pasture to recover. This forage suystem was subject to strict and complex restrictions developed and enforced by a council of elders led by the Laibon. Those who violate these rules were threatened with a curse and excommunication from the community. Using this system, the Maasai were able to take care of the natural resources and evade famine (Robertshaw 1989)
In Botswana, the Bapedi-Batswapong of Moremi village north of Gaborone have effectively used their traditional systems, in the management and conservation of their cultural and natural heritage.
Moremi village is among villages that surround the Tswapong Hills and its landscape includes the Manonnye,

Seroolo and Magweele gorges. Seroolo and Magweele have ephemeral springs and are highly sacred to the community. Only *komana (*intermediaries between the *badimo* and people) members can access these gorges. As a result, the Batswapong instituted a system of sanctions that would protect springs. These include: People are not supposed to go far into the gorge, some trees are not supposed to be cut for instance *mboana, mokakata* whose barks are used to trap animals, *thatlha,* which is widespread in the gorge, is not supposed to be harvested, firewood is not supposed to be collected within the gorge and its vicinity, whistling not allowed in the gorge and use of modern cups for collecting water in the gorge is not allowed, only traditional gourd can be used. Smoking cigarette in the gorge is prohibited, only snuff is allowed, swimming in the pools is highly prohibited neither are people supposed to wash their faces in the pools. No sex at the gorge. People are not allowed to throw at or kill anything in the gorge. Dogs are not allowed in the gorge nor are the use of insults or bad language allowed (Dichaba nd).

Taboos were/are to safeguard the integrity of the gorge. For example making of fires in the gorge could destroy the vegetation and animals in the area, thus introducing new ecological system and giving the site a new interpretation. The taboos thus minimized the interaction of man with the environment, and thus kept the landscape preserved; so that the flora and fauna is highly undisturbed and rich. For instance, the cape vultures, (*Gyps coprotheres) manong,* which are highly sensitive to noise, still occupy the site; the Manonnye gorge derives its name from these vultures, *manong.* Other endangered species in the gorges include the black eagle (*Aquila verreauxxi*). The poisonus *euphobia coperia,* which is only endemic to Tswapong Hills is also found at the gorge (Dichaba nd).

Conclusion

> *"A major gap in disaster risk reduction in Africa is weak (*indigenous*) knowledge management. There is inadequate attention to information management and communications" (*Africa Working Group on Disaster Risk Reduction)

Thus indigenous knowledge is not categorized as knowledge and yet all the above examples show that African communities used their indigenous knowledge systems to avert or minimise risks. The risks could be either lack of rain or protection of the ecosystem. For instance some communities were able to use their traditional indigenous knowledge of storm routes and wind patterns to design their disaster management long in advance by constructing types of shelter, wind break structures, walls, and homestead fences appropriately

Because most of these communities still identify with this knowledge it can be used for disaster prevention, preparedness, response and mitigation. Risks occur at community level and affect communities and it is in the community where all the operational activities related to disaster risk management take place. Therefore disaster risk reduction should be:

- a community-driven process. Indigenous knowledge and input from traditional leaders should be included in all of the activities with risk management.

- Traditional risk management systems should be documented for the benefit of future generations.
- Governments should involve local communities in the development of national disaster risk management systems.
- Traditional risk reduction systems should be made part of the educational system curriculum.
- There should therefore be a blend of approaches and methods from science and technology and from traditional knowledge as this will open avenues towards better disaster prevention, preparedness, response and mitigation

References

Dichaba, T. nd. Traditional and Modern Systems in the Management and Conservation of Heritage Sites in Botswana, Which Way? The Case of Moremi Cultural Landscape. Unpublished Manuscript.

Githitho A, 1998. A report on the International Symposium on Natural Sacred sites –Cultural Diversity and Biological Diversity. (CFCU internal report, Kilifi).

Nyamweru C.K, 1998, Sacred Groves and Environmental conservation. Frank Piskor Faculty lecture St. Lawrence University.

Okoola R E A , 1996. Space- time characteristics of the ITCZ over equatorial Eastern Africa during anomalous rainfall years. PhD Thesis Department of Meteorology, University of Nairobi, Kenya, 251 pp.

Robertshaw, Peter 1990. *Early Pastoralists of South-Western Kenya.* Nairobi: British Institute in Eastern Africa. Memoir 11.

Robertson S. A and Luke W.R.Q. 1993 Kenyan Coastal Forest: The report of the NMK/WWF/Coastal Forest Survey WWF project 3252 Nairobi, WWF

Spear, T. T-1978 *The Kaya Complex: a history of the Mijikenda peoples of the Kenya coast to 1900.* Nairobi: Kenya Literature Bureau.

Tengeza, A. H- 1999.The Mijikenda Grevemarkers: Report of a Study on Timber and Live Tree Grave- Markers and Associated traditions in Kayas Forests and Adjacent areas of Kilifi District NMK/CFCU.

Willis J, 1996.The Northern Kayas of the Mijikenda: A gazetteer and a Historical
Reassessments. *Azania XXX1.*

The Protection of Cultural Property (PCP) in Switzerland

Hans Schüpbach
Federal Office for Civil Protection (FOCP), Switzerland

(This paper is adapted from the speech Mr. Schüpbach had prepared for the conference)

The Swiss PCP service had its beginnings in the Second World War. Switzerland was luckily not much affected by the war. Nevertheless, a museum in Schaffhausen, a Swiss town near the German border, was bombed during the Second World War, destroying a great deal of cultural property in the process. At the end of the war in 1945, UNESCO was set up, giving new impetus to cultural property protection efforts. Subsequently, as we all know, the Hague Convention was passed in 1954. Switzerland ratified the Convention in 1962, thereby committing itself to taking the best possible measures to protect its cultural property. Switzerland has had its own PCP law since 1966, which governs the execution of protective measures, set out in the Hague Convention. The most recent further development of PCP in Switzerland was the ratification of the Second Protocol in March 2004.

How then is PCP work structured in the civilian domain in Switzerland? As Figure 1 shows, the works are carried out by various bodies.

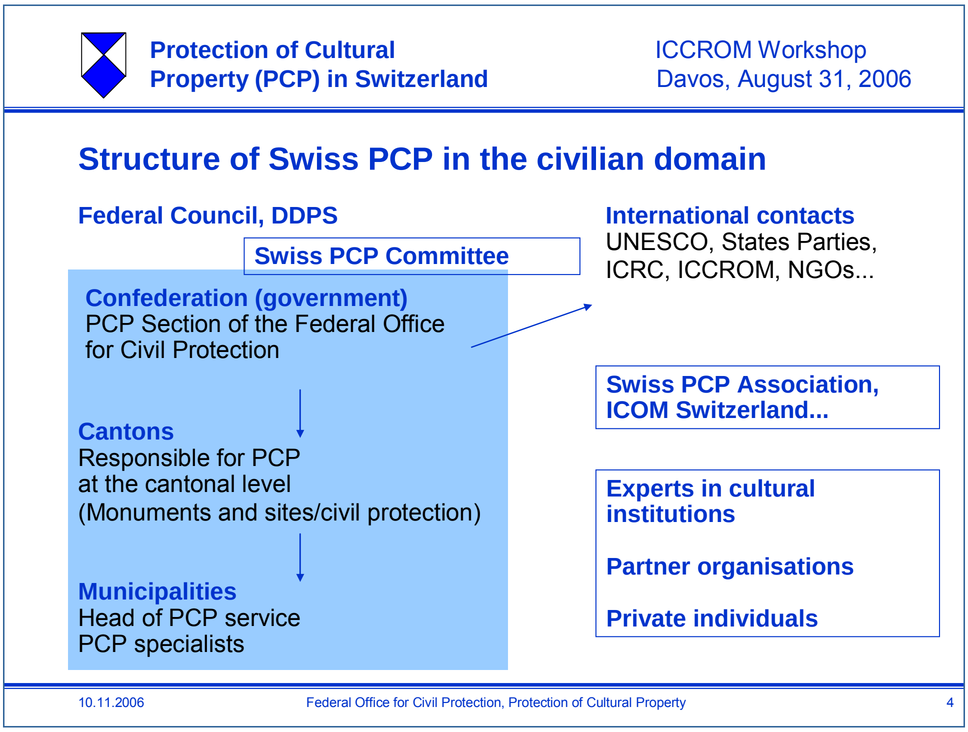


Fig. 1

In Switzerland we have the three political levels of the Federation, the 26 cantons and almost 2800 municipalities. On each level there are people especially concerned with the protection of cultural property. PCP is part of the Department of Defence, protection of the Population and Sports (DDPS). As a link between the Department and the Federal Office there exists a Swiss PCP Committee, consisting of all the institutions and partner organisations that are concerned with PCP. The international contacts are taken by the PCP section at the Federal Office for Civil Protection, where I work. Additionally, there are private organisations like the Swiss PCP association, or the specialists in cultural institutions, the partner organisations and private individuals that are occupied with PCP. Figure 1 shows you the network of all these people involved in the system.

The recent re-structuring and re-design of Civil Protection in Switzerland, to which the PCP service belongs, rightly focuses on natural and man-made disasters, everyday risks, and damage caused by water and fire. Article 3 of the Hague Convention already addresses the issue of protective measures in peace time; these have now been reinforced by Article 5 of the Second Protocol. To summarise, there are three categories of risks to cultural property: permanent risks, natural or man-made disasters and armed conflicts.

I shall now move on to measures which Switzerland has taken to protect its cultural property. Maybe the most important measure is the Swiss Inventory of Cultural Property. Before you can protect something, you must first know what is actually worth saving. This inventory, which contains around 1600 objects of national importance, serves theses purposes. The Inventory is currently being revised, and publication of the new updated version is planned for 2008. We entered the Inventory in a database In the near future we would like to put this database online and using G.I.S (Geographical Information System), visitors to the site will be able to call up information on a chosen region. They will be able to click on images of cultural property items marked with symbols to find out more about them (texts, plans, photos etc.). Instead of looking at map sections, visitors will have access to aerial photos, like this one of a farmhouse, the roof of which is marked with the PCP symbol (Figure 2). G.I.S trials are currently under way. In addition to the revised Inventory in 2008, we also aim to make the G.I.S available to all internet users. Especially interesting are combinations with other layers, e.g. adding the zones threatened by earthquakes, which give additional information.

I shall now briefly look at other measures used in Switzerland to protect our cultural property. Firstly, safeguard documentation enables the reconstruction of a damaged or destroyed object by means of plans, texts and photos. Secondly, we place important documents on microfilm, which are then stored in a government cavern. Thirdly, Switzerland boasts a large number of protective shelters that provide space at any time to store movable cultural property. Switzerland has around 280 protective shelters currently in use today by museums, libraries, archives or monasteries specially to hold cultural property. For all three measures – microfilm, safeguard documentation and protective shelters – financial support can be provided by the Swiss government, the cantons and/or the municipalities.

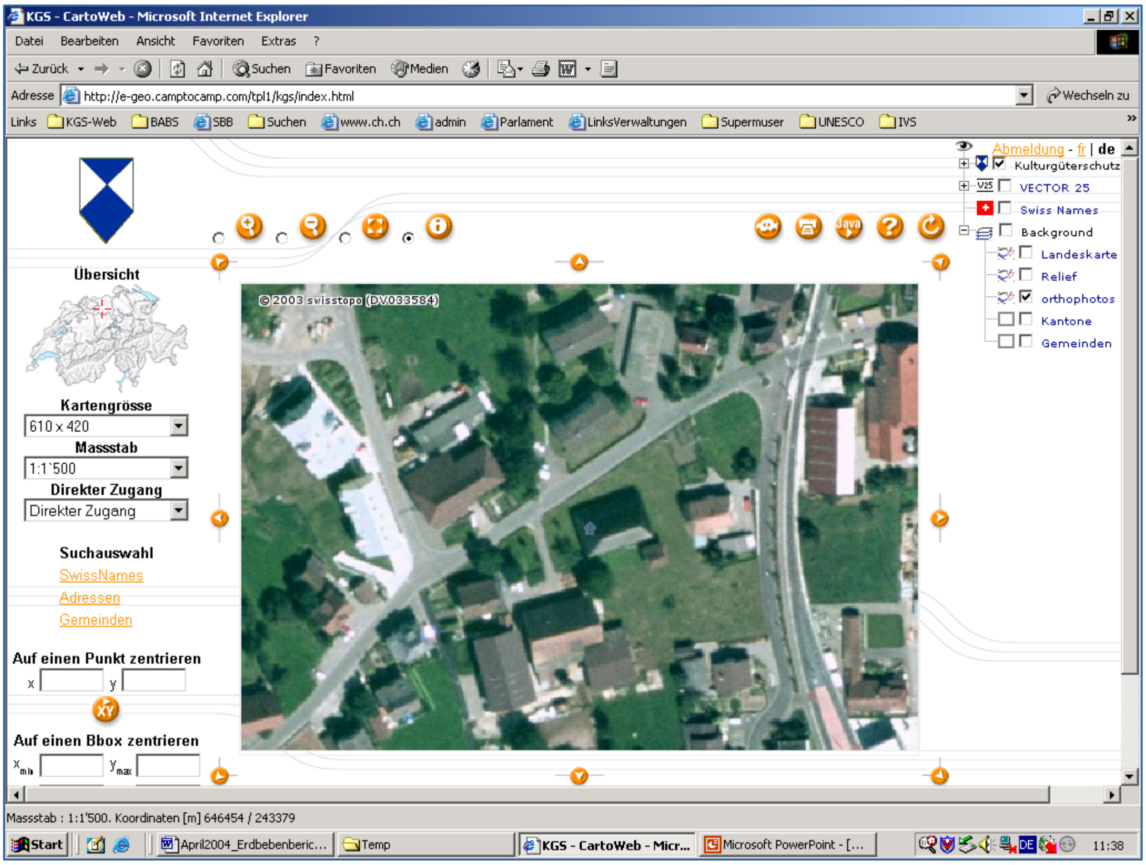


Fig. 2

To be able to carry out PCP activities, there must be the necessary personnel with the appropriate training. There are about 4000 people working in the PCP service for up to a week per year – most of them are also concerned with this theme in their everyday jobs (e.g. people from museums, archives, libraries, monuments and sites or archaeologists). Collaboration with cultural institutions and the army is very also important. For instance, we were elaborating a model disaster plan which museums and archives could adapt to their own needs, in order to prepare emergency actions planning. We place great emphasis on information and awareness, as past experience has shown that a lot of cultural property has not been damaged maliciously but through ignorance.

On the cantonal level the Swiss Civil Protection System joins different partner organisations in the case of a catastrophy. PCP service is part of the Support & Protection. In that relation the PCP services work closely together with the partner organisations, in particular the police (when there's a theft of art objects) and especially with the fire service, if there's a fire in a historic building. We have joint priorities, which were presented in a journal. We also prepare training material, which we put into practice during the joint training courses of both partners. The Swiss cantons have until 2011 to draw up hazard maps to warn from various risks. There, cultural property (which is often forgotten in emergency situations because of other priorities) could be listed explicitly under "special risks". Figure 3 shows how measures depicted in the hazard maps may prove to be very efficient in a damage situation.

In 2004, the Federal Council asked the PCP section to draw up a report on the risks to cultural property posed by earthquakes. From past and present experience, it is clear that the

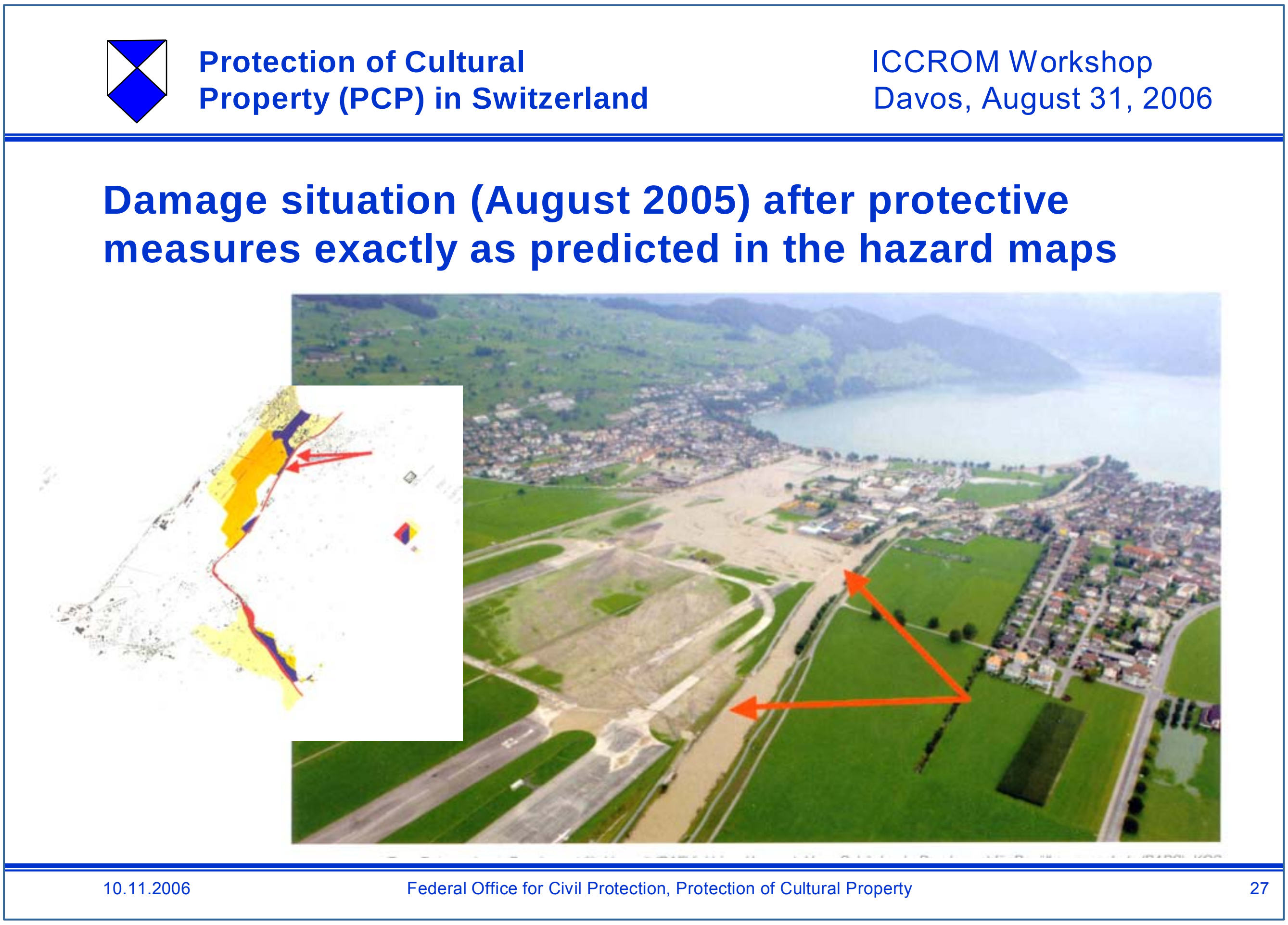


Fig.3

protection of cultural property is increasingly becoming a task on a global scale. Therefore international cooperation is also for us of central importance. In 2002, we hosted an international conference, the theme of which was the Second Protocol. Its findings were published in the Conference Papers.

Let me give you a concrete example of international cooperation. Following the heavy floods that inundated Germany and the Czech Republic in autumn 2002, the Swiss PCP service together with other Swiss authorities helped with the construction of a freeze-drying machine. Experts in the Czech Republic will now be able to use it over the next few years to dry out water-damaged documents – they had first been frozen to limit the damage. It is hoped that these efforts will make the documents usable again.

Now, if we look again at the Second Protocol, we can see that Switzerland has largely met the obligations set out in Article 5 to protect cultural property in the civilian domain. Another possibility for Switzerland to bring in its experiences is the election into the International Committee for the protection of Cultural property in armed conflicts.

Let me finish this presentation with a picture (Figure 4). This parasol shows the scope of Swiss PCP services. From outside, there are external influences, such as international documentation and experience. At home, the Swiss PCP service covers the following three areas: prevention – which is the most important one, disaster and event management planning and training, and thirdly collaboration with the army. This conference provides us not only with the opportunity to improve the Swiss system, but also to subject it to international comparison and debate.

Fig. 4

Part 3: Participant Presentations

A STRATEGY FOR RISK REDUCTION AT WORLD HERITAGE PROPERTIES

By Giovanni Boccardi – UNESCO WHC

Integrating traditional knowledge systems and concern for cultural and natural heritage into risk management strategies
Davos – 31 August 2006

1

Strategy for Risk Reduction at World Heritage Properties

GAP BETWEEN HERITAGE AND DISASTER REDUCTION SECTORS

The Heritage sector, in the past, was concerned about how to protect the heritage (mostly the tangible one) from disasters;

This is perhaps why the Heritage and Disaster Reduction sectors have not been able to communicate and cooperate: their objectives were different.

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Davos – 31 August 2006

2

Strategy for Risk Reduction at World Heritage Properties

A SHIFT IN PERSPECTIVE

In the past decade, however, the Heritage sector has redefined its mission and objectives within the broader development context;

Heritage, both tangible and intangible, as a fundamental component of bio and cultural diversity, is now recognized as a contributing factor to sustainable development.

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Davos – 31 August 2006

3

Strategy for Risk Reduction at World Heritage Properties

WHAT DO WE CALL HERITAGE?

Tangible heritage includes monuments, groups of buildings, cultural landscapes and natural sites;

Intangible heritage includes "the practices, representations, expressions, as well as the knowledge and skills, that communities, groups and, in some cases, individuals recognise as part of their cultural heritage".

Integrating traditional knowledge systems and concern for cultural and natural heritage into risk management strategies
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4

Strategy for Risk Reduction at World Heritage Properties

HOW CAN HERITAGE CONTRIBUTE TO REDUCING DISASTERS?

TANGIBLE

- Primary function (e.g. shelter, housing, infrastructure, environmental resource; etc.)
- Defense against disasters (e.g. by reducing disasters through traditional resistant and easy-to-repair buildings; appropriate and sustainable land uses; etc.)
- Economic asset for recovery (e.g. for tourism)
- Strengthening identity, social cohesion (e.g. by providing psychological support as a symbol of continuity within a community)
- Education (e.g. how did this building survive?)

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5

Strategy for Risk Reduction at World Heritage Properties

HOW CAN HERITAGE CONTRIBUTE TO REDUCING DISASTERS?

INTANGIBLE

- By facilitating learning, communication, decision making and social binding through the use of a familiar cultural and symbolic paradigm, especially at times of particular stress;
- By ensuring the continuity of the social systems, knowledge and skills related to risks from disasters developed and accumulated over centuries of adaptation to the local environment.

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Strategy for Risk Reduction at World Heritage Properties

Integrating traditional knowledge systems and concern for cultural and natural heritage into risk management strategies
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7

Strategy for Risk Reduction at World Heritage Properties

ARE DISASTER REDUCTION STRATEGIES ALREADY DEALING WITH HERITAGE?

Heritage, indeed, consists of properties and people (e.g. holders of traditional knowledge). One might think therefore that these are already covered by general DR strategies within a given area

However, heritage is defined by special values and vulnerabilities, that can only be identified by local communities and experts through a dedicated approach

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Strategy for Risk Reduction at World Heritage Properties

IMPLICATIONS

Reducing risks from disasters for the heritage, therefore, is one way of contributing to sustainable development;

By conserving tangible and intangible heritage, moreover, we can actually contribute directly to disaster risk reduction, throughout the DR "circle" (mitigation, response, reconstruction).

Integrating heritage into wider DR strategies requires direct involvement of local communities and specific expertise

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Strategy for Risk Reduction at World Heritage Properties

…AND WHAT THE REALITY IS

Despite this, most heritage sites and traditional knowledge systems are unprotected/unused with respect to risks from disasters;

The Heritage sector finds it very difficult to convince decision makers (Governments, development agencies, donors) and disaster managers that it is useful to invest in risk reduction for heritage, at all stages;

The Heritage sector does not have a strong policy for risk reduction that fits within the wider DR framework.

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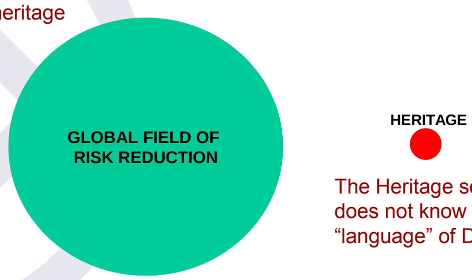
Strategy for Risk Reduction at World Heritage Properties

The global Disaster Risk Reduction sector is currently not concerned with the heritage



The Heritage sector does not know the "language" of DR

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Strategy for Risk Reduction at World Heritage Properties

SO WHAT?

The World Heritage Committee has requested UNESCO and Advisory Bodies (ICCROM, ICOMOS, IUCN) to develop a Strategy for Risk Reduction at World Heritage Properties (July 2006);

This Strategy (a collaborative effort in consultation with various institutions) is aimed at reducing risks from disasters at WH sites, including by integrating our policies and practices with the global Disaster Reduction framework;

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Strategy for Risk Reduction at World Heritage Properties

THE STRATEGY INCLUDES

- Purpose
- General considerations
- Objectives and priority actions (in a Table format)

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Strategy for Risk Reduction at World Heritage Properties

THE STRATEGY

Purpose

- Strengthen protection of WH and contribute to sustainable development by integrating heritage into risk reduction policies and incorporate concern for disaster reduction within site Management Plans
- Provide guidance to integrate risk reduction into WH strategic planning and management

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Strategy for Risk Reduction at World Heritage Properties

THE STRATEGY

General considerations

- Recognize positive role of heritage in sustainable development and particularly risk reduction
- Key is advance planning and prevention
- Consider cultural diversity, local knowledge, special groups etc. and involve communities concerned
- Include people and movable heritage within scope

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15

Strategy for Risk Reduction at World Heritage Properties

THE STRATEGY

Mainstreaming World Heritage in the five priority areas of the *Hyogo Framework for Action*

1. Strengthening institutional support and governance for reducing risks at World Heritage properties;
2. Using knowledge, innovation and education to build a culture of disaster prevention at WH properties
3. Identifying, assessing and monitoring risks from disasters at WH properties
4. Reducing underlying risk factors at WH properties
5. Strengthening disaster preparedness at WH properties

Integrating traditional knowledge systems and concern for cultural and natural heritage into risk management strategies
Davos – 31 August 2006

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Strategy for Risk Reduction at World Heritage Properties

THE STRATEGY

Table 1. Objectives and priority actions

objectives	Actions		By Whom
1.	Level		

Integrating traditional knowledge systems and concern for cultural and natural heritage into risk management strategies
Davos – 31 August 2006

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Strategy for Risk Reduction at World Heritage Properties

THE STRATEGY

Emphasis is on:

1. Integrating heritage within broader risk reduction strategies (ref. to Objective 1 HFA)
2. Inclusion of relevant traditional knowledge systems and building a culture of prevention (ref. to Objective 3 HFA)

These are the two areas where UNESCO and its Partners felt that they could make a difference (hence the themes of this Session)

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Strategy for Risk Reduction at World Heritage Properties

CONCLUSIONS / 1

The Heritage sector is moving towards the global Disaster Reduction field, since it believes that heritage, much like ecosystems, has a significant role to play in achieving the HFA objectives and sustainable development in general

The Strategy developed recently in the framework of the World Heritage Convention is an attempt to lay down a bridge towards DR. We are here to cross that bridge, as we are convinced that both sides would strongly benefit from integration

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Strategy for Risk Reduction at World Heritage Properties

CONCLUSIONS / 2

The Strategy includes a number of specific actions (see Table) which can form the basis for dialogue and cooperation between heritage and other partners. We aim to select one or two priority actions for each Objective, where to concentrate our efforts

We are eager to listen to your comments, suggestions and even criticisms to understand if we are on the right track and what needs to be done to develop a more meaningful, comprehensive and sustainable Risk Reduction approach

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Strategy for Risk Reduction at World Heritage Properties

THANK YOU FOR YOUR ATTENTION

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Traditional Management Systems for WH properties: risk reduction lessons from Mount Athos

IDRC

Integrating traditional knowledge systems and concern for cultural and natural heritage into risk management strategies

Davos, Switzerland

August 30, 2006

Herb Stovel, Carleton University, Canada.

1

Focus of this presentation

Original goals of this paper limited by:

- **small number of World Heritage properties that have management plans**
- **small proportion of those which include concern for risk reduction**
- **negligible proportion of those available for research (without strenuous effort!)**

•Hence, focus is: analysis of lessons from Mount Athos – fire at Chilandar Monastery, two years ago

2

Traditional management - - - traditional knowledge

- traditional management systems =
  informal framework for decision-making
  - –Identifying priorities for action/ sustaining/ changing/ improving
  - –Identifying appropriate approaches (strategies, resources etc..) to address priorities
    - »Here, input of **traditional knowledge** can guide analysis of options
- traditional knowledge =
  experience built and retained through generations

3

Mount Athos, Greece

- near autonomous enclave within Greek State
- 1000 years of independence and isolation
- comprises at present 20 working monasteries, a “capital” town (Kariyes)
- and no women

4

Mount Athos, Greece

•governed by a Council (Holy Community) giving equal representation to all monasteries, working with reference to a traditional law (the “tipica”) – all established 1000 years ago, and still in place

• traditionally, monasteries function independently

5

Chilandar Monastery

• established 10th century, re-established as Serbian monastery in 1198; inscribed as WH property (1988) under criteria ii, iv, v, vi.

6

Chilandar Monastery

• fire (March 4, 2004) destroyed 60% of structure
• 10,000 m2 of surface lost; $30,000,000 Euros needed



7

Lessons from Mount Athos – the fire

1. No alarm given by the monastery (fire suppresion engines took two hours to arrive)
2. Fire put out by pumping salt water rather than gravity tanks – with dire consequences for surviving frescoes

8

Lessons from Mount Athos – the fire

3. Means of spread of fire – horizontal transmission through wooden beams, joists, nailing strips – virtually no vertical “fire walls”


9

Lessons from Mount Athos - preparedness

1. Monasteries appoint a monk to be responsible for fire, and a Committee to support preparedness – no continuity, no authority, no commitment – and these are ineffective

2. Fire drills occur, but once every five years?

10

Lessons from Mount Athos - preparedness

3. No preparedness plan: no answers to questions:
   - How to respond?
   - What to protect?
   - What order to do things?
   - Who to communicate with, and how?

11

Lessons from Mount Athos - preparedness

4. Little interest in linking preparedness for fire and earthquake

5. Little interest to do better – “this is God’s will” – 19 of the 20 monasteries have had major fires/ earthquakes regularly and frequently destroying significant cultural heritage property

12

Principles – traditional managements systems and risk reduction

1. Traditional management systems will normally integrate concern for cultural heritage in the overall management regime

   – Focus of management in such systems is likely to be objects, materials, traditions of heritage value – e.g., for religious places, maintaining functioning of the living faith is a goal highly compatible with preserving the forms of expression of that faith

13

Principles – traditional managements systems and risk reduction

2. But - traditional management systems don't necessarily integrate available risk reduction traditional knowledge

   – In the case of Mount Athos, the traditional management system does not integrate traditional knowledge

14

Principles – traditional managements systems and risk reduction

3. Traditional management systems can integrate useful (traditional) knowledge more easily than formal (western style) management systems, once such knowledge is valued.

   – Valuing such knowledge involves challenging traditionally accepted priorities within the management system

15

Ongoing Challenges

16

Today at Mount Athos

- efforts to develop a comprehensive approach to risk management being discussed by the Council – hence risk preparedness is becoming a priority
- Chilandar is being rebuilt with fire protection measures in place

17

Recommendations

- Need for research to document degree to which, and how, traditional management systems in place on WH properties support risk reduction
- Need more generally for research which
  – shows that traditional management systems mainstream concern for cultural heritage (case studies)
  – shows how to bring traditional or acquired knowledge into traditional management systems (more case studies)

18

Traditional knowledge as a cultural heritage that can contribute to future risk management strategies—

some remarks from the Moken community of the Surin Islands, Phang-nga Province, Thailand

Narumon Arunotai, Ph.D.
The Andaman Pilot Project
Social Research Institute
Chulalongkorn University

1

Map of southern Thailand and the Andaman Sea –home to the sea gypsy

and tsunami affected area

2

Sea Gypsy, Sea Nomad, *Chao Lay*

- Over 30 communities of former sea gypsy in southwestern Thailand bordering the Andaman Sea coast
  - Moken
  - Moklen
  - Urak Lawoi
- About half of the communities were either totally wiped out or badly damaged by the wave impact.

3

Chao Lay – Invisible, unrecognized

- *Thai Mai* (New Thai)
- "backward and poor" – facing marginalization
- Sedentary communities
  - Thai citizenship
  - Formal education
  - Intense contact with local population
  - Increasingly diverse occupation

4

The Moken

- The Andaman Pilot Project focuses on the Moken, the group which have retained much of the traits and characters of the sea gypsy or sea nomads compared to their counterparts

5

The Moken of the Surin Islands National Park

- Moken "amphibious" –hunter-gatherers
- Protein from fish and other sea animals
- Need cash to buy rice and other necessities

Marine gathering

6

The Moken

Forest gathering

7

The Moken after the tsunami

8

The Moken after the tsunami

9

Survival? – Old legend

- The tsunami incident has proved that the Moken indigenous marine knowledge and their almost forgotten "legend of the seven waves" have saved them and others (especially tourists and park staff) from the disaster.
- The legend
  --- "imprinted" "*laboon*"
  ---unwritten "historical record"
  ---recognizing the "warning sign" of the coming disaster
  ---educating younger generations

10

Survival? –boat maneuvering

- Boat maneuvering in the turbulent current
- Taking boat out to a deeper water when waves hit the shore
- Almost "instinctive" – a boy noticed the strong and unusual current and row back to shore

11

Survival? Settlement site selection

12

Survival? Settlement site selection

- Knowledge about site selection for village settlement
- The area on the eastern side—protected bays
- Higher ground/steep slope behind the village

13

Post-tsunami recovery

- Getting back to normal lives
- Resilient social system
- Loss and death quite common in daily lives

14

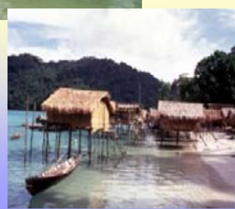
The Moken after the tsunami

- The tsunami incident has brought "the Moken" on the social map
- Previously regarded to be a backward and poor tribe, with virtually nothing to offer to the larger society.
- Became a "celebrity" through a media coverage

15

The Moken after the tsunami

- Respect to the local knowledge and decision?
- traditional huts vs. new huts



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The pre-tsunami village

17

The post-tsunami village

- •Large setback space
- •Houses set in tidy rows
- •"Marine" visibility
- •Little space between the huts.

18

Dead tree threat!

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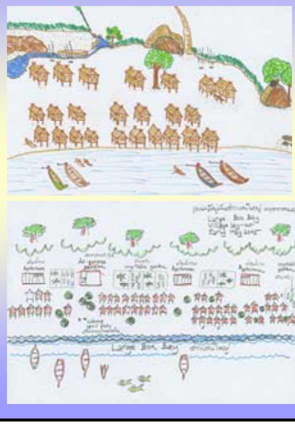
The Moken after the tsunami



- Combining two communities together may lead to the deterioration of community health, social and physical well-being, and the degradation of natural resources around the village.

20

Moklen hut style elsewhere

21

Moklen hut style elsewhere

More “private space” needed in the new permanent housing community

22

Traditional hut of the Urak Lawoi

“Traditional” and
“Modern?”

23

Urak Lawoi new permanent houses!

24

Traditional knowledge threatened

- Media and education
- New forms of media-- Volunteers and health officers stationed temporarily in the village turned on karaoke and VCD loudly to show to the children and young adults
- The elders sang, danced, and got into trance during the spirit ritual
- Education – "universal" and "uniform" education and courses --causes alienation to traditional culture

25

Capacity building?

- Capacity building -- crucial strategy for rehabilitation
- Given a low priority or even totally neglected
- It takes so much effort and time, and may not yield a satisfactory output within one short project cycle.

26

Capacity building?

- As for the Moken of the Surin Islands, becoming a celebrity also attracted several forms of relief aid.
- Given "4 necessities" in life
- The two main things lacking
  - understanding, recognizing, and appreciating the culture
  - effort to promote self-organization and build capacity.

27

Capacity building?

28

Capacity building?

- The building of two public structures – a "school" and a "all-purpose pavilion".
- What is more important
  - Teacher (changed children's names!)
  - Local curriculum
  - Funding of books and school equipment
  - -----------------------
  - Political will and practical support towards self-organization and self-administration.

29

Capacity building?

- Capacity building – alternative livelihood of ecotourism – small-scale/low impact

30

Preparation for the future

- The next tsunami might come earlier than expected in the Moken legend (once every two generations)
- In addition, the next tsunami or other natural disasters may have a more devastation effect.

31

Preparation for the future

- Physical --evacuation plan, escape route and gathering area
- Cultural –revival of traditional knowledge and culture

32

The Moken village that will no longer be!

33

'Integrating traditional knowledge systems and concern for cultural and natural heritage into risk management strategies'

A CASE STUDY IN JAPAN

International Disaster Reduction Conference (IDRC)
Davos, Switzerland 2006
31 August, 2006

KANEFUSA MASUDA
RITS-DMUCH
RESEARCH CENTER FOR DISASTER MITIGATION OF URBAN CULTURAL HERITAGE, RITSUMEIKAN UNIVERSITY, KYOTO JAPAN

1

- 1. Is the importance of traditional knowledge in disaster risk reduction **a perception shared by all**?

  2. If we are convinced that traditional knowledge systems can play a positive role, **what evidence** can we bring forward to demonstrate this, especially in recovery phase?

  4. What concrete **steps** can be taken in the short and medium term better understand and integrate traditional knowledge systems into the larger disaster risk reduction framework and by **whom**?

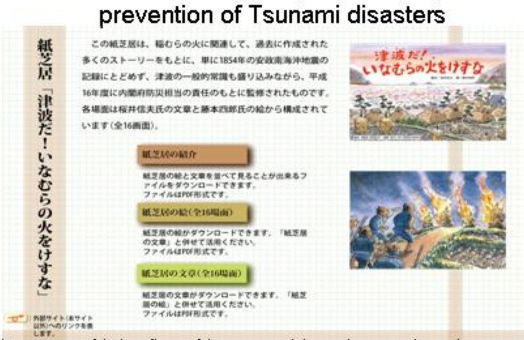
  5. What are the best ways to **involve local communities** in the process of understanding traditional knowledge systems and their relation to disaster risk reduction?

  3. **What actions** (additional research etc.) needs to be carried out to better understand traditional knowledge systems and their relation to disaster risk reduction?

- →INTERNATIONAL TRAINING COURSE ON RISK MANAGEMENT OF CULTURAL HERITAGE, by RITS-DMUCH, Japan.

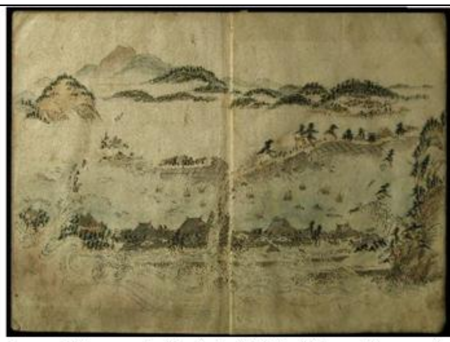
2

The fire of Inamura (rice sheaves) and prevention of Tsunami disasters



The story of ' the fire of Inamura (rice sheaves) and prevention of Tsunami disasters' is widely spread by Japanese government not only in Japan but also in Asian countries like Indonesia. From the homepage of Cabinet Office

3



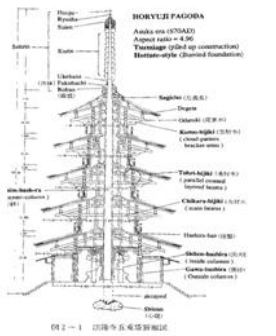
- Picture of Tsunami attack in 1854 at Hiro village, Japan.
- Mayor Hamaguchi saved people by the fire of rice sheaves and constructed 600m dike of 5m high to provide works.
- This story was taught to 10 million pupils in primary school.
- The dike saved peoples again at the next Tsunami in 1946.

4

- The fire of Inamura (rice sheaves) and prevention of Tsunami disasters.
- Village people transmit the memory to prepare for next Tsunamis through the story telling, inscription monuments and a training festival in November on the dike.

5

Traditional building structure is itself an important traditional knowledge system. The five storied pagoda in Horyuji stands more than 1300 years not falling down by disasters.



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The structural theory of modern high rise building learned its seismic resilience from the traditional five storied wooden pagoda in 1960s in Japan. (Fukuyama castle environment)
National Building cords should respect traditional structures as important knowledge system in disaster mitigation policy.

7

Kiyomizu-dera temple, a World Heritage site in Kyoto, had been burned down more than ten times since 8th century, keeping the form until 1633 in the present structure.

A fire disaster can be the most fatal damage for the value of wooden buildings. Earthquake damages can be repaired within minimum damage to the value because the traditional structure is made prepared for it.

8

Kyoto, as a wooden city, suffered many big fires in the history since 794 AD. Only 3 sites among 17 sites of World Heritage are located in the outer edge of central area, and the others are in far suburban areas. Ex. War fire in 1159.

9

Wooden building needs constant maintenance and reconstruction. Traditional techniques and materials are essential, and they are protected as Conservation Techniques by the cultural property protection law in Japan.

- Contemporary conservation carpenters keep their working posture and tools as same as of 12th century pictures.

10

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- 1.At Great Hanshin-Awaji Earthquake Disaster in1955, mass medias began to deliver news on the cultural heritage protection 10 days after in the recovery phase. The damaged peoples need their hope to live forward for future through their identity, and need heritages' recovery. **Cultural heritage is essential for disaster mitigation.**
- 2.In 1996, one year after the earthquake, a new legislative measure on registration of historic buildings started at national level in Japan, followed by Taiwan and Korea by 2000, then widened for all fields of heritage in Japan in 2004. **Cultural heritage conservation is encouraged by disaster.**
- 3.The new registration system is going to combine our small and conventional cultural heritage field with the wide societies of city planning, disaster mitigation, and community involved movements etc. **Cultural heritage is widely accepted in the society after the disaster in Japan and Taiwan.**
- 4. In 1997, a new training program for 'Heritage Manager' started among ordinary voluntary architects and carpenters in Kobe, followed by Kyoto in 2004. The registration system encouraged them to participate with community through the cultural heritage conservation. Their activity is effective also in other disasters.

13

At the Kobe earthquake in1995, a former American Consular office building, designated heritage, collapsed. It was constructed in 1890s according to American east-coast building structure, with no preparation against earthquake.

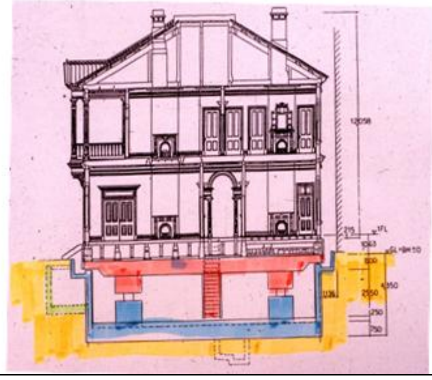
14

The building had been used as a restaurant, but no one was killed, because the earthquake happened before 6 o'clock in the morning.

The owner wanted to reconstruct it again as a shop, and more safe structure became necessary, keeping the high authenticity of design and material.

15

The safe reconstruction became possible by using anti-seismic basement. The basement isolation technique was popular at traditional buildings in more simple way.



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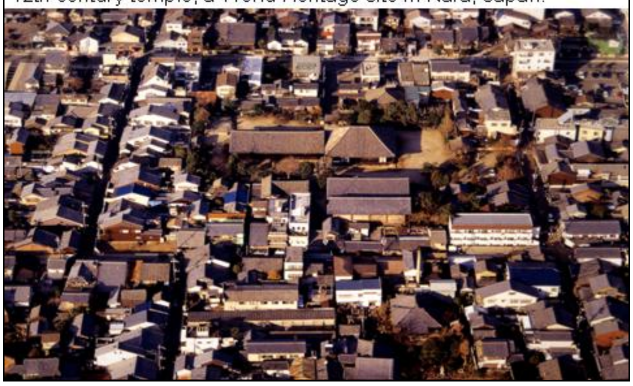
Earthquake fire is still most urgent disaster to wooden heritage in wooden town. The local community has survived with Gango-ji, 12th century temple, a World Heritage site in Nara, Japan.



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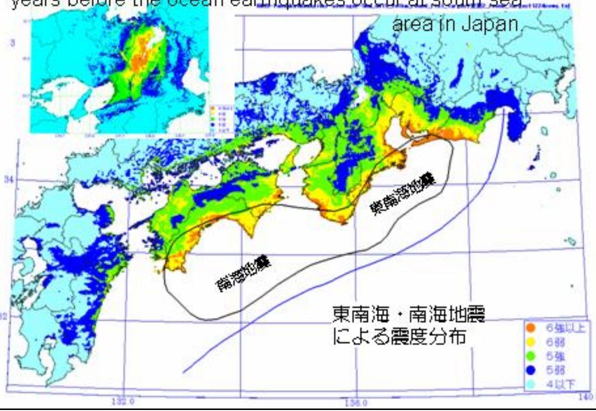
At another World Heritage, Shirakawa-go, the village community in wooden buildings with thatched roof is the essential main factor for the conservation and the protection against disasters.

18

The modern hydrant system in Sgirakawa-go village is to strengthen the existing **traditional community knowledge**. A 600 tons water reservoir on the hill supplies 20 minutes extinction activities before fire cars come.

19

History tells us a series of big active fault earthquakes may attack Kyoto or Nara, the world heritage sites, within 40 years before the ocean earthquakes occur at south sea area in Japan.



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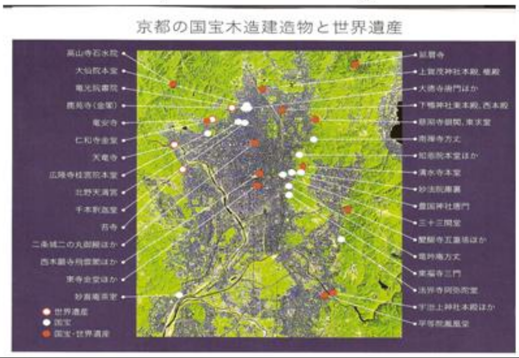
The Kyoto basin area, where 17 sites of World Heritage and other rich stock of various heritage exist, expanded into a huge wooden city with 1.5 million population through the modernization process in 20th century.



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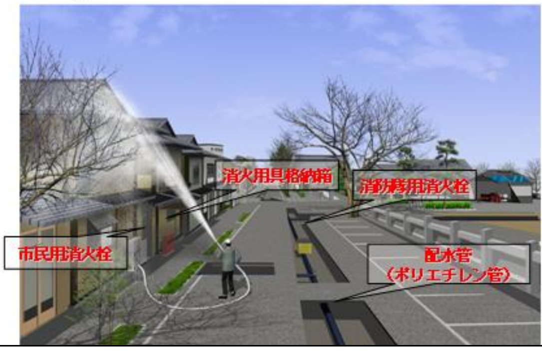
In Kyoto, many World Heritage sites are surrounded with wooden towns, as the buffer zone area which is expected to protect the heritage. A new community based disaster mitigation system is needed urgently here in the urban area.

22

Ritsumeikan Univ. Rits-DMUCH in Kyoto recently pushes a multi disciplinary research project for the disaster mitigation of urban cultural heritage with the cooperation of both disaster and heritage authorities in the municipal and central government as well as the local communities.



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A most advanced technology can be combined together with the **traditional community knowledge** to prevent earthquake fire from the wooden town at buffer zone area, and consequently the core cultural heritages.

- A seismic-resistant underground 1500tons fire water tank construction starts in 2006 at the buffer zone of Kiyomizudera, one of the World Heritage sites in Kyoto.

24

We share the experience of disasters tragedy all over the world, like this Frankfurt city in the Second World War.

フランクフルト中心部 1947爆撃

25

Cultural heritage is essential for the community in disaster recovery. Frankfurt in 1977.

26

Ritsumeikan Univ. Rits-DMUCH in Kyoto wishes to share our experience of multi-disciplinary research method for the disaster mitigation of urban cultural heritage with other experts of both disaster and heritage fields in other countries.
We starts the below program on coming October 2006 with the cooperation of UNESCO and relevant authorities in the municipal and central government as well as the local communities, according to the UNESCO/ICCROM/ACA recommendation at UNWCDR 2005 in Kobe.

- INTERNATIONAL TRAINING COURSE ON RISK MANAGEMENT OF CULTURAL HERITAGE, by RITS-DMUCH, Japan.

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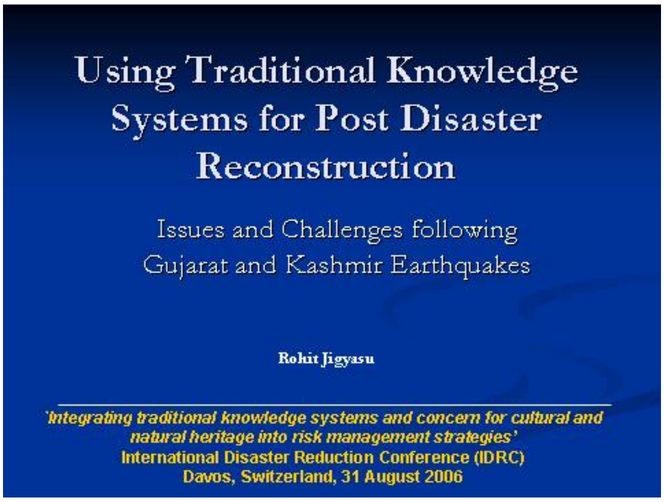
Using Traditional Knowledge Systems for Post Disaster Reconstruction
Issues and Challenges following Gujarat and Kashmir Earthquakes
Rohit Jigyasu
'Integrating traditional knowledge systems and concern for cultural and natural heritage into risk management strategies'
International Disaster Reduction Conference (IDRC)
Davos, Switzerland, 31 August 2006

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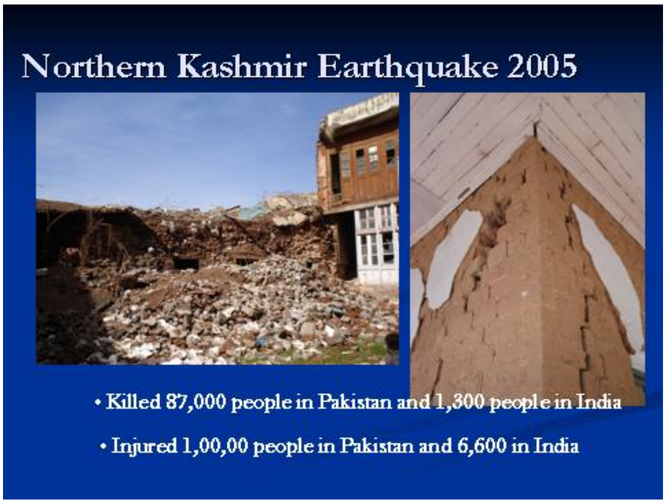
Northern Kashmir Earthquake 2005
• Killed 87,000 people in Pakistan and 1,300 people in India
• Injured 1,00,00 people in Pakistan and 6,600 in India

2


But why most buildings failed?

3

4

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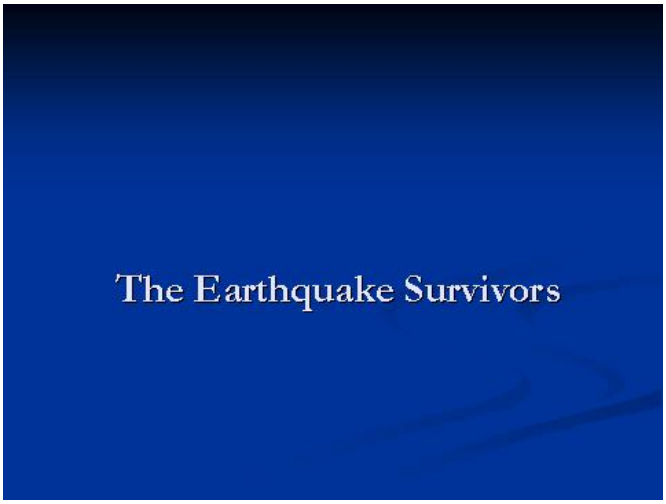
The Earthquake Survivors

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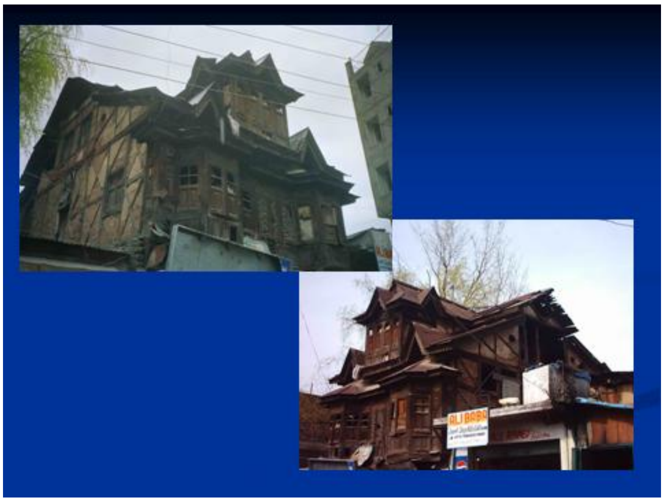

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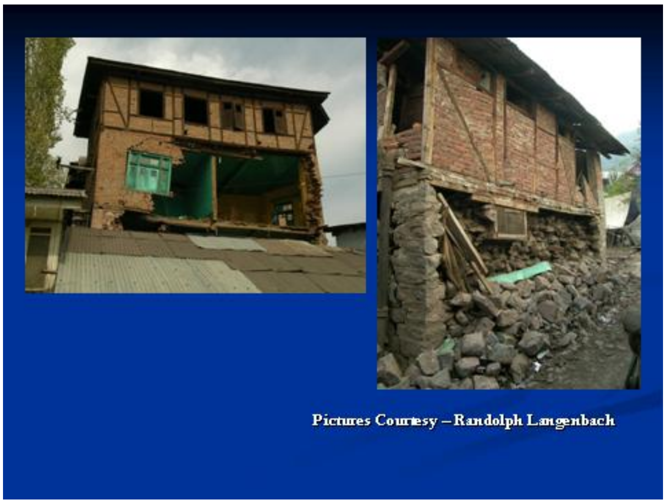
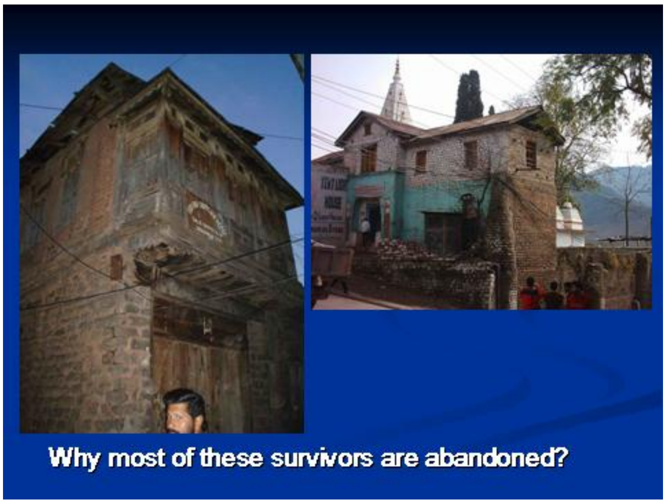

Pictures Courtesy – Randolph Langenbach

8


BLUESTAR
GARMENTS

9


Why most of these survivors are abandoned?

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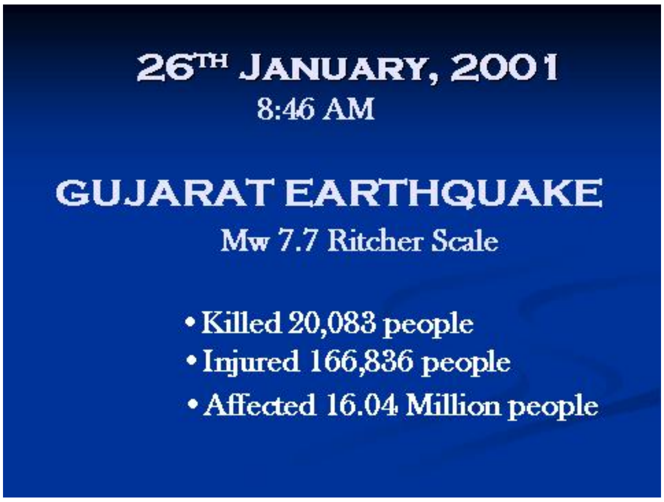
26TH JANUARY, 2001
8:46 AM
GUJARAT EARTHQUAKE
Mw 7.7 Ritcher Scale
• Killed 20,083 people
• Injured 166,836 people
• Affected 16.04 Million people

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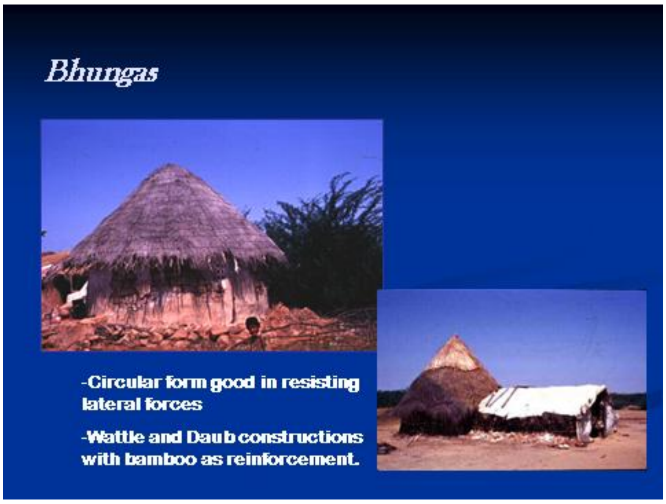

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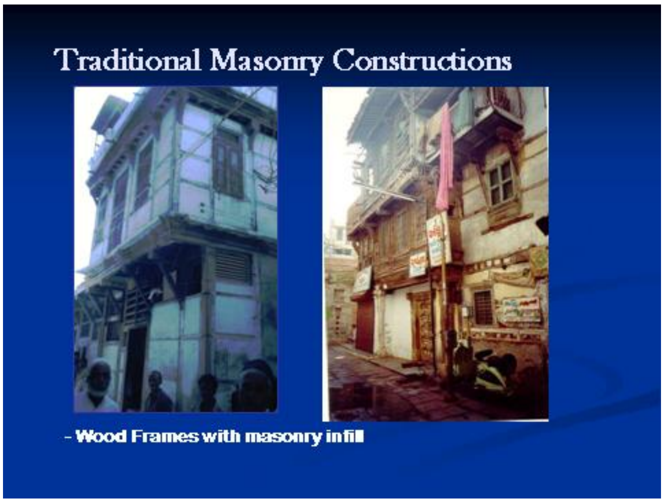

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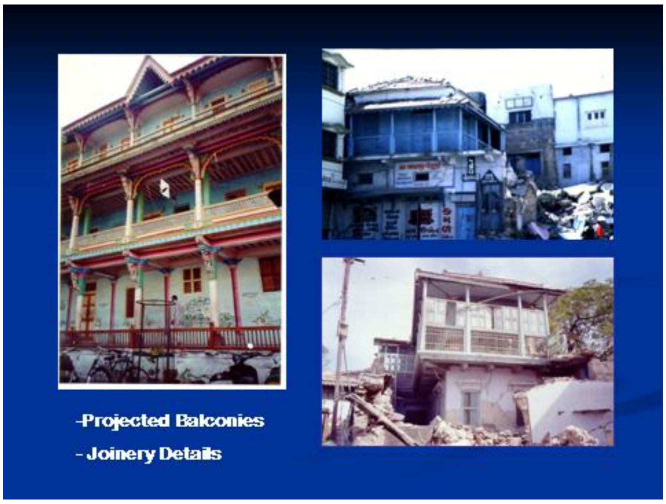

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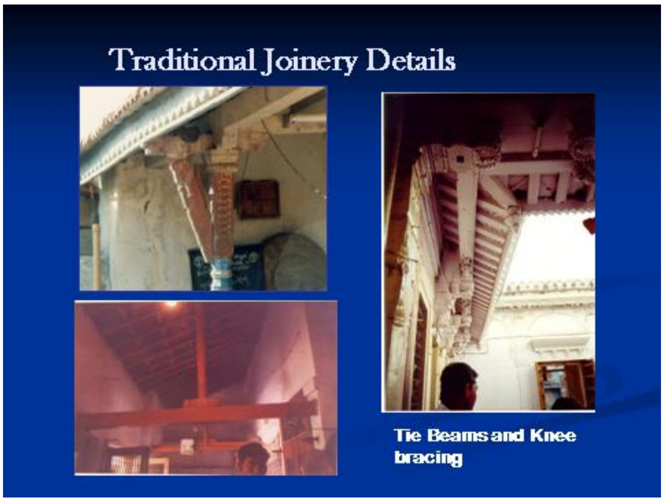

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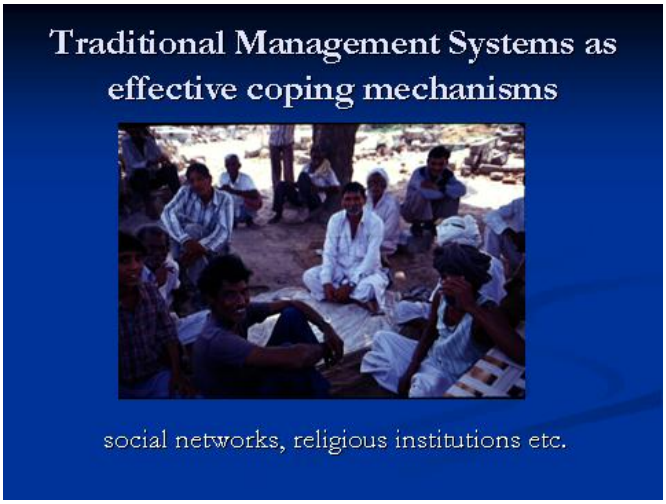

18

Nature and Scope of Traditional Knowledge for Disaster Mitigation

- Not merely objective emperical but also experiential.
- Not static but dynamic
- Optimum use of local resources to ensure sustainability
- Applied, not academic
- Cross-disciplinary, not sectoral

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Post Earthquake Reconstruction Challenges & Opportunities

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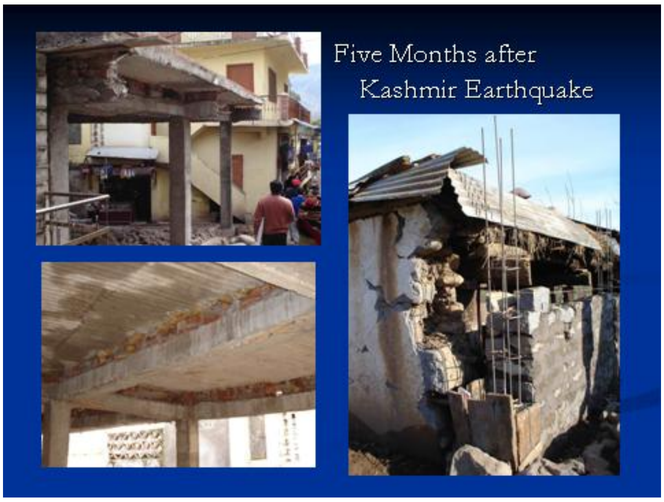

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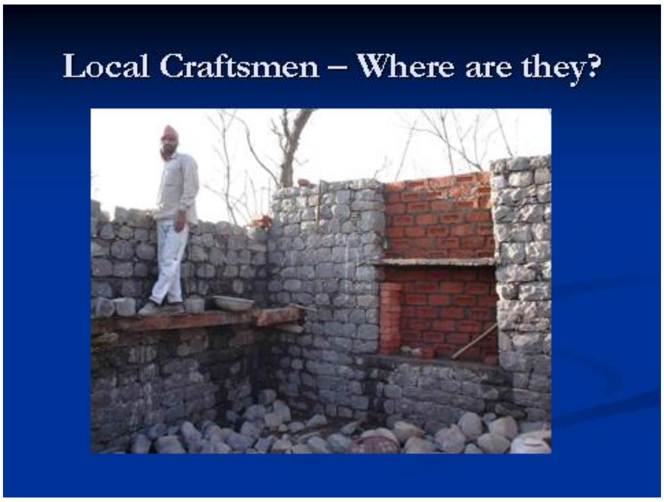

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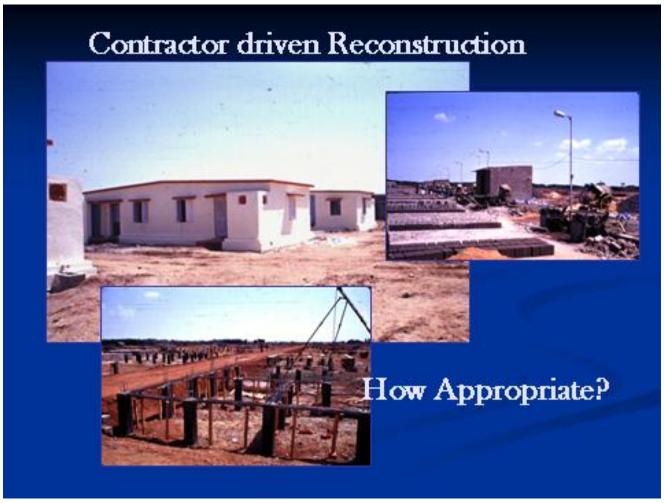

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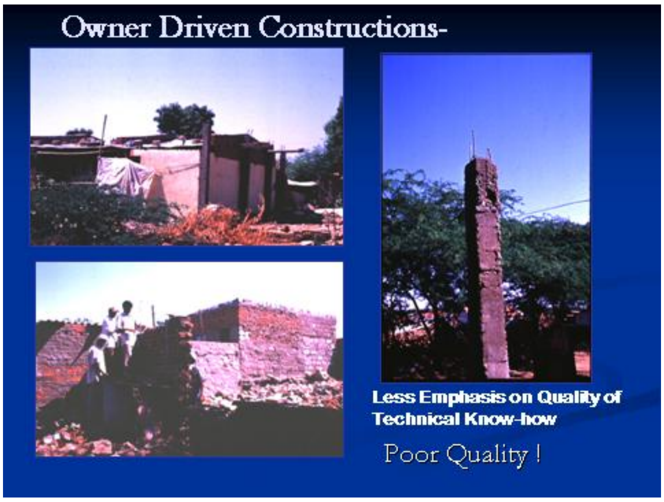

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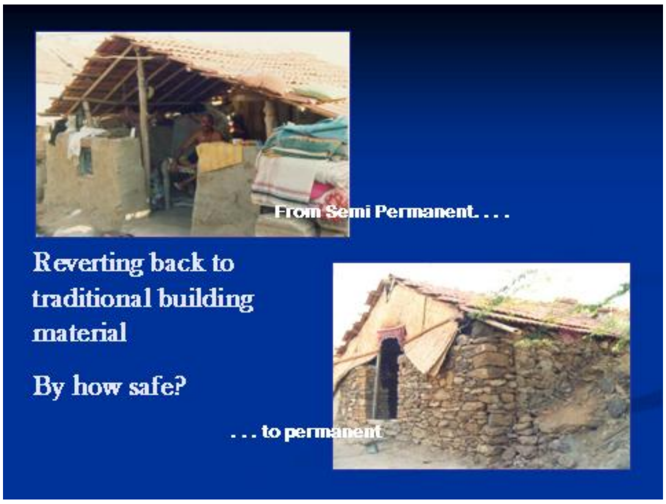

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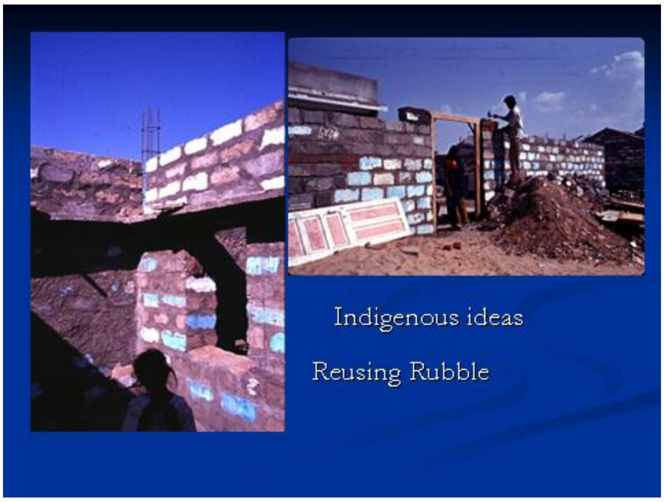

Indigenous ideas
Reusing Rubble

31


Emerging Key issues
Loss / Degeneration of Traditional Skills. Process of Evolution of Traditional Knowledge is disrupted
Cultural Incompatibility of External Interventions. Earthquake Resistant Technology conceived as a 'Packaged product' for fast transfer. Traditional Knowledge systems are also in danger of falling in the same trap.
Linked to larger issues of current paradigm of 'development leading to inequity and loss of local control over material and land resources

32


Critical Challenges for Mainstreaming
'Heritage' – an elite term ?
Expanded scope of heritage to be integrated within various development and disaster risk management sectors through redefining and repackaging heritage concerns e.g. regenerating traditional livelihoods, ecological planning, sustainable development etc.
Conservation
Disaster Management
Development

33


Traditional and Scientific Knowledge not to be seen as separate categories. Rather attempt to recover 'scientific' aspects of traditional knowledge and 'traditional' aspects of 'scientific knowledge'
Evolving 'Range of workable options' based on local context rather than 'standard engineering recipes and design packages'
Establishing Optimum Acceptable standards for managing risks in response to local constraints and opportunities, and not merely fighting against risks.
From Community Participation to Engagement through Empowerment – from rhetoric to reality

34

Traditional Risk Management amongst African communities.

Herman Kiriama
Fort Jesus Museum, Mombasa

1

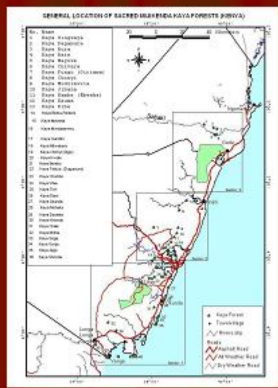
Introduction

- African communities used their indigenous knowledge for a long time to:
- monitor various disaster prone natural systems such as climate
- potential human caused disasters
- Used this knowledge to establish early warning indicators for their own benefit and future generations.

2

- For instance, the Mijikenda of coastal Kenya developed an elaborate system of values in order to prevent the degradation of their environment from both natural and man induced disasters
- Initially, the ancestors of these groups settled in six individually fortified hilltop villages or *Kayas* along the ridge behind the Kenyan coast. Three more kayas were later added

3



4

- In early 20th C conditions outside the Kayas became more secure
- people cleared land outside the forests not just to farm but to build homes
- As people settled outside, the Kayas became powerful link with the past.
- They were the home of the ancestors, increasingly a ritual place where prayers were said in the event of serious threats or calamity, and places of refuge.

5

- Important people were taken into the Kaya to be buried and their graves marked by ***vigango*** or carved grave posts and ***koma***.
- Move outside Kayas however, led to Kayas facing many risks:
- Demand for building timber
- Firewood for fuel and wild fires.
- Demand for cultivation land
- Sand harvesting and associated erosion

6

Management system

- To safeguard Kayas against such risks, community developed a management system.
- system composed of taboos and rituals that were/are (even today) enforced by special council of Elders.

7

- The *mapeho* (powerful spirits) are enjoined to protect the sites
- Everything in the Kaya therefore was/is bestowed with mystic powers. It was forbidden to:

8

9

- cut trees, saplings or any other vegetation there as they took on a spiritual value.
- The same protection went for unique animals and singular landforms such as caves and limestone cliffs
- Grazing cattle was forbidden-obviously to stop denudation- cattle straying were to be slaughtered and eaten by community.
- Special attires were to be worn in order to enter the kaya-traditional sarongs and shawls-seamless and wrap around

10

11

- In those cases where deadwood was allowed to be taken away, restrict rules were laid
- Women were allowed to carry as much as they could in their arms without use of a cord or rope.
- Cutting or metal implements were/are not allowed into the kayas- this ensures that one can only take as much as could be broken by hand or picked.

12

- Do criminal and anti-social acts or behaviour inside the forest such as murder and sorcery, adultery and incest.
- To minimize risks, the Kayas had at least eight zones with varying degrees of access
- Non-members are not allowed into Kayas- a heavy cleansing fine is levied.
- These buffer zones were/are meant to minimise and control risks to the actual sacred forest

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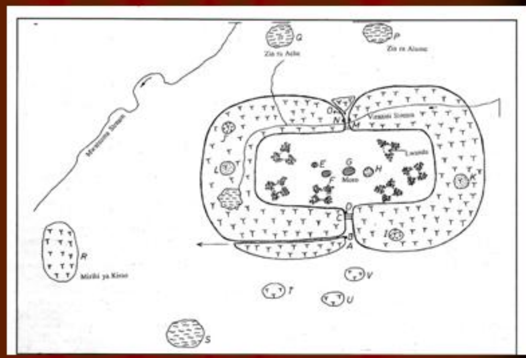

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- These areas differed in their floristic composition and structure.
- Fear of divine retribution played a significant role in the enforcement of these rules
- Heavy fines usually consisting of livestock was levied on any miscreant
- people believe that transgression of the taboos or failure to pay a fine may result in undesirable events such as illness or even death.

15

- In effect the site monitors were/are spiritual, all seeing.
- They did/do not need the 'indicators' that we talk of today of natural and cultural status

16

17

- The adherence to these rules and regulations has meant that the ecological diversity of these areas has been maintained
- there are no fires that would not only destroy the forests but affect the neighbouring communities
- erosion that could have occurred if the forests had been cut has been minimised and the survival of the forest has meant that the moisture levels in the area is quite high and thus high levels of rainfall for the area.

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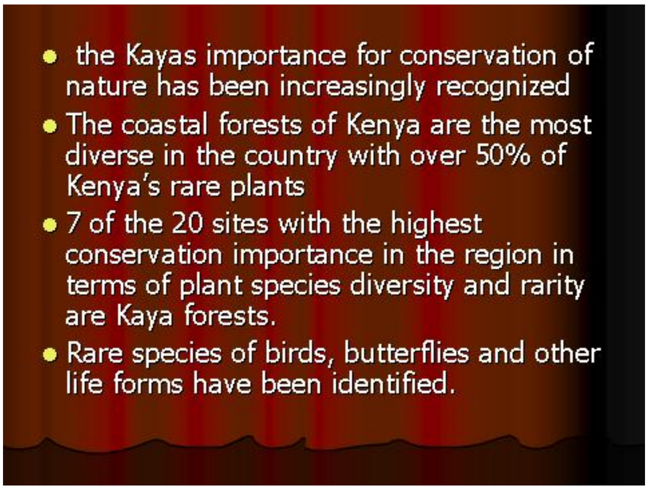

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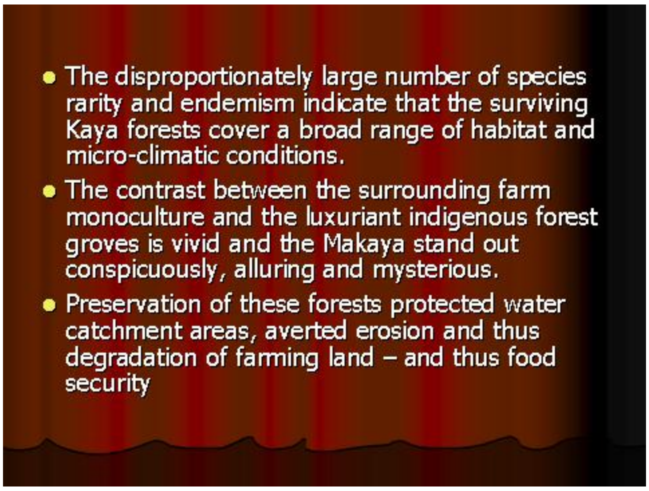

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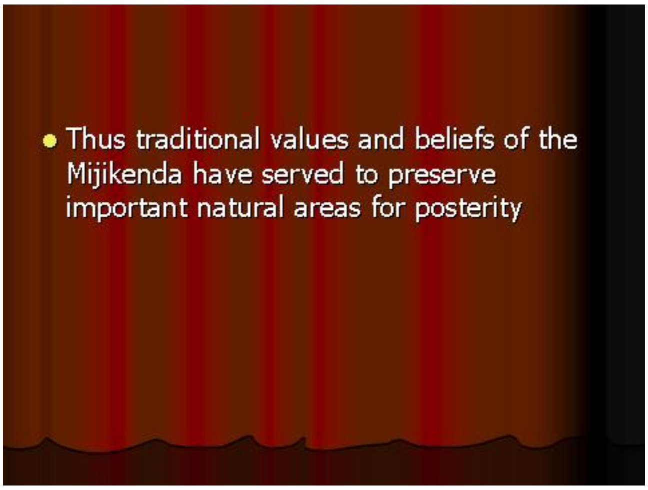

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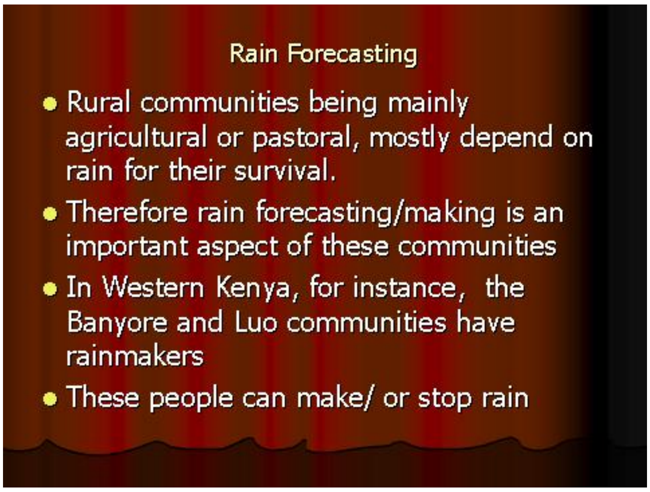

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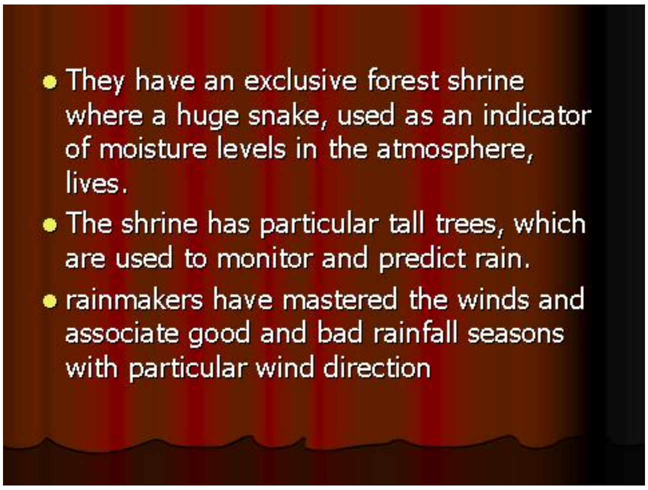

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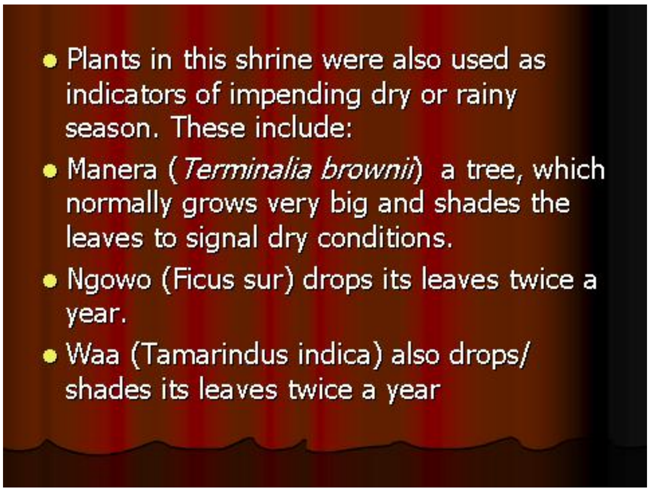

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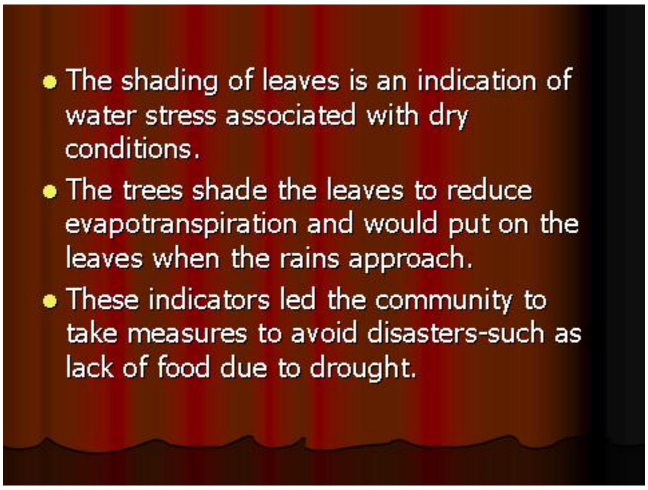

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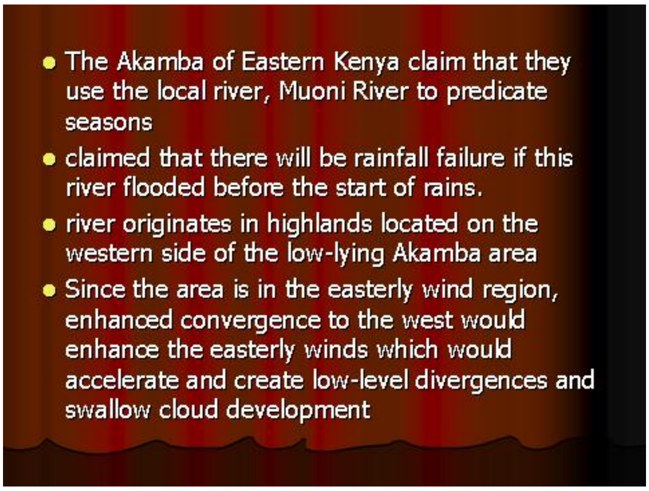

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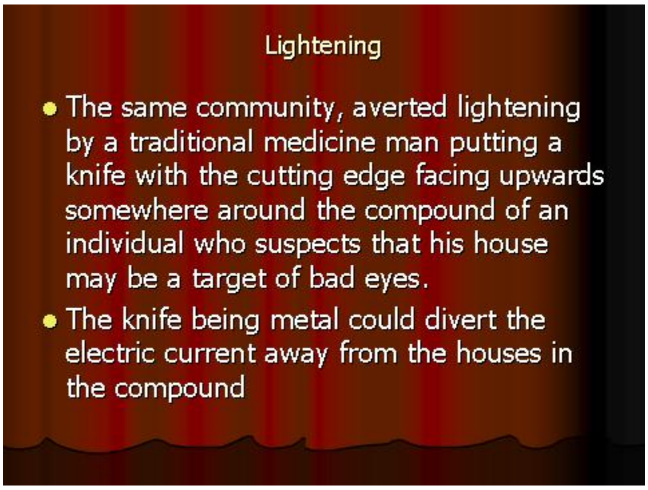

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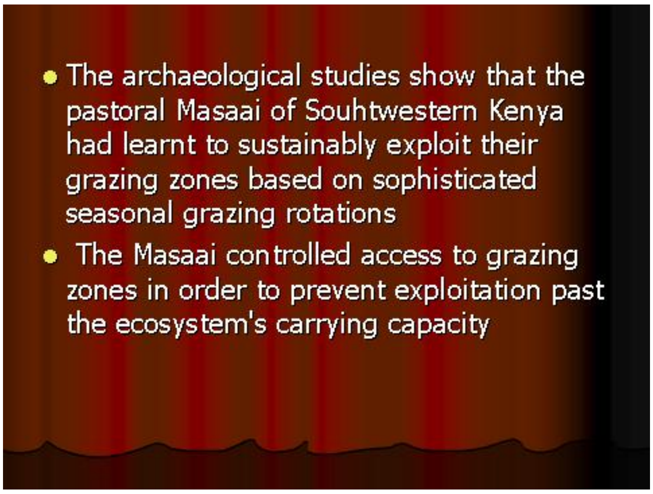

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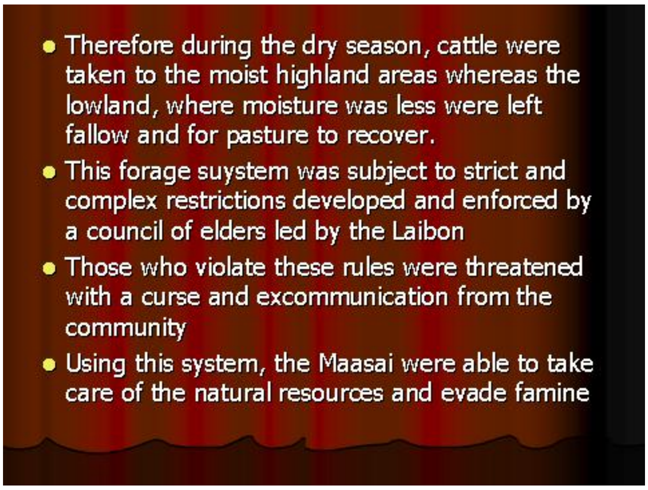

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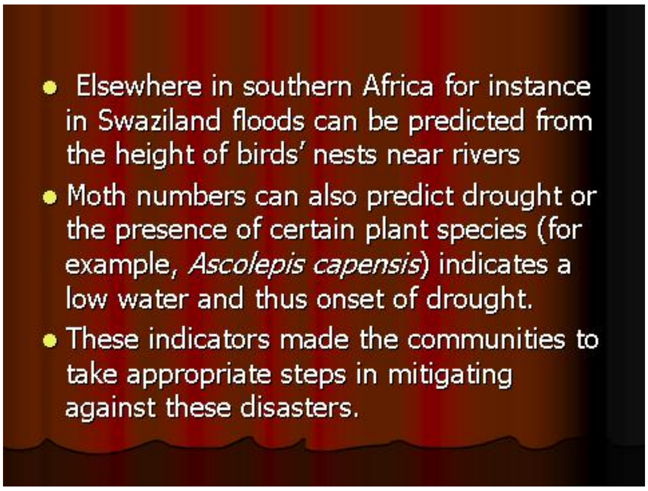

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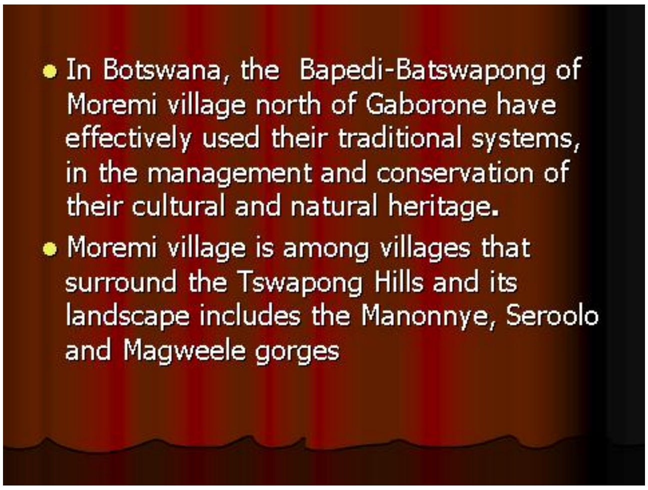

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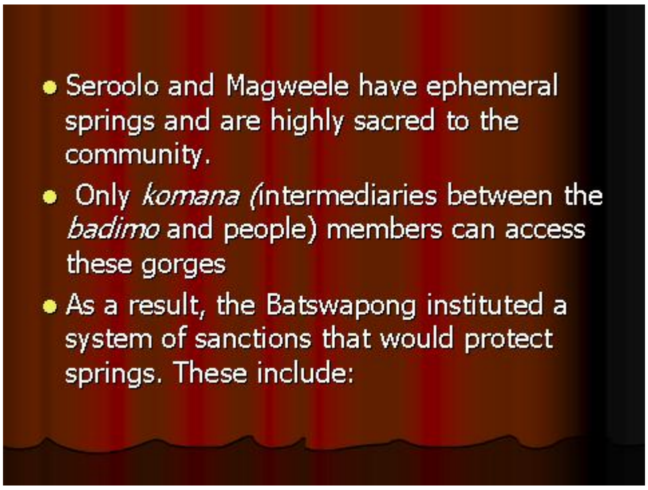

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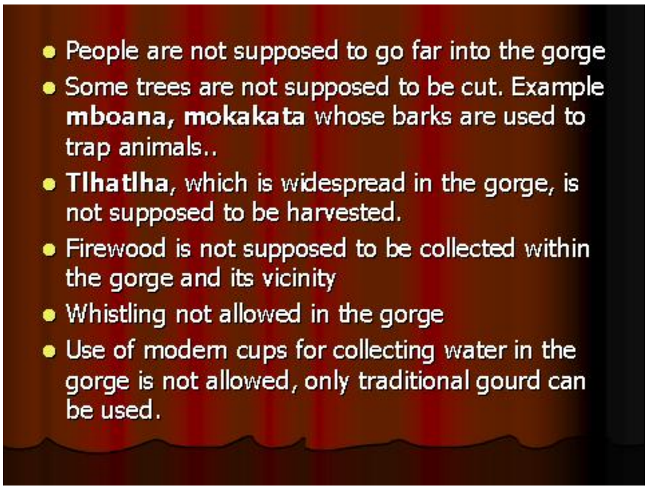

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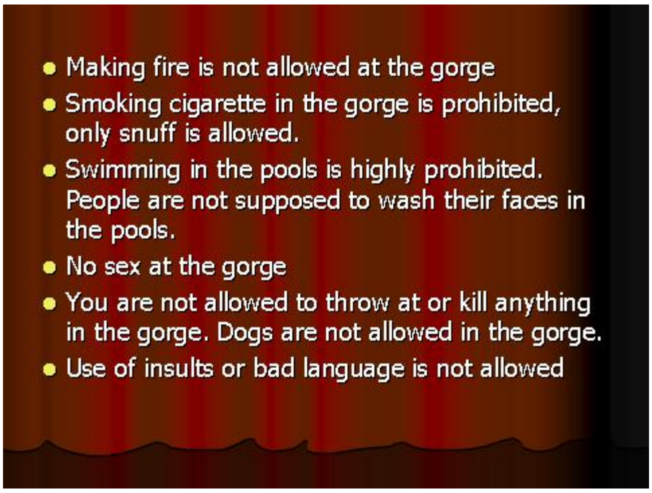

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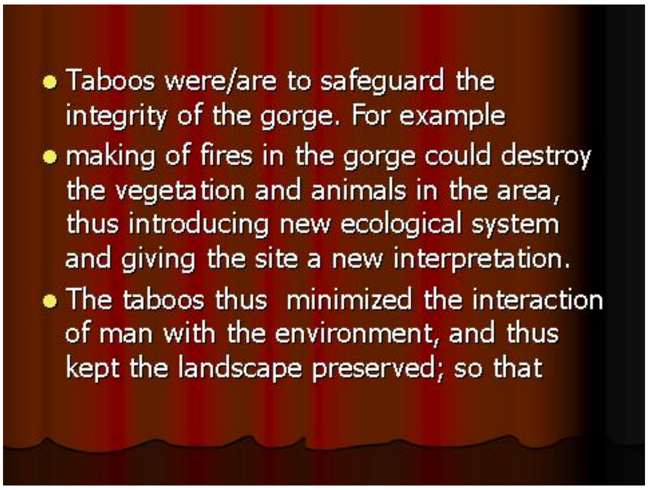

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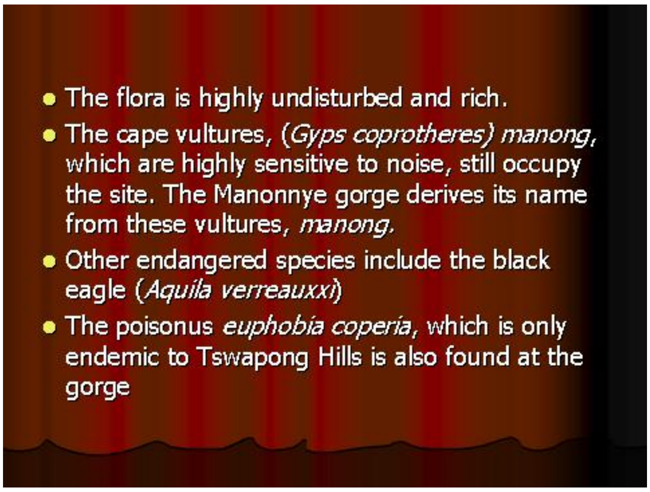

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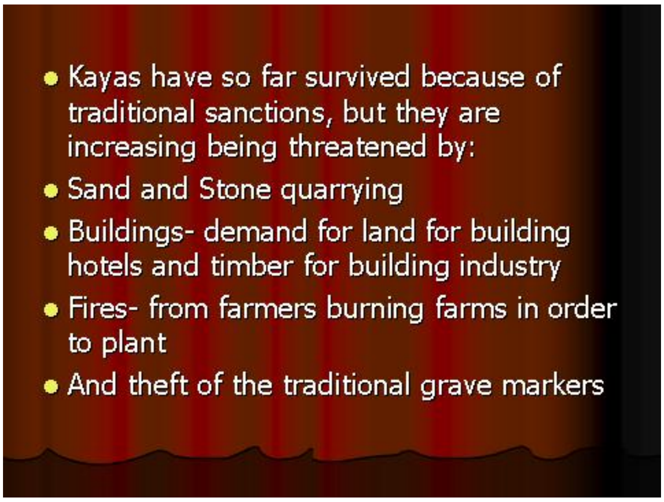

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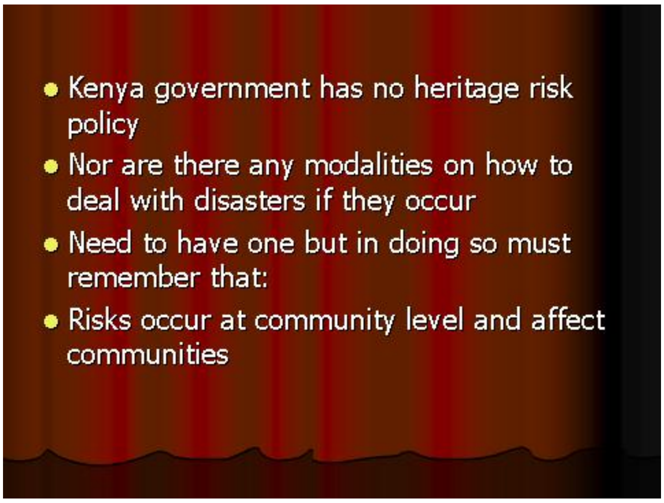

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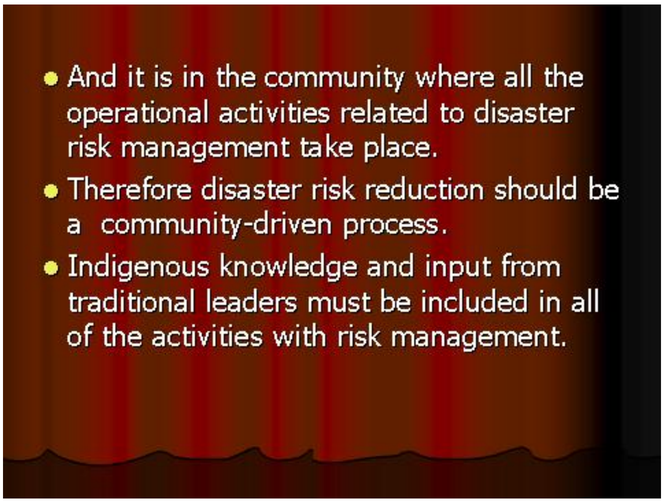

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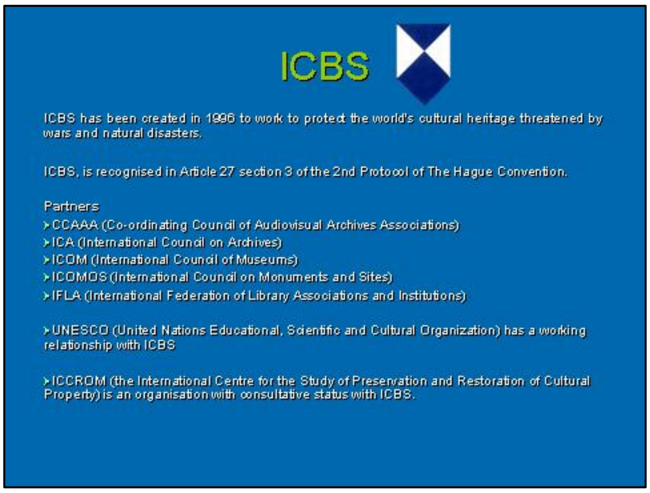
42


International Disaster Reduction Conference (IDRC)
Davos, Switzerland 2006
Integrating traditional knowledge systems and concern for cultural and natural heritage into risk management strategies

1


Risk Management Strategies of the ICBS and ICOM
Cristina Menegazzi
ICOM Programme Specialist

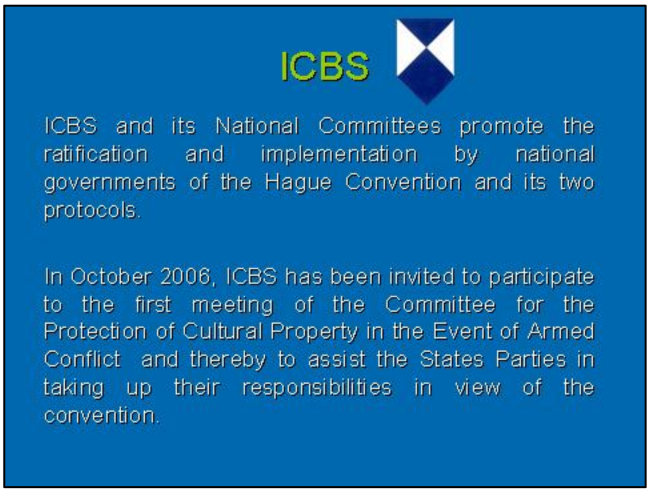
2


ICBS
ICBS has been created in 1996 to work to protect the world's cultural heritage threatened by wars and natural disasters.
ICBS, is recognised in Article 27 section 3 of the 2nd Protocol of The Hague Convention.
Partners
CCAAA (Co-ordinating Council of Audiovisual Archives Associations)
ICA (International Council on Archives)
ICOM (International Council of Museums)
ICOMOS (International Council on Monuments and Sites)
IFLA (International Federation of Library Associations and Institutions)
UNESCO (United Nations Educational, Scientific and Cultural Organization) has a working relationship with ICBS
ICCROM (the International Centre for the Study of Preservation and Restoration of Cultural Property) is an organisation with consultative status with ICBS.

3


ICBS
14 National Committees established:
Australia
Chile, Cuba
Benin, Madagascar
Belgium, Czech Republic, France, Italy, Macedonia, Netherlands, Norway, Poland, United Kingdon and Ireland

4


ICBS
ICBS and its National Committees promote the ratification and implementation by national governments of the Hague Convention and its two protocols.
In October 2006, ICBS has been invited to participate to the first meeting of the Committee for the Protection of Cultural Property in the Event of Armed Conflict and thereby to assist the States Parties in taking up their responsibilities in view of the convention.

5


ICBS
Partners
Movable Heritage
CCAAA (Co-ordinating Council of Audiovisual Archives Associations)
ICA (International Council on Archives)
ICOM (International Council of Museums)
IFLA (International Federation of Library Associations and Institutions)
Immovable Heritage
ICOMOS (International Council on Monuments and Sites)

6

ICBS

Permeation of Partner's Organisations Fields of interest

- Museums, Archives and Libraries collections are kept in buildings
- Museums have libraries and archives in their institutions
- Archaeological sites have dig storages
- Monuments and palaces have collections (objects, books, pictures, video…)
- Churches, temples and mosques have sacred objects, manuscripts, documents…
- Libraries and Archives have objects among their collections
- …

7

ICBS

ICBS as a forum

for an integrated and

holistic approach

risk management

8

ICBS

Some peculiarities of the Risk management of movable heritage

- **Evacuation plan**
- **Criteria for singling out the list of priority objects to be evacuated**
- **Exhibition preparedness and mitigation**
- **Storage preparedness and mitigation**
- **Etc.**

9

Criteria for singling out the list of priority objects

Inventory Number/ Type of object	Economic value	Historic value	Collection Contest value	Accessibility	Weight	Encumbrance /Bulk	Fragility	Symbolic value	Subjective value	Intangible link	Total
Object 1 Part of a golden crown	4	4	3	1 (exhibited in a locked showcase)	5	5	3	2	5	1	33
Object 2 Contemporary Art Mobile (ex: Calder)	3	3	3	2	4	1	1	2	4	1	19
Object 3 Feathers Head cover	3	2	5	1	5	2	1	4	3	5	31
Object 4											
Object 5											

… as a professional teamwork

10

Integrated Risk Management

Object

Inventory/ Documentation

Intangible element

11

Type of Risks associated to agents of deterioration

1. Direct Physical Forces (earthquake, building collapse…)
2. Criminals (war, theft, vandalism…)
3. Fire (arson, electric short circuit…)
4. Water (Floods, water leaking…)
5. Pests (insects, roditors, mice…)
6. Contaminants (gas, pollution,
7. Radiation (UV/unnecessary light: internal light, external light)
8. Incorrect Temperature (air conditioning break down, extreme climate…)
9. Incorrect Relative Humidity (air conditioning break down, extreme climate…)
10. Dissociation (human information not available anymore, loss of inventory, loss of labels)

12

Traditional Mitigation Knowledge

Country Name	Type of hazards	Method Information
CAMBODIA	Humidity	➢ Tobacco tramped in water to put on the surface of the wooden object (against mould)
INDIA	Pest	➢Dried neem leaves . For books , you put them inside the pages. For textiles, you put between the layers of the folder of textiles. For wood and for any organic material. ➢Peacock feathers to prevent insect and lizards . Only one feather is enough for one room exposed on the wall.
	Pest and water	➢Linseed oil for the preservation of wooden object displayed in open areas will present from insect attack and from humidity.
	Water/Flood	➢Make the landscape in such a way that the water should flow in other direction not entering in the exhibition and/or storage area.
	Rats	➢Pieces of papaya fruits displayed in the room where organic material is displayed.
	Fungus and pest	➢Natural camphor for organic materials.
	Earthquake and tsunami	➢Look at the behaviour of animals.
SRI LANKA	Pest	➢ Resin oil exposed to the air for old books, old printed maps; ➢ camphor exposed to the air and display cases for textiles and other organic material, ➢ linseed oil ([illegible]) applied like varnish on the paintings against moisture and dust; ➢ and cinnamon oil exposed in the air (for books and manuscript)
JAPAN	Pest	➢ To expose to air (in shadow) in summer or autumn books and/or objects normally in storage, so as to prevent from insect attacks.

13

Traditional Mitigation Knowledge

Dried neem leaves to preserve books, textiles, wood and any organic material from pest

Neem Tree

Neem - *Melia Azadirachta*

14

Traditional Mitigation Knowledge

Peacock feathers to prevent insect and lizards in collection and storage areas.

Lucky treasure pot from a home in Bhutan

fan ornament of the vase [*bumpa*] and sprinkling utensil used for distributing the blessing or purifying water in Tibetan Buddhist empowerments

Nepali, practitioners of Jhankrism, a shamanic tradition

15

Traditional Mitigation Knowledge

Pieces of papaya fruits displayed in the room where organic material is displayed against possible damage caused by rats.

- **contraceptive qualities of papaya**

Citrus fruit (pineapple, papaya, oranges) are poisonous to rats

16

Museums Emergency Programme
Programa de Urgencia en los Museos
Programme d'urgence dans les musées

http://icom.museum/mep.html

17

What is Museums Emergency Programme (MEP)?

Museums Emergency Programme
Programa de Urgencia en los Museos
Programme d'urgence dans les musées

- MEP is included within the framework of the concerns of the International Committee of the Blue Shield (ICBS)
- MEP is a response to the needs expressed by museum professionals all over the world in the field of disaster risk reduction

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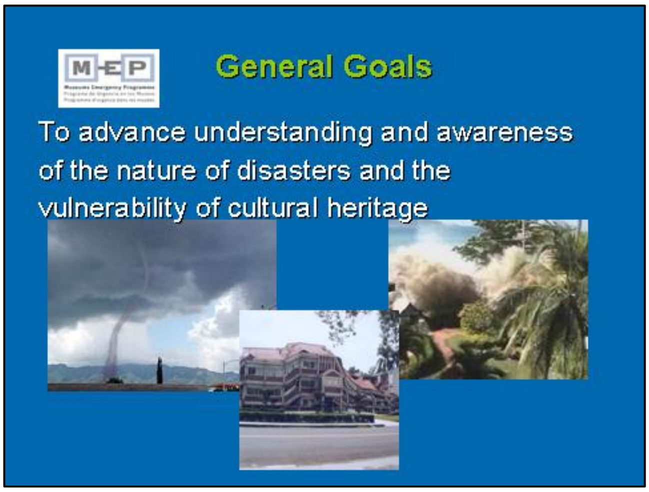
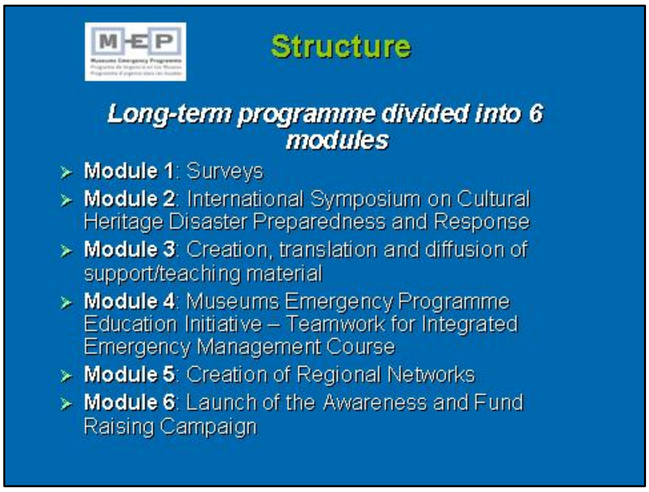

General Goals
To advance understanding and awareness of the nature of disasters and the vulnerability of cultural heritage

19


General Goals
To limit and contain damage through preventive conservation measures, mitigation and rapid intervention
⇨ To save cultural heritage

20


Structure
Long-term programme divided into 6 modules
Module 1: Surveys
Module 2: International Symposium on Cultural Heritage Disaster Preparedness and Response
Module 3: Creation, translation and diffusion of support/teaching material
Module 4: Museums Emergency Programme Education Initiative – Teamwork for Integrated Emergency Management Course
Module 5: Creation of Regional Networks
Module 6: Launch of the Awareness and Fund Raising Campaign

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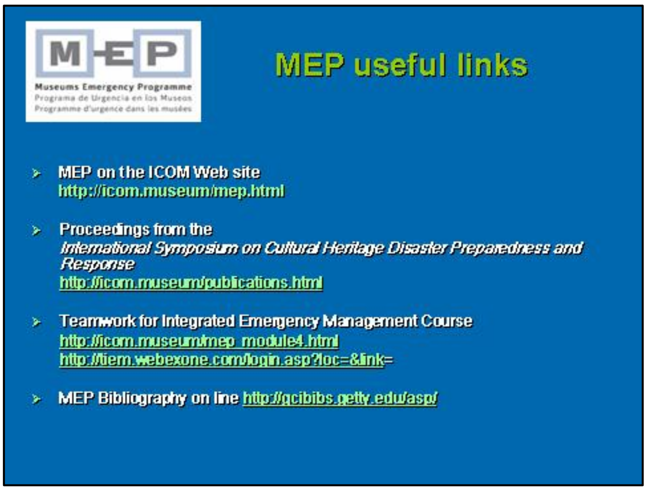
MEP useful links
MEP on the ICOM Web site
http://icom.museum/mep.html
Proceedings from the
International Symposium on Cultural Heritage Disaster Preparedness and Response
http://icom.museum/publications.html
Teamwork for Integrated Emergency Management Course
http://icom.museum/mep_module4.html
http://tiem.webexone.com/login.asp?loc=&link=
MEP Bibliography on line http://gcibibs.getty.edu/asp/

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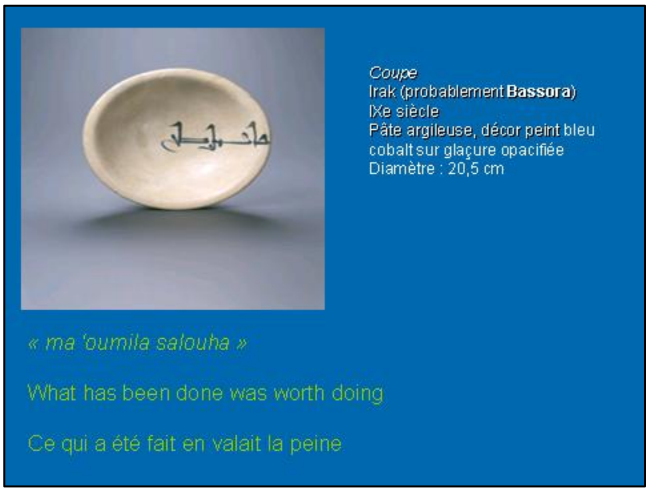
Coupe
Irak (probablement Bassora)
IXe siècle
Pâte argileuse, décor peint bleu cobalt sur glaçure opacifiée
Diamètre : 20,5 cm
« ma 'oumila salouha »
What has been done was worth doing
Ce qui a été fait en valait la peine

23

Global Solidarity, National Organisation and Local Conservation

Canadian and International Efforts in Connecting the Heritage and Risk Management Sectors

Dinu Bumbaru, Secretary General, ICOMOS
Davos, IDRC / 31.VIII.2006

31.VIII.06 – ICDR Davos | Global-National-Local Connecting Heritage & Risk

1

Cultural Heritage

- Natural – Tangible - Intangible / Common language
  - Carriers/communicators of memory
  - Active assett and usable resource
  - Relation to site
- Diversity of dimensions and interests:
  - Scientific interest of natural sites;
  - Achievement in individual human creations;
  - Aesthetics and meaning in cumulative landscapes
  - Knowledge acquired from archaeological sites
  - Sense of memory or traditional use in historic sites

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2

Three levels of intervention

GLOBAL	**Solidarity, Inspiration** Means, concepts…
NATIONAL	**Organisation** Laws, resources…
LOCAL	**Conservation** Care, presence…

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3

Four clans

Academia	Educator, advisor
Public Sector	Protecter, enabler
Private Sector	User, invester, supplier
NGO Sector	Initiator, catalyst
+ … the media	Public debate, meaning

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4

International Council on Monuments and Sites
Conseil International des Monuments et des Sites

HÉRITAGE MONTRÉAL

31.VIII.06 – ICDR Davos | Global-National-Local Connecting Heritage & Risk

5

NGOs: Global and Local

ICOMOS
- Founded 1965
- Professional organisation (conservation standards, dissemination, networks)
- Advisory body status in World Heritage Convention
- 8 500 members in some 150 National and International Committees

Héritage Montréal
- Founded 1965
- Civil society organisation (education, advocacy, promotion)
- No statutory role but participation in various forums, committees…
- 650 individual members and about 60 volunteers

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6

Some milestones

ICOMOS

1992: 1st Round Table after Dubrovnik bombings

1994: Inter Agency Task Force; Scheme

1995: SAARC meeting in Colombo

1996: International Committee of the Blue Shield

1997: Kobe-Tokyo Conference and Guidelines

2000: 1st Heritage at Risk Report

Héritage Montréal

1987: Work with fire department after leathal church fire

1996: Participation in 1st National Summit on Heritage and Emergency Situations in WH City of Québec

1998: Activities in the Ice Storm Crisis and public enquiry

1999: Workshop on Heritage and Civil Security in Montreal

2006: Participation in National Summit on Civil Security

7

1st National Summit on Heritage and Risk Preparedness in Canada (Québec, 1996)

- Awareness
  - Professionals, decision-makers, public
- Collaboration
  - Institutions, communications, sustainable
- Building local capacity
  - Intergrate heritage in current plan, volunteers
- Strenghtening the enabling framework
  - Warning, experiences, commitments

8

Other experiences in Canada

- Parks Canada
  - Yearly risk assessment of all the inventory ($7G)
  - Risk Management Plan developed at site level
- Vancouver
  - Building inspectors and Fire Dept personnel trained on listed Historic Bldg.
  - Equivalences re Codes
- Ottawa
  - Emergency Relief Agreement between National Heritage Institutions and Sites

9

Tools, means, conditions

- Policies
- Programmes
- Projects

- People
- Personnel
- Partnerships

- Principles
- Procedure
- Practice

- Perseverance
- Patience
- Pride

10

Heritage Policy

World Heritage Convention (1972) – Article 5

To ensure that effective and active measures are taken for the protection, conservation and presentation ... each State Party shall endeavour...

a. ***To adopt a general policy which aims to give the ... heritage a function in the life of the community and to integrate [its] protection into comprehensive planning programmes;***

b. *To set up ... services for the protection, conservation and presentation...;*

c. *To develop scientific and technical studies and research...;*

d. *To take appropriate legal, scientific, technical, administrative and financial measures...;*

e. *To foster the establishment or development of national or regional centres for training in the protection, conservation and presentation... and to encourage scientific research in this field.*

11

Example: Montreal's Heritage Policy

Inclusive definition of heritage: landscapes, buildings, archives, collections, intangible

City as an examplary
- Owner/keeper of heritage
- Manager of heritage

Consistency and collective accountability of a large number of services, etc.

12

Actions

- National Summits
  - Establish human/institutional connections
  - Develop common understanding, standards on vulnerability or damage statistics
  - Connect with the response/reconstruction industry
  - Contextualise traditional technology, ways or know-how
- Integrated Policies
  - Involve «communities», experts, authorities
  - Acheive consistency on goals/obligations
  - Build up experience, creativity and knowledge
  - Improve implementation and credibility

31.VIII.06 – ICDR Davos Global-National-Local Connecting Heritage & Risk

13

Opportunities

- **Current conceptual framework**
  - Sustainable development
  - Cultural diversity
  - Creative economy
  - Access to knowledge
- **Upcoming topics in the Heritage Sector**
  - Religious Heritage
  - Heritage and Human settlements
  - Landscapes
  - Climate changes

31.VIII.06 – ICDR Davos Global-National-Local Connecting Heritage & Risk

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Thank you.

dbumbaru@icomos.org - www.icomos.org

31.VIII.06 – ICDR Davos Global-National-Local Connecting Heritage & Risk

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Protection of Cultural Property (PCP) in Switzerland

Presentation for the ICCROM workshop
at the International Disaster Reduction Conference,
in Davos, August 31, 2006

by Hans Schüpbach

1

Protection of Cultural Property (PCP) in Switzerland — ICCROM Workshop Davos, August 31, 2006

Presentation overview

1) Development of PCP / Organisation in Switzerland
2) Risks / Threats
3) Risk preparedness
   - Swiss Inventory of Cultural Property
   - safeguard documentation and microfilming
   - shelters (mainly for large museums, archives, libraries, monasteries)
   - training, personnel, staff
   - information
   - collaboration with offices, cultural institutions, NGOs, partner institutions, private individuals
   - measures against fire, floods and earthquakes
4) International activities
5) Questions, discussion

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Protection of Cultural Property (PCP) in Switzerland — ICCROM Workshop Davos, August 31, 2006

Schaffhausen, 1944

- Damage caused during WWII
- Foundation of UNESCO, 1945
- Hague Convention on the Protection of Cultural Property, 1954
- Ratification of the Hague Convention by Switzerland, 1962
- Swiss Law on PCP, 1966
- Second Protocol, 1999 -> 2004

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Protection of Cultural Property (PCP) in Switzerland — ICCROM Workshop Davos, August 31, 2006

Structure of Swiss PCP in the civilian domain

Federal Council, DDPS

Swiss PCP Committee

Confederation (government)
PCP Section of the Federal Office for Civil Protection

Cantons
Responsible for PCP at the cantonal level
(Monuments and sites/civil protection)

Municipalities
Head of PCP service
PCP specialists

International contacts
UNESCO, States Parties, ICRC, ICCROM, NGOs...

Swiss PCP Association, ICOM Switzerland...

Experts in cultural institutions

Partner organisations

Private individuals

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Risks to cultural property

Disasters, everyday risks

- Hague Convention, Art. 3
- Swiss Law on PCP
- Second Protocol, 1999, Art. 5
- Swiss Law on Civil Protection, 2004

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Fungi, bacteria

Water damage

Oil

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Protection of Cultural Property (PCP) in Switzerland

ICCROM Workshop Davos, August 31, 2006

Risks to cultural property

Permanent risks

- theft
- vandalism
- fungi / bacteria / pest
- decay
- ignorance / lack of concern

Natural or man-made disaster

- fire / smoke
- flood / earthquakes / storm
- avalanche / landslide

Armed conflicts

- bombardment / explosion
- pillage / removal
- terrorism

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Protection of Cultural Property (PCP) in Switzerland

ICCROM Workshop Davos, August 31, 2006

Protective measures in Switzerland

- Inventories (Confederation, cantons, municipalities)
- Safeguard documentations, microfilms (cantons)
- Shelters
- Organisation and personnel training
- Information

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Protection of Cultural Property (PCP) in Switzerland

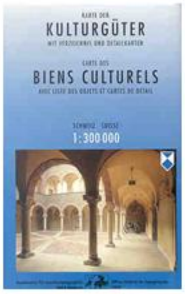
ICCROM Workshop Davos, August 31, 2006

Swiss PCP Inventory (1995), Revision 2008

No. of objects in the 1995 version

1,647 of national importance

6,617 of regional importance



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Protection of Cultural Property (PCP) in Switzerland

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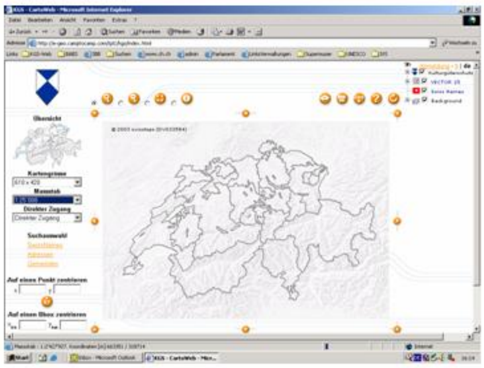

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Protection of Cultural Property (PCP) in Switzerland

ICCROM Workshop Davos, August 31, 2006

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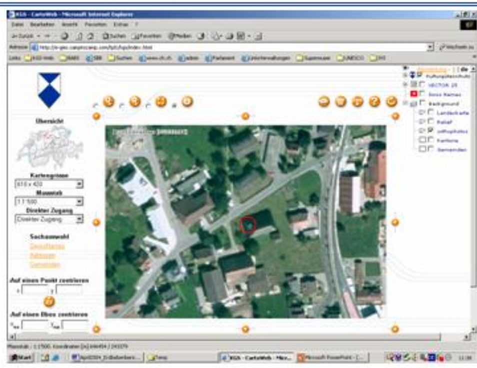
Protection of Cultural Property (PCP) in Switzerland

ICCROM Workshop Davos, August 31, 2006



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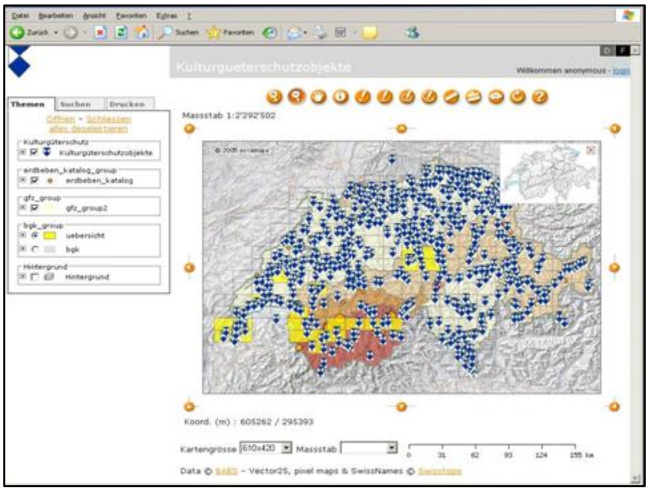

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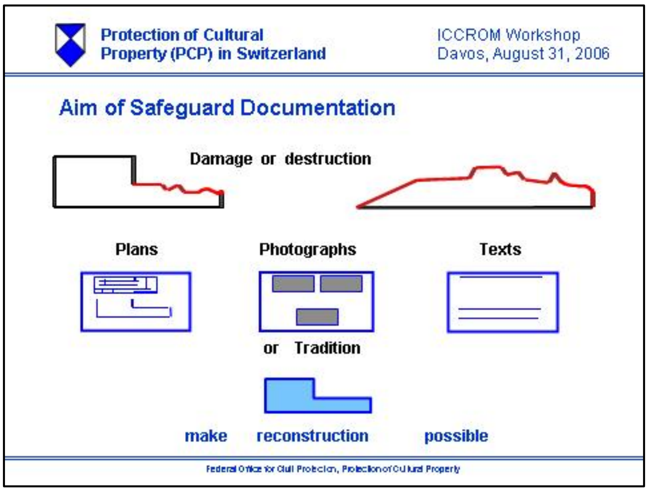

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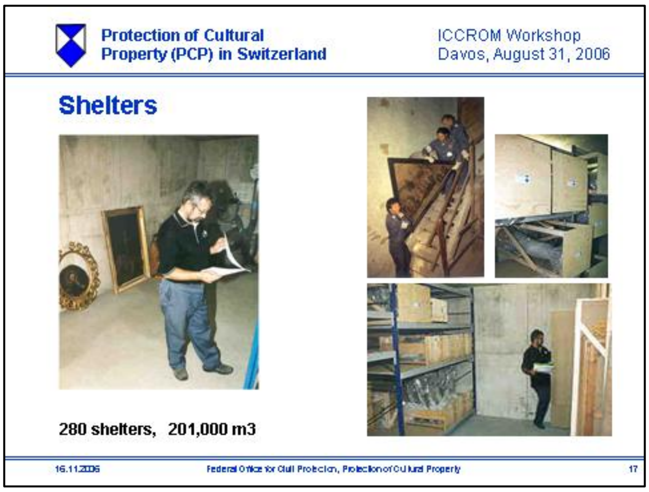

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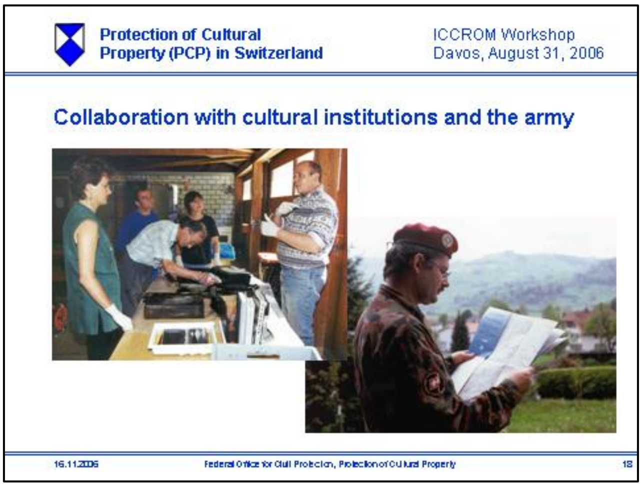

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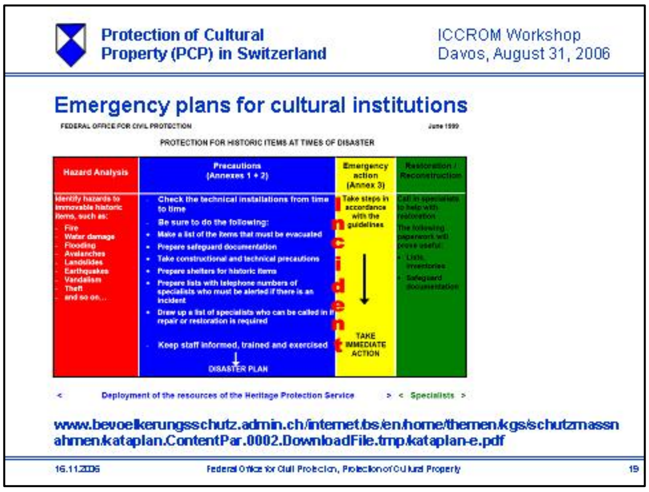

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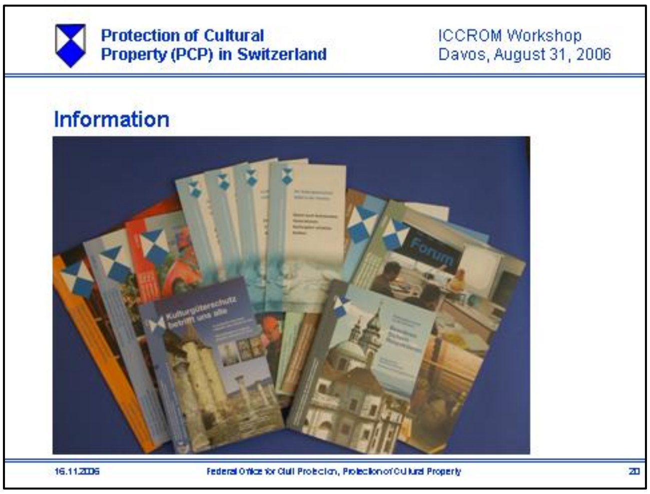

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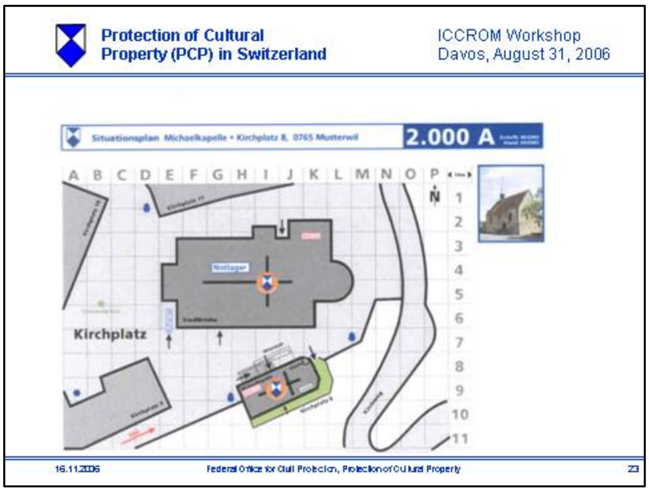

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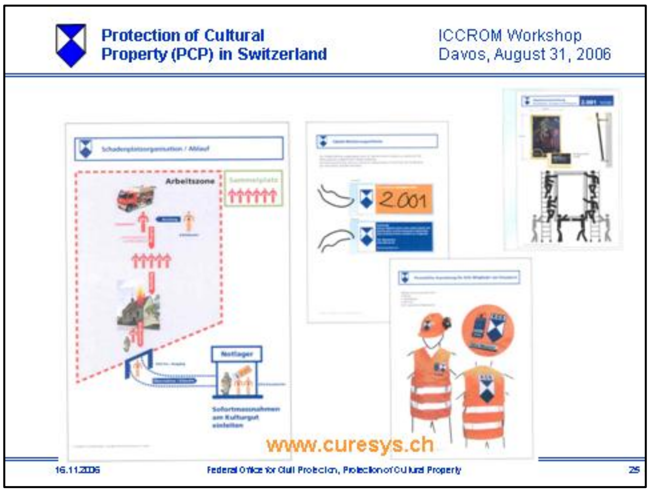

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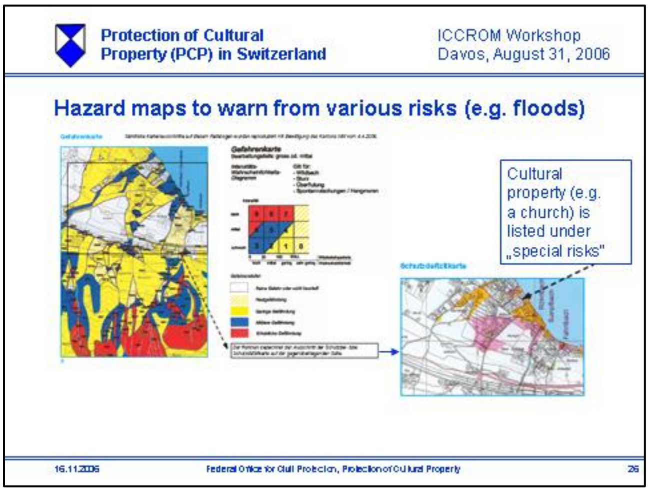

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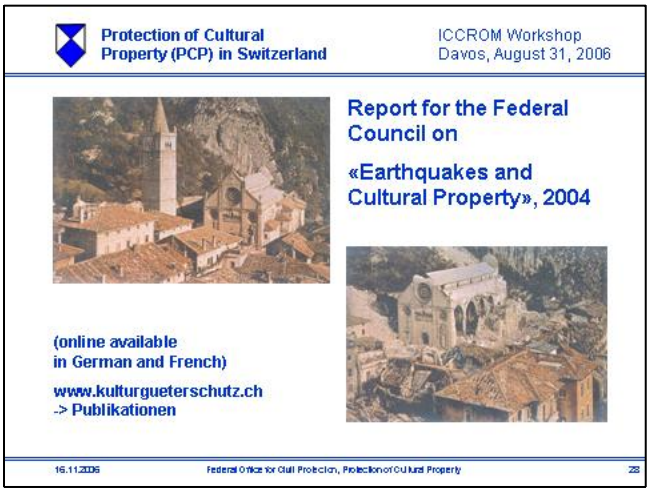

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International Conference o
Congrès international de l
Internationale Kulturgüters
Switzerland – Suisse – Sch
Bern, 23.–25.09.2002 ww

75 participants from more than 60 countri

Patron:

United Nations Educational, Scientific and Cultural Organization.

31

Protection of Cultural Property (PCP) in Switzerland
ICCROM Workshop Davos, August 31, 2006

Second Protocol to the Hague Convention, 1999

Article 5 Safeguarding of cultural property	Measures CH
Preparatory measures taken in time of peace for the safeguarding of cultural property against the foreseeable effects of an armed conflict pursuant to Article 3 of the Convention shall include, as appropriate, the preparation of **inventories**, the planning of **emergency measures** for protection against fire or structural collapse, the preparation for the **removal of movable cultural property** or the provision for **adequate in situ protection** of such property, and the designation of **competent authorities responsible** for the safeguarding of cultural property.	• Inventory • Emergency plan • Evacuation plans • Shelters • Personnel • Training (civ/mil.) • Microfilms • Safeguard doc.

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Protection of Cultural Property (PCP) in Switzerland
ICCROM Workshop Davos, August 31, 2006

Switzerland elected for 4 years

UNESCO Conference of October 2005
International Committee for PCP in the case of armed conflict (Art. 24 of the Second Protocol 1999/2004)

- El Salvador, Libya, Austria, Peru, Switzerland, Serbia and Montenegro (for 4 years)
- Argentina, Finland, Greece, Iran, Lithuania and Cyprus (for 2 years).

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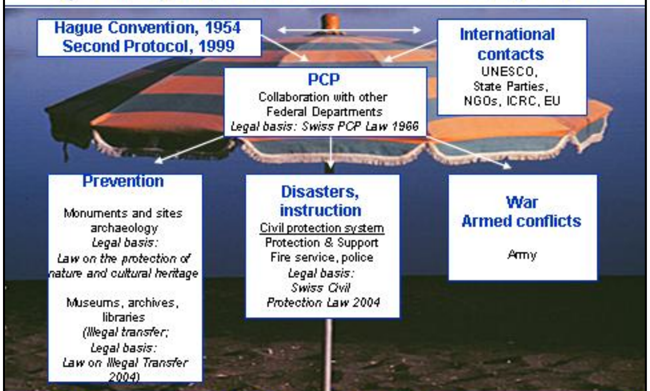
Protection of Cultural Property (PCP) in Switzerland
ICCROM Workshop Davos, August 31, 2006



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Protection of Cultural Property (PCP) in Switzerland
ICCROM Workshop Davos, August 31, 2006

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Disaster Risk Management in South Asia

Recent Initiatives

Rohit Jigyasu

1

2

Increasing Vulnerability of cultural heritage to natural disasters in South Asia.

An estimated one fifth of the vulnerable poor in South Asia become victims of natural disasters each year.

3

Floods in Surat, Gujarat

August 2006

4

Northern Kashmir Earthquake 2005

5

Mumbai Floods, India 2005

6

7

Disasters – linkages across boundaries

- Drought in 2000 affected India, Pakistan and Afghanistan simultaneously.
- October-November 2000 monsoon flooding and subsequent soil erosion in North-East India, Nepal and Bhutan triggered severe floods in Bangladesh.
- December 2004 Tsunami affected eastern coast of Sri Lanka and South India
- October 2005 Kashmir Earthquake affected India and Pakistan.

8

Common Factors for Increasing Disaster Vulnerability

- Poverty resulting in lack of maintenance, poor quality of constructions.
- Loss of Traditional Knowledge and inadequate understanding of 'Modern' Knowledge
- Acute Urbanization Pressures.
- Unsustainable Development
- Risks to Delicate Ecological Relationships

9

SAARC Regional Initiatives

- Regional Study on the Causes and Consequences of Natural Disasters and the Protection and Preservation of Environment, 1991
- Plan of Action on Environment, 1997
- Meteorology Research Centre, Dhaka, 1995
- Coastal Zone Management Centre, Male, 2004
- Proposed SAARC Disaster Management Centre, Delhi expected to start in October 2006.

10

South Asian Regional Policy Dialogue on Disaster Risk Reduction and Management

New Delhi Declaration

21-22 August 2006

11

Calling for Recognition of Local Knowledge and Capacity

……*State-level disaster preparedness and mitigation measures are heavily tilted towards structural aspects and undermine nonstructural elements such as social and economic aspects of risk and vulnerability, knowledge and capacities of local people on coping and risk management*…..

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Some priorities identified:
Arrive on conceptual clarity on the inter-linkages between hazards, risk, development and natural resource management.
Develop and promote a regional multi-hazard, risk, vulnerability and capacity analysis with a regular cycle of updating.
Establish Regional Hazard Risk Management Centres in respect of specific disasters.
Development of Early Warning Systems.
Develop tools and methodologies for mandatory disaster risk analysis for major development projects.

13


Mechanisms for inter-country information sharing and learning from response and recovery experiences from previous disasters.
Strengthen the existing institutions and networks and identify new institutions for regional sharing and cooperation on disaster risk reduction and management.
Strengthen linkages and networking with global organizations like ISDR, IRP, Pro-vention etc.

14


Cultural Heritage Risk Management Initiatives at Regional Level
Scientific Symposium - "Heritage @ Risk – The Forgotten Victims of Earthquake, Floods and Tsunami in South Asia
Organized by
UNESCO New Delhi in cooperation with Ministry of Science and Technology, Govt. of India and other National and International Partners.

15


Field Manual for Repair & Retrofitting of Vernacular Structures in Kashmir
Target Groups – Local Engineers and Masons
Objective – To develop user friendly illustrated guidelines for repair and retrofitting to be carried out by local masons.
Case Studies to demonstrate Retrofitting options

16

Appendix: The Davos Declaration

IDRC Davos 2006 Declaration, Participant's self-commitment for action VERSION 1. Friday, September 8, 2006

This Declaration was prepared by the participants at the International Disaster Reduction Conference held in Davos, Switzerland in August 2006. Our Declaration aims to draw attention to important issues which have been discussed. The Declaration shall serve **as a self-commitment** of all participants, expressing our will to actively support and implement the conference recommendations in our daily work and on a regular basis. We call upon the international community to join us in this effort.

Preamble

The IDRC Davos 2006 Conference, a technical gathering, supported the objectives of disaster risk management as outlined in the *Hyogo Framework for Action 2005-2015: "Building the Resilience of Nations and Communities to Disasters"*. Special attention was given to implementation at the "last mile".

The Conference discussed risks related to natural hazards and technological failures, as well as emerging human-induced risk factors such as pandemics, terrorism and climate change in a truly integrated and participative approach.

The Conference provided a forum for decision makers, scientists and practitioners to exchange ideas on how to cope with disasters and risks using state-of-the-art methodologies.

General Findings and Recommendations

Integrated risk management and sustainable development:

- To achieve the Millennium Development Goals (MDG), disaster risk reduction has to become an important and comprehensive part of the whole planning process for poverty reduction, food and water security, education and health.
- We need to adopt an integrative, multi-disciplinary approach and bring representatives from the public and private sector, NGOs and academia to "the table" to discuss disaster prevention, mitigation, response and recovery.
- Disaster risk management has to concentrate more pro-actively on prevention and preparedness to reduce adverse socioeconomic impact on the MDG. Rapid intervention and response during and recovery after a disaster may limit subsequent losses and damages.
- In addition we should focus on basic needs (food, water shelter), infrastructure and environment, it is important to have preparedness plans addressing people's social, psychological and emotional needs and involve the affected in their preparation.
- National strategies that integrate all types of measures and risks are needed. Disaster risk management and natural resource management have to go hand in hand.
- Disaster risk management should be viewed as a process rather than a solution.
- Adequate tools for hazard analysis, vulnerability estimations, risk appraisal, tolerability and acceptability judgments and comprehensive disaster risk management are needed.
- When designing community and rural risk management plans, people, livestock and other agricultural assets must be protected in order to preserve livelihoods, and reduce poverty, hunger, water shortage and the spread of zoonotic diseases.

Gender and Disasters:

- Gender issues are an integral part of disaster risk reduction.
- It is imperative that the specific needs and contributions of both men and women are mainstreamed throughout practice, science, data-collection, policy and decision making.
- This will require awareness raising and capacity building of planners, decision makers and practitioners.

Environmental Vulnerability

- Environmental degradation, whether creeping change or acute emergencies, poses grave risks to human communities. Protection of vital ecosystem services is fundamental to reducing vulnerability to disasters and strengthening community resilience.
- To recognize ecosystem services management as an integral part of disaster risk management. These need to be part of cost-effectiveness estimations.
- To recognize that some disaster reduction and recovery efforts can have adverse environmental consequences that could be avoided.
- Ecosystem services based management, environmental engineering solutions, mitigation of greenhouse gases and climate change adaptation, integrated water resource and catchment area management – all support the goals of disaster risk reduction.

Education, Knowledge and Awareness

- We believe that education for disaster reduction should form an integral part of the United Nations Decade of Education for Sustainable Development (2005-2015).
- Building the ability to reduce losses, as well as the capacity to respond to, and recover effectively from extreme events when they do, inevitably, occur.
- A better working relationship between the scientific community and end-users, be they mitigators, planners, educators, communicators or responders, is of prime importance. The end-user's needs have to be better articulated and the knowledge management improved.
- Whereas the availability of accurate, timely, relevant, gender disaggregated and usable information is essential to all aspects of disaster reduction, development and enhancement of processes and infrastructure to acquire, manage, and share information across sectors and decision-making will substantially increase the efficiency and effectiveness of all aspects of disaster risk reduction.
- Knowledge transfer and capacity building shall contribute substantially to disaster risk reduction.
- 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.

Human Security

- Transnational terrorism has developed into a worldwide threat. Close international cooperation and information exchange is needed to cope with this threat.

Regional Dimensions

- Regional variations in vulnerability, abilities, resilience and in disaster risk management capacity building were a central theme of discussion.
- The unique needs, challenges and existing capacities of China, Central Asia and Africa were highlighted throughout the conference.

- Participants from Africa (annex 1) took the opportunity to advance plans for promoting mutual interest and cooperation in disaster risk reduction for safer, disaster resilient communities and issued position papers outlining details in this regard.
- For the Central Asian delegation, adopting the principles of the integrated water resources management and increasing the activities of coordination at the national, interstate and global level will offer a good chance to reduce vulnerability. Actions should give priority to the human needs to water and should include the principals of integral risk management for natural and human-induced hazards (annex 2).

Outreach Process

Participants are invited to report on their continuing activities and findings and to share their experiences with IDRC Davos. Periodic progress reports and assessments will be made available on the conference website www.davos2006.ch. This information will also be introduced to the UN-ISDR system.

Acknowledgement

Participants expressed gratitude and high appreciation to the local organizing committee, the cosponsors and the Swiss Federal Institute of Snow and Avalanche Research in Davos, Switzerland, whose efforts have been instrumental in making the IDRC Davos 2006 a success.

Annexes

Annex 1: African delegation's statements

Annex 2: Central Asian delegation's statements