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Environment and ecosystems

The relationship between disasters and the environment is highly complex. There is growing evidence of disasters impacting on natural resources and ecosystems, and of environmental degradation increasing disaster risk. However, there are also opportunities to harness the linkages between disasters and environment to reduce risk, at the same time as providing 'no regrets' development and climate change adaptation co-benefits. The successor to the HFA must recognise the potential of environment to build resilience to disasters.

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Disasters cause environmental degradation

During the 1997–98 El Niño event (a climatic phenomenon of periodic warming), a spike in sea surface temperatures led to the loss of 16% of the world’s coral, and some countries, such as the Maldives, lost up to 90% of their reef coverage.¹³¹

Environmental impacts of the Deepwater Horizon oil spill in the Gulf of Mexico – one year on:¹³²



Between 1973 and 2009, salt intrusion caused by cyclone and storm surges contributed to a 27% increase in the area of Bangladesh affected by salinity.¹³³



During the 2010 Russian heatwave, drought, high temperatures and fires destroyed one-third of the national grain crop, caused widespread destruction of wildlife habitats and altered the make-up of Central Russia’s forests for several generations into the future.¹³⁴

Environmental degradation increases disaster risk

Floods are among the most frequently occurring natural hazards. Environmental degradation is widely recognised to be an important cause.

Hydrological disasters by continent in the past 10 years:¹³⁵

	Number of events	Number of people killed	Total number of people affected	Damage (\$ 000)
Africa	420	7,637	28,967,375	3,377,868
Americas	343	7,104	37,862,402	46,244,765
Asia	762	49,259	743,314,531	170,018,808
Europe	192	892	2,741,691	46,059,670
Oceania	48	248	687,530	11,865,747
TOTAL	1,765	65,140	813,573,529	277,566,858

In 2011 floods accounted for 44% of all disasters in Asia and were responsible for 54% of all disaster-related deaths.¹³⁶ In the Mekong Delta, over 20 million people access groundwater aquifers via more than 1 million wells. Over-exploitation is exposing a dense population to a range of hazards, including arsenic contamination,

saline intrusion, land subsidence and potential damage to infrastructure.¹³⁷

The impacts of Hurricane Katrina were exacerbated by the loss of Louisiana’s wetlands, at a rate estimated to be 6,600 acres per year.¹³⁸

Sustainable environmental management can reduce disaster risk

Coral reefs absorb more than 85% of incoming wave energy, benefiting 200 million people living in low-lying coastal zones.¹³⁹ By one estimate, the total net benefit of the world’s coral reefs in terms of coastal protection is \$9 billion per year.¹⁴⁰



Coral reefs and sea grass habitats provide

up to 40%

of coastal protection against storm surges in Jamaica.¹⁴¹

Number of people protected by coral reefs around the world:¹⁴²

KEY



Reefs at high or very high risk based on number of threats



Number of people living at low elevation (<10m) and near reefs (<50km)

ASIA

37% **127.2 million**



NORTH AND CENTRAL AMERICA AND THE CARIBBEAN

29% **15 million**



SOUTH AMERICA

23% **8 million**



AFRICA

37% **7.4 million**



OCEANIA

11% **1.9 million**



CYCLONE NARGIS caused over 135,000 deaths in Myanmar in 2008. The affected area had experienced a

50%

loss of its mangrove forests and serious degradation of its remaining cover since the 1970s.¹⁴³



IN 2004, the Asian tsunami hit Sri Lanka’s southern coast

KAPUHENWALA VILLAGE



2 deaths



200 hectares of mangrove habitat

WANDURUPPA VILLAGE



5,000–6,000 deaths



degraded mangrove habitat¹⁴⁴

Substantial investments are being made in the environment to reduce disaster risk



AMOUNT THE GOVERNMENT OF THE PHILIPPINES

has pledged for mangrove restoration after Typhoon Haiyan:

PHP 1 billion¹⁴⁵



IN VIETNAM, THE PLANTING AND PROTECTION

of 12,000 hectares of mangroves by the Red Cross cost around \$1.1 million, but helped to reduce the cost of sea dyke maintenance by:

\$7.3 million per year¹⁴⁶



TO TRANSFORM THE SAHARA AND SAHEL

into a stable, sustainable and resilient region, the World Bank and the Global Environment Facility are investing to support the Great Green Wall initiative.¹⁴⁷

\$1.1 billion

SUMMARY OF RECOMMENDATIONS

- The environment needs to be strengthened as a key consideration in the post-2015 framework for DRR, as well as in the post-2015 development goals and the UNFCCC negotiations. The opportunity for closely aligning these frameworks must not be missed, in order to ensure coherence but also to realise the potential co-benefits of sound environmental management for sustainable, climate-compatible development.
- The HFA does not adequately acknowledge the cross-cutting nature of environment or the different dimensions of the relationship with disaster risk. Its successor must move beyond simple consideration of environment as a risk factor and incorporate it into all aspects of the framework.
- Environmental factors need to be fully integrated into risk assessment and monitoring processes.
- More detailed measures for 'soft' engineering solutions for DRR, such as restoration of coastal ecosystems or reforestation of watersheds, should be acknowledged in the successor to the HFA.
- Adequate financial, technological and knowledge resources will be needed to build capacity for integrating environmental management into national and international institutions. This should be explicitly recognised in the post-2015 framework on DRR's approach to implementing and financing DRR.

How environment is featured in the HFA

Para 3: '[...] Disaster risk arises when hazards interact with physical, social, economic and environmental vulnerabilities.'

Para 17: 'The starting point for reducing disaster risk and for promoting a culture of disaster resilience lies in the knowledge of the hazards and the physical, social, economic and environmental vulnerabilities to disasters that most societies face, and of the ways in which hazards and vulnerabilities are changing in the short and long term, followed by action taken on the basis of that knowledge. Key activities: [...] Develop systems of indicators of disaster risk and vulnerability at national and sub-national scales that will enable decision-makers to assess the impact of disasters on social, economic and environmental conditions [...].'

Para 19: 'Disaster risks related to changing social, economic, environmental conditions and land use, and the impact of hazards associated with geological events, weather, water, climate variability and climate change, are addressed in sector development planning and programmes as well as in post-disaster situations.'

Para 19 (i): 'Environmental and natural resource management (a) Encourage the sustainable use and management of ecosystems, including through better land-use planning and development activities to reduce risk and vulnerabilities. (b) Implement integrated environmental and natural resource management approaches that incorporate disaster risk reduction, including structural and non-structural measures, such as integrated flood management and appropriate management of fragile ecosystems [...].'

Para 19 (o): 'Mainstream disaster risk considerations into planning procedures for major infrastructure projects, including the criteria for design, approval and implementation of such projects and considerations based on social, economic and environmental impact assessments.'

How environment is included in statements and consultations on the successor to the HFA

Elements Paper

Para 8: '[...] poorly planned and managed urban development, environmental degradation, poverty and inequality and weak governance mechanisms continue to drive rapidly-increasing loss and damage associated with extensive risk.'

Para 9: 'Unless these drivers [of disaster risk] are addressed, in coming decades [...] food security and environmental health will threaten the viability and sustainability of nations, enterprises and communities.'

Para 12: 'The creation of a more resilient humanity and environment requires strong international and local commitment, and goodwill to engineer the necessary changes to current development practices, processes and patterns.'

Para 14: '[A harmonised post-2015 paradigm] should enable the management of the risks inherent to development and that manifest through disasters, climate change and variability, financial and economic crises, and other consequences for the economy, society and the environment.'

Para 32: '[...] The sustainability of development and resilience of people, nations and the environment depend on sound

risk management, which needs to guide private and public planning investments.'

Para 35: '[...] the priority areas of the post-2015 framework for disaster risk reduction need to be defined in terms of critical public policies that address disaster risk in publically owned, managed or regulated services and infrastructures, and in the environment [...].'

Para 39: 'The success of these policies will determine the level of disaster loss and damage a country faces and the longer term impacts on the economy, the environment and social welfare.'

Para 43: 'Indicators will be developed in some categories, including: economic and fiscal structure; poverty and social vulnerability; environmental and ecosystem services degradation and climate change; urbanization; coping capacity.'

Para 53: 'Proposed substantive elements for consideration in the political declaration include: [...] a recognition of the need to focus explicitly on risk management, encompassing the reduction of existing risk and the avoidance of new risk accumulation, to achieve resilience of people, nations and environment.'

Chair's Summary

'Several proposed actions included: [...] utilizing established mechanisms for environmental protection such as Environment Impact and Strategic Environmental Assessments, systems for protected areas management and integrated water resource and coastal zone management to address environmental degradation, strengthen livelihoods and address disaster risk [...].' (pp. 1–2).

'Both the accumulation and reduction of disaster risk are closely intertwined with the fields of sustainable development, environmental protection and climate change as well as human mobility. It is important that policies in these areas are designed to be mutually reinforcing, whether at the local, national or international levels' (p. 2).

Mid-Term Review

'Progress reported in 2007 on reducing underlying risk factors was limited [...] There was also little mention of successfully reducing risk through sustainable natural resource management and the incorporation of disaster risk reduction measures into environment planning and management' (pp. 27–28).

'The subsequent reporting cycle, ending in 2009, indicated that many countries had difficulties addressing underlying risk drivers such as [...] ecosystem decline in ways that led to reduced risk of damages and economic loss' (p. 28).

'At the local level there is an increasing recognition of links between natural resource management and disaster risk reduction issues' (p. 28).

'Additional guidelines have been produced by UNISDR partners and thematic platforms, including [...] a guidance note on environment and risk reduction [...].' (p. 36).

'[...] However, the study highlighted a common misconception about disaster risk reduction being a technical issue as opposed to an approach to the survival of human beings, livelihoods, and assets underpinning development, environment, and human rights' (p. 37).

'[...] the study suggested considering the possibility of having higher-level representation for UNISDR in New York to facilitate higher visibility and improve its ability to participate in discussions

bridging humanitarian, development, and environmental perspectives' (p. 38).

'[...] governance arrangements do not facilitate integrated management of risk drivers, especially when responsibilities for critical issues such as environment policy, social protection mechanisms, disaster risk reduction, climate change adaptation, land tenure and rural development policy, housing, and urban development policy are entrusted to different governmental entities' (p. 44).

'The General Assembly has regularly called for a more effective integration and, by acknowledging the significant impacts of disaster risk reduction on social, economic, cultural, and environmental systems, underlined the need for a close interrelation of disaster risk reduction with development' (p. 56).

'[...] the Mid-Term Review Advisory Group advocated for full integration and reflection of disaster risk reduction in the development, humanitarian and environmental work of the UN, including in its Strategic Framework and Programme Budget documents' (p. 57).

'A significant role identified for the international community, especially bilateral and multilateral aid organizations and NGOs, was support of national level mechanisms for the implementation of integrated and more flexible humanitarian, environmental, disaster risk reduction, and development programmes' (p. 64).

'National and international institutions, including bilateral aid organizations and the United Nations, must integrate disaster risk reduction in their development, climate change adaptation, environmental and humanitarian planning, execution and accountability frameworks to safeguard development gains and investments' (p. 69).

RECOMMENDED READING

For more on environmental impacts of disasters:

IPCC (2012b) *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX). A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change* [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, UK, and New York.

IPCC (2014) *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, UK and New York, USA: Cambridge University Press (<http://ipcc-wg2.gov/AR5/report/final-drafts/>)

To understand the role of ecosystem services in building resilience, see:

Carabine, E., Cabot Venton, C., Tanner, T. and Bahadur, A. (2014) *The contribution of ecosystem services to human resilience: a rapid review*. London: Overseas Development Institute.

Renaud, F., Sudmeier-Rieux, K. and Estrella, M. (eds) (2013) *The role of ecosystems in disaster risk reduction*. Tokyo: United Nations University Press.

For more on how to integrate environment into development practice, see:

Wilkinson, E., Carabine, E., Harris, K., Brickell, E., Scott, A., Allinson, C., Jones, L. and Bahadur, A. (2014) *Integrating disaster risk reduction, environmental sustainability, climate change adaptation and mitigation into development practice: experiences, challenges and benefits*. Advancing Integration Series. Working Paper. London: Overseas Development Institute.