CHILD-CENTRED RISK ASSESSMENT

Regional Synthesis of UNICEF Assessments in Asia

Multi-hazard map (UNICEF 2012)

Very low
Low
Medium
High
Very high
Extremely high

Child Vulnerability map (UNICEF 2012)

Very Low
Low
Medium
High
Very High
Extremely High

Child-centred Risk map (UNICEF 2012)

Low
Medium
High
Very High

Exposure (child population)

unite for children

unicef

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Acronyms

ADPC	Asian Disaster Preparedness Center
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
BNPB	Indonesian Disaster Management Agency
CCA	Climate Change Adaptation
CCCs	(UNICEF) Core Commitments for Children in Humanitarian Action
CRED	Centre for Research on the Epidemiology of Disasters
DEM	Digital Elevation Model
DEWA	(UNEP) Division of Early Warning and Assessment
DPT	Diphtheria, Pertussis, and Tetanus vaccine
DRR	Disaster Risk Reduction
EAPRO	(UNICEF) East Asia and Pacific Regional Office
EM-DAT	Emergency Disasters Database
EMIS	Education Management Information System
EMOPS	(UNICEF) Office of Emergency Programmes
GDP	Gross Domestic Product
GFDRR	Global Facility for Disaster Reduction and Recovery
GRID	(UNEP) Global Resource Information Database
LSIS	Lao Social Indicator Survey
METI	Ministry of Economy, Trade and Industry
NDMA	National Disaster Management Authorities
NDMO	National Disaster Management Office
NGO	Non-governmental Organization
OCHA	Office for the Coordination of Humanitarian Affairs
ROSA	(UNICEF) Regional Office for South Asia
SitAn	Situation Analysis
SMS	Short Message Service
SUSENAS	Indonesia Social and Economic Survey
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UN-HABITAT	United Nations Human Settlements Programme
UNICEF	United Nations Children's Fund
UNISDR	United Nations International Secretariat for Disaster Reduction
WASH	Water, Sanitation and Hygiene

Contents

Foreword

In 2012, Asia was hit by the largest share of disasters in the world (40.7 per cent), followed by North and South America (22.2 per cent), Europe (18.3 per cent), Africa (15.7 per cent) and Oceania (3.1 per cent).[1] The number of victims in Asia in 2012 (80.3 million) was, however, far below the 2002-2011 average (232 million). While consolidated data for 2013 was not available before this publication, South Asia is likely to remain the world region most prone to disaster impacts. In addition to natural hazards, parts of South Asia continue to be affected by conflicts.

Over the last few years, UNICEF Regional Office for South Asia (ROSA) has provided technical support and guidance for the scaling up and integration of disaster risk reduction (DRR) and climate change adaptation (CCA) in UNICEF-supported Country Programmes in South Asia. These efforts have been well-received by UNICEF Country Offices in the region, since these frequently have to respond to the humanitarian consequences of disasters especially as they affect the survival, well being and rights of millions of children in the South Asia region. Our efforts are also in line with UNICEF new global Strategic Plan 2014-2017 which calls for increased attention and resources on risk informed programming, notably in the mitigation and prevention of disaster risks and the negative consequences of climate change.

This publication describes UNICEF's work in South Asia in pursuing risk-informed planning by integrating child vulnerability data with natural hazards and climate change information. Child centered risk assessments were initiated by UNICEF Nepal in 2011 and followed by UNICEF Country Offices in Pakistan and India in 2012. UNICEF Offices in Asia and the Pacific – notably in Lao PDR, Indonesia, and Solomon Islands - have also sought inspiration in this spatial methodology to quantify child risk as part of the preparation for, or review of ongoing Country Programmes. The methodology has also been welcomed by UNICEF Office of Emergency Programme (EMOPS) which has incorporated child-centered risk assessments in its guidance on emergency-risk informed planning.

The objective of these assessments is not just to produce maps, but to use them as tools for programme planning and implementation and for advocacy on child-centered DRR and CCA. This publication describes the process, requirements and limitations of child-centered risk assessment, leading up to risk informed action planning in the different UNICEF programme sections. By reconsidering the geographical focus, the beneficiaries, the outreach, the timing and the approach, UNICEF interventions can become effective risk reduction and adaptation interventions.

With the adoption of the resilience concept in the new UNICEF Strategic Plan 2014-2017, these efforts have become more important. In South Asia it is essential that resilience builds upon our years of experience with risk informed planning, and attempts to better align humanitarian action and development programming. The ultimate goal is to ensure that humanitarian action pays more attention to vulnerabilities rather than shocks, and that nationally-owned development policies and plans become risk informed and climate sensitive.

It is my hope that this publication will contribute to the ongoing discussion within and outside of UNICEF to advance child-centered risk assessments as a key approach to proactively address disaster risk, climate change, and other man-made hazards so as to lessen its impact on the most vulnerable and build their resilience.

Children in South Asia deserve it!

Karin Hulshof
Regional Director
UNICEF South Asia

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[1]   Source: Universite Catholique de Louvain, 'Annual Disaster Statistical Review 2012', August 2013

1 Introduction

Asia and the Pacific[2] incur the greatest human, social and economic losses globally triggered by natural hazards. The dominating hazards include earthquakes, tsunamis, floods, landslides, volcanic eruptions and droughts. Weather-related hazards are becoming more frequent, intense and unpredictable and are likely to be exacerbated by climate change (UNISDR, 2013). Increased exposure (e.g. population density and population growth) and vulnerability (e.g. unregulated land use, poor construction standards, migration, urbanization and poverty contribute to growing disaster risk.

Most disaster losses are caused by the cumulative effect of high frequency and low impact events. Disasters and climate change disproportionately affect poor countries, erode development gains and impede progress in achieving the Millennium Development Goals and the realization of child rights. They thus exacerbate existing vulnerabilities and inequalities across gender and age groups, in particular vis-à-vis the most marginalized populations.

Disaster risk is a function of hazard, vulnerability, exposure and capacity. It is time and place-specific, leading to potential losses in lives, health status, livelihoods, assets and services. Disaster Risk Reduction (DRR) is a systematic approach to reduce disaster risk by minimizing vulnerabilities, and preventing or limiting (mitigating and preparing for) the adverse impacts of hazards. As such, it is both a humanitarian and a development concern.

With a mandate that combines humanitarian relief and development work, UNICEF recognizes its crucial responsibility to integrate DRR into its programmes. UNICEF's extensive field presence before, during and after a disaster also means that UNICEF is ideally positioned to address disaster risk and undertake risk reduction measures (UNICEF, 2012b). In collaboration with governments and NGOs[3] UNICEF promotes child-centred DRR in order to strengthen the resilience of children, families and communities to shocks and stresses relating to natural hazards, climate change, violent conflicts and epidemics.

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[2]   UNICEF has eight Country Offices in South Asia: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. UNICEF has 14 Country Offices in East Asia and the Pacific: Cambodia, China, DPR Korea, Indonesia, Lao PDR, Malaysia, Mongolia, Myanmar, Pacific Island Countries, Papua New Guinea, Philippines, Thailand, Timor-Leste and Viet Nam.

[3]   Partners in the Changing Climate Coalition are the Institute of Development Studies (University of Sussex), Plan International, Save the Children, World Vision and UNICEF. This coalition has a regional arm working to influence climate change and DRR policies in Asia and the Pacific. For more information see: http://www.childreninachangingclimate.org/home.htm

**CHILD-CENTRED
RISK ASSESSMENT**

CHILD-
CENTRED
RISK
ASSESSMENT

2

This publication begins by outlining the importance of child-centred DRR in Asia and the Pacific and describing UNICEF's actions to advance risk-informed programming[4]. It presents UNICEF's approach to child-centred risk assessments undertaken by six UNICEF offices in the region: India, Indonesia, Lao PDR, Nepal, Pakistan and Solomon Islands. It describes how natural hazards, climate change, child vulnerability, exposure and capacity were combined to produce these risk assessments, and points out key similarities and differences in the methodologies used. Lastly, this paper articulates some of the ways the assessment findings can be utilized in practice.

The publication aims to provide practical guidance to government counterparts, UNICEF offices and partner organizations interested in conducting risk assessments that consider the needs of children. Rather than elaborating on the outcomes of each assessment, it describes the child-centred approaches that were taken, the challenges encountered during the process of analysis, and the lessons learned. It should be noted that the assessments presented here are not necessarily the final products. The six Country Offices concerned continue to improve their assessments as and when newer and more accurate data become available.

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[4]   Risk-informed programming is one of UNICEF's approaches to resilience (UNICEF EMOPS, 2013). It refers to programming informed by natural hazards, climate change, conflict and/or other risk factors. The child-centred assessment methodology described in this paper prioritizes natural hazards and to a lesser extent climate change.

2 Child-centred DRR

2.1 Child-centred DRR in Asia and the Pacific

DRR efforts cannot properly take into account children's needs unless these are given voice during the design and implementation of development and humanitarian programmes (Back, Cameron & Tanner, 2009). As such, UNICEF and partners advocate for child-centred DRR in Asia and the Pacific. Child-centred DRR is DRR *for* and *with* children and involves children, parents, communities, service providers and governments. It aims at strengthening accountabilities between rights-holders (children) and duty-bearers (parents, communities, service providers and governments) through improved information flows and exchange, thereby contributing to capacity development.

There are three solid rationales to support a child-centred approach to DRR.

Child rights: From a child rights perspective, child-centred DRR reflects the understanding that disaster risk affects a child's basic right to survival and development. It upholds their right to participate in decision-making and have access to relevant information, as well as the requirement that decisions be made in their best interests (Children in Climate Change, 2011). In terms of climate-related hazards, intergenerational justice has to be taken into account[5] because today's children will experience more impacts in the future than adults. Under the *UN Convention on the Rights of the Child* ratified by all member states in Asia and the Pacific, children have inalienable rights in all circumstances, including in disasters. Thus, the *UN Convention on the Rights of the Child* and child-centred DRR are mutually reinforcing.

Demography: From a demographic perspective, the child population in Asia and the Pacific matters. Children constitute between one third and one half of the population in most countries in Asia and the Pacific and they are often disproportionately affected by disasters (5th Asian Ministerial Conference on DRR, 2012). Globally, climate change impacts in the future are projected to increase the number of children affected by weather-related hazards from an estimated 66.5 million per year in the late 1990s, to as many as 175 million per year in the coming decade (Save the Children UK, 2007).

Policy support: It is worth noting that there is growing support for child-centred DRR from high-level policy makers in the region. Following the 2004 Indian Ocean Tsunami and the formulation of the *Hyogo Framework for Action 2005-2015*, a number of regional as well as global declarations acknowledged the importance of children and school safety. In October 2010, delegations from 28 countries adopted the *Beijing Declaration on South-South Cooperation for Child Rights in the Asia Pacific Region*. It recognized DRR as a frontline strategy for Climate Change Adaptation (CCA)

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[5]   There should be distributive fairness or justice between children, youth, adults and future generations, and the rights of the generations should be considered equal over time (UNICEF, 2008 and UNICEF EAPRO, 2011).

and sought to promote child-centred and community-based DRR (UNICEF & Government of China, 2010). In 2012, the 5th Asian Ministerial Conference on DRR adopted the *Yogyakarta Declaration*, which included a *Statement of Children, Youth and Child-centred Organizations* calling for the mainstreaming of child-centred DRR (5th Asian Ministerial Conference on DRR, 2012).

At the global level, the *Children's Charter for DRR* is an effective tool to create awareness of child-centred DRR (Children in a Changing Climate, 2011).

> The *Children's Charter for DRR* is based on consultations with more than 600 children in 21 countries in Africa, Asia, the Middle East and Latin America. The Charter identifies five priorities:
> 1) Schools must be safe and education must not be interrupted.
> 2) Child protection must be a priority before, during and after a disaster.
> 3) Children have the right to participate and to access the information they need.
> 4) Community infrastructure must be safe, and relief and reconstruction must help reduce future risks.
> 5) DRR must reach the most vulnerable.

2.2 Child-centred DRR in UNICEF

Internally, UNICEF has begun emphasizing the importance of risk-informed Country Programmes. There are several guiding documents worth highlighting. Firstly, two UNICEF EMOPS guidance notes stress that the foundation for risk-informed programming is the identification and assessment of priority risks in a given country through a 'risk-informed' Situation Analysis (SitAn) (UNICEF EMOPS 2010b). The SitAn is an essential step to ensure that UNICEF Country Programmes are developed on the basis of a sound child-centred analysis of risk so as to proactively reduce the vulnerability of children and build their capacity (UNICEF EMOPS, 2012a). UNICEF's core guidance for programming, the *Programme Policy and Procedure Manual*, has therefore been revised to incorporate risk-informed planning.

Secondly, with the emergence of the resilience concept championed by the international aid community, UNICEF is currently developing its own approach to resilience, based on the recognition that the social and economic costs of disasters, climate change, conflicts and other calamities have continued to increase and that reactive humanitarian interventions are expensive and unsustainable. UNICEF has identified risk-informed programming as one of its two main approaches to resilience (UNICEF EMOPS, 2013). The recognition of different types of hazards and the importance of resilience have been incorporated in the new global *UNICEF Strategic Plan 2014-2017*.

Thirdly, from a humanitarian perspective, UNICEF's *Core Commitments for Children in Humanitarian Action* (CCCs) provide a set of principles, approaches and specific interventions that cover preparedness, response and early recovery, and thus bridge the gap between development and humanitarian programming (UNICEF EMOPS, 2010a). While they echo the second approach of the UNICEF resilience agenda – the sequencing and alignment of development and humanitarian work – the revised CCCs underpin risk-informed programming as one of the strategies to support humanitarian action (UNICEF EMOPS, 2011). DRR is thus an important component of the CCCs as it emphasizes that preparedness and response (emergency programming) need to be supplemented by prevention and mitigation (recovery and development programming). The purpose of all these approaches is to ensure that humanitarian action becomes less shock-driven and more vulnerability-based and that development programmes become risk-informed and climate sensitive.

3 Child-centred Risk Assessments

In 2011, UNICEF Nepal's Emergency Unit developed the first child-centred risk assessment in collaboration with UNICEF's regional emergency team. In DRR, risk is commonly understood as a function of hazard, vulnerability, exposure and capacity. The basic risk formula is as follows:

$$\text{Risk} = \frac{\text{Hazard x Vulnerability x Exposure}}{\text{Capacity}}$$

Inspired by OCHA's Global Focus Model, the Nepal risk assessment applied a quantitative and spatial risk methodology. With a specific focus on child vulnerabilities, data was collected for each component of the risk formula, the methodology demonstrating that risks are inter-disciplinary and multi-sectoral in nature. The findings identified localities with the highest disaster risk. This new approach integrating natural hazards into development work motivated several other UNICEF offices in Asia and the Pacific to undertake similar exercises. UNICEF Country Offices in Pakistan, India, Lao PDR, Indonesia and Solomon Islands undertook child-centred risk assessments to make UNICEF Country Programmes risk-informed by embedding DRR and CCA into the programming cycle, often through the SitAn or a Mid-Term Review. In India, the child-centred risk assessment was not designed for internal purposes but to influence National Disaster Management Authorities (NDMA) and support the Government's risk-informed planning.

Two types of UNICEF-supported child-centred risk assessments have been piloted:

1. **One dimensional (spatial) risk assessment**: Country Offices in Pakistan, Lao PDR and Indonesia and the Solomon Islands Field Office undertook the same type of assessments as UNICEF Nepal. By overlaying child vulnerability and hazard data, these assessments provide snapshots of the spatial distribution of risk at a given point in time.

2. **Two dimensional (spatial and temporal) risk assessment**: The India Country Office went one step further by assessing the changes of risk over time. In collaboration with DevInfo[6] and the NDMA, UNICEF India piloted a Multi-hazard Vulnerability Mapping system for regular data collection in the states of Rajasthan and Bihar. The system enables risk-informed development planning through real time monitoring and analysis of various hazards and demographic and economic indicators in correlation with key child development indicators at district level.

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[6] DevInfo is a powerful database that is used to compile and disseminate data on human development. It is an integrated desktop and web-enabled tool that supports both standard and user-defined indicators. The DevInfo project is an interagency initiative managed by UNICEF on behalf of the UN System: http://www.devinfo.org/

The following sections describe the choice of indicators and processes followed in the development of the child-centred risk assessments. The sections are structured according to each component of the risk formula (hazard, vulnerability, exposure and capacity) followed by a section on risk calculation.

3.1 Hazard Analysis

The first step of a child-centred risk assessment is to collect and analyse information on hazards. A hazard map of the country, ideally one covering multiple hazards, is needed to conduct a spatial analysis. The majority of UNICEF Country Offices used pre-existing multi-hazard assessments developed by the national government, academic institutions or other agencies while the Pakistan Country Office created a multi-hazard map based on available single-hazard maps (see Figure 1). The Lao PDR Country Office combined the use of existing multi-hazard as well as single-hazard maps.

FIGURE 1 Multi-hazard Map Creation in Pakistan
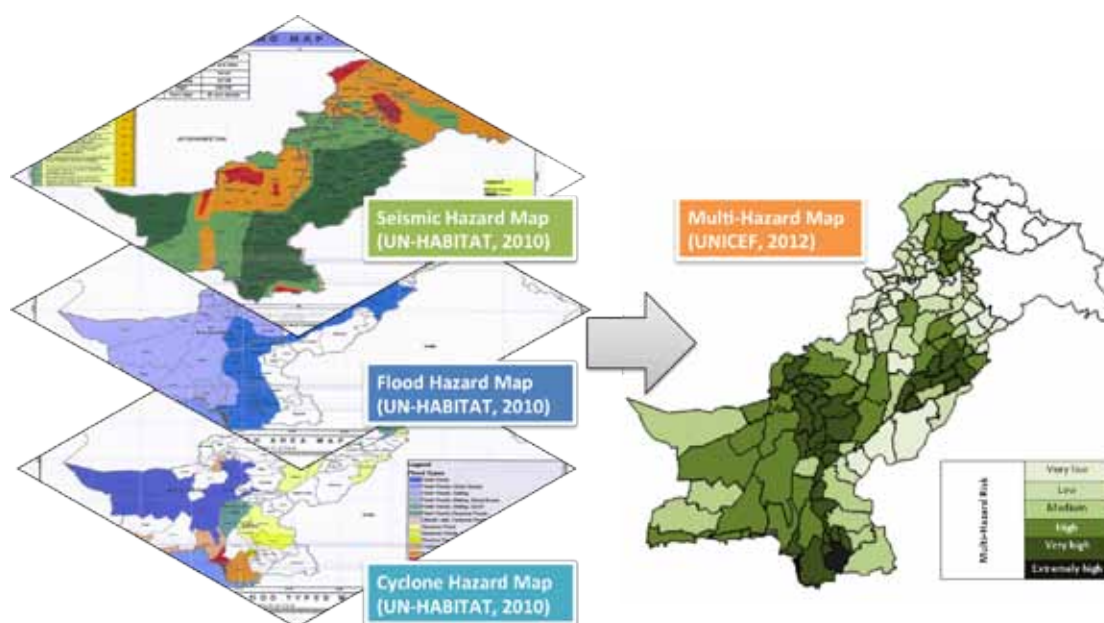
According to UNISDR, a hazard is "a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage (UNISDR, 2009)." Natural hazards (e.g. earthquakes, floods, landslides, droughts, storms, cyclones) figure most prominently in the assessments although some countries consider other types of hazards. The Nepal Country Office added climate change data from the Ministry of Environment (Government of Nepal, 2010). The Indonesia Country Office used the Indonesian Disaster Management Agency's (BNPB) Disaster Prone Score based on an analysis of natural hazards, other types of hazards (e.g. technological and industrial failures, failed modernization, epidemics and disease outbreaks) and conflict risk (BNPB, 2011).[7]

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[7]   BNPB's Indeks Rawan Bencana uses the terminology 'natural, non-natural and social disasters', 2011.

The Multi-Hazard Vulnerability Mapping system in India allows the user to generate a composite hazard map through real time analysis of a specific hazard or a combined analysis of multiple hazards depending upon the data availability for a specific state. For Rajasthan and Bihar, four hazards were incorporated. Table 1 shows details of the indicators for each country.

TABLE 1 Hazard Indicators

Hazard types	Nepal	Pakistan	Indonesia
Natural	Multi-hazard map with the probability and intensity of natural hazards including: • Earthquake hazard with 500 years' return period • Earthquake triggered landslides • Rainfall triggered landslides • Flood hazards with 10 years' return period • Winter drought	3 individual hazard maps for: • Earthquake • Floods • Cyclones	• Earthquake • Tsunami • Volcano eruption • Floods • Droughts • Tornado • Landslides
Climate Change	Climate Change Vulnerability Index based on sensitivity, adaptation and exposure		
Biological	Disease outbreaks		Epidemics and disease outbreaks
Social/Human-made			• Technology failures • Failed modernization
Conflict			• Conflict between community groups and the public and terror
Sources	• World Bank/ADPC (2010) • Government of Nepal (2010)	UN-HABITAT (2010)	BNPB (2011)

Hazard types	Solomon Islands	Lao PDR	India
Natural	Global estimated risk index for multiple hazards[8], including: • Tropical cyclone • Earthquake • Flood and landslide induced by precipitations	• Flood • Landslide • Earthquake • Drought	• Drought • Earthquake • Cyclone • Floods (for Bihar)
Climate Change	Due to uncertainty in climate change modelling and unavailability of data at the provincial level, a climate change indicator was not included in the current draft assessment		
Biological		Epidemics	
Social/Human-made			
Conflict		Unexploded Ordnances	
Sources	UNEP/DEWA/GRID-Europe (2011) Global Assessment Report on DRR (2011)	ADPC, Public Works and Transportation Institute, the National Disaster Management Office and UNDP (2010) Lao National Risk Profile	• Department of Water Resources • Disaster Management Department • NDMA • India Meteorological Department

[8]   The Solomon Islands Field Office is currently working on the risk assessment. The risk index cited here is expected to be replaced with Pacific Climate Change Science Program hazard maps developed for Solomon Islands in 2011 through the Pacific Catastrophe Assessment and Financing Initiative. This is a joint initiative of the Applied Geoscience and Technology Division of the Secretariat of the Pacific Community, World Bank, Asian Development Bank, Japan and GFDRR.

3.2 Child Vulnerability Analysis

UNISDR defines the term vulnerability as "the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard" (UNISDR, 2009). There are many aspects of vulnerability, arising from various physical, social, economic, and environmental factors. For UNICEF, the main focus is on children and in particular on aspects relating to the organization's sectoral interventions. As part of UNICEF's Country Programme planning process, many Country Offices have developed Child Deprivation or Child Wellbeing indexes for planning, monitoring and evaluation purposes. These are based on a wide range of indicators reflecting the situation of children in each country. For the assessments, five of the six Country Offices (the exception being India), measured child vulnerability based on an equal weighting of five to 10 indicators in a composite index covering key UNICEF sectors such as Nutrition, Education, Health, WASH and Child Protection. Figure 2 shows an example from Indonesia.

FIGURE 2 Child Vulnerability Map of Indonesia

The Lao PDR Country Office used a few additional indicators from the *Lao Social Indicator Survey* (LSIS). The India Country Office used a similar set of indicators as the others but instead of creating a comprehensive child vulnerability index, it put together an index for each sector composed of sector-specific indicators. For instance, the nutrition index consisted of nutrition-relevant vulnerability indicators (prevalence of underweight children and number of children with wasting) and service coverage indicators (number of nutrition centres and number of nutrition frontline workers per person/district). Table 2 provides details of the indicators used by each Country Office.

TABLE 2 Child Vulnerability Indicators

Country	Nepal	Pakistan	Indonesia
Indicators	8 child vulnerability indicators: • Severity of food insecurity • Net enrolment rate in basic education • Proportion of working children 10-14 years old • Sanitation coverage • Per capita development budget expenditure • DPT3 immunization under 1 year of age • Expected frequencies of diarrhoeal outbreaks • Ratio of girls to boys in secondary education	Inverse Child Wellbeing Index based on a set of 12 indicators: • Skilled birth attendance • Underweight prevalence • % of children immunized fully • Net primary school attendance rate • Net middle/secondary school attendance rate • Gender parity ratio in primary and middle/secondary education • Unimproved source of drinking water • No toilet facility • Child labour • Birth registration • Children residing in one room dwellings • Access to information (radio)	Inverse value of the Child Deprivation Index, which is constructed from 5 indicators: • Access to sanitation • Net attendance rate of children 13-15 years old • Child birth registration • Skilled Birth Attendance • Youth female literacy (15-24 years old)
Source	UNICEF Nepal (2011) Child Deprivation Index	UNICEF Pakistan (2012) Child Wellbeing Index	• SUSENAS (2010) National Living Standard Survey • Census (2010)

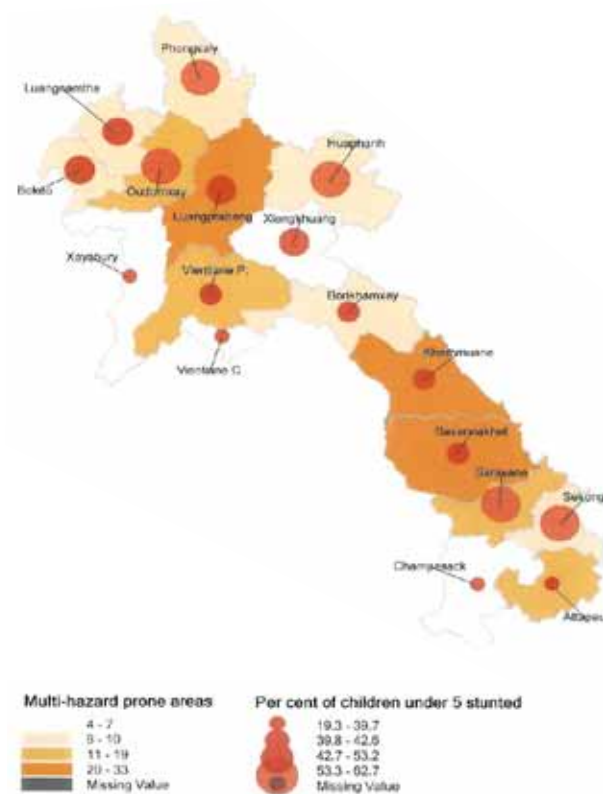| Country	Solomon Islands	Lao PDR	India
Indicators	Provisional Child Deprivation index comprised of 10 sectoral indicators	Inverse of 10 indicators from the Child Wellbeing and Disparities Indexes: • Poverty incidence • Asset Wealth Index • DPT3 immunization coverage • Measles immunization coverage • Vitamin A coverage • De-worming coverage • Net enrolment rate in primary school • Drop-out rate in primary school • Gender gross enrolment ratio • School WASH coverage Additional 4 indicators from LSIS: • Under 5 mortality rate • Primary school completion rate • Access to improved water source • Access to Improved sanitation facility	A total of 38 indicators across 5 sectors were used to create composite indexes per sector: • Health • WASH • Education • Nutrition • Economy: allocation and spending per sector, BPL (below poverty line) registration, per capita income, income distribution, household expenditures, out-of-pocket expenditures (food, health and education), house construction (by type of construction material)
Source	• Solomon Islands National Census 1999; Solomon Islands National Census 2009 • Solomon Islands Government and UNICEF (2012) *Children in the Solomon Islands: 2011 Atlas of Social Indicators, based on National Statistical Bulletins* from 2011	• National Commission for Mothers and Children and UNICEF (2013) *Child Well-being and Disparities Indices in Lao PDR* • *LSIS* (2012)	• Census (2011) • *National Family and Health Survey* 2005-2006 • *Annual Health Survey Bulletin* 2010-2011 • *District level Household and Facility Survey* 2007-2008 • *District Information System for Education* 2011-2012

At this stage of the process, one type of risk assessment can be prepared by overlaying the composite indexes of hazards and vulnerabilities. The resulting map projects locations with the highest levels of child risk. Figure 3 shows an example from Lao PDR, overlaying multi-hazard data with stunting.

3.3 Exposure Analysis

The third component of risk is exposure, defined as "people, property, systems, or other elements present in hazard zones that are thereby subject to potential losses" (UNISDR, 2009). Measures of exposure include the number of people or types of assets in a given area. For UNICEF, the child population is of particular interest, whether measured directly or assessed as a proportion of the total population. Most of the Country Offices used population data for children aged 0-18 years although some relied on data for children aged 0-17 or 0-14 years. All six used the relative distribution of children at sub-national level (i.e. districts/provinces) as an indicator.

A more complex indicator would investigate what proportion of children was exposed to hazards within each geographical unit (e.g. river, coastal and landslide-prone areas). This would require detailed high-resolution maps for hazards and settlements, which are not always available. It is worth noting that the vulnerability assessment in India did not classify its demographic index as 'exposure' but rather as part of a 'base index'. Further explanation is given in section 3.5.

FIGURE 3 Child Risk Assessment of Lao PDR

Multi-hazard prone areas

4 - 7
8 - 10
11 - 19
20 - 33
Missing Value

Per cent of children under 5 stunted

19.3 - 39.7
39.8 - 42.6
42.7 - 53.2
53.3 - 62.7
Missing Value

Sources
LAO_LSIS_2011-2012
LAO_National Risk Profile, table 3.14 p 93-96, ADPC/NDMO (data before 2010)_2010

3.4 Capacity Analysis

Capacity includes "infrastructure and physical means, institutions, societal coping abilities, as well as human knowledge, skills and collective attributes such as social relationships, leadership and management" (UNISDR, 2009). Apart from infrastructure, this risk component is not readily quantifiable. Furthermore, few comprehensive indicators and relevant sets of data exist. Due to the lack of available information, only two of the Country Offices (Nepal and Indonesia) defined this component and incorporated 'capacity' in the risk calculation (see Table 3). India's Multi-hazard Vulnerability Mapping system did, however, consider the Economic Index indicators and at least two service coverage indicators (e.g. number of health centres and number of health workers per persons/district) in each sector composite index as an expression of capacity (See Table 2).

TABLE 3 Capacity Indicators

Country	Nepal	Indonesia
Indicators	• Presence of the Village Development Committee (VDC) secretary • Per capita development expenditure • District preparedness and response plan/district contingency plan	• Existence of District Disaster Management Agency in districts • District contingency plan formulated or revised in 2011/2012

3.5 Calculation of Risk

In DRR, the risk formula comprises hazards, vulnerability, exposure and capacity. However, this formula is only a theoretical framework that needs to be adapted to specific contexts. Risk calculation is done by assigning relative weights to individual risk components and merging the available datasets. Figure 4 illustrates how the three composite indexes of multiple hazards, child vulnerability and exposure are overlaid in a child-centred risk map of Pakistan.

FIGURE 4 Process of Child-centred Risk Assessment in Pakistan[9]
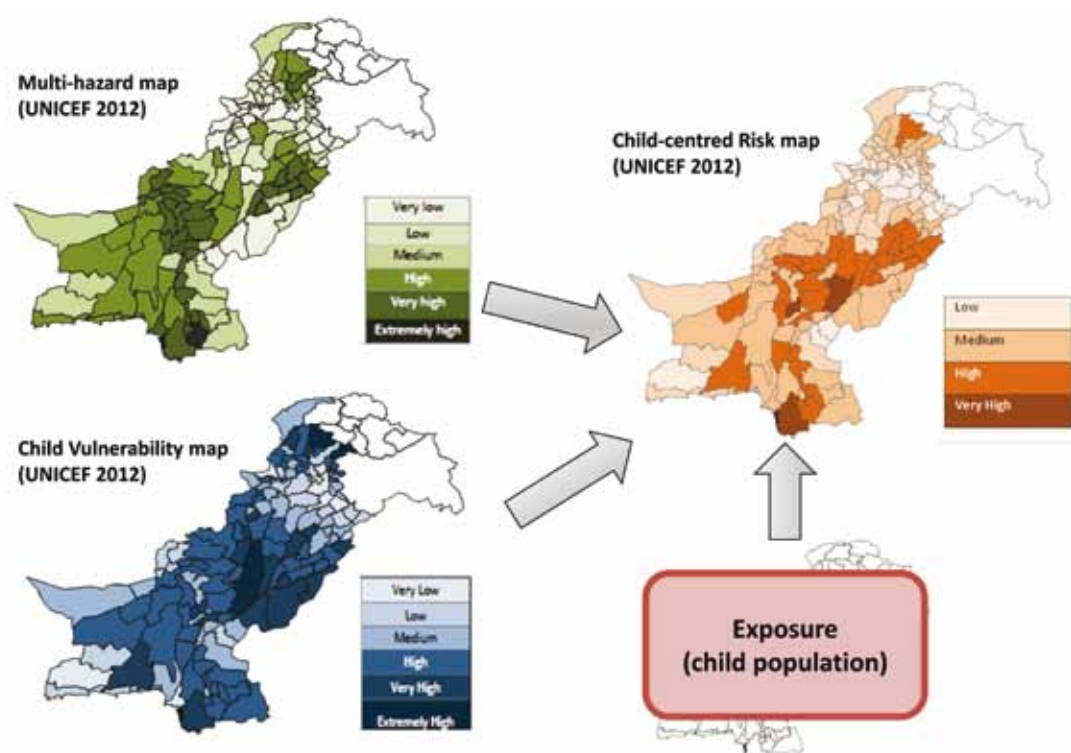

Table 4 shows the weighting system for each country. In general terms, equal weights were given to the hazard/climate components and to the vulnerability/capacity/exposure components. This weighting distribution stems from the general definition of risk, according the same level of importance to external risk factors (hazards) and developmental/programmatic challenges (vulnerability/capacity/exposure). The relative weight of various components depends on the specific purpose of the risk assessment, the profile of the Country Programme as well as the availability and reliability of data.

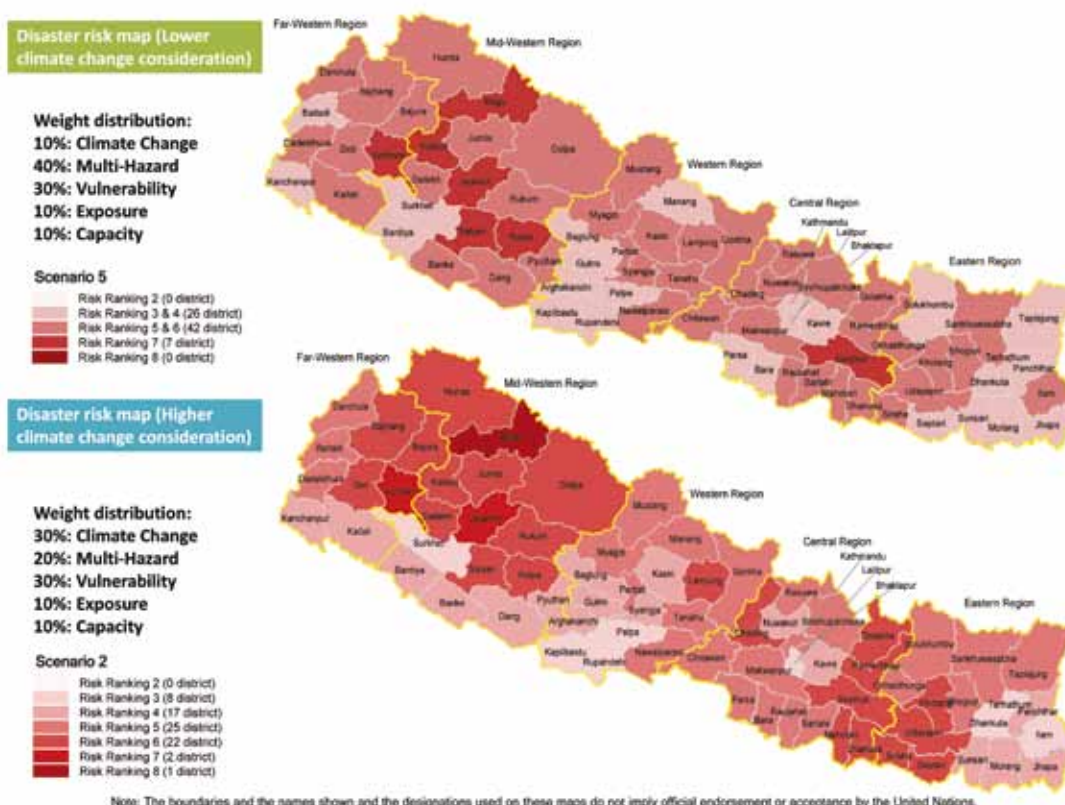| **Table 4** Weights of Different Risk Components			
Country	Nepal	Pakistan	Indonesia
Weighting	• 40% Multiple hazards • 10% Climate change • 30% Vulnerability • 10% Exposure • 10% Capacity *3 other scenarios were tested.	• 20% Seismic hazard • 20% Flood hazard • 10% Cyclone • 40% Vulnerability • 10% Exposure	• 50% Multiple hazards • 30% Vulnerability • 10% Exposure • 10% Capacity

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[9]   Although exposure was given a 10% weight in the risk calculation, an exposure map was not produced.

Country	Solomon Islands	Lao PDR	India
Weighting	• 50% Multiple hazards • 40% Vulnerability • 10% Exposure	NA	Equal weighting on all indexes: Base, Health, WASH, Education, Nutrition and Economic index for the two pilot states

The Nepal Country Office initially developed four scenarios with different weights for different components. Such an exercise allowed a comparison of various scenarios with actual field experiences before deciding the final distribution of weights. In addition, the projection of different risk profiles helped individual sectors zoom in on natural hazards or climate change to shape the assessment according to their programmatic needs.

The maps in Figure 5 show two different results of risk calculations with different weight distributions for climate change and natural hazards. Following thorough analyses, the Nepal Country Office decided to assign a 40 per cent weight to natural hazards and 10 per cent to climate change. In this way natural hazards were accorded the highest priority without disregarding climate change.

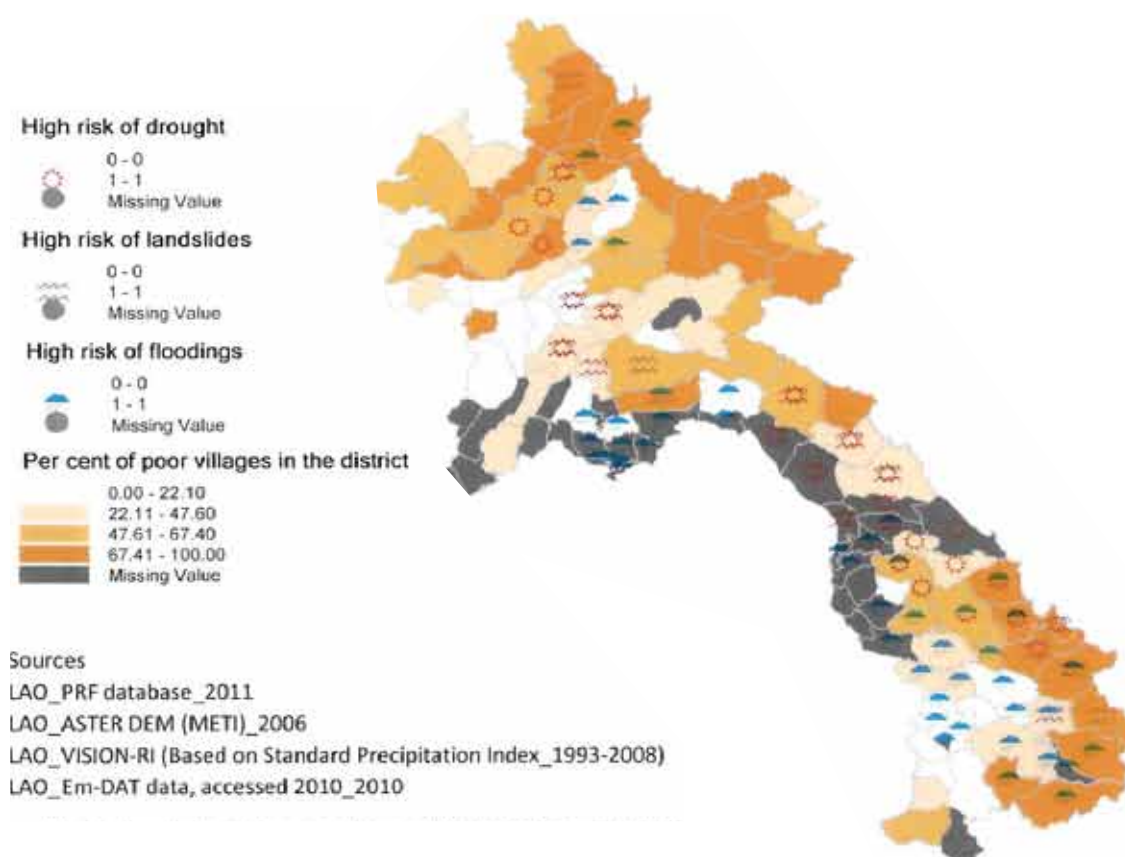**FIGURE 5** Two Scenarios of Child-centred Risk Assessments in Nepal

Note: The boundaries and the names shown and the designations used on these maps do not imply official endorsement or acceptance by the United Nations.

Because individual hazards can be important for UNICEF's programme planning, the Pakistan Country Office chose to allocate different weights to specific hazards. Earthquakes and floods were assigned double the weight of cyclones in view of their cumulative consequences. This decision reflected a qualitative and quantitative assessment of emergency and recovery scenarios in Pakistan based on the frequency, intensity and characteristics of individual hazards.

In the case of Sindh province, the Country Office looked at whether the entire or only a part of a district was exposed to a specific hazard in order to assess disparities of risk levels within a district.

The Lao PDR Country Office prepared several maps comparing multiple or single hazards with individual child vulnerability and exposure indexes. This assessment approach provided different snapshots that allowed examination of the correlation between different risk components and specific indicators within the country. Figure 6 shows one example of a correlation between three natural hazards and poverty levels.
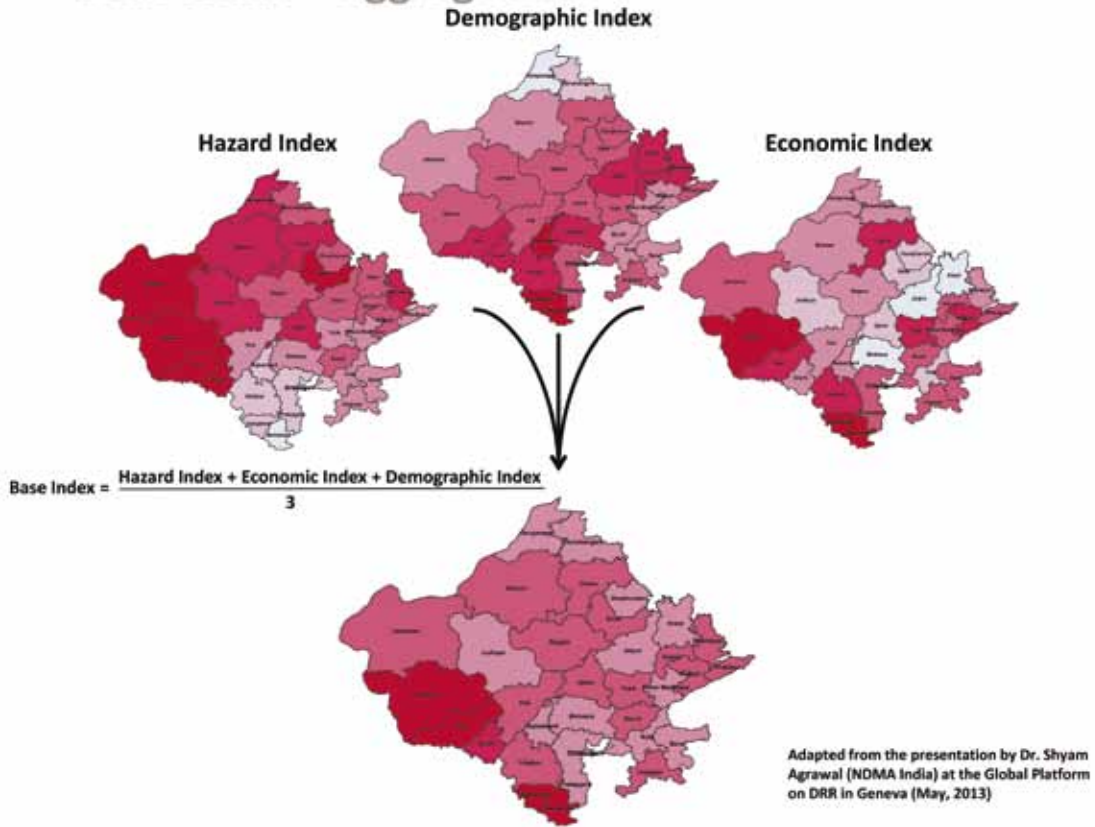
FIGURE 6 Poverty and Likelihood of Droughts, Landslides and Floods in Lao PDR

High risk of drought
    0 - 0
    1 - 1
    Missing Value

High risk of landslides
    0 - 0
    1 - 1
    Missing Value

High risk of floodings
    0 - 0
    1 - 1
    Missing Value

Per cent of poor villages in the district
    0.00 - 22.10
    22.11 - 47.60
    47.61 - 67.40
    67.41 - 100.00
    Missing Value

Sources
LAO_PRF database_2011
LAO_ASTER DEM (METI)_2006
LAO_VISION-RI (Based on Standard Precipitation Index_1993-2008)
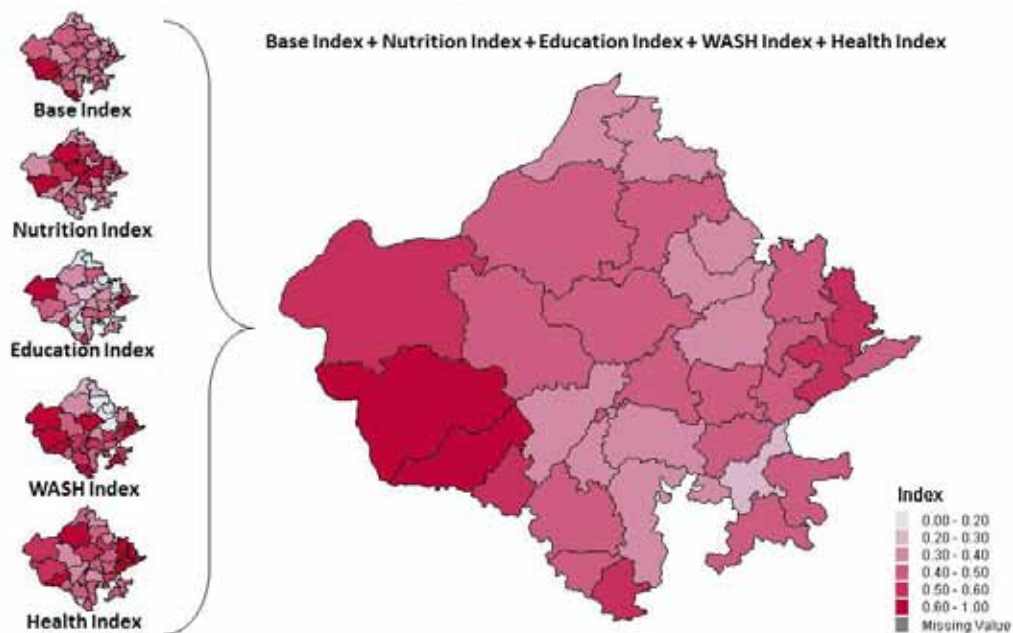LAO_Em-DAT data, accessed 2010_2010

A unique feature of India's Multi-hazard Vulnerability Mapping system is its base index composed of hazard, demographic and economic indexes, created because all three components are seen to influence all sectors. The risk level was calculated by assigning an equal weight to the base index and sectoral indexes (see Figure 7). The advantage of this approach is that it presents not only a readymade risk snapshot based on a fixed number of indicators but also provides flexibility for user-driven analysis based on unique combinations of indicators from the DevInfo database platform. The three composite indexes of the base index can be analysed individually (hazard, demographic or economic pressures) or in correlation with each other and other sector indexes.

FIGURE 7 Multi-hazard Vulnerability Mapping in Rajasthan, India

Base Index – Aggregation

Demographic Index

Hazard Index

Economic Index

$$\text{Base Index} = \frac{\text{Hazard Index} + \text{Economic Index} + \text{Demographic Index}}{3}$$

Adapted from the presentation by Dr. Shyam Agrawal (NDMA India) at the Global Platform on DRR in Geneva (May, 2013)

Multi-Hazard Vulnerability Index – MHVI

Base Index + Nutrition Index + Education Index + WASH Index + Health Index

Base Index

Nutrition Index

Education Index

WASH Index

Health Index

Index
0.00 - 0.20
0.20 - 0.30
0.30 - 0.40
0.40 - 0.50
0.50 - 0.60
0.60 - 1.00
Missing Value

By analysing monthly data, trends and changes in risk over time could be monitored. For instance, the India Country Office examined the correlation between school attendance and rainfall deficit in order to identify whether drought had an effect on children's behaviour during specific seasons of the year and in specific district(s) (see Figure 8). This time series analysis showed the full potential of a child-centred risk assessment to better understand child behaviour and ultimately assess the violation of child rights due to disasters.
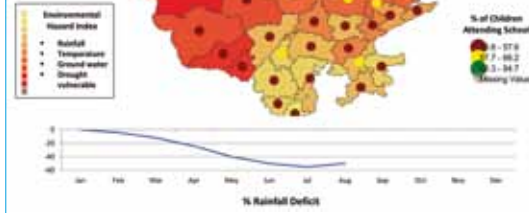
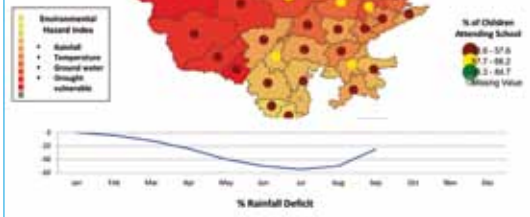**FIGURE 8** Time Series Child Risk Assessment in Rajasthan, India
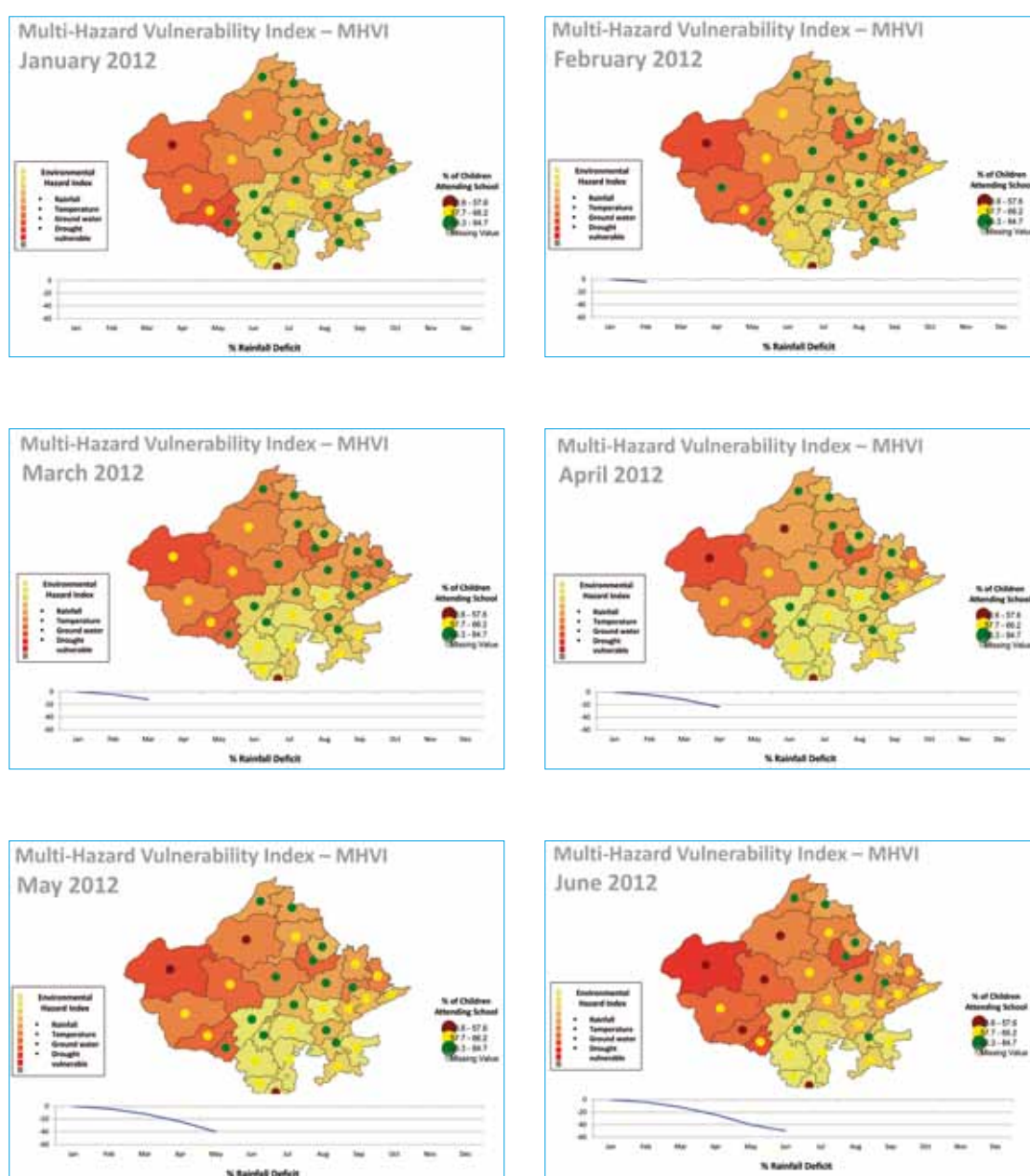
Multi-Hazard Vulnerability Index – MHVI
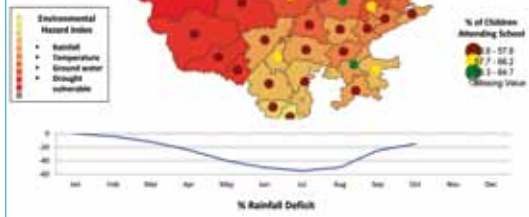July 2012
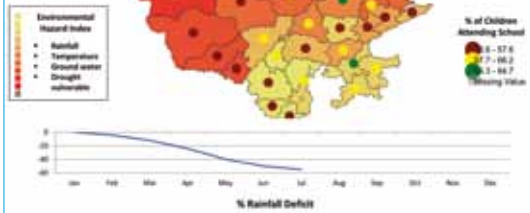
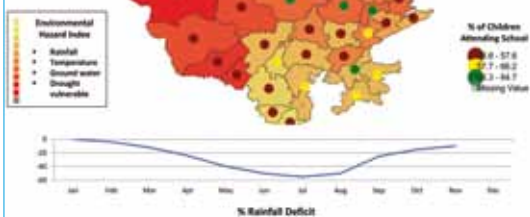Multi-Hazard Vulnerability Index – MHVI
August 2012

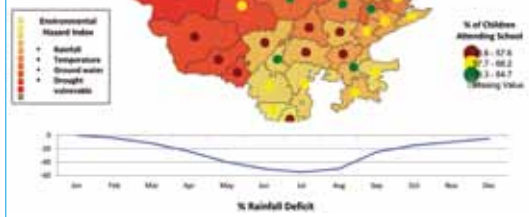Multi-Hazard Vulnerability Index – MHVI
September 2012

Multi-Hazard Vulnerability Index – MHVI
October 2012

Multi-Hazard Vulnerability Index – MHVI
November 2012

Multi-Hazard Vulnerability Index – MHVI
December 2012

4 Use of Child-centred Risk Assessments

A quantitative and spatial risk assessment helps to better understand and operationalize risk. It is an essential tool for risk-informed planning and ultimately risk-informed programming. There are at least four ways in which the findings of a child-centred risk assessment can be utilized in relation to government counterparts, partner organizations and community members, or internally in UNICEF.

4.1 Advocacy on Child Rights and Child Participation

Emergency/DRR sections and/or programme planners in UNICEF Country Offices played a key role in developing child-centred risk assessments. Yet every Country Programme is prepared in close collaboration with governmental counterparts, other UN agencies and NGO partners. Thus the findings derived from these analyses could well be used as an external communication and advocacy tool to inform government planning and support their decision-making. A child-centred risk assessment helps communicate to government counterparts the importance of 1) bridging development and emergency programmes by combining hazards and vulnerability; 2) bringing children onto the national agenda on DRR, CCA and resilience; and 3) integrating child vulnerability into existing risk assessments or adopting child-centred risk assessments as a risk-informed planning approach.

Although few people question the importance of child vulnerability indicators, they are rarely included in disaster risk assessments undertaken by other organizations. Since most non-participatory risk assessments tend to be based on economic indicators (e.g. poverty levels or GDP per sq km), urban areas are likely to be identified as high-risk areas. By using child vulnerability indicators, the findings of risk assessments are less predictable and often better in tune with sub-national development priorities than the value of assets and infrastructure. The point is that child vulnerability often serves as a better proxy for community vulnerabilities than monetary values utilized by insurance companies and investment banks. This is particularly true for Asia and the Pacific, regions with a high proportion of children and youth, and even more so for small island development states heavily exposed to weather-related hazards. As such, child-centred risk assessments provide a good measure of community vulnerabilities and help address the specific challenges of children, the poor and the marginalized.

In terms of advocacy, India's Multi-hazard Vulnerability Mapping system is making considerable headway. When the NDMA presented the mapping system at a South-South Forum at the Fourth Session of the Global Platform for DRR in Geneva in May 2013, it was well received by National Disaster Management Authorities from around the world. Hosting the database in a common platform (DevInfo) has encouraged its use by other stakeholders. The India Country Office plans to provide training in the use of this tool to government officials in Rajasthan and Bihar. The state governments are willing to use this system to track development progress with due consideration to child vulnerabilities and natural hazards. The NDMA expects to facilitate the replication of the system in six other states with a final goal to introduce it throughout the country.

UNICEF Indonesia plans to share its child-centred risk assessment with BNPB to provide evidence that will support the development of the *National Disaster Management Plan* (2015-2019) and influence the Government's *National Medium Term Development Plan* (2015-2019). UNICEF Nepal is supporting the Ministry of Home Affairs to integrate climate and disaster risk in its development planning guidelines. UNICEF Pakistan colleagues plan to use the findings of the child-centred risk assessment to promote the rights and value of child participation in DRR within the One UN Disaster Risk Management Programme.

4.2 Risk-informed Country Programming

A child-centred risk assessment allows 'smart' development programming informed by natural hazards, climate change, conflicts and/or other shocks. At a time of increasing uncertainty, it facilitates the protection of development investments. Simultaneously, a child-centred risk assessment allows humanitarian action to become less shock-driven and more vulnerability-based by identifying areas with a high likelihood of future disasters. The spatial assessment helps both development and humanitarian actors identify locations exposed to hazards and with the highest levels of child risks based on past disaster trends, current vulnerabilities and future risk scenarios.

For UNICEF, a child-centred risk assessment helps Country Offices check to what extent current Country Programmes focus on locations with high child-risk levels and facilitates better targeting of the worst-off areas. Nepal and Pakistan conducted their assessments to incorporate the findings in the SitAn for the preparation of new Country Programmes. The Nepal Country Office identified seven out of 75 districts particularly exposed to natural hazards and climate change. Indonesia and Lao PDR carried out their assessments for their Country Programme Mid-Term Review. In Indonesia, 13 out of the 14 focus provinces of its Country Programme were amongst 24 high-risk provinces while in Lao PDR, four out of six provinces were amongst the most hazard-prone areas. Such 'smart' analysis sheds new light on areas where children and communities are particularly at risk and hence justifies continuous work and additional efforts from UNICEF and other partners.

4.3 Multi-sectoral Interventions

Disaster risks are multifaceted and resilience calls for multi-sectoral approaches. A child-centred risk assessment provides an opportunity to advance multi-sectoral approaches in both development and humanitarian action. Interventions across multiple sectors are often the most effective way to reduce vulnerabilities since their impact can be greater than actions undertaken individually. Participatory action planning linked to the risk assessment allows different sectors to coordinate with each other. It might be convenient to begin the process of convergence-seeking by focusing on an advanced sector with highly motivated staff and gradually expanding to related sectors.

Child-centred Disaster Risk Reduction: Guidance Notes for UNICEF Asia-Pacific (UNICEF EAPRO & ROSA, 2012) identified seven multi-sectoral approaches. One such approach is advocacy for safe infrastructure to reduce risk and adapt to climate change. If natural hazards are not considered in site selection and building design, critical infrastructure may fail during natural events and amplify a disaster. Past disasters such as the earthquake in Kashmir in 2005 and in Sichuan, China in 2008 had dramatic effects on schools, teachers and students. Making child infrastructure (e.g. health facilities, cold chains, child protection centres and schools) safe is not only a cost-effective investment, but also a social, moral and ethical imperative. The Comprehensive School Safety Framework, in which 'safe learning facilities' is one of the three pillars, aims at building the resilience of children at school as well as in communities[10].

Another rapidly emerging area for multi-sectoral interventions is social protection. While DRR focuses on children's vulnerabilities to natural hazards, social protection targets economic and social vulnerabilities. Social protection has the potential to act as a permanent buffer against all types of risks – including disaster risk – and aims at building resilience. The Lao PDR early warning system, developed to monitor the social impact of the economic crisis on children could, for instance, be expanded to incorporate natural hazards and climate change. Typhoon, flood and drought monitoring would be particularly relevant since weather-related hazards have implications for WASH, nutrition and child health indicators.

Capacity development in DRR, CCA, conflict sensitivity, and resilience is another multi-sectoral strategy. Indeed it is the second strategic goal of the *Hyogo Framework for Action* aimed at strengthening resilience to hazards. Capacity development moreover is an integral part of UNICEF's approach to development and humanitarian action. Targeted capacity development of both rights-holders and duty-bearers reduces underlying vulnerabilities, increases resilience to disasters, and contributes to enhanced emergency preparedness, response and early recovery.
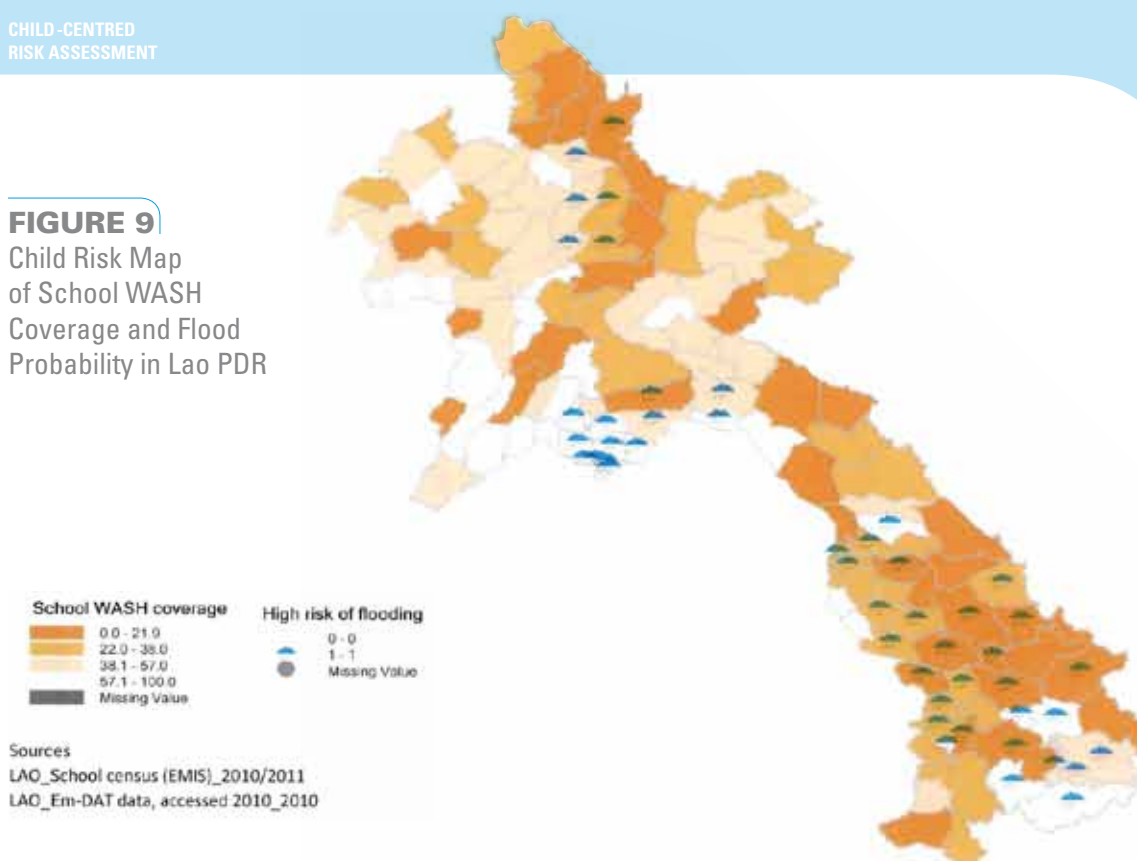
4.4 Sectoral Interventions

A multi-hazard risk assessment is useful for planning and programming purposes at the national level. When operationalizing child-centred DRR in sectors, it is important to analyse individual hazards and vulnerabilities in specific locations. This is because prevention and mitigation measures – to a larger extent than preparedness and response – are hazard-specific. One example can illustrate this point: Because the probability of water-borne diseases is higher during floods than earthquakes, targeted rather than universal public health campaigns (e.g. prevention of diarrhoeal diseases in flood-prone areas and pneumonia in mountainous areas) could prove cost-effective. The child-centred risk assessment from Lao PDR combined specific hazards with individual sectoral indicators (see Figure 9). Although no other Country Office generated sectoral risk maps, it would be relatively straightforward to analyse and map sectoral risks by building on the child-centred risk assessment.

Sectoral risk maps can also serve as an advocacy tool to encourage individual sectors to undertake risk-informed programming. The Nepal Country Office applied this approach to identify districts with high levels of child risks in terms of malnutrition and hazards. It helped the national nutrition cluster target its emergency preparedness efforts. In Solomon Islands, the UNICEF WASH Section used existing hazard and climate information (e.g. floods and droughts) to tailor WASH interventions (Pacific Catastrophe Risk Assessment and Financing Initiative, 2011).

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10   The two additional pillars of the Comprehensive School Safety framework are: 'school disaster management' and 'risk reduction and resilience education'. For more information see: www.preventionweb.net/files/globalplatform/5194f951dabc99997_STC00792_DRR_CSS_Framework_singles_web.pdf

FIGURE 9

Child Risk Map
of School WASH
Coverage and Flood
Probability in Lao PDR

School WASH coverage
- 0.0 - 21.9
- 22.0 - 38.0
- 38.1 - 57.0
- 57.1 - 100.0
- Missing Value

High risk of flooding
- 0 - 0
- 1 - 1
- Missing Value

Sources
LAO_School census (EMIS)_2010/2011
LAO_Em-DAT data, accessed 2010_2010

Targeting geographical areas with high levels of child risks is not the only way of contributing to DRR. Based on a child-centred risk assessment, each section would need to consider what it could do differently in terms of the following five parameters:

1. **Geography:** Focus on areas with high levels of child risks.

2. **Beneficiaries:** Focus on the worst-off population groups who have the fewest livelihood options when exposed to natural hazards, climate change, violent conflict and other risk factors.

3. **Outreach:** Undertake specific actions to reach out to the often-overlooked population groups (e.g. socially excluded boys, girls and women for reasons of caste, ethnicity, language, disability, household structure and school enrolment).

4. **Timing:** Speed up interventions with high risk-reduction/climate change adaptation potential in high-risk areas.

5. **Approach:** Design new types of activities to build resilience (e.g. including climate change in the school curriculum, awareness campaigns through Communication for Development, hazard-specific public health campaigns, ensuring that cold chain/WASH infrastructure is hazard-proof etc).

Based on an analysis of these parameters and individual hazard maps, UNICEF programme sections sections can identify concrete actions to contribute to risk reduction and resilience.

5 Way Forward

A child-centred risk assessment is a new tool for UNICEF and partner organizations. Refinements therefore are ongoing, with UNICEF Country Offices working to improve the quality of their assessments. This section highlights some of the limitation of current approaches, and suggests way forward.

5.1 Improved Data Collection

A child-centred risk assessment requires a wide range of data for different variables. Hence, the most common challenge is data availability. The absence of hazard and/or vulnerability assessments as well as quantifiable data makes it difficult to advance evidence-based DRR. Where data are available, their validity and reliability may be questioned due to outdated sources, inconsistent methodologies and unreliable denominators. Even when valid data are available, they are often difficult to disaggregate by sex, age and location.

Although all six Country Offices benefited from pre-existing hazards maps, they encountered data availability challenges. Lao PDR did not generate a consolidated risk map since data for different indicators were considered incomparable. Climate change data were only available for Nepal and Solomon Islands (see Table 1). The Solomon Islands Field Office ended up disregarding climate change due to a lack of climate data at ward level. Indonesia and Pakistan faced difficulties in aggregating data from district to provincial, and from provincial to national levels respectively, due to the disparity of available data as well as the use of indicators in different districts and provinces.

Several Country Offices found it difficult to define capacity and gather the necessary data. However India's case shows that for sector-specific risk assessments, a few datasets in a given sector can be used as capacity indicators, such as contingency plans in place, operational level of key social services (e.g. facilities and dedicated staff) and availability of contingency budgets. The Pakistan Country Office has recently undertaken a comprehensive mapping exercise of partner organizations in two provinces and plans to review its child-centred risk assessment by incorporating the capacity component.

5.2 Community-based Risk Assessments

The main objective of a spatial risk assessment is to visualize the different degrees of child risks at selected administrative units within a country. However, the diversity of contexts from one district/province to another is an area of concern – especially in big countries like India, Pakistan and Indonesia. A child-centred risk assessment should ideally be followed by

a detailed analysis of local areas incorporating specific socio-economic characteristics. The Nepal Country Office is currently replicating risk assessments at village level in 15 high-risk districts. In India, Rajasthan and Bihar are considering establishing a risk assessment system at sub-state level, as this is the unit for planning in practice. The weaknesses regarding data availability at local level could be addressed by strengthening data collection through field staff, implementing partners and community members.

The child-centred risk assessments presented here are based on secondary data, often originating from scientific institutions or government departments. In other words, they use a top-down approach. To build resilience at community level, spatial and quantitative assessments need to be verified by participatory and qualitative risk assessments. Community-based and child-centred DRR has the potential to ensure that the views and characteristics of a given community are incorporated, including those of the most vulnerable groups. A combination of approaches that are top-down, bottom-up, scientific, and participatory are important considerations in designing appropriate interventions.

5.3 Seasonality of Risk and Real-time Information

Risks are not static. In terms of hazards for example, the likelihood of flooding is highly dependent on monsoon and cyclone/typhoon seasons in Asia and the Pacific. The majority of risk maps are mere snapshots and don't pay attention to seasonal variations. They tend to show average or relative risk instead of maximum or absolute risk at specific times of the year. Comparing data from sources produced in different years is also likely to hamper the reliability of the findings. Careful selection of data sources and weighting of risk components could help address these reliability issues – if data are available.

The next step for many Country Offices is to capture the dynamics of risk over time and encourage government counterparts to establish a monitoring system like that which exists in India. Ideally, this could be linked to an Early Warning System identifying hot spots for risk reduction and emergency preparedness. Various options can be explored, such as using routine data from the regular monitoring system and data from Multiple Indicator Cluster Surveys. In India, to enhance regular data collection, potential is seen in the use of SMS. The data collected from trained frontline workers through mobile phone SMS could be directly transferred to servers connected to a Global System for Mobile Communications and aggregated into the Multi-hazard Vulnerability Mapping system. Not only would this strengthen existing data collection and information management systems but also help to improve the quality of child-centred risk assessments.

(Real time) weather forecasts and/or long-term climate variability trends would also help to create more robust (and operational) risk assessments instead of reliance on averages and past patterns.

6 Conclusion

This publication aims to share good practices and limitations of the child-centred risk assessments developed by UNICEF in Asia and the Pacific, and suggests way forward. The wide range of datasets and methodologies used demonstrate that a child-centred risk assessment does not follow a one-size-fits-all approach. Yet the fundamental purpose of such an assessment is shared by all: advancing risk-informed development programming and humanitarian action through government counterparts, UNICEF Country Offices and partner organizations to minimize risks for and with children.

From a rights-based perspective, there are at least three reasons to advocate for this approach. Firstly, children have rights that are enshrined in the *UN Convention on the Rights of the Child*. These rights are universal and apply to all contexts – before, during and after a disaster. Secondly, children have different views on and experiences of risks than adults. They are often disproportionately affected by disasters and climate change. Their views and intergenerational justice have to be taken into account. Thirdly, children have the right to access the information they need and participate in decision-making processes that affect them.

Children can play a significant role in DRR by identifying risk, communicating risk, implementing DRR activities and mobilizing action and resources (Seballos, 2011). In addition, the large child populations in Asia and the Pacific and the strong support from high-level decision-makers for child-centred DRR cannot be ignored.

A child-centred risk assessment is essentially an analytical and advocacy tool to promote child-centred and risk-informed development and humanitarian interventions. For UNICEF internally, it facilitates risk-informed programming at country level. Externally, it helps initiate dialogue with government counterparts and partner organizations to bridge development and humanitarian action, brings children into the resilience equation and integrates child vulnerabilities in existing risk assessments. If no risk assessment has yet been conducted, a child-centred approach can be adopted. Despite the limitations of current methodologies, such efforts will ultimately contribute to the realization of child rights.

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KEY POINTS

- A child-centred risk assessment is a quantitative and spatial methodology to assess child risk composed of hazard, vulnerability, exposure and capacity.

- Risk is analysed by overlaying the data of various risk components with a specific focus on child vulnerabilities.

- Child vulnerabilities often serve as a better proxy for community vulnerability than monetary values utilized by insurance companies and development banks.

- The findings as well as the assessment methodology can serve as an advocacy tool for government counterparts and partner organizations to add a 'child-centred lens' when risk assessments exist, thereby further promoting child rights and child participation.

- Conducting a risk assessment is an essential entry point to make development programmes 'risk-informed' and 'climate sensitive' by factoring in natural hazards and climate change.

- Risk assessments allow humanitarian action to focus upon vulnerabilities rather than being shock-driven by identifying areas with the highest likelihood of future disasters.

- The proposed risk assessment methodology provides an opportunity to advance multi-sectoral interventions, which often are the most effective way of pursuing resilience.