
UNIT 12 RELEVANCE OF INDIGENOUS KNOWLEDGE*

Structure

- 12.0 Objectives
- 12.1 Introduction
- 12.2 Understanding Traditional Knowledge
- 12.3 Indigenous Knowledge and Disaster Risk Reduction
- 12.4 Indigenous Knowledge and Early Warning System
- 12.5 Indigenous Knowledge and Coping Strategies
 - 12.5.1 Cyclones and Floods
 - 12.5.2 Droughts
- 12.6 Conclusion
- 12.7 Glossary
- 12.8 References
- 12.9 Answers to Check Your Progress Exercises

12.0 OBJECTIVES

After reading this Unit, you should be able to:

- Understand the concept of traditional knowledge;
- Relate indigenous knowledge with Disaster Risk Reduction (DRR); and
- Understand the coping strategies during cyclones.

12.1 INTRODUCTION

In recent times, there has been constant occurrence of natural disasters around the globe, mainly due to ill-conceived development efforts and unprecedented climate change. For instance, disasters such as unforeseen floods, heavy rain and drought are the results of climate change. Such climatic variations, not only lead to natural catastrophe, but also cause a huge impact on the lives of the local community. Though the occurrence of such disasters is sometime unavoidable, the repercussions of such disasters can be avoided when participation of community members is given due recognition in disaster reduction activities. Further, accomplishment of targeted goals and sustainability of risk reduction interventions also depend upon the involvement of local populace, their knowledge, culture and traditional practices. Thus, increasing the adaptive capacity of the communities helps in bringing back the resilience and also in reducing the levels of vulnerability. The adaptive capacity could be increased by laying emphasis on the traditional knowledge of the local communities. In this Unit, the discussion is on the concept of traditional knowledge and the interrelationship between traditional knowledge and disaster risk reduction. It also documents some of the existing traditional

* Contributed by Dr. A. Senthamizh Kanal, Consultant, Faculty of Public Administration, SOSS, IGNOU, New Delhi.

practices that were adopted in dealing with disaster situations like, cyclones and droughts.

12.2 UNDERSTANDING TRADITIONAL KNOWLEDGE

Traditional Knowledge is “the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men, indigenous to a particular geographic area” (Grenier, 1998). The world ‘traditional knowledge’ is derived on the belief that the local communities have knowledge about the history of their locality based on the past experiences. Berkes (2007) defines traditional knowledge as “a body of cumulative knowledge, practice and belief, evolving by adoptive process, and handed down through generations by cultural transmission about the relationship of living being (including humans) with one another and the environment”. The traditional knowledge can be also called as ‘Indigenous Knowledge’ or ‘Local Knowledge’. UNESCO (2002) describes traditional knowledge as a “cumulative body of knowledge, know-how, practices and representation, maintained and developed by peoples with extended histories of interaction with the natural environment, while indigenous as attached to place and indigenous people”.

As per the World Bank Report (2005), “Indigenous knowledge also referred to as traditional or local knowledge refers to the large body of knowledge and skill that has been developed outside the formal education system. Indigenous knowledge is embedded in culture and is unique to a given location or society. Indigenous knowledge is an important part of the lives of the poor. It is the basis for decision making of communities in food security, human and animal health, education and natural resource management”. Flavier also states that the “traditional knowledge is the information base for a society, which facilitates communication and decision-making. Indigenous information systems are dynamic and are continually influenced by internal creativity and experimentation as well as by contact with external systems”. Based on the above definitions on indigenous knowledge, it can be concluded that indigenous knowledge is not only about the past experiences of the community, but also helps a community to make a decision on what to do and what not to do. According to IIRR, indigenous knowledge is “the knowledge that people in a given community has developed over time, and continues to develop. It is based on experience, often tested over centuries of use, adapted to local culture and environment, dynamic and changing”.

Rajib Shaw (2010) characterised indigenous knowledge as: “Locally bound, indigenous to a specific area and communities; culture and context specific; non-formal knowledge; orally transmitted, and generally not documented; Dynamic and based on innovation adaptation, and experimentation; and closely related to survival and subsistence for many people worldwide”.

12.3 INDIGENOUS KNOWLEDGE AND DISASTER RISK REDUCTION

This section discusses how the traditional knowledge helps to reduce the disaster risk. It is always obvious that the local people know their land and environment thoroughly well. They have a unique ability, through traditional wisdom, to get and store the information on natural disasters that their land is exposed to. Hence, focus should be laid on the local people, to make their situation better. The Sendai

Framework for Disaster Risk Reduction (SFDRR) 2015-2030 stated that to achieve the disaster risk reduction at the global and regional level it “requires a multi-hazard approach and inclusive risk-informed decision-making based on the open exchange and dissemination of disaggregated data, including by sex, age and disability, as well as on easily accessible, up-to-date, comprehensible, science-based, non-sensitive risk information, complemented by traditional knowledge.”

Combining the traditional knowledge with scientific expertise is more relevant in the current context. Knowing and documenting the traditional knowledge is not effective unless it is included in the disaster risk reduction activities. It is the entry point of people’s participation at the grassroot levels. The SFDRR report suggests that to understand the disaster risk at national and local level, it is important to “ensure the use of traditional, indigenous and local knowledge and practices, as appropriate, to complement scientific knowledge in disaster risk assessment and the development and implementation of policies, strategies, plans and programmes of specific sectors, with a cross-sectoral approach, which should be tailored to localities and to the context.”

To this effect, Pan American Health Organisation (2015) suggested the following points to be included in the Disaster Risk Reduction (DRR) planning:

- Securing the input of indigenous peoples and their cultural and environmental knowledge in the development and implementation of government disaster risk reduction plans;
- Integrating an indigenous perspective into government disaster plans that reflects how climate change is contributing to increased disaster risk;
- Considering how infrastructure development and climate change impact the disaster vulnerability of indigenous people;
- Collaborating indigenous people in the design and implementation of early warning systems in order to ensure their linguistic and cultural relevance;
- Encouraging indigenous groups to develop, with the participation of entire community, their own community-level preparedness and risk reduction plans and strategies that include actionable contingency plans to protect lives, livelihoods and critical infrastructure.

Types of Indigenous Knowledge

The indigenous knowledge can be divided into three types, that is, Technological Knowledge, Economic Knowledge and Environmental Knowledge.

1) Technological Knowledge

The indigenous people use their technical knowledge, gained over the years to address some of the concerns related to disaster risk reduction. For instance, the traditional practices of the community are still in existence; with respect to construction of house and infrastructure in the flood inundate areas, coastal regions and the mountain regions. For example, during the Uttarkashi earthquake of 1991, though the damage was visible, most of the traditional structured houses still could survive even after the disaster. Similarly, Kashmir region is also known for its earthquake resistant construction practices, that is, *Taq System* and *Dhajji Dewari System*. These types of houses could survive during 2005 Kashmir Earthquakes. Incorporating such local technical knowledge and encouraging participation of community members in the disaster preparedness improves the sustainability.

2) Economic Knowledge

The other type of indigenous knowledge is the economic knowledge used by the community at times of crisis. People come up with economic ideas to address the issues on a temporary basis. For instance, the construction of temporary/permanent shelter by the community with the locally available resources, in both ‘during and post-disaster’ phases is an apt example. Thus, low cost strategy is planned using local resources by the community. Similarly, the community also adapt themselves to alternative livelihood to overcome the crisis situation.

3) Environmental Knowledge

Environmental knowledge is something which is sensed by the community, even based on the minor or minute inference which they get from the environment or surrounding. For example, it is the knowledge which is based upon the experiences during cyclones or floods. On the basis of the colour of the water or clouds, people used to predict and warn the community members. It used to help the community members to take preparedness measure like storing food, firewood, saving drinking water and fodder for cattle.

Check Your Progress 1

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the Unit.

1) Define Traditional Knowledge.

.....
.....
.....
.....

2) Bring out the relationship between indigenous knowledge and Disaster Risk Reduction.

.....
.....
.....
.....

3) Discuss the types of Indigenous Knowledge.

.....
.....
.....
.....

12.4 INDIGENOUS KNOWLEDGE AND EARLY WARNING SYSTEM

To reduce risk and prepare for effective response, early warning system plays a major role in DRR. In olden times, people used to sense the cyclones through certain indicators. Precautionary measures were taken by the community based on the indications they receive from the nature through their traditional knowledge.

However, in recent times we tend to ignore native intelligence. Mostly, the indigenous early warning indicators prove to be true and paying heed to such warnings could save the community from great disasters. The following table indicates the indigenous early warning indicators of cyclones.

Indigenous early warning indicators of cyclone

Weather Patterns	<p>Sky turns gloomy and overcast#</p> <p>Black rolls of cloud and change in colour of cloud – indication for flood \$</p> <p>Weather unusually hot and humid/hot spells after rain#</p> <p>Strong wind blows from the south/south-east #</p> <p>East wind blows in full noon – indication of cyclone</p> <p>If clouds move north wards, it is indication of flood \$</p> <p>Wind changing from east to south & gets cooler– indication of the change of direction of cyclone</p>
Sea/River Patterns	<p>Big waves/dark rolls of water</p> <p>‘Goroom goroom’ noise in the river</p> <p>Smokey or cloudy shapes in the sea</p> <p>Pond and river water becomes hot*</p>
Animal Behaviour	<p>Cattle become restless and stop eating grass***#</p> <p>Cattle/dogs wail continuously/at night***#</p> <p>Barking of dogs in day time – indication of cyclone \$</p> <p>Dogs scratch the ground continuously \$</p> <p>Ants climb trees with eggs on their backs#</p> <p>Bees move around in clusters</p> <p><i>Kurpals</i> (type of gull) fly high and cry</p> <p>Flocking of large number of birds from north to south – indication of cyclone</p> <p>Birds fly without destination</p> <p>Increased number of flies and mosquitoes#</p> <p>Insects attack cattle**</p> <p>Fish jump in the rivers and ponds</p> <p>Crows/cockerels call/fly at night</p> <p>Frogs call constantly</p> <p>Foxes bark during the day</p> <p>Crabs come into the house and courtyard****</p>
Other	<p>Bending trees</p> <p>Water hyacinth in the canal</p> <p>Leaves of the mandar and cotton tree turn upside down</p> <p>New leaves of trees fall to the ground</p> <p>Muddy smell on the wind*</p> <p>Particular kind of fish catch by fishermen – indication of cyclone \$</p>
<p>* - up to one day before; ** - 1-2 days before; # - most commonly mentioned across all four chars; *** - 3-7 days before; **** - 10-12 days before. Source: Adopted from Howel, 2003.</p>	

12.5 INDIGENOUS KNOWLEDGE AND COPING STRATEGIES

12.5.1 Cyclones and Floods

Traditional knowledge of the community has always been the guiding force for the community members to develop their own coping mechanism for different disasters faced by them. For instance, people living in cyclone prone areas, areas of frequent earthquakes, landslides, etc., are used to such events as it happens on a regular basis. Based on the inference drawn from the nature, they resort to coping strategies. For example, people living in coastal areas are aware of the time of rising tides and hence avoid fishing in that season or go to high mounts in that time. Though useful and very intelligent strategies are evolved by the community members, there is hardly any documentation on the community's traditional knowledge, wisdom, and coping mechanism strategies. It is important to document such strategies, supplement the same with scientific facts and thus pass it on to larger community for adherence. Such documentation of the traditional knowledge and coping strategies of indigenous community can be beneficial, as it can help in minimising the loss of life or property, when a disaster strikes.

Some of the coping strategies that are adopted to deal with cyclones have been discussed here:

- People wrap all available seeds, rice and paddy and bury it under ground when they move for safer places.
- Some families wrap all their important papers, documents and other valuables and bury it under ground before leaving their houses.
- Houses are constructed on higher plinth whereby the water cannot enter the house.
- If the clouds move towards north, there is an indication that there will be floods in three or four days.
- Some people while looking at the colour of the clouds and their formation can predict about floods.
- People grow banana trees around the houses as the banana stems are used for floating. Something similar to a boat is made out of banana stems and is also used as barge.
- Banana leaves are used as fodder during cyclones and floods.
- People identify nearby villages and inform them before hand for their temporary migration and shelter in those villages in case of floods.
- People store foodstuff, dry food, coconut, pumpkins, etc. to be used immediately after the disaster.
- Beating of drums for dissemination of warning.
- Continuous blowing of wind from east indicates that the cyclone is approaching, more so if within two hours the wind starts becoming hot; indication is that the intensity of cyclone will be more.
- If the wind changes its direction from east to south and gets cooler, it indicates that the cyclone has changed its direction.

- Barking of village dogs without any provocation during the daytime is indicative of an unusual event like cyclone approaching in the immediate future.
- The dogs start scratching the ground.
- Fishermen get substantive catch of a particular fish prior to the cyclone which normally they are unable to get.
- The fishermen nets catch particular small plankton which they never get otherwise. This also indicates that a cyclone is approaching.
- A strange and rather thundering sound from sea for two-three days indicate that a cyclone is about to strike.
- If the clouds move fast from north to south, then there is a likelihood of cyclone.
- Birds in large quantity flock together and fly from north to south, give the indication to the community about an approaching cyclone.
- People don't plant big trees near their house so that these may not fall on them when the cyclone approaches.

12.5.2 Droughts

Droughts are not flood, earthquake, landslide and tsunami like disasters. But they create pressure on the society in the name of malnutrition, food shortages and ill-health. The reason behind drought is low rainfall and high soil moisture stress. Sometimes prolonged droughts will lead to famines and the situation gets worsened further. The recent intervention by government agencies in the maintenance and up gradation of water harvesting structures e.g. ponds, *taankas*, *naadis* and *khadeens* have also led to other avoidable complications. In this context, it is important to resort to indigenous measures taken by the community for managing situations like drought. Some of the indigenous measures adopted for dealing with drought have been discussed as below:

- The nomadic *Maldharis* of Gujarat construct 'Virdas', which serve as a means for water harvesting. They also dig shallow wells in low depressions, which are called 'Jheels' to collect water.
- The 'Kundis' of Rajasthan are unique structures that look like huge concrete saucers on the landscape. They are used for collecting rainwater to meet the needs of the local people and animals.
- The 'Kuis' were found in Bikaner and Jaisalmer. These were *kuchcha* structures dug near tanks to collect seepage and were usually covered with planks of wood.
- Rajasthan also had 'Rapats' and 'Tobas' which were effective water harvesting techniques.
- The Spiti area of Himachal Pradesh has been dependent on diversion channels called 'Khuls' for irrigation for a long time. They have carried water from glaciers to village.
- The 'Khasis' used to practice a 'Bamboo Drip' irrigation system. Maharashtra had a 'Phad' system and Bihar had 'Ahar' and 'Pynes'.
- 'Palliyals' or stream diversions were common in Kerala.

Check Your Progress 2

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the Unit.

1) Bring out the indigenous early warning indicators during cyclones.

.....
.....
.....
.....
.....

2) Discuss the indigenous coping strategies.

.....
.....
.....
.....
.....

12.6 CONCLUSION

Indigenous knowledge or the traditional knowledge of a community is laden with rich values and information on a potential disaster which is about to happen. Indigenous knowledge, as discussed in this Unit, is the ability of the community to sense possible disasters for which the inference is drawn from nature through various indications, which is passed on to generations through experiences. Attention to the voices and experiences of indigenous community is very important, if we are to safeguard the people from disasters. Indigenous knowledge not only gives indications of early warnings about a disaster, but is also helpful to know the coping strategies adopted to deal with disaster situation. Accordingly, in this Unit, examples related to cyclones and droughts have been discussed.

12.7 GLOSSARY

Taq System : “In the Taq system, large pieces of wood or timber are used as horizontal runners embedded into the masonry walls. These runners are located at floor level and at the top of windows. These runners tie together all of the elements of the building or house and keep the entire structure in concert, thus preventing spreading and cracking of masonry. The runners are joined together with small pieces of timber, giving the shape of a ladder laid over a wall covering two exterior faces of the wall” (UNESCO, 2002).

Dhajji-Dewari System

: “In the Dhajji-Dewari system, timber frames for confining masonry in small parcels are used. The timber frames, not only have vertical elements, but also have cross members, which divides the masonry infill into various small panels. The most important characteristic of this type of construction is the use of lean mud mortar. A common practice in the region is to use the Dhajji-Dewari system in the upper story walls, especially for the gable portion of the wall” (UNESCO, 2002).

Relevance of
Indigenous
Knowledge

12.8 REFERENCES

Agrawal, A. (1995). Dismantling the divide between Indigenous Knowledge and Scientific Knowledge. *Development Change*. 26: 413-439.

Berkes, F. (2007). Understanding Uncertainty and Reducing Vulnerability: Lessons from Resilience Thinking. *Natural Hazards*. 41: 283-295.

Flavier, JM. et al. (1995). The Regional Program for the Promotion of Indigenous Knowledge in Asia. In Warren DM, Slikkerveer LJ and Brokensha D, (eds). *The Cultural Dimension of Development: Indigenous Knowledge Systems*. London: Intermediate Technology Publications.

Fletcher, SM., Thiessen, J, Gero, A., Rumsey, M., Kuruppu. & Willets, J. (2013). Traditional Coping Strategies and Disaster Response: Examples from the South Pacific Region. *Journal of Environmental and Public Health*. Retrieved from <https://www.hindawi.com/journals/jep/2013/264503/>

Grenier L, 1998. *Working With Indigenous Knowledge, A Guide for Researchers*. IDRC: Ottawa.

Howell, P. (2003). Indigenous Early Warning Indicators of Cyclones: Potential Application of Coastal Bangladesh. Retrieved from https://www.preventionweb.net/files/1529_workingpaper6.pdf

IGNOU-NDMA (2012). *Training Manual on Disaster Preparedness and Mitigation*. New Delhi.

International Institute of Rural Reconstruction (IIRR). (1996). *Recording and using Indigenous Knowledge: A Manual*. Silang: Cavite.

International Strategy for Disaster Risk Reduction. (2008). *Indigenous Knowledge for Disaster Risk Reduction: Good Practices and Lessons learned from experiences in the Asia-Pacific Region*. Bangkok.

Jha, V. & Jha, A. (2011). Traditional Knowledge on Disaster Management: A Preliminary Study of the Lepcha Community of Sikkim, India. *Indian Journal of Traditional Knowledge*. 10(1): 173-182.

Kelman, I., Mercer, J., & Gaillard, J. C. (2012). Indigenous knowledge and disaster risk reduction. *Geography*. 97(1): 12–21.

Misra, K. (2017). *Indigenous Knowledge and Coping Mechanism Practices for Disaster Management Practices for Disaster Management in Rajasthan – Case Study*. Unpublished thesis. New Delhi: Indira Gandhi National Open University.

Mercer, J., Kelman, I., Taranis, L., & Suchet, S. (2010). Framework for integrating Indigenous and Scientific knowledge for disaster risk reduction. *Disasters*. 34(1): 214–239.

Pan American Health Organisation, www. www.paho.org.

Rahman, A., Sakurai, A. & Munadi, K. (2016). Indigenous knowledge management to enhance community resilience to tsunami risk: Lessons learned from Smong traditions in Simeulue Island, Indonesia. *Earth and Environmental Sciences*, 56.

Rumbach, A. & Foley, D. (2014). Indigenous Institutions and their Role in Disaster Risk Reduction and Resilience Evidence from the 2009 Tsunami in American Samoa. *Ecology and Society*. 19(1):19.

Shaw, R. & Krishnamurthy, R.R. (2009). *Disaster Management: Global Challenges and Local Solutions*. Boca Raton: CRC Press.

Shaw, R. 2008. *Indigenous Knowledge Disaster Risk Reduction: Policy Note*. Kyoto: Kyoto University.

The World Bank. (2005). Working Paper on Making five years of the World Bank Indigenous Knowledge program. Washington.

UNESCO. 2002. Best Practice of Indigenous Knowledge. Paris: UNESCO.

United Nations. 2015. Sendai Framework for Disaster Risk Reduction, 2015-2030. Geneva: UNISDR.

12.9 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

- 1) Your answer should include the following points:
 - Traditional knowledge is not only about the past experiences of the community, but also helps a community to make a decision on what to do and what not to do.
 - It is a locally bound, indigenous to a specific area and communities; culture and context specific; non-formal knowledge; orally transmitted, and generally not documented; Dynamic and based on innovation adaptation, and experimentation; and closely related to survival and subsistence for many people worldwide.
- 2) Your answer should include the following points:
 - Integrating the traditional knowledge with scientific expertise is more relevant in the modern times. Knowing and documenting the traditional knowledge is not effective unless it is included in the disaster risk reduction activities.
 - SFDRR Framework.
- 3) Your answer should include the following points:
 - Technical Knowledge

- Environmental Knowledge
- Economic Knowledge

Check Your Progress 2

1) Your answer should include the following:

- Weather patterns
- Sea/River patterns
- Animal behaviour and others

2) Your answer should include the following points:

- Science time immemorial, traditional knowledge of the community has been guiding the community members to develop their own coping mechanism for the different disasters faced.
- Documentation of the traditional knowledge and coping strategies of indigenous community can be beneficial to the people, as it can help in minimising the loss of life or property, when a disaster strikes.
- Adopted coping strategies.

