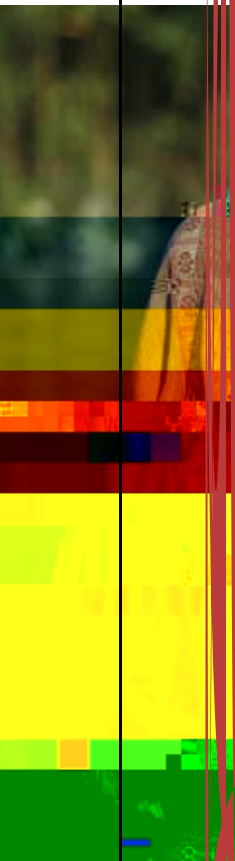
IUC

Envi

Not

Healthy

Karen



Ecosystem t Series

n Eco agement

© Reuters, A. Biraj, 2008

About IUCN

IUCN, International Union for Conservation of Nature, helps the orld nd pragmatic solutions to our most pressing environment and development challenges.

IUCN orks on biodiversit , climate change, energ , human livelihoods and greening the orld econom b supporting scienti c research, managing eld projects all over the orld, and bringing governments, NGOs, the UN and companies together to develop polic , la s and best practice.

Environmental uidance Note for Disaster Risk Reduction

Healthy Ecosystems for Human Security

Published b : IUCN, Gland, S it erland

Citation: Sudmeier-Rieu?, K. and N. Ash (2009) Environmental Guidance Note for Disaster Risk Reduction: Health Ecos stems for Human Securit . Gland, S it erland: IUCN, iii + 34 pp.

ISBN: 978-2-8317-1164-5

Cover photos: Front: Flooded village of Godadha, Bangladesh 2008 @Reuters/A. Biraj, 2008
Back: Post-tropical storm Stan, Me?ico 2005 @ M. Calvo, IUCN-ORMA, 2005

La out b : 100 Watt, St-Martin-Bellevue, France

Printed b : Pol gravia Arts Graphiques, Lausanne, S it erland.

Available from: IUCN Publications
rue Mauverne , 28
1196 Gland,
S it erland
Tel. 0041 22 999 0000
Fa?. 0041 22 999 0020
books@iucn.org
.iucn.org/publications

A catalogue of IUCN publications is also available.

Printed on FSC paper.

This note as developed to provide guidance on the bene ts of and a s **to integrate environmental concerns into disaster risk reduction strategies (DRR) at the local and national levels.** As recognised and outlined under the H ogo Frame ork for Action priorit 4: Reduce the Underl ing Risk Factors , health ecos stems and environmental management are considered ke actions in DRR. Although the eld of disaster risk management has evolved to recogni e the need for addressing development issues for reducing risk, the environmental dimension has not to date received adequate attention and practical guidance.

The questions we would like to answer with this guidance note are:

- **What are healthy ecosystems and ecosystem management?**
- **How can we integrate these environmental considerations into DRR?**

The rise in number and intensit of man e?treme h dro-meteorological events is increasingl recogni ed as being the result of global and regional climate change. More broadl and importantl , the underl ing risk factors of disasters are increasing: more people are living in vulnerable areas, such as lo l ing coastal areas, steep hillsides, ood plains, near cliffs, or in forested areas on the outskirts of cities most often out of necessit , but sometimes out of choice. Environmental degradation is reducing the capacit of ecos stems to meet the needs of people for food and other products, and to protect them from ha ards. The people affected b reoccurring disasters are often the most dependent on natural resources for their livelihoods, and the appropriate management of ecos stems can pla a critical role in their abilit to prevent, cope ith, and recover from disasters.

Investments in sustainable ecos stem management or sound environmental management can offer **eability eability et( )-e eability eabilit-of ority un ospeople gey(pe**

The bene ts that people derive from ecos stems, or ecos stem services are often categorised into four t pes:

- **Supporting services:**

The Millennium Ecos stem Assessment (MA), a five- ear international assessment initiative, clearl demonstrated the strong and varied links bet een human ell-being, human securit , livelihoods, health and intangible benefits such as equalit and freedom of choice, ith ecos stem services. The MA also highlighted that ecos stem degradation is undermining this link due to a number of human activities, mainl :

- **over-exploitation of resources** or higher demand for ecos stem goods than can be sustained, such as over shing;
- **land use and land cover changes,** or changes to habitats due to conversion to croplands and urbani ation;
- **climate change impacts** are affecting ecos stems and e?acerbating environmental degradation;
- **invasive alien species** are introduced species that compete and encroach vigorousl upon native species, ith the potential to degrade ecos stem services and cause severe economic damage;
- **pollution,** from chemical aste and agricultural inputs has severel degraded man ecos stem services, and continues to act as a major driver of change.

(modi ed from Miththapala, 2008)

Ecos stem degradation and loss have led to serious impacts on human ell-being: these include reduced availabilit of goods and services to local communities, increased spread of diseases and reduced economic opportunities. This, in turn, is leading to loss of livelihoods, and reduced food securit (Miththapala, 2008.)

Health ecos stems both reduce vulnerabilit to ha ards b supporting livelihoods, hile acting as ph sical buffers to reduce the impact of ha ard events. As such, this natural infrastructure is in man cases equall effective in reducing the impact of ha ard events, and are often less e?pensive than human-built infrastructure. Disasters also hamper development goals, and et fe governments, donors and development organi ations adopt a precautionar

Five reasons why ecosystems matter to disaster risk reduction:

- **Human well-being depends on ecosystems** that enable people to ithstand, cope ith, and recover from disasters. Disaster-resilient communities, especiall in rural areas, are based on health ecos stems and diverse livelihoods;

- **Ecosystems, such as wetlands, forests, and coastal systems can provide cost-effective natural buffers** against ha ard events and the impacts of climate change. According to the World Bank (2004), investments in preventive measures - including in maintaining health ecos stems is seven-fold more cost effective than the costs incurred b disasters;

- **There are clear links between resource degradation and disaster risk.** Degraded ecos stems are unable to provide the bene ts that help communities to reduce their vulnerabilit to disasters. In addition, man disasters are caused b reoccurring con icts, hich are based on competition for scarce natural resources and once a con ict has started it can also lead to additional environmental degradation;

- **Healthy and diverse ecosystems are more robust to extreme weather events.** Disasters can affect biodiversit through the spread of invasive species, mass species mortalit , loss of habitat and poorl designed post disaster clean-up efforts. This ma have a negative impact on progress to ard achieving the objectives of the Convention on Biological Diversit [1] and Millennium Development Goals;

- **Ecosystem degradation reduces the ability of natural systems to sequester carbon**, e?acerbating climate change impacted disasters.

BOX 3

An analysis of 141 countries in the period 1981 to 2002 found that dr- and 2007).

BOX 4

Examples and values of protective ecosystem services:

Regulating flood waters

Wetlands and peatlands provide storage space for ood aters, and there is gro ing evidence that maintaining vegetation and associated soil structure in local atersheds regulates the o of rain ater into streams and rivers, although this service can be over helmed ith large-scale rainfall and ooding events. Sri Lanka's Muturaja la marsh is a coastal peat bog covering over 3,100 hectares and an important part of local ood control as the marsh buffers and regulates ood ater discharge into the sea. The annual value of this service as estimated at more than $US 5 million, or $US 1,750 per hectare (Emerton and Bos, 2004). Riparian and coastal vegetation also stabili es shorelines and riverbanks. The costs of losing vegetation along riverbanks has been estimated at up to $US 425 per meter of bank (Ramsar Convention on Wetlands, 2005).

Reducing landslides, avalanches and rockfalls

In addition to providing improved aesthetics over engineering structures, forests are estimated to save bet een $US 2-3.5 billion per ear in disaster damage (UNISDR, 2004). S it erland, for e?ample, long ago recogni ed the value of 'protection forests' in reducing damage from avalanches, landslides and rock falls, and forests are a ke part of the countr 's disaster prevention plan (Stolten et al., 2008). Health forests are less likel to be invaded b pests, invasive alien species and destro ed b natural ha ards, and provide numerous additional bene ts such as the storage of carbon, and the opportunit for recreation, timber production and non-timber products.

Improving coastal management and flood risk reduction

Intact coastal ecos stems - in particular mature, stabili ed sand dunes, coral reefs, lagoons, salt marshes, and mangroves - pla an important role in reducing ood damage during coastal storms (UNEP-WCMC, 2006). Coastal ecos stems are particularl effecti(il)anparticularllmdre8,eujstj coartfaais,aa,,,
as nurser habitat for sh and other marine species, re ood, building materials and medicine hich support the needs of communities for both disaster risk reduction and darllopment (P(a)-20Act Net ork, 2008).

D(a)-ught, SimhuStorm and Fiegulation

Wild res, ind erosion, severe drought are e?pected to increase orld ide as a result of climate-20(,(chsmee-inge8ed)-13(eather-20(,(chsmee-20(m(,(Wind)-13(e(a)-20s0(r)-2(e(caus

maintain soil structures, trap ater and restore organic material, rendering soil more favorable to agricultural practices. Fire is a natural part of man ecos stems, and can enhance vegetation b controlling invasive plants and enhancing regenerative processes, especiall in gra ing lands. Where a reoccurring feature, re is best managed

How can ecosystem management be integrated with disaster risk management?

Although disaster risk management, ecos stem management, development planning (and climate change adaptation) institutions each have their o n speci c set of stakeholders, goals and actions, a number of these are interrelated (see Figure 2). The each seek the overarching goal of sustainable development, human ell-being and human securit . Improved dialogue and speci c coordinating mechanisms are being created bet een these spheres, although more effort is needed to achieve greater convergence. Like ise, conservation programmes can bene t b including risk and climate change considerations into project planning and monitoring. Belo are e?amples of speci c actions that can be taken to ard bridging the gap bet een ecos stem-based management and disaster risk management.

Three previously separate institutional spheres need to converge to form new procedures for integrated disaster risk management. Ecosystem management becomes central to all aspects of disaster risk reduction, without which goals of

- **Conduct integrated risk assessments** (coupling ph sical risk, vulnerabilit and environmental assessments);
- **Implement ecosystem restoration and rehabilitation** that follo clear technical guidance and match local needs and priorities;
- **Incorporate environmental safeguards** into disaster emergenc response plans, such as Rapid Environmental Assessments (see checklist belo);
  (Modi ed from UNEP, 2009)

Engaging with stakeholders

Ecos stem management practices are the most successful hen the involve communities as stakeholders and land ste ards, such as communit -managed marine protected areas, or communit forest user groups. These environmental mechanisms can become especiall relevant and effective for disaster risk reduction if the incorporate disaster risk assessments. To achieve this, there is a need to put into place mechanisms for consultations bet een environmental, planning and disaster management authorities. It is important to:

- **Build dialogues** and mechanisms for collaboration bet een environmental, planning and disaster risk management authorities and people affected b the decisions;
- **Include communities**, especiall omen, minorities, and people ith disabilities in designing and implementing the above procedures.

Knowledge creation and exchanges

Capacit -building through a areness-raising, education and training are critical to changing attitudes and behaviors to ard more sustainable environmental practices. As an e?ample, ecos stem rehabilitation and restoration can be options in the aftermath of a disaster or to safeguard against ne ones. Ho ever, successful ecos stem rehabilitation requires time, kno ledge, resources and should be conducted in consultation ith communities, appropriate technical advice, and based on local needs and priorities especiall hen natural restoration ma be the most effective option.

designing and implementilegislommunitie(oa)nitie(failsitie(isitie(initie()he)-e(i(( )Tmmunitie

5 years after the Indian Ocean tsunami - lessons learned from Sri Lanka

- **Beach clean-up efforts led to the spread of invasive species, notably prickly pear *(O ia h mif a)*;**
- **Dumping of debris from the cleanup into waterways and wetlands created pollution and drainage problems that hampered long-term recovery;**
- **Several transitional settlements were located in elephant pathways and near waterways, creating animal-human conflict and pollution of drinking water;**
- **In some instances, sand dunes and coral reefs that protected coastal communities from the tsunamis' full impact were used for building materials, thereby reducing coastal protection;**
- **Better coordination and information fow between environmental authorities, NGOs and disaster management authorities could have avoided several of these pitfalls;**
- **Women died and were affected in much larger numbers, likely due to restricted clothing and lack of swimming skills;**
- **Boats were improperly distributed post-tsunami, creating social tension and**

- **Rehabilitate damaged ecosystems with native species and prevent the spread of invasive alien species**; these are non-native species that can invade habitats and agricultural land.

- Special provisions should be made for women, children and other vulnerable populations, according to Sphere Handbook charter[5].

- **Rapid Environmental Assessments[6]** are useful to assessing the environmental situation post-disaster in a quick and lo cost manner for more effective immediate and long-term recover planning. (Modi ed from Miththapala 2008)

BOX 11

Key actions for ecosystem-based DRR:

Watersheds, forests and coastal zones are naturally linked – for example without adequate upstream forest cover, sedimentation can create severe downstream pollution and damage to coastal vegetation and coral reefs.

Watershed management

Watershed management is necessary for agricultural, environmental, and socioeconomic development. The physical and biological resources of watersheds provide goods and services to people, including water protection, attenuation of disasters by regulating runoff, protection of coastal resources and fisheries, protection of the environment and protection of productive lowlands. Watershed management programs need to build on existing environmental initiatives.

- **When located in foodplains, structures should be built to withstand food damage, to prevent floodwater contamination, and to avoid disruption to river courses, river banks and vegetation;**
- **Intensive agricultural activity should not to be permitted on slopes greater than a specified percentage reflecting land stability;**
- **Clear cutting of forests should be limited with forest conservation and sustainable forest management prioritised;**
- **Institutional bodies, such as River Basin Organisations should be formally established to address land use conflicts, and staff trained in conflict-resolution;**
- **Public participation of both men and women should be increased in management decisions;**
- **Effective management plans and enforcement of environmental and zoning regulation are critical;**
- **Regional environmental impact assessments are needed to ensure that cumulative impacts of economic activities are sustainable.**

Forest management

Forest management is required to balance demand for forest products with the ecological requirements of forests, while ensuring other key benefits for livelihoods, notably by stabilizing steep slopes and reducing soil erosion. Although listed separately here, forest management is often integrated into watershed management.

- **Protect and improve the forest environment through increased vegetation;**
- **Help alleviate poverty by generating income through increased tree cover and related activities;**
- **Increase forest resources;**
- **Establish community-driven economic activities based on forest plantation;**
- **Increase multiple uses for land; and**
- **Create popular awareness about sustainable forest management.**

Coastal zone management

Ecosystems such as coral reefs and coastal mangrove forests can adapt to change and recover from storms and floods and still provide services of protecting the coast and absorbing pollution. But once these ecosystems are put under pressure by coastal development, they may lose their resilience. Coastal zone management strategies being considered in the Asia-Paci fc region after the 2004 tsunami highlighted the continuum of inland areas, coasts, and oceans. Below are some key entry points.

- **Replant coastal forests and restoration of mangroves, which have been taken up as a part of the environmental recovery process.**
- **Restore and maintain the health of the coral reefs and seagrass beds.**
- **Maintain and/or develop mangrove belts as buffer zones for coasts and coral reefs.**
- **Protect wetlands and watersheds to minimize sedimentation.**

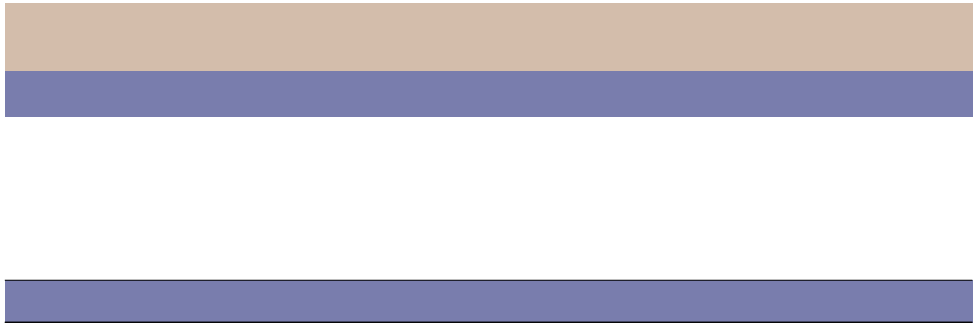
(Modi fed from DEWGA, 2008)

An island village, Fiji

[5] *(www.abuhrc.org)*

Protective Effects of Coastal Vegetation during the 2004 Tsunami in Sri Lanka

The tsunami in December 2004 hit large parts of the Sri Lankan coastline. In addition to more than 30,000 fatalities the aves also affected valuable coastal ecos stems such as lagoons, mangroves, and salt marshes. To check the h pothesis that coastal vegetation saved lives b reducing the energ of the aves, a surve as carried out in Balapiti a, a densel populated to n at the south-estern Sri Lankan coast. In the hinterland



2.7 National resources-related policies and environmental legislation (forestr plans, integrated coastal oning management plans etc) include and implement risk assessments

2.8 National Sustainable Development Strategies include and implement risk assessments

2.9 Public and private infrastructure investments that include enforceable EIAs and risk assessments

2.10 Financial incentives in the form of ta? rebates, subsidies, and other monetar and non-monetar re ards are for investments in ecos stem restoration and sustainable environmental management that emphasi e ecos stems as part of disaster risk planning.

3. Ecos stem-based management and DRR

Risk assessments are integrated into:

3.1

6.5.4 Coverage of live coral reef ecos stems
6.5.5 Area of health mangroves as buffer ones as measured b area, densit and idth

7. Threats to ecos stems are monitored

7.1 Climate change impacts
7.2 Conversion of ecos stems for urbani ation and agriculture
7.3 Fragmentation of habitats
7.4 Slash and burn agriculture
7.5 Over harvesting of forest products
7.6 Deserti cation
7.7 Industrial logging/ illegal logging
7.8 Over gra ing/ cattle ranching
7.9 Invasive Alien Species
7.10 Soil erosion
7.11 Eutrophication: overuse of fertili ers

Sources:
U.N. Commission on Sustainable Development (2007)
Cardona, Inter-American Development Bank, (2005)
Millennium Ecos stem Assessment (2005)
Convention on Biological Diversit
Environmental Vulnerabilit Inde? (2004)

Conclusions and future perspectives

Increasing numbers of e?treme events causing casualties and affecting populations are eather and climate-related. Ho ever, climate change, although often cited as the culprit of rising numbers of disasters, is one of several factors increasing disaster vulnerabilit and environmental degradation.

The risk of suffering from an particular disaster depends on the si e and frequenc of the ha ard event but even more on the vulnerabilit of people, often linked to environmental degradation and governance issues. Disasters are not caused b e?treme events themselves, but occur hen a societ 's capacit to cope ith an e?treme event is over helmed or mismanaged. For these reasons, the terms natural disaster and natural ha ard have increasingl become misnomers (He itt, 1997; Wisner et al., 2004; Abramovit et al., 2002).

Unfortunatel , available economic statistics on disasters do not re ect lost agricultural land and livelihoods in developing countries. The more common and chronic disasters - shallo landslides, recurring ooding, rising sea aters, drought, and impacts of invasive species - impose the greatest costs on poor populations, and et are not mirrored in of cial statistics on disasters. These small, cumulative disasters are most often those grounded in land use and pressure on natural resources, and are therefore often the most avoidable through appropriate ecos stem management.

Even if the number and frequenc of e?treme events increases, the magnitude of disasters can be reduced through adopting integrated approaches that combine development processes, disaster risk reduction measures, and ecos stem management. Combining

Abramovit , J., T. Banuri, P. Girot, B. Orlando, N. Schneider, E. Spanger-Siegfried , J. S it er, and A. Hammill. 2002. Adapting to Climate Change: Natural Resource Management and Vulnerabilit Reduction. Background Paper to the Task Force on Climate Change. Adaptation and Vulnerable Communities. (IUCN, World atch Institute. IISD, SEI-B).

Aguilar, L. 2009. In press. IUCN/UNISDR Gender Indicators

Cardona, O.D. 2005. Indicators of disaster risk and risk management: program for Latin America and the Caribbean: summar report

DEWGA. 2008. Stocktaking paper: Linking Disaster Risk Reduction, Environmental Management and Development Practices and Practitioners in Asia Paci c Region: A Revie of Opportunities for Integration, Working Paper.
ĚĚĚĭ}§Ě»[ĭÖ§ĉć) [ĉ[ćGē i íłs[ĉ‡ÚÖćJĉÚs Ìĉ[Ì‡łÖ» í đÇG[é§þĘS§þã‡ÚÖ í đÇĆ í đÇÇ¬Ç¬đ¶îé}´

Emerton and Bos. 2004. Value: Counting Ecos stems and Water Infrastructure. Water and Nature Initiative, (IUCN: Gland S it erland)

Emerton, L. 2009. Investing in Natural Infrastructure: the Economic Value of Indonesia's Marine Protected Areas. Coral Triangle Center, The Nature Conservanc (TNC), Bali

Goldammer, J.G. 1988. Rural land-use and res in the tropics. Agroforestr S stems 6, 235-252. *ĚĚĚĭıµþ§îëÖ‡Å´þ§‡ i ēþ»î}§*

He itt, K., ed. 1983. Interpretations of Calamit , from the Vie point of Human Ecolog . (Boston: Allen and Un in)

IISD, IUCN, SEI, SDC and Intercooperation. 2003. Livelihoods and Climate Change, Combining disaster risk reduction, natural resource management and climate change adaptation in a ne approach to the reduction of vulnerabilit and povert , (IISD:Winnipeg)

IUCN Meso America (ORMA). 2005. Tropical Storm Stan in MesoAmerica, S nopsis of Actions Taken b IUCN in the region *www.iucn.org/mesoamerica*

IUCN-UNEP (2007) Developing International Pa ments for Ecos stem Services: To ards a Greener World Econom . IPES Brochure, available online at: http://cmsdata.iucn.org/do nloads/ipes_brochure_0607_1.pdf

Le is, J. 1999. Development in Disaster-prone Places: Studies of Vulnerabilit . Intermediate Technolog Publications, London, UK.

Mainka, S, McNeel , J. and Xie, Y. Unpublished (2009) Ecos stem Considerations for Post-disaster recover : Lessons applied to the 2009 China earthquake

Millennium Ecos stem Assessment. 2005. Ecos stems and Human Well-Being S nthesis (Island Press, Washington D.C)

Miththapala, S. 2008 Integrating Environmental Safeguards into Disaster Management, Vol. 1 and Vol. 2 (IUCN:Ecos stems and Livelihoods Group, Asia)

Neuma er, E. and T. Plumper. 2007. The Gendered Nature of Natural Disasters: The Impact of Catastrophic Events of the Gender Gap in Life E?pectanc , 1981-2002 (London School of Economics and Political Science, White paper)

OECD. 2004. OECD Ke environmental indicators (OECD, Paris)

ProAct Net ork. 2008. Environmental Management, Multiple disaster risk reduction and climate change adaptation bene ts for vulnerabl communities (ProAct; Tanna , S it erland) *ĚĚĚîéþÚ[s‡ÖŞ‡ĚÚþìîÚþ»*
Secretariat of the Convention on Biological Diversit (2006) Global Biodiversit Outlook 2.Montreal

Shepherd, G. 2008. The Ecos stem Approach: Learning from E?perience (IUCN: Gland, S it erland)
ĚĚĚîł‡ēsÖîÚþ»ć[i Úē‡ćēÖł‡ÚÖćsÚÑÑł‡ãã‡ÚÖãćs§Ñćs§ÑĘ þ§ãÚēþs§ãćôáĆ¶đ‡ĽÃ§Å§sÚãĉã‡§ÑÅ[ééþÚ[sÃÅĺ§[þÖł‡Ö»Å´þÚÑÅ §ěé§þ§Ös§

Stolten, S., N. Dudle , J. Randall. 2008. Natural Securit , Protected Areas and Ha ard Mitigation. (WWF and Equilibrium: Gland, S it erland.)

Sudmeier-Rieu?, K., H. Masundire, A. Ri vi and S. Rietbergen (Eds.) 2006. Ecos stems, Livelihoods and Disasters, An integrated approach to disaster risk management, IUCN, Ecos stem management series, no. 4 (IUCN: Gland, S it erland.)

T igg. J. 2007. Characteristics of a Disaster-Resilient Communit , A Guidance Note, Version 1 for eld testing (DFID DRR Interagenc coordination group: UK)

United Nations Environment Programme World Conservation and Monitoring Centre (UNEP-WCMC) 2006. In the Front Line: Shoreline Protection and Other Ecos stems Services from Mangroves and Coral Reefs (UNEP: Cambridge, U.K.)

United Nations Environment Programme. 2009 Global Assessment Report on Disaster Risk Reduction (UNEP:Geneva)

UN DESA (Department of Economic and Social Affairs of the United Nations Secretariat). 2007.Indicators of Sustainable Development, Guidelines and Methodologies, Third Edition (UN: Ne York)
ĚĚĚîēÖîÚþ»ć§ã[ĉāēãĉ}§ęćÔ[ĉĺł‡Ö´Úć‡Õ}ł‡s[ĉÚþãć»ēł}§ĺ‡Ö§ãîé}´

UN/International Strateg Disaster Reduction. 2004. Living ith Risk: A global revie of disaster reduction initiatives, (UN/ISDR: Geneva, S it erland)

UN/International Strateg Disaster Reduction and UNEP. 2007. Environment and Vulnerabilit , Emerging Perspectives (UN/ISDR: Geneva, S it erland)

Wisner, B., P. Blaikie, T. Cannon, and I. Davis. 2004. At Risk, Natural Ha ards, People's Vulnerabilit and Disasters

International environmental frameworks, conventions and agreements relevant to DRR Risk Management Indicators

UNESCO World Heritage Convention (Paris, 1972)

Convention Concerning the Protection of the World Cultural and Natural Heritage Established **by parties to protect cultural heritage and natural heritage, from damage and destruction**, including those caused b disasters.

Agenda 21 (1992)

Adopted b 168 countries in 1992, establishes sustainable development as a main polic goal. Especiall relevant to disaster risk reduction is Chapter 7: Promoting Sustainable Human Settlement Development, hich refers to developing a **culture of safety** in all **countries, especially those that are disaster-prone** (paragraph 7.60).

Convention on Biological Diversity (1992)
(COP 6, the Hague, the Netherlands, 2002)

The Convention on Biological Diversit (CBD) has been rati ed b 190 Parties. In decision VI/26 (2002), the COP adopted the Strategic Plan for the CBD. This so-called 2010 Biodiversit Target as subsequentl endorsed b the World Summit on Sustainable Development and the United Nations General Assembl at the 2005 World Summit. The Summit also highlighted the essential role of biodiversit in meeting the Millennium Development Goals (MDG), and the 2010 Biodiversit Target has been incorporated into the MDGs. Of relevance here is the focal area ithin the 2010 target of: **maintaining ecosystem integrity, and the provision of goods and services provided by biodiversity in ecosystems, in support of human well-being.**

Convention to Combat Deserti f cation (1994)

Relating speci call to drought, Part II of the Convention (on General provisions), paragraph 2, states that: In pursuing the objective of this Convention, the Parties shall: (d) promote cooperation among affected countr Parties in the elds of

Selected tools and resources related to environment and DRR

Asian Disaster Preparedness Center

- Community based DRM tool

CARE International *(www.care-international.org)*

- Community Vulnerability Capacity Assessment Tool

Center for International Climate and Environment Change Oslo *(www.cicero.uio.no)*

Disasters and Environment Working Group for Asia *(www.dewga.net)*

Global Fire Management Center

International Institute for Rural Reconstruction *(www.iirr.org)*

- Ecosystem-based Disaster Risk Reduction
  International Institute for Sustainable Development/ Intercooperation/IUCN/SEI
- CRiSTAL (Community Risk identification Screening Tool for Adaptation and Livelihoods - *www.cristaltool.org*)

International Federation of Red Cross and Red Crescent Societies

- Vulnerability and Capacity Analysis

International Union for Conservation of Nature

- Tsunami guidelines *(www.iucn.org/resources/tools)*
- Integrating Environmental Safeguards into Disaster Management, Vol. 1 and Vol. 2 and Training module

- Ecosystems, Disasters and Livelihoods: An Integrated Approach to Disaster Risk Reduction
- Strengthening Decision-Making Tools for Disaster Risk Reduction, a case study from Northern Pakistan

Island issues *(www.islandvulnerability.org)*

La Red *(www.desenredando.org)*

Pro Act Net ork

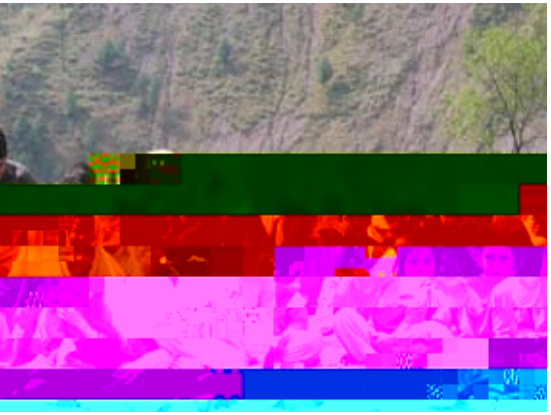
Provention Consortium

Risk RED *(www.riskred.org)*

Stockholm Environment Institute *(www.sei.se)*

United Nations Environment Programme

United Nations Univer



?é§ÖÅ[‡þ¢ãsÃÚÚíz¢éÚã¢Å§[þ¢Ãóë[Ì§¢G[Ì‡ã¢[Ö

INTERNATIONAL UNION
FOR CONSERVATION OF NATURE

WORLD HEADQUARTERS
Rue Mauverney 28
1196 land, Switzerland
mail@iucn.org
Tel +41 22 999 0000
Fax +41 22 999 0002
www.iucn.org/ecosystems
ecosystems@iucn.org