



INDIGENOUS KNOWLEDGE IN DISASTER MANAGEMENT

Issue 6 April 2007

In this issue:

- ❑ What is Indigenous Knowledge?
- ❑ Importance of Indigenous Knowledge
- ❑ Categories of Local Knowledge
- ❑ How Indigenous Knowledge is Exchanged
- ❑ Indigenous Knowledge in Disaster Management
 - Disaster Early Warning, Preparedness and Response*
 - Disaster Prevention and Mitigation*
- ❑ Role of the United Nations in Promoting Use of Indigenous Knowledge

Dear Readers,



Achim Steiner

Natural disasters from floods, droughts and earthquakes to cyclones, landslides and tsunamis are becoming more destructive. They spell misery for hundreds to sometimes millions of victims who suffer death, injury and loss of livelihoods.

Hard infrastructure like buildings, roads and power plants can be damaged alongside the goods and services provided by 'soft' infrastructure such as forests, river systems, coral reefs and other economically important features collectively known as ecosystems.

Cost effective, practical and scientifically sound management of the environment is a prerequisite for reducing the impacts of disasters. Consideration should and must also be given to the importance of local traditional wisdom and indigenous knowledge which, wisely used and in some cases adapted, can strengthen protective measures.

From time immemorial, natural disaster management has been deeply rooted in local communities, especially in developing countries. Here indigenous knowledge is used to monitor climate and other natural systems and to establish early warning indicators for the benefit of current and future generations.

It is therefore important that relevant bodies working within disaster management and relief look more specifically at indigenous techniques that could contribute to better management of natural disasters. This is why this issue on

the application of Indigenous Knowledge (IK) is focused on the management of natural disasters. We are keen to share different kinds of experiences and different kinds of IK. We are also keen to shed light on how this information is exchanged and applied in disaster management, especially in early warning, preparedness, response and mitigation. In addition this edition of Environmental Emergencies News seeks to explain the role of the United Nations in promoting the utilization of this precious and all too often over looked knowledge-based resource.

Achim Steiner

UN Under-Secretary General and Executive Director, UNEP



Traditional bhungas with mud-walls and thatched roof in India. Bhungas, which are earthquake and cyclone safe, demonstrate the use of indigenous knowledge in designs that utilize locally available resources and materials for optimal protection from extreme climatic and physical conditions.

Picture by Rohit Jigyasa

What is Indigenous Knowledge?

Indigenous Knowledge (IK) refers to the unique, traditional local knowledge existing within and developed around the specific conditions of a community indigenous to a particular geographical area, covering all aspects of life including management of the natural environment upon which their livelihoods and survival depend.¹

Indigenous Knowledge is based on, and is deeply embedded in local experience and historical reality of a community. It develops over centuries of observation on how to adapt to local conditions. It therefore represents all the skills and innovations of a people, and embodies the collective wisdom and resourcefulness of a community. Indigenous knowledge is unique to a specific culture and plays an important role in defining the identity of a community.

Importance of Indigenous Knowledge

Over the course of history, communities develop a culture and lifestyle that is intricately tied to nature and the local ecosystem. Indigenous knowledge is firmly incorporated into the belief systems, myths and folklore of society; it informs local practice. It shapes decisions regarding the use of resources and environmental conservation. It helps to avoid the incidence and negative impacts of natural disasters. It provides guidance on agricultural practices and food preservation, health care and a host of other activities. It constitutes an environmental management system that is largely community led². Enforcement of these customs and norms is often ensured by social conformity and by codified threats.

In the past two decades, a growing set of evidence has indicated a strong relationship between IK and sustainable development. Large populations in developing countries owe their survival to the time-tested application and use of IK in environmental protection and reduction of the impacts of natural disasters.

Principle 22 of the 1992 Rio Declaration on Environment and Development³ specifically underlines the vital role that indigenous people and their communities play in environmental management and development because of their knowledge and traditional practices. It calls for recognition and support of their identity, culture and interests to enable their effective participation in the achievement of sustainable development.

The global scientific community has acknowledged the importance of IK. It was endorsed at the World Conference on Science held in Budapest, Hungary, 29 June - 1 July 1999, which recommended that traditional knowledge be integrated into science, particularly in the fields of environment and development. Further, the Preamble of the United Nations Declaration on the Rights of Indigenous Peoples, adopted on 29 June 2006 by the Human Rights Council, highlights respect for IK, cultures and traditional practices, which contribute to sustainable and equitable development and management of the environment.

Categories of Local Knowledge

Local knowledge refers to a collection of facts that relate to the entire system or concepts, beliefs and perceptions that people have about the world around them. It is divided into three categories: common knowledge, shared knowledge and specialized knowledge. *Common knowledge* is that which is held by most people in a community; for example, nearly everybody in a community may know how to roast maize. *Shared knowledge*, on the other hand is held by many but not all community members; for example, people who brew *busaa* (a traditional beer in Kenya) share skills other people may not have. *Specialised knowledge* is held by a few people in a community who might have had special training or apprenticeship; for example, only a few people are traditional rain predictors, healers, or midwives.

How indigenous knowledge is exchanged

As IK is predominantly embedded in practices and experiences, it is most commonly exchanged through personal communication and demonstration, from master to apprentice, from parents to children, from neighbour to neighbour and from traditional leaders to the community.

Various communities have different ways of disseminating indigenous information. For instance, faced with an impending disaster, the clan elders in some communities in Kenya beat specific drums and sound horns to alert people to assemble at known meeting points where specific advice or instructions are communicated and appropriate preparedness and response actions are decided upon.

Although IK is readily shared among members of a community where the providers and recipients have the same culture and speak the same language, it is generally shared to a lesser degree across communities. This is because, in most cases, the exchange of IK is ingrained in cultural values, which cannot easily be recognized by an external observer. For instance, various messages can be communicated through drumming, understood only by members of a particular community. There are also restrictions on accessibility of IK within the community beyond a few trained individuals or families that pass the skills from master to apprentice, or from parent to child, as it is considered restricted information.

Indigenous Knowledge in Disaster Management

Indigenous communities know that a well-conserved environment helps reduce risks associated with natural disasters and have the knowledge and administrative structures to cope with disasters. In Africa, in particular, local communities have well-developed traditional systems and coping strategies that make them more resilient to environmental changes. Further, IK is used to help local people cope with day-to-day challenges, detect early warning systems of change and know how to respond to challenges, including knowing which plants to conserve and protect, which medicines to use, where to find food or water in times of crisis, which signs signal oncoming natural catastrophe and which plants and animals are best avoided. Indigenous knowledge is also a life raft that, in the event of a disaster, keeps communities afloat before external aid arrives.

Disaster Early Warning, Preparedness and Response

Each community has an array of early warning indicators and well-developed structures through which the wisdom of the community is applied to deal quickly and efficiently with disasters. The structures include a council of elders which has at its disposal, as a study in Kenya reported,⁴ "the speed and strength of numerous young people that could be used to investigate a particular phenomenon or to pass on urgent messages upon need."

In Kenya, for example, the Banyala community in Budalang'i on the shores of Lake Victoria had a well-organized system for mitigating impending disasters. There were elders who dealt with rainfall prediction and early warning. Each homestead had a dugout canoe ready for transport in case of heavy flooding. Each community was also required to dig trenches to control the water around the homestead and around farmlands. In addition, they were required to avoid ploughing along the lake shores when heavy flooding was predicted and were advised to catch fish during the April-August rainy period when fish was plentiful and preserve them by drying and smoking for use in times of scarcity. And when crocodiles started laying their eggs on river banks at

¹ Louise Grenier, *Working with Indigenous Knowledge, A Guide for Researchers*. IDRC, 1998

² Samuel Mwangi, "Indigenous knowledge, policy and institutional issues for collaboration between mountain adjacent communities and management agencies". Kenya Resource Centre for Indigenous Knowledge, National Museums of Kenya, 2002

³ Adopted by the United Nations Conference on Environment and Development in Rio de Janeiro, 3-14 June 1992, as a Reaffirmation of the Declaration of the United Nations Conference on the Human Environment, adopted in Stockholm on 16 June 1972

⁴ Nature Conservation and Natural Disaster Management: The Role of Indigenous Knowledge in Kenya, Report by IGAD Climate Prediction and Applications Centre (ICPAC), September 2006.

higher ground, that was a sign to the community of impending floods. When floods came, those living on the highlands were expected to accommodate neighbours displaced by the floods in the lowlands.

In Swaziland, where drought and occasional floods are common disasters, communities use various methods to predict disasters. For example, they use the height of the nests of the *emahlokhloko* bird (*Ploceus spp.*) on trees growing by river banks to predict floods. When floods are likely to occur, the nests of the *emahlokhloko* are very high up on the trees and when floods are unlikely the nests are low down. The Swazis also use the cry of certain birds to predict rain, and yields of certain wild fruit plants to predict famine. Other indigenous methods used by the Swazis to predict natural hazards include wind direction, the shape of the crescent moon and the behaviour of certain animals.

In Tanzania, animals feature prominently in prognosis of drought and famine. For instance, by reading signs on goat intestines, specialized Maasai elders can divine drought and predict incoming famine or diseases.

In the regions of Nenets Autonomous Okrug and Kamchatka of the Russian Federation, the hunters, gatherers and herders interviewed in a UNEP study described how careful observation of the behaviour of animals, and of the appearance and colour of the sky, is used as early warning of natural disasters. "When the dogs start rolling on their backs on the snow and the crows circle in flocks and then hide, a blizzard is coming," explained a hunter from Kamchatka.

In Indonesia, the Simeulue community (population 80,500) of farmers, fishermen and traders close to the epicentre of the 26 December 2004 tsunami survived by rushing to nearby hills in response to long held IK on the behaviour of their buffaloes. Only seven people from the community lost their lives, compared to 163,795 that died across the rest of Indonesia's northern Aceh province. In recognition of their application of IK in saving thousands of lives, the community, through their leader, was awarded the prestigious United Nations Sasakawa Award for Disaster Reduction. This brought to the fore the applicability and relevance of IK in natural disaster situations. "It was the one community that had its own traditional way of avoiding the impact of a tsunami," Nannie Hudawati, a senior official at Indonesia's national disaster management office, told the press.

Two other communities stood out in the aftermath of the 2004 tsunami for relying on IK and fleeing to safety. The sea gypsies along Thailand's southern coast and the tribal communities living on India's Andaman and Nicobar islands used their IK to flee the shore for higher ground, saving thousands of lives. These communities have an intense early warning system involving the observation of the behaviour of creatures in their surrounding. The cries of the birds, the frenzy of the smaller mammals and even the change in the swimming pattern of the marine animals, all give them clues and signals of approaching natural disasters like storms and tidal waves. Those communities reportedly survived the tsunami disaster more successfully than other people in the region because of their indigenous early warning system. The communities' sense of the sea provided them with an early warning before the strong waves hit the islands. Surveys conducted by the Coast Guards confirmed that all the five of the indigenous tribes had instinctively moved to higher grounds.

Prior to the onset of typhoons, communities living in the typhoon prone areas of Saigasaki and Tano districts of Japan keenly observe the quick eating habits of birds. They carefully observe the *tsubane* (swallows), which normally build their nests at the second floor of houses in the neighbourhood; when they build their nests at the third or fourth floors, it indicates that the forthcoming typhoon would be big and strong with a high water surge. The communities also apply the same rule for honeycombs. Their predictions are known to be highly accurate.

In Bangladesh, local communities prepare movable cookers (*chula*) to preserve dry food, fuel, and fodder before floods. They also prepare boats and rafts for emergency rescue operations. To cope with cyclones and storm surges, the communities also apply appropriate response measures such as storing dry food and valuable seeds, stocking fuel, constructing bamboo mat-based platforms (*matchas*), and many other measures that go a long way in saving lives and property.



Nesting of *emahlokhloko* (*Ploceus spp.*) up a tree next to Nkomati River. Indigenous knowledge used to predict floods in Swaziland. Picture by A. M. Manyasi

Disaster Prevention and Mitigation

Traditionally, it is not always clear when disaster preparedness and response end and prevention, mitigation and recovery begin. There is no distinct point at which these phases change from one to the other, as there is a lot of overlapping depending on the nature of the disaster.

In Burkina Faso, the Mossi farmers use their IK to abate problems of drought. They build lines of stones (bunds) on their cultivated land to construct terraces and pits that conserve water. They also fill the bunds with organic material to increase soil fertility. The semi-permeable bunds allow for a gradual seeping in of the water and prevent run-off caused by the scarce but highly intensive rains, thus reducing the risk of crop failure and soil erosion. In the disastrous drought years of 1983 and 1984, crops grew on land with bunds, while on adjoining fields nothing could grow.

In India, rural communities play an important role in mitigating the effects of drought by using traditional drought-coping methods such as construction of ponds and dams (*anicuts*) to save the rain water, which would otherwise be lost due to surface runoff, thus mitigating the effect of drought.

Indigenous knowledge has also been used in mitigating the impacts of earthquakes and cyclones in India. After the disaster of 26 January 2001, Manav Sadhna, an NGO based at Gandhi Ashram in the city of Ahmadabad, Gujarat state, became engaged in earthquake rehabilitation efforts in the village of Ludiya. It implemented a recovery project aimed at reducing impacts of disasters. Remodeled traditional circular houses (*bhungas*) were constructed to replace the thousands of destroyed homes⁵. The traditional circular homes are known to be resistant to earthquake and are also considered to be cyclone proof. They are constructed with local materials such as sun-dried bricks and straw branches (*khip*) of the *babool* tree.

Studies done in the South Pacific Small Island Developing States (SIDS) indicate that despite the influx of outside aid, indigenous communities still show considerable resilience to natural disasters. Strong levels of intra-community cooperation exist and many indigenous groups still utilise traditional building and food preservation techniques to help them escape the ravages of disasters in the region⁶. There is also a growing mutual assistance amongst indigenous groups in the SIDS, not only

⁵ <http://www.indiatogether.org/photo/2002/bhungas.htm>.

⁶ Heidi Ellemor of Emergency Management Australia 2003, Emergency management and remote indigenous communities; reconsidering key concepts. Campbell J, 2003, Geography, vulnerability and nature. Paper presented at the New Zealand Geographical Society Annual Conference, Auckland, July 6-11, 2003



Houses destroyed after the 26 January 2001 earthquake in India were replaced with the remodeled traditional bhungas, which are earthquake and cyclone safe. Pictures by Manav Sadhna

in sharing resources when disasters occur but also in building disaster management capabilities. This shows that indigenous groups are able to adapt to change and their knowledge is extremely valuable in ensuring recovery⁷.

All these examples underscore the importance of harnessing IK as a crucial element in the management of natural disasters, particularly at the community level.

Role of the United Nations in promoting use of indigenous knowledge

The United Nations Environment Programme (UNEP) recognizes the important role IK systems play in the conservation of environmental resources as well as in the management of natural disasters. It is concerned that custodians of this knowledge are dying without having passed on the knowledge to the younger generation. The best way to remedy this situation is to document much of the knowledge. UNEP is therefore implementing a project on IK in Kenya, South Africa, Swaziland and Tanzania, which will provide information on IK from specific locations in these countries that will be used to enhance better understanding of IK and its potential application and use elsewhere. The project is an acknowledgement of the global concern and calls for the utilization of IK in development processes, especially in addressing poverty alleviation and disaster risk reduction among developing country communities.

Also, UNEP in partnership with the Russian Association of Indigenous Peoples of the North has implemented a project in the Nenets Autonomous Okrug and Kamchatka regions of the Russian Federation. The project has documented IK warning signs of natural disasters and how to cope with and lessen their impacts. This information is intended to raise awareness and enhance understanding of the application and use of traditional knowledge in natural disaster management.

Major global development assistance players also acknowledge the role of IK in the achievement of the United Nations Millennium Development Goals (MDGs), the set of eight agreed goals, ranging from eradication of extreme poverty to global partnership for development, to be achieved by 2015. Thus, for the last five years the World Bank has engaged in an elaborate IK programme in collaboration with countries and local communities in developing countries. The programme covers various issues, including natural resource management.

The World Bank programme, launched in 1998 to respond to government leaders and civil society who had called for the Bank and other donors to learn from local communities, partners with over a dozen organizations. Recognizing that IK is a critical factor for sustainable development, the programme aims to integrate IK into Bank-financed operations, to mainstream IK in development, to build the capacity to facilitate IK exchanges, to collect and disseminate IK and to build partnerships.

In the five years since its inception, the programme has achieved considerable success. For example, IK was integrated into a multi-sectoral AIDS project in Burundi, an agricultural research and training project in Uganda, and in the Lake Malawi Ecosystems Project.

Moreover, the programme has created a database of over 200 indigenous practices, developed a monthly publication *IK Notes*, which appears in English, French, Wolof and Swahili. In March-April 2005, the World Bank also organized a pilot cross regional distance learning course on using IK for the MDGs. Over 100 participants attended the course in Uganda, Tanzania, Sri Lanka and India.

Other organizations have also engaged in best practices related to IK. For example, the Netherlands Organization for International Cooperation in Higher Education/Indigenous Knowledge, in co-operation with UNESCO's Management of Social Transformation (MOST) has established a database of best practices on IK.

This database is part of the MOST database of best practices, which concentrates on poverty alleviation. It contains examples of successful projects illustrating the use of local and IK in the development of cost-effective and sustainable survival strategies, covering Africa, Asia-Pacific, Europe, North America and Latin America and the Caribbean.

Related sites and sources of information.

- ♦ Sustainable Development Update, Issue 1, Volume 5, 2005
<http://www.albaeco.com/sdu/20/index.htm>
- ♦ Melville, Manmohan, "Tsunami Warning System of Aboriginal Tribes",
<http://www.gatewayforindia.com/articles/tsunami.htm>
- ♦ Cintron, Gilberto & Yara Schaeffer, "The Mega Tsunami of 26 December 2004: Recognizing Ecological Lesson from a Large-Scale Natural Disaster", <http://www.iucn.org/tsunami/docs/ecological-lessons-large-scale-disturbances.pdf>
- ♦ TRADITIONAL KNOWLEDGE CASE STUDIES
<http://www.kivu.com/wbbook/casestudies.html>
- ♦ NIRAPAD: Network for Information, Response and Preparedness Activities on Disaster, <http://nirapad.org>
- ♦ UNESCO: Management of Social Transformations (MOST)
<http://www.unesco.org/bpindi.htm>

Published by the Post-Conflict and Disaster Management Branch
Division of Environmental Policy Implementation
United Nations Environment Programme (UNEP)
P.O. Box 30552 Nairobi, Kenya
Tel: +254 (20) 7623507/7623508 Fax: +254 (20) 7624249/7623794
Website: <http://www.unep.org/DEPI/programmes/emergencies.html>

⁷ Loomis, T.M., 2000; Indigenous populations and sustainable development: Building on indigenous approaches to holistic, self-determined development. *World Development* 28(5):893-910

