

## 1.8 Traditional Knowledge Digital Library (TKDL)

TKDL is a collaborative project between National Institute of Science Communication and Information Resources (NISCAIR), Council of Scientific and Industrial Research (CSIR), Ministry of Science and Technology and Development of AYUSH and Ministry of Health and Family Welfare, which is being implemented at NISCAIR. An inter-disciplinary team of Traditional Practices Experts, Patent Examiners, IT Experts, Scientists and Technical Officers are involved in creations of TKDL. The project TKDL involves documentation of the knowledge available in public domain on traditional knowledge from the existing system. Traditional Knowledge Resources Classification (TKRC), an innovative structured classification system for the purpose of systematic arrangement, dissemination and retrieval has been evolved for about 10,500 sub-groups against one group in International patent Classification (IPC).

4. Source: Indigenous Technical Knowledge in Rice Cultivation, P. Muthuraman & S.N.Meera, Senior Scientists (Agricultural Extension), Directorate of Rice Research (ICAR), Hyderabad – 500030.

## 1.9 Disaster Mitigation Management and Sustainable Development

The shift in focus from hazards to underlying vulnerabilities has provided disaster managers with a richer understanding of the factors that erode the coping capacities of communities and social systems. Ecological environment plays a role in many of these factors. There is a strong causal relationship between poverty, a degraded environment, knowledge vulnerabilities and higher disaster risk.

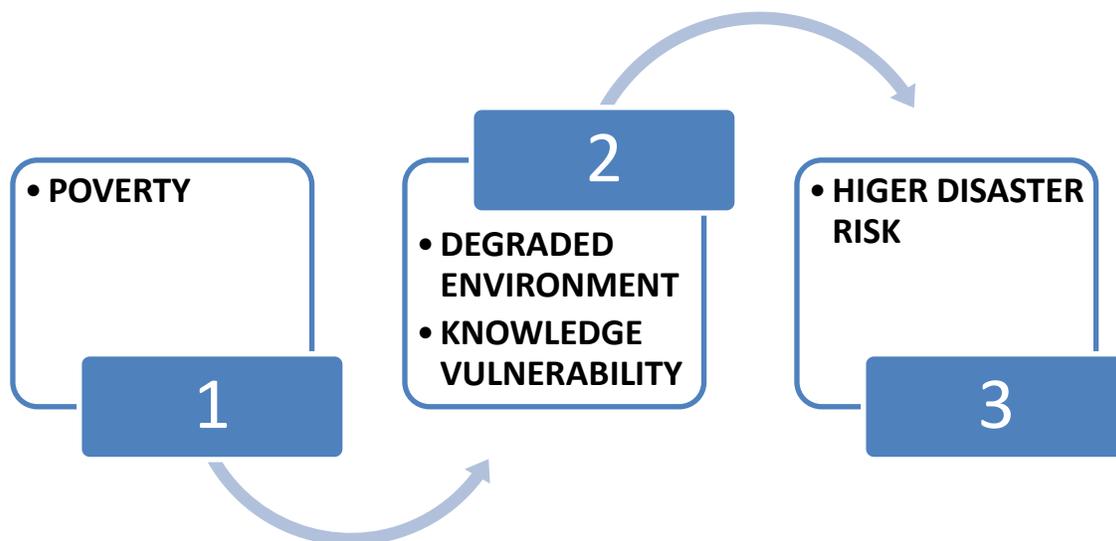


Figure 1: Causal Linkages to Disaster Risk

People who live in marginal or environmentally degraded areas and often devoid of rich knowledge heritage, struggle on a daily basis to survive and are unable to cope with any additional stress factors. Limited livelihood alternatives, competition over scarce resources, weak educational-governance structures and lack of access to healthcare can compromise a community's ability to respond to a hazard event. Indigenous environmental management and community based resource management can promote more resilient communities through supporting sustainable livelihoods, conflict

prevention and strengthening cooperation for good governance. Moreover, sustainable development is universally considered pro-nature, pro-poor, pro-women and pro-job generation that combines social, economic and environmental equity and ethical imperatives for economic situation. A bottom-up approach for eco-restoration calls for holistic management of natural resources in accordance with the live tradition of rural India.

### **1.9.1 Sustainable Development**

Sustainable development has been variously defined and explained. For example, the International Union for the Conservation of Nature and Natural Resources (IUCN) explains that, “for development to be sustainable it must take account of social and ecological factors, as well as economic ones; of the living and nonliving resource-base; and of the long term as well as the short term advantages and disadvantages of alternative actions” (IUCN, 1980, p. 23). The definition most often quoted, however, comes from the World Commission on Environment and Development (WCED), published in 1987, which refers to sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”<sup>5</sup>

Indigenous knowledge in respect of sustainable development provides an expanded view of the concept. African philosophies explain that there is a duty on the present generation to look beyond itself to future generations as well as to look back at the past and respect departed ancestors. This is beautifully expressed in the traditional African concept which Bishop Desmond Tutu has referred to in his sermons – that, the human community consists of three elements - those who went before us, those who are with us here and now, and those who are yet to come. All three together constitute the human community and if sight is lost of any one of those component parts of the trinity, you then get a lopsided view of the human Endeavour. That is a very important concept, which can help protect the environment as well as enhance the principles underlying sustainable development.

**5. Source: Indigenous Knowledge Systems and the Need for Policy and Institutional Reforms by Kwame Ameyaw Domfeh, chapter 5.**

### **1.9.2 IKS and Sustainable Development:**

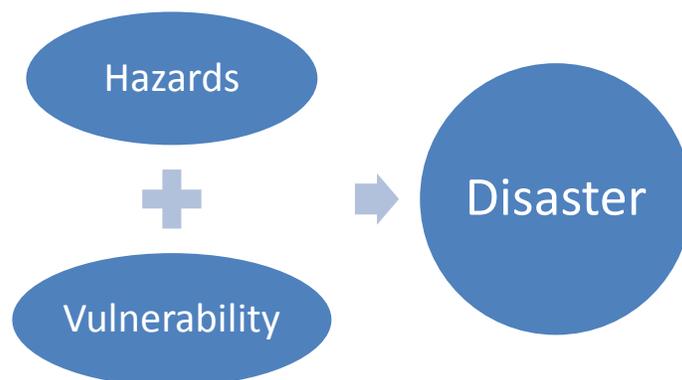
IKS of the Rajbanshi Social Fold (progressing on the track of modernity) is very essential to work out and in a process the non-functional domains could play an important role and ultimately the basic pattern of the folk life would therefore reveal out in front of us. In addition, the most important thing is that only after getting this IKS, we could properly apply the modern knowledge upon the folk life and the nature in which it resides. From proper adjustment between traditional and modern technologies as well as between IKS and advanced knowledge system, we could achieve actual way of conserving the bio-diversity, because from this biodiversity the indigenous community maintains its folk life and therefore protects it in its own indigenous feed back management system. To do it appropriately, the community needs a banner like Indigenous Peoples and aid from indigenous rights. Correct adjustment among folk life, proper management programs and indigenous rights could postulate a sustainable development. In addition, this adjustment could only be achieved when there is a definite balance between traditional and modern knowledge systems through proper association of all the capitals from various domains like

Knowledge, Nature and Human Resource, culture and society with their non-adaptive part, as well as intellect and instruction. Impetus is also needed from the domain of intellectual property rights and patent laws especially to check bio-piracy and illegal technology and knowledge capital transfer. Disequilibrium between these capitals, rights and systems could then produce catastrophic results from the very clash between Globalization and anti-Globalization.

3. Source: **Indigenous knowledge of the other people: A humanitarian approach** by Ashok Das Gupta, Department of Anthropology, University of North Bengal, West Bengal

### 1.10 The Hyogo Framework for Action

Under Hyogo Framework for Action (HFA) 12, which guides disaster risk reduction activities globally, it is recognized that environmental degradation contributes to disaster risk, and that disasters occur when hazards interact with, among other things, environmental vulnerability. As such, the Framework recognizes both the role of environment as a trigger of disaster risk, and the sensitivity of the environment to the forces of hazards. It equally emphasizes that human societies cannot be dissociated from the environments that they shape and which in turn influence their development and livelihoods. Together they form a comprehensive system with intrinsic levels of vulnerability and inherent coping mechanisms. The less degraded the environmental component of this system, the lower its overall vulnerability and the higher its coping capacity.



Thus, environmental concerns and opportunities are relevant to the implementation of all disaster risk reduction priorities. According to HFA Priority 3: Use knowledge, innovation and education to build a culture of safety and resilience at all levels, disasters can be substantially reduced if people are well informed and embrace a culture of prevention. It stresses that local communities often maintain vast traditional knowledge on environment and disasters. Still, new technical knowledge of risk reduction, based on ecology and environmental principles, needs to be developed. Knowledge of the environmental dimensions of disaster needs to be made available for use in evidence-based analyses, public awareness, political advocacy, operational decisions and educational curricula.

### 1.11 Disaster Management:

1.11.1. Vulnerability is seen as the progression of three stages:

1. Underlying causes: a deep rooted set of factors within a society that together form and maintain vulnerability.

2. Dynamic pressure: a translating process that channels the effect of a negative cause into unsafe conditions this process may be due to a lack of basic services or provisioner it may result from a series of macro- forces.

3. Unsafe Conditions: the vulnerable context where people and property are exposed to the risk of disaster; the fragile physical environment is one element; other factors include a unstable economy and low income levels.

**6. Reference: Book, Disaster Management Vol. 1 By G. K. Ghosh, 2012 Edition**

### **1.11.2. Poverty**

Poverty explains why people in urban areas are forced to live on the hills that are prone to landslide, or why people settle near volcanoes or rivers that invariably flood their banks. Poverty explains why drought claim poor peasant farmers as victims and rarely the wealthy, and why famines more often than not are the result of a lack of purchasing power to buy food rather than an absence of food. Drought comes in Mizoram almost in every 40-50 years when bamboos flowers Death was more during yesteryears when population was less than today since poverty has been reduced. Drought in Mizoram comes due to rise in rat population.

**6. Reference: Book, Disaster Management Vol. 1 By G. K. Ghosh, 2012 Edition**

### **1.11.3. Rapid Urbanization**

It is caused because of failure of rural development programmes and exploitation of rural poor by rich with or without blessings of government machineries.

**6. Reference: Book, Disaster Management Vol. 1 By G. K. Ghosh, 2012 Edition**

### **1.11.4. Lack of Awareness and Information**

Disasters can also happen because people vulnerable to them simply did not know how to get out of harm's way or to take protective measures. In most disasters- prone societies, there is a wealth of understanding about disaster threats and responses. This understanding should be incorporated into any efforts to provide external assistance.

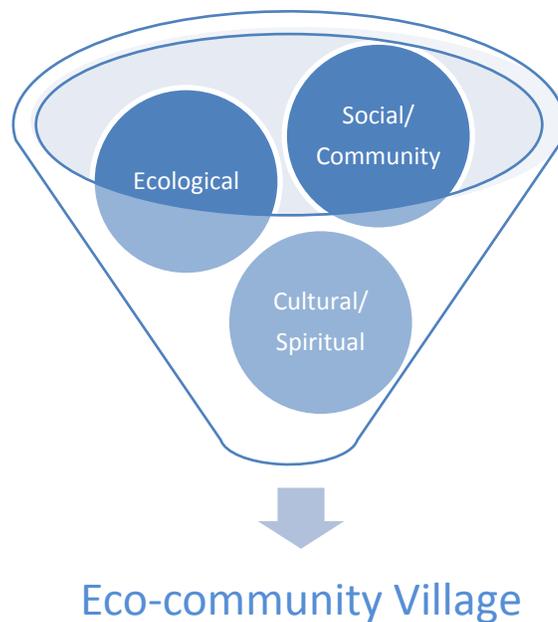
**6. Reference: Book, Disaster Management Vol. 1 By G. K. Ghosh, 2012 Edition**

### **1.11.5 Eco- Community Village and Ecological Dimension for sustainable development:**

Eco community villages can be defined as being human-scale, full-featured settlements in which human activities are harmlessly integrated into the natural world. It is supportive of healthy human development, and can be successfully continued into the infinite future. Demographically, these can be urban or rural communities of people, who strive to integrate a supportive social environment with

a low-impact way of life. To achieve this, the community integrates various aspects of ecological design, perm culture, ecological building, green production, alternative energy, community-building practices, and so on. Hence, the motivation for eco community villages is the choice and commitment to reverse the gradual disintegration of supportive social/cultural structures and the upsurge of destructive environmental practices on our planet.

Based on the three basic tenets of eco community village - Social/Community, Ecological, Cultural/Spiritual, indigenous knowledge management gains special significance under the cultural/spiritual dimension. This is with respect to its understanding of the interconnectedness and interdependence of all the elements of life on Earth and the community's place. It is prudent to note that this particular feature of an eco community plays a pivotal role in mitigating numerous ecological crises that the global civilization is facing in recent times.



**Figure: View of basic tenets of Eco-community village**

Hence, ecological conditions not only modify the frequency and magnitude of hazard events, but also affect natural barriers that can moderate the impacts of a disaster and protect communities. Moreover, maintaining ecosystems to decrease disaster risk can also contribute to the reduction of greenhouse gases and thereby further minimize the risk of future hazard events. Finally, ecosystems managed to support sustainable livelihoods also help to lessen the social, economic and environmental impacts of disasters on communities. Investments in ecosystems can therefore lead to significant savings, as compared to the cost of a disaster on human livelihoods. The proliferation of new technologies and processes for managing natural resources, including indigenous knowledge of the ecological, social and cultural dimensions of resource management, presents many opportunities for reducing disaster risk.

Disaster Management and planning is a key part of government work. Asia tops the list of casualties due to natural disaster. Among various natural hazards, earthquakes, landslides, floods and cyclones are the major disaster adversely affecting very large area and population in the India sub-continent.

**7. Reference: Book, Disaster Management By Alok Satsangi (ISBN 978-81-7611-522-3) First Edition-2011**

These natural disasters are of:

- ✓ Geographical origin such as earthquakes, volcanic eruptions, land slides.
- ✓ Climatic origin such as drought, flood, cyclone, locust, forest fire.

Rising frequency, amplitude and number of natural disasters and attendant problem coupled with loss of human lives prompted the General Assembly of the United Nations to proclaim 1990s as the International Decade for Natural Disaster Reduction (IDNDR) through a resolution 44/236 of December 22, 1989 to focus on all issues related to natural disaster reduction.

**It is almost impossible to prevent the occurrence of natural disasters and their damages. However it is possible to reduce the impact of disasters by adopting suitable disaster mitigation strategies.**

**7. Reference: Book, Disaster Management By Alok Satsangi (ISBN 978-81-7611-522-3) First Edition-2011**

The disaster mitigation works mainly address the following:

- ✓ Minimize the potential risks by developing disaster early warning strategies.
- ✓ Prepare and implement developmental plans to provide resilience to such disaster.
- ✓ Mobilise resources including communication and tele-medicinal services.
- ✓ To help in rehabilitation and Post-disaster reduction.

Disaster Management aims to reduce the occurrence of disasters and to reduce the impact of those that cannot be prevented. The government White paper and Act on Disaster Management define the roles of Local Authorities as well as Provincial and National government in disaster management.

The process of Emergency Management involves four phases: Mitigation, preparedness, response and recovery.

**7. Reference: Book, Disaster Management By Alok Satsangi (ISBN 978-81-7611-522-3) First Edition-2011**

#### **1.11.6. MITIGATION:**

Mitigation measures include legislation, land-use planning (e.g. the designation of nonessential land like parks to be used as flood zones), and insurance. Mitigation is the most cost-efficient method for reducing the impact of hazards; however it is not always suitable.

A precursor activity to the mitigation is the identification of risks. Physical risk assessment refers to the process of identifying and evaluating hazards. The hazards-specific risk ( $R_h$ ) combines both the probability and the level of impact of a specific hazard. The equation under states that the hazard multiplied by the populations' vulnerability to that hazard produces a risk Catastrophe modeling. The higher the risk, the more urgent that the hazard specific vulnerabilities are targeted by mitigation and preparedness efforts. However, if there is no vulnerability there will be no risk, e.g. an earthquake occurring in a desert where nobody lives.

$$R_h = H \times V_n$$

7. Reference: Book, Disaster Management By Alok Satsangi (ISBN 978-81-7611-522-3) First Edition-2011

### 1.11.7. DISASTER INFORMATICS

Disaster Informatics is the study of the use of information and technology in the preparation, mitigation, response and recovery phases of disasters and other emergencies.

Here are listed the disaster informatics projects that are currently underway.

- ✓ **LEAD- Linked Environments for Atmospheric Discovery**
- ✓ **Crisis Grid-Real Time Geospatial Disaster Prediction**
- ✓ **Wireless ISPs and Hurricane Katrina: Documenting Grassroots Efforts and Information Flows**

The Linked Environments Atmospheric Discovery project seeks to create a high-speed computing and network infrastructure that would help meteorologists make more timely and accurate forecasts of hurricanes, tornadoes and other dangerous weather conditions.

They are developing web-based applications that allow the integration of alerts and blog entries from official, trusted and unrestricted public sources in a combined map-enabled tool for assessing emerging situations and for the public to find local, relevant information.

They are currently working with Harold Feld of the Media Access Project to look at one successful post-Katrina grassroots initiative and the lessons it can teach them: the deployment of wireless Internet service in the region affected by the hurricane, and their role in facilitating relief and rescue work.

7. Reference: Book, Disaster Management By Alok Satsangi (ISBN 978-81-7611-522-3) First Edition-2011

### 1.11.8. Possible Risk Reduction Measures from Disaster:

Disaster	Risk Reduction Methods
<u>Earthquake:</u>	<ul style="list-style-type: none"> <li>✓ Hazard mapping</li> <li>✓ Public awareness programmes and training</li> <li>✓ Assessing and reducing structural vulnerability</li> </ul>

	<ul style="list-style-type: none"> <li>✓ Land use control or zoning, building codes</li> <li>✓ Insurance</li> </ul> <p><u>Specific Preparedness Measures:</u></p> <ul style="list-style-type: none"> <li>✓ Earthquake warning and preparedness programmes</li> </ul>
<b><u>Tsunami:</u></b>	<ul style="list-style-type: none"> <li>✓ Protection of Building along coasts, houses on stilts</li> <li>✓ Building barriers such as breakwaters.</li> </ul> <p><u>Specific Preparedness Measures:</u></p> <ul style="list-style-type: none"> <li>✓ Hazard mapping, planning evacuation routes.</li> <li>✓ Establishing warning system.</li> <li>✓ Community education.</li> </ul>
<b><u>Volcanoes:</u></b>	<ul style="list-style-type: none"> <li>✓ Land use planning for settlement around volcanoes.</li> <li>✓ Protective structural measures.</li> </ul> <p><u>Specific Preparedness Measures:</u></p> <ul style="list-style-type: none"> <li>✓ National volcanic emergency plan.</li> <li>✓ Volcano monitoring and warning system.</li> <li>✓ Training for government official and community participation in search and rescue, fire fighting.</li> </ul>
<b><u>Landslides:</u></b>	<ul style="list-style-type: none"> <li>✓ Hazard Mapping.</li> <li>✓ Legislation and land use regulation.</li> <li>✓ Insurance.</li> </ul> <p><u>Specific Preparedness Measures:</u></p> <ul style="list-style-type: none"> <li>✓ Community education</li> <li>✓ Monitoring, warning and evacuation system</li> </ul>
<b><u>Tropical Cyclones:</u></b>	<ul style="list-style-type: none"> <li>✓ Risk assessment and hazard mapping</li> <li>✓ Land use control flood plain management</li> <li>✓ Reduction of structural vulnerability</li> <li>✓ Improvement of vegetation cover</li> </ul> <p><u>Specific Preparedness Measures:</u></p> <ul style="list-style-type: none"> <li>✓ Public warning system</li> <li>✓ Evacuation plan</li> <li>✓ Training and community participation</li> </ul>
<b><u>Flood:</u></b>	<ul style="list-style-type: none"> <li>✓ Flood control (channels, dikes, dams, weirs, flood proofing, erosion control)</li> </ul> <p><u>Specific Preparedness Measures:</u></p> <ul style="list-style-type: none"> <li>✓ Flood detection and warning systems</li> <li>✓ Community participation and education</li> <li>✓ Development of master plan for flood plain management</li> </ul>
<b><u>Drought:</u></b>	<ul style="list-style-type: none"> <li>✓ Drought and famine early warning system.</li> </ul> <p><u>Specific Preparedness Measures:</u></p> <ul style="list-style-type: none"> <li>✓ Development of inter-institutional response plan</li> </ul>
<b><u>Environmental pollution:</u></b>	<ul style="list-style-type: none"> <li>✓ Set ambient air quality standards</li> <li>✓ Set emission limit for every pollutants</li> <li>✓ Establish protection policies for water supplies</li> </ul>

	<ul style="list-style-type: none"> <li>✓ Reduce the use of pesticide by integrated management</li> <li>✓ Encourage organic farming</li> <li>✓ Reduce the use of pesticide by integrated management</li> <li>✓ Reduce the rate of deforestation and increase the planting of tree</li> <li>✓ Promote energy efficiency</li> <li>✓ Regulate use of aerosols and disposal of refrigeration units</li> <li>✓ Prohibit manufacture and use of CFC's</li> </ul> <p><u>Specific Preparedness Measures:</u></p> <ul style="list-style-type: none"> <li>✓ Establish a national environmental safety and protection plan</li> <li>✓ Create education programmes for environmental awareness</li> <li>✓ Training of government personnel as part of development programmes</li> </ul>
<b><u>Pest Infestations:</u></b>	<ul style="list-style-type: none"> <li>✓ Integrate pest management employing appropriate methods of physical control, cultural control, crop plant resistance, biological control legislation, chemical control and possibly eradication.</li> </ul> <p><u>Specific Preparedness Measures:</u></p> <ul style="list-style-type: none"> <li>✓ Establishing national plan for pest control</li> <li>✓ Training for government personnel and extension to farmers through farmers field and school</li> </ul>
<b><u>Chemical and Industrial Accidents:</u></b>	<ul style="list-style-type: none"> <li>✓ Development of plan such as the APELL (Awareness and preparedness for emergencies at the local level) process, to assist decision makers and technical personnel to improve community awareness of hazards on installations and aid them in preparing disaster responses plans.</li> </ul> <p><u>Specific Preparedness Measures:</u></p> <ul style="list-style-type: none"> <li>✓ Hazards mapping</li> <li>✓ Hazardous materials identification.</li> <li>✓ Inspection of chemical plants and storage facilities</li> <li>✓ Monitoring toxic waste disposal procedures</li> <li>✓ Improving fire fighting capacity</li> <li>✓ Create safety awareness</li> <li>✓ Monitoring pollution levels</li> <li>✓ Prepare and practice evacuation plans</li> <li>✓ Test warning sirens</li> </ul>

6. Reference: Book, Disaster Management Vol. 1 By G. K. Ghosh, 2012 Edition

### 1.11.9 The Government and Disaster:

#### Top-down Strategies:

Expert system for the assessment of environmental risk, for modeling environmental emergencies and for the improvement of the disaster warning, mitigation and reconstruction are already available, and will surely improve. They will be more widely distributed with the gradual spread of computerization into the management of complex system. Management of environmental risks in

developed countries is already quite advanced, both in terms of what is regularly monitored and in how society responds to exceptional emergencies.

**6. Reference: Book, Disaster Management Vol. 1 By G. K. Ghosh, 2012 Edition**

Bottom-up Strategies:

Traditional myth-making and other ways of coping with life's expected and unexpected disasters are important factors to the traditional Beja pastoralists of Sudan during the drought of the 1980's showed that they placed blame for the drought on God's anger on the moral qualities of the central regime, rather than on such factors as increased competition for grazing land or water. Similarly it is believed by even educated person of West Bengal in India and Bangladesh, that drought or flood is directly connected with timing of these Durga Puja festivals.

**6. Reference: Book, Disaster Management Vol. 1 By G. K. Ghosh, 2012 Edition**

Therefore, more attention should be paid to indigenous strategies of adjustment and adaptation to environmental calamities. In emergency planning and disaster preparedness, the most effective responses are those, which better orchestrate what the public is going to do in any case. That is, one should build upon natural reaction to hazards: first by trying to change those reaction that would be correct in others situations, but are incorrect in one type of emergency (for example, flight from home in a nuclear accident may be more hazardous than remaining in door); and second, by streamlining more efficiently other natural reactions (for example, designating familiar roads as escape route. **6. Reference: Book, Disaster Management Vol. 1 By G. K. Ghosh, 2012 Edition.**