

International Experience of Disaster Relief and Incentives for Protection of Historic Buildings in Seismic Zones

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1. Many of us have seen striking images of buildings reduced to rubble by earthquake surrounding a defiantly standing historic mosque or other historic structure. Why is this the case, we may ask. The connections between traditional building, disaster vulnerability, disaster relief, and poverty, however, are not generally recognized by those making decisions about disaster management or mitigation. The following comments are intended to contribute to a better understanding of common objectives. Only by **bridging the worlds of international development, disaster relief, construction industries, and architecture can real advances be made.**

2. My remarks draw largely on the experience of the World Bank, the Disaster Management Facility of the World Bank, and my own fieldwork. In the 1999 report, Learning from the World Bank's Experience of Natural Disaster Related Assistance, the authors write that

“ Extreme natural events like earthquakes.....have always been part of the natural cycle.....What makes the event a disaster is its impact on vulnerable structures like buildings and infrastructures. Thus natural disasters are human, social, and economic disasters.

Accelerated changes in demographic and economic trends have disturbed the balance between ecosystems, increasing the risk of human suffering and losses. Today's populated areas – cities and agricultural zones – constitute an increasingly valuable asset base. Potential human, social and economic losses from natural disasters grow year by year, independently of nature's forces. Increased vulnerability requires that natural disaster management be at the heart of economic and social development policy of disaster prone countries.”

3. It is against this background, that I would wish to present three **main policy messages to improve incentives for protecting historic buildings:**

- **Knowledge: Cost effective products and techniques for mitigation and reconstruction of historic buildings need to be developed and used;**
- **Delivery: Knowledge about reducing vulnerability of historic buildings needs to be transferred from experts to the people affected; and**

- **Decisions: Policy makers will need to be convinced of the importance of adopting such vulnerability reduction measures.**

The World Bank, ProVention Consortium, and Disasters

4. Before launching into the main theme of my paper I thought it useful to give some background about the World Bank and the ProVention Consortium's role in responding to disasters. The World Bank, the largest of the international development agencies, has extensive experience in reconstruction after disasters. Since 1980 the Bank financed some 200 disaster related projects of which about half were for reconstruction (over US\$7.5 billion lending) and half included components for mitigation (over US\$6.5 billion lending). At least 15 were in response to earthquakes, in such countries as Turkey, China, Indonesia, Philippines, Armenia, Tajikistan, Yugoslavia, Colombia, Mexico, Iran, India, and Nepal.

Assistance After Natural Disasters: Anatomy of the WB's Reconstruction Portfolio

5. Financing emergency reconstruction projects is still seen by most Bank staff as the Bank's primary and conventional role in natural disaster management. Emergency projects account for about 70 percent of the reconstruction operations approved by the Bank since 1980. Borrowers generally give a high priority to housing reconstruction after a natural disaster but Bank projects focus more on repairing infrastructure and damaged community facilities as well as economic recovery through emergency import support.

6. Housing reconstruction experience within the Bank's portfolio has had mixed results. Proper sequencing of housing reconstruction has been crucial to success, especially ensuring that land acquisition and assembly come first. During implementation, among the factors that accelerated reconstruction were: access to construction materials, and provision of training in disaster resistant construction techniques. An earlier review also recommended that "housing technology should be simple and culturally adequate; and local construction materials should be used to deal with building bottlenecks."

Reducing Losses: Mitigation Before Natural Disasters Strike

7. The Bank and borrowers are now developing a greater awareness of the need to **mitigate or reduce** the adverse effects of natural disasters before they strike. Most of the natural disaster mitigation projects have addressed three likely weather-related events: floods, forest fires, and droughts. Institutional development is extremely important for mitigation to promote disaster awareness, planning and early warning systems. As part of institutional development, the enforcement of land use and building codes to avoid settlement in hazardous areas or in vulnerable structures, has been widely pursued by these projects.

Example of Historic Buildings in Lijiang, China

8. Let me illustrate the discussion with the example of Lijiang, a historic city in Yunnan province that was severely damaged by an earthquake in 1996. The Government of China requested the World Bank's assistance after the disaster and the Yunnan Earthquake Reconstruction Project was approved in 1997. A cultural heritage component of the project concentrated on the rehabilitation, reconstruction and conservation of the historic town and traditional buildings in the province (especially Lijiang and Dayan City), paying particular attention to improving the safety of traditional buildings. Consequently Lijiang has been proposed for listing under the World Heritage Convention.

9. The damage assessment undertaken by the Bank indicated that damage to buildings was severe in some places, and was dependent on the direction of the earthquake's impact, quality of construction, and degree of support from adjacent buildings. Damage was characterized by: destruction of mud brick walls that were inadequately tied to timber structures or had inadequate bonding between inner and outer wall surfaces; damage to internal structures, finishes and paneling; collapse of entire timber framed structures due to lack of cross bracing; displacement of columns on stone bases; and loss of roof tiling.

10. The Chinese were very eager to make immediate repairs, and the Bank worked with their counterparts to ensure adequate control of workmanship and materials, introduce improved sanitation and services into housing, and safeguard the historic environment in Lijiang and elsewhere.

11. The Bank's expert emphasized the following responsibilities of the Lijiang Municipal Government:

- Repairs must be carried out in a manner to prevent future disasters;
- Controls over construction and design detail and the intrusion of inappropriate building need strengthening;
- Future improvements should be taken into account in any immediate works;
- Guidelines with adequate diagrams and illustrations should be made available to residents;
- Training for local residents and construction industry should be established to disseminate best practice in earthquake resistant building techniques;
- Adequate fire resistance must be provided;
- Records of the historic buildings are required.

The project is now under the final stages of implementation and is judged to be satisfactory.

Priority Issues in Natural Disaster Management Today

12. There are many imperatives that can be drawn from Bank experience that are relevant:

- Minimizing losses from natural disasters must be a goal of sustainable development;
- Calculating the costs and benefits of natural disaster management should inform decisions;
- Incorporate disaster management into development planning;
- Assess natural disaster damage and loss potential as part of overall development work ;
- Share the costs and benefits of natural disaster management with potential victims;
- Get incentives for DM Right

13. We may well ask why have mitigation measures not been incorporated into national policy? There are three major constraints that hinder mitigation investment in developing countries. These constraints, surprisingly, are also opportunities for adapting traditional building materials and methods.

14. Affordability. Perhaps the most important constraint is lack of affordability. Low income urban families, already unable to pay higher prices commanded by less hazardous zones of urban areas, find it difficult to afford investments to strengthen their dwellings to make them more disaster resistant. Thus raising their incomes through economic and social development must remain a top priority as it would enable them to escape their poverty trap. With higher incomes, households can often relocate to less hazardous – and often more expensive locations. **Therefore availability of low cost technologies to reinforce dwellings is also a priority.**

15. It is also important for governments to review legislation and regulations that effectively encourage lack of maintenance, for example controls setting ceilings on rental payments leave landlords without the means to pay the proper maintenance of their properties so that structures deteriorate and become vulnerable to disasters.

16. Cost effectiveness. Emphasis in projects on lowest cost solutions for construction may not always lead to disaster resistant structures. While the Bank and other agencies seek cost effective solutions that are as affordable as possible for low income groups, calculation of costs often do consider mitigation of the effects of natural disasters. In short, mitigation must be factored into cost effectiveness. **Cost effectiveness may often lead to the use of local materials and technologies, when proven to be resistant to further damage from disasters.**

17. Short attention spans. A third important constraint is the very short attention spans that natural disaster risks generally hold. In the immediate aftermath of a natural disaster, with images of human and material losses vivid, mitigation investment is a high

priority in both the eyes of communities at risk and local and central governments. This fades quickly with time. **It is imperative that decision makers have rapid access to information about traditional building materials and techniques of proven durability.**

18. Removing constraints to mitigation investment is part of the effort to ensure that incentives are in place to reward mitigation investments. Such investments will also need to be worthwhile from the financial point of view. For example, if the government rewards a household with a new dwelling to replace an illegally and dangerously located one lost in an earthquake, it is an incentive for a household to build poorly and in a dangerous location. Moreover, households that take mitigation measures to reduce the risk of losses are often ignored by the authorities.

19. Similarly if the amount of multilateral assistance is offered to disaster struck countries is proportional to the losses and damages they suffer, then countries have no incentive to mitigate their vulnerability to natural disasters. That is, the worse the disaster, the more assistance they are likely to receive. A somewhat hard rule to encourage mitigation would be to ensure that disaster victims themselves share some or all of the cost of the losses suffered through natural disasters.

ProVention Consortium

20. Recent actions by the World Bank are changing the way in which disasters will be handled. The World Bank's Disaster Management Facility was established in July 1998 to provide proactive leadership in introducing disaster prevention and mitigation practices into development related activities and improving emergency response. A year later this was followed by the first meeting of the Consortium on Natural and Technological Catastrophes, now called ProVention, gave impetus to the formulation of a comprehensive and coordinated approach to disaster management that promotes partnerships with international development and scientific communities and the private and voluntary sector.

21. ProVention is a global, tri-sector coalition (government, private sector, and civil society) that focuses attention and resources on the critical issue of disaster risk reduction as a feature of sustainable economic and social development. It aims to mainstream disaster reduction best practice into donor and beneficiary policies, disseminate best practice to government and institutions, strengthen specialized institutions in the developing world, and expand knowledge on disaster prevention. Constituted by more than 70 organizations, it will share worldwide experience on policies and practices to reduce vulnerability and negative impacts of natural and technological disasters in disaster prone developing countries.

22. To reduce losses from natural and technological disasters, ProVention will concentrate on the following complementary actions:

- Strengthen donor coordination to adopt policies aimed at reducing disaster risk. A range of agriculture, forestry, water, land use, and urban policies now in force may have perverse impacts on disaster vulnerability and ProVentia will work to improve the overall policy environment;
- Promote a culture of safety through education and training and dissemination of good practices for reducing vulnerability to natural and technological disasters. Prevention entails those measures that reduce risks from natural hazards, including the enforcement of building codes and utilization of land use planning. Insurance can be an effective tool to encourage the adoption of effective measures by populations at risk, although today hazard insurance is not readily available in most developing countries;
- Forge linkages among public, private and civil society, and between the scientific community and policy makers for disaster risk reduction. The Consortium will focus on identifying constraints to increasing the private sector's role in mitigation in developing countries, facilitating cooperation between the international development community and the global insurance and reinsurance sectors; and
- Support pilot projects that may help to demonstrate risk reduction or risk transfer strategies.

Priorities for ProVention

23. Initially ProVention is focusing on three areas of priority:

Poverty and Vulnerability. Poverty is inextricably linked to disaster vulnerability. Losses from natural disasters are dramatically on the rise throughout the world, especially in developing countries. Factors increasing the vulnerability of poor countries to natural hazards include the concentration of populations in high-risk areas, and the increase in the size of the building stock and other elements of the built environment that are exposed to natural hazards. Cultural heritage is often located in areas with high concentrations of poor populations, particularly in historic city centers and in the environs of remote archaeological sites. ProVention will work to mobilize the resources of concerned organizations to meet this challenge.

Protecting Environmental Services that Reduce Disasters, Natural ecosystems like forests and coral reefs buffer the impact of weather-borne disasters on human settlements. Mudslides and floods can be minimized through proper watershed management as well appropriate siting of communities. Global climate change that seems to be the result of intensified energy consumption and changes in land use has the potential to alter weather patterns, making new areas prey to storms. ProVention will promote mechanisms to protect critical natural ecosystems, research on the economic contribution made by environmental services to mitigate natural disasters, and the dissemination of these findings to decision makers and the private sector.

Risk Sharing and Transfer Mechanisms in the Formal and Informal Sectors.

Emphasis will be placed on improving access of low income groups and others that have no access to risk reduction strategies, insurance mechanisms or safety nets. ProVention will work to institutionalize risk reduction measures. Private sector insurance and reinsurance, for example, can be effective tools for sharing risk and reducing the economic losses caused by disasters. Increasing the availability of hazard insurance and other risk transfer mechanisms in the most vulnerable societies will also be vital. Arrangements such as safety nets and calamity funds to assist the poor when disaster hits will be explored by ProVention.

The Strategy and Structure of ProVention

24. ProVention is intended to be a clearing house on good practice information, distilling lessons and disseminating information to i) the donor community, to increase donor coordination and improve programming in the field of disaster reduction; ii) governments, financial institutions and NGOs and other stakeholders to increase the knowledge base of all actors in the field; and iii) private sector to promote a more efficient participation of the private sector in efforts to reduce risks. .

25. ProVention is meant to provide a unified support base for the activities of a wide range of operational organizations, with the aim of advancing institutional capacity for disaster risk management in developing countries. A complementary objective is to further the use of appropriate risk reduction measures in developing countries that have been effective elsewhere.

26. Now let me turn to overall policy considerations and the question of incentives. I hope to demonstrate that incentives are bound to two factors: knowledge and delivery systems.

Policy 1: Knowledge: Cost effective products and techniques for mitigation and reconstruction of historic buildings need to be developed and used.

27. In earlier papers (World Bank 1999, UNESCO 1999) in which I looked at cultural heritage in natural disasters, I drew attention to the pattern of high vulnerability of cultural heritage in the developing world to natural disasters, a weak record of implementation of protective measures to control or limit damage, exacerbated negative impacts, and lengthy recovery time. Among the causes of this vulnerability is the inadequate knowledge of appropriate mitigation measures and of the assets themselves.

28. Despite the billions of dollars that have been spent in reconstruction and mitigation, it is not clear that knowledge about cost effective products and techniques, whether locally appropriate mortar and building forms or information tools such as inventories of historic places, is sufficiently convincing or widespread. In fact, in many

cases, there seems to be a disconnect between the knowledge of researchers and practitioners, and decisions made by the disaster relief agencies.

29. Knowledge in this context takes the form of both know how or technical knowledge, for example on what works, and information problems. Know how may have to do with how mortars are made or bracing beams are constructed. For example, at a time when the virtues of traditional mortars are being recognized by conservation specialists, is their use being promoted in emergency reconstruction works? There are issues of reliability, application, availability, and cost that arise:

- Have the products in question been field tested?
- Do local builders or householders know how they should be used?
- Are they available when reconstruction works begin?

30. Technical knowledge is exemplified by best practice for earthquakes, water damage mitigation and repair etc. This technical knowledge is unevenly accessible so that inappropriate techniques may be used which may cause additional damage. As in the case of other forms of knowledge, knowledge is less widely available in poorer countries and among the poor.

31. Furthermore knowledge of the value of the built historic environment and the cost of its loss is weak, particularly in poor countries. This leads to underestimation of the financial and economic implications from adverse events to these assets.

32. Information problems include whether information is readily understandable by the end users, for example instructions about the use of certain products or methods for protecting historic buildings or questions of legal recourse for substandard repairs.

Building Quality and the Strengthening of Existing Buildings

33. It is instructive to look at the issue of building quality and strengthening of existing buildings. Already in 1995, in a report on Informal Settlements, Environmental Degradation and Disaster Vulnerability: The Turkey Case Study, control of building quality was emphasized as a key means to reduce vulnerability. “The main parameter determining the impact of a hazard on a city is the structural resistance of the whole building stock.” The report notes that there is often a higher proportion of older, perhaps more vulnerable buildings in the center and in many areas of high seismicity, older weaker buildings often inhabited by the poorer people are the main source of expected future losses.”

34. What then is the know how and technical knowledge available about means to increase structural resistance of existing buildings and what are the incentives for the application of this knowledge? Risk reduction in the existing building stock is an increasing subject of concern and the focus of a number of programs, from California to Mexico City and it is clear from this meeting that options exist for strengthening. But are they known by those responsible for the disaster relief? The prevailing view is that

strengthening older buildings is often expensive compared with the incorporation of additional strengthening into new buildings. Another viewpoint claims that screening of the building stock to target residents most at risk results is cost effective. Findings of a pilot study in Turkey indicate that concentrating resources on the worst 5 percent of buildings would be most cost effective. Often it is the older reinforced concrete buildings with multiple occupancy which have the highest potential for loss of life, and not the reinforced masonry buildings.

35. Evidence is contradictory.

- In areas of high seismicity upgrading is likely to be more cost-effective because the costs per saved life are likely to be lower.
- Upgrading weak masonry buildings would make a considerable impact on expected casualty levels according to a study of building practices in Eastern Turkey. For example a single timber ring beam at a cost of US\$200 would reduce fatalities.
- Retrofit strengthening of existing buildings is expensive. In Mexico it costs from 15 to 40 percent of the total costs of new construction.
- It is often difficult to assess accurately the effect of any particular strengthening measure in reducing vulnerability.

36. A recent World Bank report comments,

“Recent experience shows that it is equally important to identify the particular vulnerabilities of the local built environment and determine how to reduce them in ways that lead to durable solutions. For private single-family housing, durable solutions involve using locally available materials, culturally appropriate styles, and traditional building techniques.”

37. These are complex issues but one can begin to sort out some key questions by applying knowledge from economics and public policy:

- What does an analysis of costs and benefits tell us about whether to strengthen or demolish?
- What is the cost of making the codes accessible and comprehensible to the average practising building designer?
- What is the cost of checking compliance with the codes or local building regulations?
- What level of protection should society demand or an individual owner should provide?

38. Another viewpoint, expressed by a disaster expert: “Research into disaster resistant construction tends not to be helpful because it focuses on identifying many small

ways in which traditional buildings can be improved. Research should focus on what are the three most important modifications that can be made.” World Bank analysis has shown that: An overemphasis on the perfection of construction details slows the rebuilding process and leads to unproductive conflicts with homeowners. This is also related to respecting beneficiaries willingness to pay and decisions is thus important.”

39. But there are important exceptions, such as an Earthquake Reconstruction Project in Maharashtra Province in which roof braces were supplied to householders at low cost, and painted in a contrasting color so that their performance could be easily monitored.

40. In summary, applied research on products and techniques that increase resistance to disasters is of potentially huge importance for earthquake prone areas but choices need to be informed by economic considerations.

Policy 2. Delivery. Knowledge about reducing vulnerability of historic buildings needs to be transferred from experts to the people affected.

41. There are a set of information tools that can produce significant gains in reducing risk. In order to identify and minimize potential damage and liabilities, national inventories of historic sites, Object ID, and an emergency works and advice service are of great use. At a site specific level, individual disaster plans can be detailed. Although standards for inventory and Object ID will be set at a national level, much of this preparatory work can be delegated to the local level.

42. National Inventories. National inventories of historic places are a keystone of heritage management for the simple reason that knowing what your resources are is a prerequisite for effective safeguarding. It is a hallmark of the developing world that inventories are incomplete, dusty, hard to access, and unrelated to overall spatial planning. Two recent advances enhance the effectiveness of national inventories. The first is the definition of “core data standards” for archaeological and historic sites under the auspices of the Council of Europe. The core data approach encourages a more efficient and uniform system of recording information. The second advance is the advent of inexpensive computer technology and diffusion of Geographic Information Systems (GIS). This has opened the possibility of large and speedy gains in national inventories. GIS data base combines spatial attributes and thematic map layers with information such as administrative boundaries, cadastre information, historic maps, site inventories. Maps can be layered with additional features and information sets as needed.

43. Such inventories have proven highly useful for disaster mitigation. A GIS database can provide precise locational information depicting historic features and extent of damage (from floods etc.) In a recent flood episode in the Chesapeake and Ohio Canal National Park the standard operational procedure to assemble a disaster response team composed of park officials and an interagency task force was modified with the addition of mapping professionals. Among the data collected were: peak flood data which helps to analyze patterns of flood impacts over time; monitoring flood damage; direct aid to most vulnerable areas. A GIS can aid disaster response to: identify resources; create

accurate maps showing both natural and cultural resources; establish databases to enhance maintenance of facilities.

44. Other types of data that can be added are: micro zonation, extent of data available on past earthquake performance, form of construction used for primary load bearing structure.

45.. Object ID. Object ID is an international documentation standard for the information needed to identify art and antiques, the moveable heritage. It responds to the failure of current practice of recording objects to enable owners, dealers, customs officials, and police to identify objects confidently and quickly and was initially prompted by the dramatic costs of loss of art works through illicit trade and theft. Its applicability for disaster mitigation is also high. Today illicit trade in antiquities, theft of art works, and loss of art through disasters particularly impoverishes the developing world. Spearheaded by the Getty Information Institute, Object ID is the result of intensive consultations with key groups involved in the art trade: museums and cultural institutions; art galleries and auctioneers; appraisers; customs officials; police; insurance companies; and international agencies. The contents of the standard were identified by a combination of background research, interviews, and surveys of major institutions.

46.. Object ID is based on the concept of core data standards, that is the minimum basic information required for identification. The inclusion of the category “distinguishing features” is views as an important factor in the usefulness of the tool for the purposes of recognition. Object ID was designed to meet the needs of the recorder as well as the retriever: information is easy to input and it is easy for a lost object to be found. It complements existing object inventories of museums and other collections. Launched in 1997, it is still to gain general currency.

47. Emergency Works and Advice Services. Some countries have put into affect emergency works and advice services for disasters. In the U.K. English Heritage recently set up an Emergency Works and Advice Scheme. It is designed to help owners deal with sudden catastrophes and unforeseeable circumstances and to prevent dramatic deterioration in a building or monument: “to buy time” for it until a permanent solution can be put into place. It includes advice, a site visit, and covers work that is necessary immediately to protect the overall stability or integrity of an historic building or to preserve specific features. The proposed work must be the minimum necessary, using the most cost-effective means to achieve the objective. Regional teams are responsible for the delivery of this system.

48. Individual Disaster Plans . At the individual site level, disaster plans are essential. Most major museums and some historic cities have such plans in place. This may include: appointment of a disaster team including volunteers; plans to evacuate material; removal of debris and cleaning; evaluation of structural damage; securing of funding to return site to pre-disaster condition; and training of staff to deal with dangers and other aspects of disaster response. Risk reduction through adherence to building codes, fire

proofing, fire alarms, resistant glass, seismic strengthening are key elements in any preventive effort.

49. How information is conveyed is also a problem. For example, in reconstructing housing following a major earthquake, mitigation usually has a strong educational component. The educational messages focus on how to build safer housing. Such messages are often conveyed in community meetings, through the schools, and the media and often directly to specialized groups involved in the building trades. Field work sheds important light on why little of that knowledge been communicated to the poor in developing countries. Many projects have promoted too many changes to traditional styles of building. The result is failure to respond to the central question, “Can we provide ourselves with a safer home?” There is also the time factor. Once the fear engendered by the disaster event is gone, if people have not heard that safer possibilities are available to them, the window of educational opportunity has closed until the next disaster

50. There are many ways to convey information. An interesting effort to improve information problems is The Treasury of St. Francis of Assisi exhibition staged by the Metropolitan Museum of Art. As the Financial Times review notes, “If any good could be said to have come from the calamitous earthquakes that ravaged the Upper Church of the Basilica of St. Francis in Assisi in 1997, it is through the pleasure afforded by the 70 spectacular and revered icons, relics and religious works of art...that have been dispatched on an international tour in its wake.” The exhibit, funded by a private Siense bank, has raised awareness of the gravity of the Umbrian disaster.

51. To summarize delivery of knowledge of mitigation systems requires intensive efforts. Comprehensive national inventories of historic sites, recording systems for moveable cultural property such as Object ID and emergency regional expert teams are three simple ways to reduce damage yet are not yet widespread. **Increasing learning and dissemination of good practice is a priority for reducing vulnerability to natural and technological disasters. Priority actions for government, responsible agencies, NGOs and community groups might be to:**

- Explain where building and infrastructure investments overlook disaster mitigation and document and disseminate information on the unit costs of factoring in disaster mitigation into investments in building and infrastructure to assist governments and the private sector to find cost effective solutions;
- Disseminate scientific knowledge about impending natural disaster events among populations at risk and local governments and encourage local governments to enforce compliance – even if unpopular – of building and land use codes to avoid the occupation of sites or structures dangerously exposed to natural disaster damage.

Policy 3. Decisions: Policy makers will need to be convinced of the importance of adopting such vulnerability reduction measures.

53. Among historic building experts there is often an assumption that maintaining the existing building stock is essential for social and cultural as well as economic reasons. But is this convincing to decision makers?

54. In many cases decision makers are not adequately informed. We have already pointed to obstacles such as:

- the failure to calculate the true cost of loss and damage to the historic built environment, and
- the difficulty of putting value on the non-market nature of many cultural heritage values.

55. Moreover the huge costs of repair or replacement have not been used effectively by those responsible for historic buildings to persuade decision makers of the cost effectiveness of preventive planning and systems. Recent work on the economics of heritage conservation will be useful for understanding the total economic value of heritage.

56. This is particularly important because the quantification of costs and the estimation of corresponding benefits of protection measures can illuminate choices to be made and assist in the decision making process. These choices include:

- Introducing financial and fiscal incentives
- Adjusting land use and management practices
- Reforming land tenure patterns
- Upgrading building codes
- Training for construction craftsmen and other nonstructural measures to lessen vulnerability

57. Incentives that can be employed to improve the management of risk include legal requirements and activating the private and voluntary sector. Legal Requirements. Legal compliance can be a powerful tool in improving disaster management for heritage. This may include compliance to specific building codes, earthquake resistant measures, use of fire retardants etc. The consequences of breaching legislation can be extremely serious and in addition to any fines for breach of legislation, repair or replacement costs (if applicable) or clean up works can also be levied.

58. Private Sector Role in Reducing Losses. In many countries private sector insurance and reinsurance plays an important role in sharing risks and reducing economic losses caused by disasters. They help cushion the blow for historic properties. Citizen

groups can organize into neighborhood groups to respond to natural disasters, perhaps focused around historic religious structures.

59. Therefore ensuring that policy makers have adequate information on which to base decisions about risk identification and management is a priority

Conclusions

60. We have seen that the poor are particularly vulnerable to loss when natural disasters strike. In historic cities where cultural sites are dense, for example, whether in Quito or Tblisi, low income households are often proportionally over-represented and thus are more likely to suffer when disaster hits. They are also less likely to be able to mobilize the resources needed to repair damaged historic buildings . Natural disasters often aggravate already vulnerable situations. Chronic lack of maintenance of historic buildings and inadequate infrastructure services deepen damage from disasters. In the case of the historic center of Tblisi, Georgia buildings already weakened by water damage from leaking pipes and inadequate maintenance were dealt a death blow by earthquakes which brought historic buildings down on their inhabitants heads.

61. There are a wide range of policies and techniques for reducing the vulnerability. Awareness, motivation and self protecting action by a range of groups including local government, the construction industry, private sector companies and community groups are needed. Part of reducing vulnerability involves the education, motivation and provision of information to this spectrum of agencies. **Affordability, cost effectiveness, and timeliness are decisive factors and thus should be in the forefront of thinking of all those working to reduce disaster risks and impacts.**

- The control of building quality is an essential feature in disaster mitigation. It has to be addressed in an overall disaster protection strategy.
- A quantitative framework is useful for evaluating policy options for disaster mitigation. Relatively simple loss estimation techniques could have important roles in defining cost-effective and appropriate strategies.

Annex

Initiatives to Reduce Risk to Cultural Heritage from Disasters

1. There are a number of initiatives that have tried to improve current practice. Among these most relevant are the following:
2. Operation Blue Shield. The Blue Shield initiative to improve risk preparedness for cultural heritage, borrowing the emblem of the 1954 Hague Convention, was begun by the International Council on Monuments and Sites (ICOMOS) in 1992. In 1996 an international committee of the Blue Shield was created for coordinating emergency response efforts on behalf of ICOMOS, ICOM, ICA and IFLA. The committee identified five key areas: funding, emergency response, training and guidelines, documentation and awareness. But the very areas that they defined have proven to be stumbling blocks for Blue Shield: lack of adequate funding, ineffective coordination with international and national agencies responsible for disasters, and inability to respond in a timely manner to disasters. Blue Shield has yet to deliver tangible results.
3. The Getty Conservation Institute Disaster preparedness, mitigation and response activities. The GCI in 1990 began a collaborative project in Skopje (ex. Yugoslavia) to develop a methodology for seismic strengthening of Byzantine churches and other historic structures; in the same year in California it initiated a study with similar aim for adobe structures. Also in this year it organized an international conference in St. Petersburg, "Conservation and Disaster Recovery: International Cooperation at the Library of the USSR Academy of Sciences" which reviewed the post 1988 fire. There have been no recent activities.
4. Appropriations for Disaster Relief. In the U.S. natural disasters in the 1990s prompted the United States Congress to approve supplemental appropriations for disaster relief. In 1994 the Northridge Earthquake caused significant damage in the Los Angeles area; Congress responded by earmarking \$10 million for historic preservation activities from a total appropriation of \$550 million from the President's Discretionary Fund for Unanticipated Needs. In the previous year flood relief funds also allocated moneys for preservation actions (some \$5 million out of \$6 billion). In the later case flood relief was used to fund nonconstruction activities such as on-site inspection by teams of preservation professionals to inspect buildings and provide technical advice. Printing and dissemination of a technical booklet, "Treatment of Flood Damaged Older and Historic Properties was also funded.
5. A regional workshop on Integrating Cultural Heritage into National Disaster Planning, Mitigation, and Relief was held in Macedonia in 1997. Sponsored by the University of York, the Getty Grant Program, the Ministry of Culture of the Republic of Macedonia, and U.S. and Macedonia ICOMOS, this meeting had as its aim the

development of national disaster plans. A case study on the World Heritage Site at Orhid was prepared, focusing on risks from fire and earthquake. A network of experts was initiated but there has been virtually no follow up on the conference.

6. English Heritage Emergency Works and Advice Scheme. This scheme is designed to help owners deal with sudden catastrophes and unforeseeable circumstances and to prevent deterioration in a building or monument until a permanent solution can be put into place. It is built upon the regional conservation capacity of English Heritage.

Futher Reading

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(POWERPOINT)

Main messages:

Bridge worlds of international development, disaster intervention, and construction industries

Need to develop cost effective products for mitigation and reconstruction

Need to transfer knowledge from experts to people affected

Need to influence policy makers to adopt these methods