

Indigenous Knowledge

Disaster Risk Reduction

Policy Note



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International Strategy for
Disaster Reduction



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Policy Note

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Team Members

Kyoto University

Rajib Shaw

Yukiko Takeuchi

Noralene Uy

SEEDS

Anshu Sharma

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“The European Union is made up of 27 Member States who have decided to gradually link together their know-how, resources and destinies. Together, during a period of enlargement of 50 years, they have built a zone of stability, democracy and sustainable development whilst maintaining cultural diversity, tolerance and individual freedoms. The European Union is committed to sharing its achievements and its values with countries and peoples beyond its borders.”

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Contact Details

Rajib Shaw
Associate Professor
International Environment and Disaster Management Laboratory
Graduate School of Global Environmental Studies
KYOTO UNIVERSITY
Yoshida Honmachi, Sakyo-ku, Kyoto 606-8501, JAPAN
Tel/ Fax: 81-75-753-5708
E-mail: shaw@global.mbox.media.kyoto-u.ac.jp
Web: <http://www.iedm.ges.kyoto-u.ac.jp/>

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Takayuki Moriyama and Safer World Communications

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Research on the phenomena of disasters in the Asia-Pacific region over the past decades has resulted in a wealth of knowledge on the strong link between environment and disasters, and between human practices and the environment. Human practices that evolved over centuries have been tested by time and proven to be sustainable and effective in both reducing disasters and managing unavoidable hazards.

Anthropological research of many traditional communities of the Asia and the Pacific have documented a wealth of indigenous knowledge that are passed down from generations and are internalized by the communities through a process of socialization and are part of their life styles. Humanitarian practice in the region by various organizations working in the area of disaster reduction and response has revealed a multitude of undocumented and overlooked practices in many indigenous communities. These practices exhibit a

deep understanding and ability to cope with disasters through local actions. There is a growing realization that such practices must be acknowledged and will form the basis for a holistic approach to disaster reduction that links indigenous knowledge with modern technologies.

Undoubtedly, there is compelling evidence for the Asia-Pacific region to recognize and strengthen its wealth of Indigenous Knowledge for providing local solutions to global problems of increasing disasters and climate change impacts.

This Policy Note aims to provide a directional path for mainstreaming Indigenous Knowledge in Disaster Risk Reduction by national authorities and ministries of disaster management, ministries of education, institutions of higher education in disaster management, and international and national NGOs in Asian countries.

Preamble

Indigenous Knowledge (Indigenous Knowledge) is the basis of community coping practices that have helped vibrant communities survive natural calamities over centuries. The Asia Pacific region is particularly rich in such bodies of knowledge. Ancient civilizations, a multi-hazard context, frequent disasters, diverse geo-cultural communities and large populations dependent on scarce resources have all led to the evolution of very low cost ways of life that include Indigenous Knowledge and disaster risk reduction (Disaster Risk Reduction) in a very strong yet inconspicuous way.

While such local practices are based on sound principles of interaction between humans and nature, the policy context for disaster management in most countries in the region has evolved from the governance domain. Most countries have tended to work with relief codes and with an approach of being prepared for delivering calamity relief. The emergency response systems based disaster

management models adopted from the west have generally overshadowed the Disaster Risk Reduction aspect of disaster management, and particularly Indigenous Knowledge within Disaster Risk Reduction. The recent initiatives for development of national and local disaster management plans in many countries in the region have recognized this limitation, but have so far been able to address it in very limited ways.

In spite of increased investments in the area of disaster management in recent decades, the losses continue to mount. There is an evident gap between practice and policy. The need to bridge this gap with adequate recognition of the domain of indigenous knowledge and local coping capacities is very urgent. There is a strong need to recognize the potential of community knowledge and actions, and of switching to a bottom-up approach that uses appropriate community practice as the base for policy formulation.

Context

The disaster incidences in the Asia-Pacific region have demonstrated a distinctly increasing trend over recent decades. The region experiences some of the world's worst hazards - frequent earthquakes, volcanic eruptions, cyclones and annual monsoons. It also includes many of the world's megacities - those with more than 8 million people - so the number of people exposed to hazard risks in the region is very high. There is abundant evidence that disasters disproportionately affect developing countries. Between 1991 and 2005, more than 90% of disaster deaths and 98% of people affected by disasters were from developing countries (OFDA/CRED

International Disasters Database EM-DAT). Moreover, disasters are increasing in number and size every year due to a number of factors including rapid population growth, urbanization and climate change.

Disasters are not the inevitable consequence of hazards. A volcanic eruption on an uninhabited Alaskan island is unlikely to be a disaster, but a similar eruption in the densely populated Asia-Pacific region could be catastrophic. It seems inevitable that the Asia-Pacific region will see one or more 'mega-disasters', seriously affecting millions of people, during the 21st century. Some



researchers have predicted that an earthquake with a million fatalities could occur in the Himalayan belt of South Asia and some of the megacities in China, Indonesia or the Philippines could also be potential theatres of such a mega disaster. In addition, the population explosion in the mega-deltas of Asia, combined with increasing vulnerability to climate change, indicates that a flood or cyclone event affecting tens of millions of people is also likely.

Preliminary assessment of hazard risk in the Asia-Pacific region highlights the potential for the region to experience a mega-disaster affecting millions of people during the coming century. While the scale of such a disaster may seem greater than any recorded so far, this projection is not only because the Asia-Pacific region is home to intense geological and meteorological activity, but also because of the region's burgeoning population, which has increased more than fivefold during the 20th century. People in the region are increasingly vulnerable because of trends such as rapid urbanization and their tendency to concentrate in areas especially prone to hazards. Because of the threat disasters pose to the progress of development, hazard risk management will continue to increase in importance in international development policy in the Asia-Pacific region (Assessing disaster risk in the Asia-Pacific region: Australian Government. www.ga.gov.au)

At the same time, the understanding on disaster risk reduction (Disaster Risk Reduction) has improved significantly since the early nineties, with prime landmarks for the movement being the Yokohama Strategy and the subsequent Hyogo Framework for Action (HFA). Against these developments the appreciation for indigenous knowledge has remained primarily anecdotal. There are many references to incidences of local people predicting impending earthquakes or cyclones by observing natural signs such as animal behavior, changes in characteristics of ground water sources, and abnormal weather phenomena, but fewer documented and verified evidences. One of the very few documented pieces of work in this area is 'Community Monitoring and Preparedness for Disasters' (COMPRED; formerly the United Nation Global Programme for the

Integration of Public Administration and the Science of Disasters).

While the recognition and incorporation of Indigenous Knowledge in Disaster Risk Reduction efforts has been dismally insufficient, there is compelling evidence that Indigenous Knowledge has the potential to provide solutions for reducing disasters at many levels. Recognized in a scientific approach, such knowledge unravels a vast domain of approaches and tools that can be applied in the current context with appropriate adaptation and adjustments.

The Disaster Reduction Hyperbase initiative (<http://drh.edm.bosai.go.jp/>) has given due importance to Indigenous Knowledge, and has elaborated the concept of Transferable Indigenous Knowledge (Transferable Indigenous Knowledge), as the traditional art of disaster reduction that is indigenous to specific region(s) but having potential to be applied to other regions and having time-tested reliability.

In addition, DRH identifies the following criteria for Transferable Indigenous Knowledge:

- Understandable to users
- Implementable (usable, doable)
- Originated within communities, based on local needs, and specific to culture and context (environment and economy)
- Provides core knowledge with flexibility for local adaptation for implementation
- Uses local knowledge and skills, and materials based on local ecology
- Has been proven to be time tested and useful in disasters
- Is applied or applicable in other communities or generations

With a similar understanding, efforts have been made in very recent times to identify and document Indigenous Knowledge based Disaster Risk Reduction practices from the region. The UNISDR publication 'Indigenous Knowledge Good Practices and lessons Learned from Experiences in the Asia-Pacific Region 2008' highlights the fact that even before we came up with high technology based early warning systems, or standard



operating procedures for response, numerous local communities worldwide have prepared, operated, acted, and responded to disasters using indigenous methods passed on from one generation to the next. The publication brings together a collection of Indigenous Knowledge based Disaster Risk Reduction practices from communities across the region. It also identifies the usefulness of integrating Indigenous Knowledge with modern technology to create appropriate solutions.

The approach of balancing modern technology and indigenous knowledge, however, has to be taken up with adequate caution. There is a need to recognize the good knowledge assets that already exist in local communities, and at the same time there is wisdom in adopting and benefiting from the advances that current science offers us. There is no defined line of equilibrium between the two. It is a transitional domain, which has to be worked with in a highly contextual manner that delivers benefits without undermining related assets. The core issue, besides finding solutions to physical and economic dimensions of Disaster Risk Reduction, is one of avoiding cultural invasion that so often comes as part of the package with technologically advanced disaster management solutions.

Within the overall developmental and disaster management fields, the HFA now defines the collective approach being taken by governments, practitioners, academia and the civil society. The framework, particularly through the identified priorities for action, provides ample scope for indigenous knowledge to play an integral role in a concerted global effort to reduce the impact of disasters. The concept of Indigenous Knowledge for Disaster Risk Reduction integrates well with all the priorities of action laid down under the HFA: Indigenous Knowledge can contribute to the institutional basis for implementing Disaster Risk Reduction, particularly as a local priority; Indigenous Knowledge is a valuable tool for identifying, assessing and monitoring disaster risks and enhancing early warning at the local level; Indigenous Knowledge can be very useful part of education for strengthening a culture of safety and resilience at the local level; Indigenous Knowledge very effectively reduces various

underlying risks associated with unsustainable development; and Indigenous Knowledge can very effectively strengthen disaster preparedness for effective response at the local level. The HFA has a direct linkage on creating wider understanding on Disaster Risk Reduction issues through awareness, assessments, innovation, education and institutionalization. Education has a strategic role in all of these, and this has implications on strategically mainstreaming Indigenous Knowledge in the field of disaster and development education.

The holistic approach advocated by the HFA, and increasingly becoming the way forward for nations faced with recurrent disasters, is a resource intensive process. The costs being incurred in disaster reduction efforts are increasing, and yet failing to have a desirable level of impact. Furthermore, the societies worst afflicted by recurrent and large-scale disasters are from the underdeveloped or transitional economic groups, thereby making such investments more burdensome. Reliance on a balanced system of indigenous knowledge and technological applications presents itself as a viable option in the face of financial concerns of disaster reduction works, with Indigenous Knowledge offering a very cost effective approach to Disaster Risk Reduction.

Efforts to recognize and promote indigenous knowledge need to be coordinated and synergized with other fora and initiatives taking up similar or aligned approaches. Regional initiatives on science, education and in particular the DESD offer valuable opportunities.

The current understanding of Indigenous Knowledge for Disaster Risk Reduction emerges from a series of events organized and publications brought out during 2007-08 by UNISDR, Kyoto University, European Commission, DRH Asia, SEEDS and other Asian role players. Some of the main events in this regard are:

- Transferable Indigenous Knowledge meeting in Delhi in February 2007: initial discussion and case study experience sharing
- Transferable Indigenous Knowledge meeting in Delhi in February 2008: Indigenous Knowledge action agenda discussion

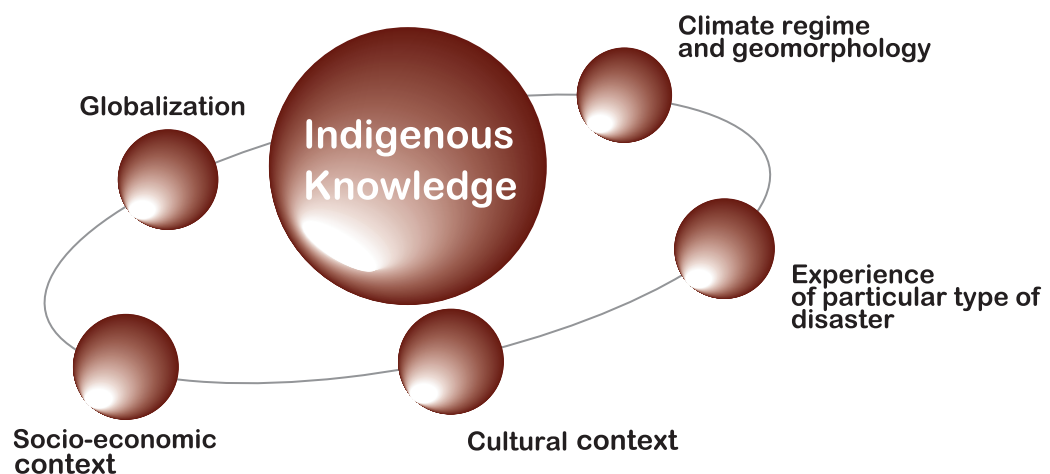


- Indigenous Knowledge Good practices document: November 2007 to June 2008: Provide key emphasis areas
- Transferable Indigenous Knowledge for DRH and Beijing workshop in February 2008: Discussion on Indigenous Knowledge usage, practice and documentation
- Indigenous Knowledge workshop in July 2008 in Kyoto University: Policy discussion on thematic Indigenous Knowledge sectors
- SAARC Disaster Management Centre study on Indigenous Knowledge for Disaster Risk Reduction in South Asia
- Third Ministerial meeting in December 2008: Indigenous Knowledge Side event to discuss the policy note

Entry Points

Indigenous knowledge can be difficult to define and identify, since in many cases it emerges more as a way of life rather than a set of specific initiatives or tools. Having said that, there are a large number of individual practices that can be highlighted as specific disaster reduction mechanisms. These practices, however, need to be viewed with caution when seen without their larger contexts. The approach to integration of indigenous knowledge in disaster risk reduction thus needs to be based on universally applicable principles illustrated with locally contextual practices. The policy level initiatives on Indigenous Knowledge for Disaster Risk Reduction thus fall into the seemingly ambiguous area between the abstract concepts of Indigenous Knowledge and the relatively new and yet emerging paradigms of

Disaster Risk Reduction. In this light, certain specific entry points need to be identified as engines that can provide the initial thrust needed to get 'Indigenous Knowledge for Disaster Risk Reduction' on the agenda of regional, national and local decision makers. The International Workshop on Indigenous Knowledge and Disaster Risk Reduction: From Practice to Policy, held at Kyoto University in 2008, identified the following generators or areas of influence for current issues related to Indigenous Knowledge and Disaster Risk Reduction: Based on this approach, the workshop identified entry points for work on the issue of Indigenous Knowledge for Disaster Risk Reduction in the Asia Pacific Region. These are briefly described as follows:





Priority Thematic Areas

The first level of entry is through thematic focus areas that offer a rich body of existing Indigenous Knowledge that needs to be harnessed and applied back with appropriate inclusion of technological and managerial innovations. The thematic focus areas identified as priority themes are: mountain ecosystems, coastal zones, river basin management, water management and

housing. In addition there are other areas such as arid ecosystems, small island systems and others that can be taken up as the next stage intervention themes, but the initial focus may be kept on select areas in order to do justice to the work with limited resources towards starting the initiative and getting initial thrust. These thematic focus areas are discussed in the following section.

Climate Change and Food Security

The argument for contextualization assumes further critical proportions in the light of recent trends in the area of climate change induced disasters. The rapid pace of change in the climatic context over the past few decades has outpaced the ability of local coping systems to adapt through a process of testing and changing in a practice continuum. Further, communities are faced with a new starting point from which to cope, where some of the existing indigenous practices are no longer viable. The implications of finding the right balance between technology and local practices assumes greater importance in this regard. Technology can help

reduce vulnerabilities to accelerated changing conditions while indigenous knowledge can support seamless integration of these practices into the local context. In addition, communities that have developed local practices to cope with certain conditions over time, such as drought or flood, can provide lessons and strategies for other communities newly facing these conditions. Food security issues are being answered in various situations through a combination of new and more resilient crop varieties and cropping systems. The element of Indigenous Knowledge, though recognized, needs to be incorporated more significantly in the process.

Rural Development

Indigenous knowledge, through its very definition, finds its natural home in rural societies that have evolved over centuries and through generations. The implications of rural development initiatives, and of migration from rural to urban areas, are very direct and potentially detrimental to the survival and continued adaptation and application of indigenous systems. Rural development thus forms a very crucial area for appropriately designed systems of integrating the traditional with the modern. The rural development field has very wide and diverse applications, ranging

from farming and livestock rearing to local resource management, education, health and social securities. As a developmental approach to disaster management, Disaster Risk Reduction offers virtually all subsets of physical, social and economic development for Indigenous Knowledge integration of Indigenous Knowledge. Participation in governance, an ongoing theme for global good governance work, forms a very viable base for such work, since participation and Indigenous Knowledge are both rooted in local perceptions, understanding and appropriate application.

Urban Risk Reduction

In contrast to the rural context, the urban environment may be alien for indigenous knowledge. The very pronounced basis of economic gains that drives the urban engines and pulls migrant populations to work and live in cities denies the space for rural ways of life. At the same time, within urban areas and urban

communities there are subsets that retain, or have the potential to retain, and deploy adapted indigenous systems in their new settings. This is of importance since more than half of the Asia-Pacific people will live in cities soon, and a majority of these people will live in sub-standard conditions in fast growing but ill serviced urban



centres at high risk of urban disasters. The context of climate change induced 'migration storms', water stresses leading to 'urban droughts', and the social implications of a widening gap between the urban rich and urban poor sets the stage for intensive work on urban risk reduction with a human face. As a melting-pot

of cultures, practices and wisdom, the city offers a wide range of Indigenous Knowledge ingredients for finding innovative new solutions based on traditional inputs. As an emerging theme of future concerns, urban risk reduction needs urgent attention, and as an area of lost social roots, it also needs inclusion of Indigenous Knowledge.

Gender and Inclusion

At the humanitarianism and rights level, social inclusion is an issue that deserves special attention when working with indigenous knowledge and disaster reduction. Caution needs to be maintained regarding the fact that indigenous systems often come with their own baggage of social practices that can, and sometimes have been, interpreted as discriminatory. Besides inclusion of marginalized groups, the aspect of gender and disaster needs to be highlighted with specific emphasis within the inclusion discourse. It must also be noted that some knowledge is held by specific groups or members of a community, restricted to one gender, or to certain religious and spiritual leaders, midwives, or healers. In this case, women often hold unique knowledge

unknown by others in the community, and therefore must be included in decision-making related to disaster reduction due to the added value of their insight and knowledge. The subject of gender and disaster has attracted attention in recent years, primarily from the approach of addressing the gender divide and fulfilling the special needs of women in emergency situations. The strength of women's groups in Disaster Risk Reduction has begun to be realized, and work on women's self help groups has gained ground. The link of Indigenous Knowledge with gender based work in specific, and social inclusion work on a general level, however still requires significant attention from the point of research, identification of opportunities, and development of applicable models.

Thematic Focus

Indigenous knowledge is embedded in countless communities throughout the world, each with their own local environmental, social, cultural, economic and political contexts. While this knowledge is intrinsically tied to these local conditions, there is potential for specific principles and practices to be transferred between communities in order to further support disaster reduction.

Several subsets of indigenous knowledge, organized by thematic group, provide areas where knowledge themes are more closely connected due to similar contextual details. Within these thematic groups, sets of principles of indigenous knowledge can be applied to all communities living in that context, easing the process of transferability.

Mountain Ecosystem

Mountain ecosystems have unique characteristics: the varied environment at different altitudes, the high number of hazards faced (earthquakes, forest fires, flash floods, landslides and avalanches), poor accessibility and

infrastructure, scarce livelihood opportunities and a fragile eco-system. Further, modern developments have produced factors such as out-migration, children leaving villages to get better education, and the detrimental environmental impacts of ad-



hoc development projects, all of which contribute to increasing vulnerability in mountain areas.

Indigenous Knowledge provides very valuable guidelines that can make new development approaches appropriate. For example, in the northern Chitral district of Pakistan, the risky nature of the mountainous environment means there are few areas where people can reside. Local inhabitants, however, are able to successfully interpret their landscape, translating the signals

provided by large rocks or the flow of the river into knowledge about where and how to settle. Specific local practices also exist in mountainous areas, such as slope farming to reduce erosion, glacier grafting to control water predictability, and vertical transhumance to diversify crops and livestock. These practices, developed over a history of habitation and experience relating to the local environment, provide valuable knowledge which allows mountain communities to pursue livelihoods in the face of risky environments.

Mountain ecosystems have unique characteristics: the varied environment at different altitudes, the high number of hazards faced (flash floods, landslides and avalanches), and the need for people to protect their livelihoods through coping mechanisms for natural resource use. Such areas have been going through socio-economic changes, a determining factor in Indigenous Knowledge transferability, which include immigration, children leaving villages to get better education, and the increase of development projects in mountain areas. An equation for the transferability of Indigenous Knowledge can be:

$$\text{Transferability} = (\text{usability or adaptability}) \times (\text{environment})$$

Here, two factors are taken into account: the adaptation to the given landscape as well as the change in environment. If the point is reached where the community can no longer cope with the rapidly changing environment, external influence is needed.

It must also be noted that environment can be read in multiple ways: enabling environment, social

environment, physical environment, etc. In addition, the concept of rationality needs to be viewed along with usability/adaptability, such that the people's perception can be seen in contrast to the surrounding environmental elements. When these two factors are interlinked and remain positive, there can be transferability.

An issue requiring detailed assessment is that of external intervention and when it is needed. It is agreed that external influence can help prevent negative consequences of disasters; however, any external intervention must be done in cooperation with the community, using a participatory approach. It needs to be examined who holds the decision making power.

It is generally observed that in the past, decision making was always with the people. Today, it is often with governments and partly with NGOs. Indigenous Knowledge is valuable and can be transferred if the decision making power stays with the people.

(International Workshop on Indigenous Knowledge and Disaster Risk Reduction: From Practice to Policy - Kyoto University, 2008)

Coastal Zones

Coastal zones are among the hotspots of impending disasters, threatened by cyclones, storm surges, sea erosion, flooding, sea level rise and tsunamis. Many of these events are expected to become increasingly severe due to climate change. In addition, many of the issues related to pollution, poor development and resource management filter down to the coastal areas, causing devastating impacts on coastal livelihoods. Since most communities living in coastal zones are directly or indirectly dependent on fishing, drop in fish yield is an economic risk associated with coastal zone mismanagement. Coastal ecosystems

are also negatively impacted by pollution, development in sea ports and climate change, destroying coral reefs and mangroves which offer additional protection from impending hazards. Further, due to close proximity to the source of tsunamis, earthquakes, and the sudden changing nature of storms, early warning becomes a key issue for coastal communities.

The inhabitants of these coastal areas have been developing mechanisms to survive and adapt to such hazards for centuries. They are rich in indigenous knowledge relating to the



coastal environment and how to live in harmony with it, much of which is manifest in survival and livelihood strategies. Several key principles apply to most indigenous knowledge held by these communities, which helps highlight areas of transferability between coastal communities around the world. Coastal indigenous knowledge relates to the water or ocean and its behavior, as well as the wind and weather conditions. Coastal communities also tend to be smaller, close-knit communities and their knowledge often reflects this characteristic of the social system. Many

times this is illustrated in valuable knowledge dissemination techniques, passing down information through small family groupings. The use of local materials is also an important element of coastal indigenous knowledge, such as using sand or thatch for construction. Finally, most of the knowledge is closely related to fishing and farming practices, which constitute the livelihood of coastal inhabitants. The revival and appropriate application of such knowledge principles can substantially support ongoing efforts to increase resilience of coastal communities.

There are several specific cases of Indigenous Knowledge in coastal zones that can be transferred. From there, key characteristics can be extracted and principles from these examples can be applied to all cases. These characteristics of coastal zone Indigenous Knowledge included the following:

- Relates to the water/ocean, its behavior as well as wind/weather conditions
- Characteristic of social system, generally smaller, close-knit communities
- Use of local materials (sand, thatch)
- Involvement of ecological elements (mangroves, coral reefs, rocky shores)
- Disseminated in small family groupings
- Closely related to fishing and farming practices - livelihood of inhabitants

Transferable elements of these characteristics that affect the changing lifestyle of coastal communities need to be studied in detail. Four basic elements felt important for reducing risk in coastal areas and transferable to most coastal communities are:

- Maintain coastal defenses through mangrove protection and coral reef protection, using designated protected areas for mangroves, sea grass beds, fishing areas, etc.
- Promote the research and use of medicinal properties of resources for coping mechanisms
- The simplicity of the knowledge, making practices cheap and available locally
- More specifically, thatch house construction is a valuable technique which could be used in other coastal areas

Several general policy recommendations can be made relating to two categories: education and Disaster Risk

Reduction. Under education, the following may be considered:

- Encourage the respect and consideration of indigenous knowledge as valid knowledge, taught in formal settings
- Teach communities to protect coastal ecosystems and to understand their benefits; This can begin by restricting damaging coral reef practices and the cutting of wood from mangroves
- Educate about early warning systems, how to recognize and respond; Organize community on where and how to evacuate and be prepared
- Develop exchange programs, sharing of information between local indigenous communities and local immigrant communities, between communities who have experienced a disaster and those who have not, between different coastal communities and different generations within local communities

With regards to policy recommendations relating to Disaster Risk Reduction, the following may be considered:

- The need for genuine consultation with indigenous communities regarding Disaster Risk Reduction and development projects by Disaster Risk Reduction practitioners and policy makers.
- The support of chiefs and Indigenous Knowledge holders as those with power over policy related to Disaster Risk Reduction
- The conservation and reliance on existing local social institutions.
- The consideration of development impacts informed by Indigenous Knowledge
- The continuation of incorporating Indigenous Knowledge into non-traditional, contemporary Disaster Risk Reduction approaches/mechanisms



Building from the general policy recommendations, specific implementation-oriented recommendations can be made relating particularly to coastal communities. These included: the incorporation of indigenous communication systems (sounds, flags, etc.) into early warning dissemination; the incorporation of Indigenous Knowledge into technological systems such as early warning systems and Potential Fishery Zone information being derived from Remote Sensing Data (if scientific information is not available, moving seamlessly between scientific and indigenous knowledges); recognizing and developing safe places during disasters; and creating protection buffers (at least 100m) of mangroves. Finally, the following challenges facing coastal zone communities and their Indigenous Knowledge need to be addressed:

- Many of the issues relating to pollution, resource management, etc. filters down to the coastal areas
- Development often comes directly to the coastal areas via ports
- There is often no access to other geographical elements (hills to run to) either due to absence of these formations or no ownership rights
- Globalization and modernization of fisheries changes Indigenous Knowledge
- It is sometimes difficult to interpret modern sources of knowledge in relation to Indigenous Knowledge and understandings
- It is necessary to determine the best ways to disseminate early warning information to communities and increase their awareness

- Disasters and climate change are impacting coastal ecosystems, such as destroying coral reefs.
- Changes in technology are making traditional knowledge less significant
- Increasing populations are upsetting natural balances
- There is difficulty transferring knowledge to different topographies even among coastal communities
- It is difficult to learn and access knowledge from highly isolated communities

Further, the difference between indigenous and scientific knowledge and the challenge of integrating the two needs to be examined. The validation of Indigenous Knowledge is important to promote this integration. The knowledge must be translated to be understood by both the government and local people. Work must be done to validate the Indigenous Knowledge by explaining it in a contemporary way. The difference between the communication techniques of traditional indigenous communities and the scientific community was discussed, emphasizing the need for the two groups to develop a way to communicate. It also needs to be emphasized that indigenous communities need to be given the opportunity to speak.

(International Workshop on Indigenous Knowledge and Disaster Risk Reduction: From Practice to Policy - Kyoto University, 2008)

River Basin Management

River basins have been the cradles of civilizations across history, and offer a rich abundance of indigenous knowledge on sustainable development and disaster risk reduction. Riverine communities live within two prominent extremes—floods and droughts. In between there is a wide range of issues including sustainable agriculture, urban regions and energy generation. River basins vary in their very character and context as they move from mountain areas through plains and finally to deltaic eco-systems. In each one of these there is a unique source of lessons, indigenous knowledge, and a space for applying appropriate technologies and processes, generated by several distinctive factors. These factors range from

cultural and socio-economic context, to climate regime and geomorphology, to past experiences relating to certain types of disasters.

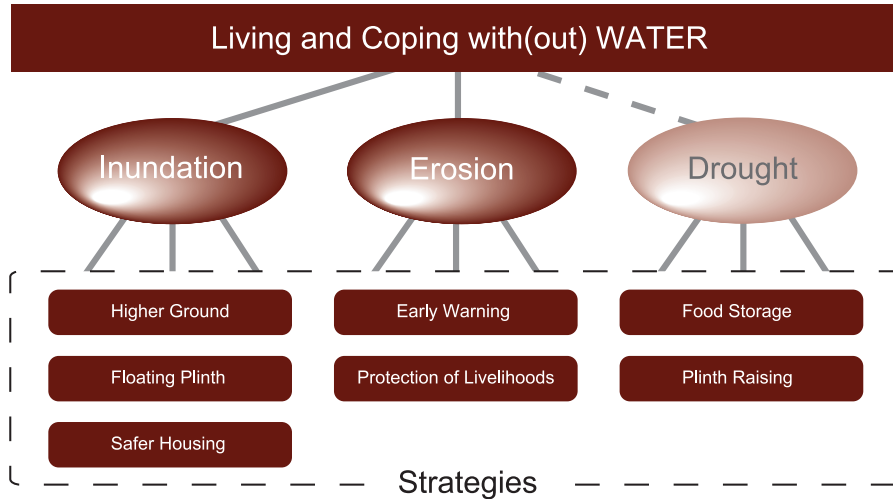
Globalization also plays a role in shaping the knowledge of indigenous communities. Guided by the duality of living and coping with or without water, local communities have developed valuable indigenous knowledge techniques for river basin management which can be valuable for all communities in this context.

Facing inundation/flood, erosion and drought, indigenous strategies have evolved to protect livelihoods, build safer houses, secure food storage, and develop early warning systems.



These areas of knowledge have allowed river basin communities to survive and flourish throughout history, and their value can be further shared among communities facing similar threats to help reduce vulnerability.

River basin management has three major phenomena that can lead to a number of strategies:



Key elements that belong to Indigenous Knowledge, including housing, food, environment, health, livelihood and land use have been identified. The transferability of this knowledge depends on the commonalities of certain Indigenous Knowledge generators between those creating the Indigenous Knowledge and those looking to use this knowledge. If the two groups face similar risks and have similar contexts then the knowledge is more likely to transfer.

The impact of a changing climate on Indigenous Knowledge and its transferability need to be addressed when talking of river basin management. Both modernization and climate change have contributed to and will continue to contribute to many shifts in the environment that will affect Indigenous Knowledge related to RBM. Examples of these changes include increasing rainfall, higher temperatures, globalization and consumerism, seasonal fluctuations, salinity changes, flash floods, CO₂ emissions, industrialization, and increased information technology. Therefore, communities will have to adapt from worse conditions in the future, beginning at a different starting point.

Two different stakeholders have been identified, those of Indigenous Knowledge (individual, community, civil society, CBOs and local government), and those of scientific knowledge (scientists, researchers, technicians, government, institutions and external agencies). These two groups of stakeholders will need to work together

in order to incorporate both types of knowledge into Disaster Risk Reduction policy. A dialogue is needed between the two in order to determine the best strategies.

At the same time, strong distinction between Indigenous Knowledge and scientific knowledge have also been challenged. It is argued that the two concepts should be better harmonized. In addition, a community as a whole does not always hold the Indigenous Knowledge, sometimes there are specific groups or rural experts which are the only holders of this knowledge. These people must be identified in order to manage disasters.

Further, the challenges of transferability, including the affordability of transferring the knowledge or practice and the consideration of the context of both communities (those holding the knowledge and those adopting it) need to be addressed. Often NGOs do not do a thorough assessment of the existing situation to determine the current context and the existing resources that can be used. Another challenge highlighted is the speed at which knowledge is adapted to other communities. Sustainability becomes a problem if technology is rushed somewhere, which has happened in the past.

(International Workshop on Indigenous Knowledge and Disaster Risk Reduction: From Practice to Policy - Kyoto University, 2008)



Water Resource Management

Water has been the theme for many disaster management efforts. Water is the leading cause of disasters globally, and its management can offer the much needed resilience to communities struggling with its abundance or dearth. With the increase of extreme water related events, as well as the growing divide between water demand and available water resources, changing environments are putting water resource management further at risk.

There are technological as well as process issues involved in the management of water resources, and indigenous knowledge has much to offer for both. Indigenous technology has produced specific practices which can be transferred to many different communities, such as evaporation control by using underground canals, water storage by tank systems, water transfer by gravity, and traditional weather forecasting. In addition, elements of management, such as community rule, community-based decision-making, and collaboration with local government can be found in indigenous knowledge and provide further insight into successful protection and distribution

Housing

Vernacular or traditional housing has been well documented in many parts of the world, and has often proven to be more resistant to disasters such as earthquakes when compared to modern buildings. Often this is so because modern buildings, particularly in the developing world, are constructed using modern materials not appropriate for the local context, and with grossly inadequate skills. Traditional housing utilizes local materials and locally available technology and artisans. This technology is successful because it has developed over time, tested by local phenomena, and influenced by local conditions such as culture or climate. With the changing environment, vulnerability related to poor housing construction is increasing. Vernacular practices are being lost over generations, due to the lack of respect for these traditions and their diminishing use. The impacts of several important forces, such as modernity, climate change and

of water resources. Finally, indigenous knowledge also teaches unique ways of disseminating information related to water, using stories, proverbs, songs, poems, and festivals to pass on valuable lessons.

Regardless of its value, much indigenous knowledge is being lost. The dying wisdom of harvesting water in indigenous communities through innovative means has been documented to some extent, but not applied in true measure. The indigenous system of water councils for equitable distribution and community level management of water exist, but now mostly in isolated case studies. It is important to recognize what indigenous knowledge can offer to the increasingly prominent issue of water management. With the forces of climate change, many communities will experience a changing water situation, either increasing or decreasing the typical amount of resources. Therefore, water management provides a unique opportunity for transferring indigenous knowledge between communities, which must be further explored.

development, are also changing the environments and the way people live in their house over time.

Nonetheless, it is proven that traditional housing can protect lives and secure livelihoods. There are innumerable anecdotes surrounding every large earthquake recounting how old, traditional buildings such as local temples, mosques or forts survived the disaster while newly built, modern buildings collapsed. Several components of housing need to be analysed and incorporated in sensitive disaster reduction and response policies, including local materials, construction technologies, and building management systems. There is a need for an increase in research and development as well as training and education related to traditional housing. Housing provides a valuable opportunity to integrate indigenous and modern technologies by learning from traditional cultures while transitioning into modern societies.



The basic principles of Indigenous Knowledge relating to water resource management include:

1. Diversity: fulfilling the needs of local people/ adapted to local culture, climate, environment, geography, etc.
2. Equality: common property, resource sharing, interest balancing
3. Environmentally friendly: multiple purpose, reuse, conservation
4. Economically sustainable: local materials, no need of extra energy for water transferring (use of gravity)

Three transferable elements of Indigenous Knowledge for water resource management are: Technology (or specific practices which could be transferred) such as evaporation control by using underground canal, water storage by tank system, water transfer by gravity and traditional weather forecasting; Elements of management, such as community rule, community-based decision-making, and collaboration with local government; and Elements related to methods of transfer, including the use of songs, stories, poems, festivals, beliefs and proverbs to transfer Indigenous Knowledge relating to water resource management.

Two impacts of Indigenous Knowledge from a changing environment are: impacts to water resources, which includes a general difference between water demand and available water resources (like water scarcity) as well as increasing extreme events; and impacts to Indigenous Knowledge question whether Indigenous Knowledge is still applicable and whether it is evolving with the changing environment. In addition, the need for adaptation in several different areas: technology, management, crop and livelihood diversity and self-checking or an enhancement of social capital needs to be addressed.

The question on how to link can Indigenous Knowledge and the decision making of the local government also needs to be tackled. Two approaches can be taken: one related to management and regulation, emphasizing the need for community-based decision making as well as hierarchical management among different levels and between governments, and the second related to the conservation and promotion of Indigenous Knowledge, highlighting documentation, dissemination, education and awareness. There are also several challenges in the future, such as the increase of more extreme events and large scale disasters, the decreasing of water resources and the change of spatial climate patterns. There is therefore a stronger need for local solutions to these global changes.

An important issue to be looked into is the commercialization of water. Recently, there has been an intervention of the private sector into water management. There is general agreement that water should not be privatized since it poses an additional danger of either losing or not utilizing valuable Indigenous Knowledge relating to water management, since Indigenous Knowledge is usually public belonging to the people. There must be an effort made to get the private and community groups together, though a private intrusion on Indigenous Knowledge can be dangerous.

Another important issue is the relevance of Indigenous Knowledge on water resource management to the urban sector. Which Indigenous Knowledge principles can be applied to the urban sector? There are several examples from India, Sri Lanka, Maldives and China of how indigenous practices could be used in an urban environment. Examples include indigenous practices for collecting rain water, using groundwater/wells, and decreasing sediment in the water. Many of these techniques could be adapted to urban contexts, and possibly improved with modern technology.

(International Workshop on Indigenous Knowledge and Disaster Risk Reduction: From Practice to Policy - Kyoto University, 2008)



Indigenous housing (IH) can be defined as vernacular housing, traditional housing and local housing. There are several specific features of IH: including local materials, locally available technology and artisans, evolved over time, and influenced by local conditions such as culture and climate. Influences can be local, including local resources, culture, the community's lifestyle and existing skill/technologies, as well as external, perhaps relating to the economy. Housing does not stand alone. With regards to transferability, its holistic property may make it difficult to transfer from place to place, and even from generation to generation, given the changing environments, the impacts of modernity and the way people live in their house over time.

There are several reasons for discussing and studying IH. The work is done with an objective of reusing existing local wisdom in order to reduce community vulnerability which may be increased with changing conditions. It provides an opportunity to learn from indigenous communities with an insight into the transferability to Indigenous Knowledge. It helps promote sustainable development, especially with the integration of indigenous and modern technologies. It also allows for successful transition into modern societies. Finally, this knowledge is part of a cultural identity which should be preserved and celebrated.

There are several issues associated with transferring indigenous housing knowledge. Since modern housing has a high status in many communities there is no respect for the traditional life styles. In addition, indigenous artisanship to carry out these IH techniques is fading. In many cases, a traditional form is being transferred, but it is either incompatible with the materials and technologies used or it is not applied in the correct way

(such as applying the wrong orientation or location). It must also be noted that the impacts of climate change are making it even more difficult to transfer and reduce community vulnerability.

There can be several policy suggestions related to housing and Indigenous Knowledge. There is a need for an increase in research and development as well as training and education relating to IH. Local tourism should be encouraged, which could help develop an interest in IH and generate good employment for local artisans who hold indigenous techniques. There is a need for increased awareness about this knowledge and its value. Local resource management and decentralization of many of these processes should be improved in order to support the cultural identity of IH and utilize the indigenous techniques.

It needs to be emphasized that there is a need to make indigenous techniques more feasible, preserve them, and make them more attractive in the modern context. Reviving indigenous practices is not always possible in some contexts, and some technologies are not always safe. It is important not to romanticize this knowledge.

Finally, there should be an effort to preserve IH techniques; however it must not be lost that the context is constantly changing. New techniques must also evolve which take into account climate change impacts as well as modern technologies. The focus should be on extracting elements of principles from IH which can be transferred.

(International Workshop on Indigenous Knowledge and Disaster Risk Reduction: From Practice to Policy - Kyoto University, 2008)



Policy Tools

Research, documentation and showcasing

Indigenous Knowledge needs to be recognized and upgraded from a body of undocumented anecdotal practices to a validated body of applicable knowledge. The following steps can contribute to this effort:

- Understand and establish the value of Indigenous Knowledge in present context, and build a foundation for its integration with other knowledge and operational systems
- Systematically document the Indigenous Knowledge on disaster risk reduction in traditional communities
- Test the value of Indigenous Knowledge and identify appropriate practices for replication and scaling in the context of current science
- Demonstrate through national and regional pilot programs the applicability of Indigenous Knowledge with appropriate adaptation, as an input to awareness and advocacy work

Education

Education is the most elementary and important tool for the revival and application of Indigenous Knowledge. Education can establish the linkages between Indigenous Knowledge and modern technology, and also bring about the connection with local context and knowledge. Under education the following aspects can be useful tools for appropriate application of Indigenous Knowledge in disaster risk reduction:

- Promotion of Indigenous Knowledge as an element of formal education within the numerous curriculum development exercises being carried out in the region for school as well as higher education on Disaster Risk Reduction

- Creation of informal education content on Indigenous Knowledge and its applicability under the various community based Disaster Risk Reduction initiatives being implemented across the region

Advocacy

The most useful frontier for activating the application of Indigenous Knowledge significantly under Disaster Risk Reduction work is that of governance. Inclusion of Indigenous Knowledge in disaster management, risk reduction, climate change adaptation and sustainable development approaches of governments will pave the way for its widespread acknowledgement and application. Advocacy initiatives for the same may be carried out at various levels:

- Advocacy at international for a for inclusion of Indigenous Knowledge in the regional efforts for institutionalization of the HFA, and in the DESD initiatives
- Advocacy with national and local governments for inclusion of their local Indigenous Knowledge as well as adapted Indigenous Knowledge from other relevant communities in their disaster management plans as also climate change adaptation practices
- Dissemination to international and national civil society organizations and academic institutions towards inclusion of Indigenous Knowledge and Disaster Risk Reduction in their respective agendas

Institutional framework

The effort for promotion of Indigenous Knowledge and its integration in mainstream Disaster Risk Reduction work cannot be a one time initiative and needs a sustained push. An appropriate institutional set up is required at the regional level to provide support and impetus for continued work for promoting research, education and advocacy tools discussed above.



Action Agenda

The immediate next steps for promotion of Indigenous Knowledge for Disaster Risk Reduction in the Asia Pacific need to include engagement with policy makers, making a clear commitment to the issue, developing a framework for specific actions, and assigning responsibilities.

The processes for documenting, validating, educating, advocating, and continued working need to be spelt out. The foremost step that needs to be taken is to identify the roles of different stakeholders based on strengths and

weakness of different organizations, institutions and groups. The creation of a database of Indigenous Knowledge practices, their analysis and subsequent recognition of practices with positive as well as negative consequences needs to be done before dissemination, education and advocacy work can be taken up. Linkage with national and regional platforms with this as a discussion agenda can however be initiated immediately.

Seven main issues have emerged as cross-sectors to work on the overall agenda discussed above:

1: Establishment of Resource Group

The work done thus far must be consolidated and moved forward. A Regional Resource Group may be established for pursuing the agenda, and identifying and linking various community resource groups with an aim of establishing further linkages.

2: Documentation and Research

There is a need for cataloguing and documenting Indigenous Knowledge in Disaster Risk Reduction and developing contextual guidelines based on Indigenous Knowledge for disaster prone areas. Validation must happen through communities as well as current science. This can be done through action research and demonstration that this knowledge works, grounded in the fact that it has been sustainable and successful. Advantages of improvement and adaptation of this knowledge must be demonstrated and highlighted.

3: Education

This can be done by using databases of Indigenous Knowledge for curriculum creation, both for formal and informal education. Then, based on evidence of success, the knowledge can be appropriately adapted and transferred through the education system. Inclusion of Indigenous Knowledge must be promoted and mainstreamed in disaster, environment and development education.



4: Policy Advocacy

Those supporting and recognizing the values of Indigenous Knowledge must engage in a regional policy discussion. The body of promoters of Indigenous Knowledge should subsequently engage with a wider spectrum of regional and national stakeholders for integration of Indigenous Knowledge in Disaster Risk Reduction, disaster management and developmental sectors under the umbrella of sustainable development.

5: Enabling Environment

There is a need to create an environment that cuts across the techno-legal, socio-economic as well as cultural regimes. A wide policy engagement will pave the initial way for this, but it must be followed up with a multi-pronged approach that can include influencing current areas of work that have a potential for incorporating and promoting Indigenous Knowledge. These can include initiatives such as DRH-Asia, various school safety initiatives, various tsunami rehabilitation and risk reduction initiatives, HFA and DESD program etc.

6: Change Agents

Agents for change must be identified at both the policy level, i.e. the right legislators and administrators, and the community level, i.e. the right local leaders and influential citizens.

7: Special Focus Areas

Several specific focus areas can help to guide policy initiative on Indigenous Knowledge for Disaster Risk Reduction so that it becomes comprehensive, appropriate and appealing. These can include gender, urban risk, climate change adaptation and food security.



EUROPEAN UNION

European Union
Delegation of the European
Commission Bangkok, Thailand
Tel: +66 2305 2600/2700
Fax: +66 2255 9113
Web: http://ec.europa.eu/europeaid/index_en.htm



International Strategy for
Disaster Reduction

UN International Strategy for Disaster
Reduction for Asia & the Pacific
UNESCAP Building - 4th Floor, Section B,
Rajdamnern Nok Avenue - 10400
Bangkok - Thailand
Tel: +66(0)2 288 2745
E-mail: isdr-bkk@un.org



Kyoto University
International Environment and
Disaster Management Laboratory,
Graduate School of Global
Environmental Studies
Yoshida Honmachi, Sakyo-ku, Kyoto
606-8501, Japan
Tel/ Fax: +81-75-753-5708
E-mail: iedm.gsges@gmail.com
Web: <http://www.iedm.ges.kyoto-u.ac.jp/>



SEEDS

SEEDS
15/A First Floor,
Institutional Area,
Sector-IV, R.K. Puram
New a, India
T: 91-11-26174272
F: 91-11-26174572
W: www.seedsindia.org
E: info@seedsindia.org