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CASE STUDY

# INFORMATION USE IN NEPAL'S NATIONAL ADAPTATION PROGRAMME OF ACTION

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AARJAN DIXIT

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## INTRODUCTION

Nepal is passing through a turbulent period of transition, reorganizing its internal political boundaries, establishing a federal structure, and changing the very nature of the national government. Since 2008, Nepal's priorities have been dominated by these political imperatives, a post-conflict peace process, and attempts to integrate Maoist ex-insurgents into the national mainstream. This dynamic presents numerous challenges for the government in seeking to meet the country's development and environmental needs. Climate change adds extra stress to these needs in the form of heightened weather variability, extreme events, and other impacts on the country's natural and social systems.

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This case study is part of a World Resources Institute project, *Information for Climate Adaptation in South Asia: Identifying User Needs*. Each of the case studies in this set explores an aspect of information use in adaptation decision making. The goals of this series are twofold:

1. provide insights into how information (such as climate projections, stakeholder interviews, and environmental monitoring) can be used to support adaptation decisions; and
2. guide investments by national governments and their development partners in information systems that can inform decision making around risks related to climate change.

This case study series was supported by the UK Department for International Development. Case study authors used the same framework of guiding questions for their research, which consisted of literature reviews and interviews. The case studies accompany a World Resources Institute working paper, “Information for Climate Change Adaptation: Lessons and Needs in South Asia,” and the conclusions from a 2-day workshop convened by WRI and Development Alternatives, a research and action organization, in Delhi in April 2012. Both documents and the other case studies can be found at <http://www.wri.org/project/vulnerability-and-adaptation/information>.

In addition, the government lacks crucial information and evidence necessary for climate change adaptation decision making. Despite these challenges, there has been significant movement around climate change adaptation in the country,<sup>1</sup> most notably the successful development of the National Adaptation Programme of Action (NAPA) in September 2010 by the Ministry of Environment (MOE).<sup>2</sup>

This case study examines how Nepal’s NAPA process identified urgent and immediate priorities in a situation of significant data gaps and uncertainty. Since the global climate models and a composite national vulnerability index both failed to provide a practical information base, the MOE met the NAPA guidelines set by the United Nations Framework Convention on Climate Change (UNFCCC)<sup>3</sup> using participatory methods to gather information from locations spread along three north-to-south transects across the country. This approach used information about currently emerging coping strategies as a basis for determining urgent and immediate needs. In addition, the NAPA process used a novel institutional structure to enable cross-sector analysis and multi-stakeholder buy-in, which are both increasingly viewed by experts as important to contending with the complexity and uncertainty associated with adaptation.<sup>4</sup> This helped set the stage for the innovative Local Adaptation Plan of Action (LAPA) process that Nepal launched in 2010.<sup>5</sup>

## NAPA INSTITUTIONS AND RESOURCES

The MOE facilitated the preparation of the NAPA by establishing thematic working groups (TWGs) (see Box 1 for definition) on six themes: water and energy, agriculture, forests and biodiversity, public health, urban settlements, and disaster risk reduction. Based on an initial scoping, these areas were thought to be the most impacted by climate change. The MOE also identified livelihoods and governance, and gender and social inclusion as two crosscutting themes that all TWGs worked on while developing the NAPA. The six working groups, with the help of external facilitators (local consultants), conducted the background research, collected the necessary information about impacts and existing coping strategies, conducted field work, and prepared the bulk of the NAPA draft. A relevant government line ministry (e.g. the Ministry of Agriculture or the Ministry of Energy) led each TWG. The TWGs became the main mechanism through which the government completed its NAPA document and got buy-in from respective line ministries. A total of nine different urgent and immediate adaptation profiles were identified. TWGs were first asked to prioritize a list of activities for their own themes. When these groups came together towards the end of the NAPA process to prioritize the final list, many of the activities that each TWG had prioritized were similar. Instead of selecting projects, the TWGs decided to group together the various adaptation activities they had identified into profiles that consisted of a portfolio of activities.

Resources to prepare the NAPA document came from the Least Developed Country Fund<sup>6</sup> (US\$200,000) and the United Nations Development Programme (UNDP) (US\$50,000). This support was supplemented by funding from the United Kingdom Department of International Development (DFID) (US\$875,000) and the Danish International Development Agency (US\$200,000). This additional funding from the two bilateral donors helped turn the NAPA into “NAPA Plus,” including additional activities related to climate change knowledge management and initiation of a Multi-stakeholder Climate Change Initiatives Coordination Committee.<sup>7</sup> The UNDP provided technical and quality assurance support to the Government of Nepal (GON) throughout the NAPA formulation process with the help of the International Institute for Environment and Development (IIED).

## INFORMATION USE

The UNFCCC NAPA guidelines asked least developed country governments to use existing information and participatory processes to identify urgent and immediate adaptation needs. Following these general guidelines, the GON gathered information through three processes:

1. a review of secondary information sources;
2. consultations along three national transects for gathering information from local levels; and
3. the creation of a climate vulnerability index.

Each of these processes is briefly described:

The NAPA also draws heavily on two climate change studies that provide historical trends and future projections of temperature and precipitation.

### Review of Secondary Information Sources

In its initial scoping in preparation for the NAPA, the MOE reviewed studies conducted at the national level by the Central Bureau of Statistics, the Nepal National Living Standard Survey, the World Bank, academics, and NGOs. This review provided background information on each of the six themes that became the organizing structure for the NAPA.<sup>8</sup> The NAPA also draws heavily on two climate change studies that provide historical trends and future projections of temperature and precipitation: Vulnerability through the Eyes of the Vulnerable by the Nepal Climate Vulnerability Study Team (NCVST) and Temporal and Spatial Variability of Climate Change over Nepal (1976–2005) by Practical Action.<sup>9</sup>

The NCVST report reviewed climate change scenarios based on 15 Global Circulation Models (GCMs). The NCVST also used two Regional Circulation Models (RCMs) and analyzed their usefulness. This report revealed the significant limitations of climate models for generating future

scenarios of change, particularly with respect to precipitation in the country. The report pointed out that these limitations were the results of the complexity introduced by poorly understood monsoon dynamics and the Himalayan landscape, as well as partly a consequence of the lack of data for the region for climate model development. Authors of the study suggest, “a far more comprehensive set of multi-RCM and GCM simulations are required before a sense can be gained of the range of possible climate conditions that different regions Nepal might experience.”<sup>10</sup> Most GCMs used in this study had limited spatial resolution—typically around 2.5 x 2.5 degrees latitude and longitude. This translated to only three grid points of the models that cover Nepal, which roughly fall on the western, central and eastern parts of the country. Even if a GCM can account for the impact of the South Asian monsoon (and most GCMs do not),<sup>11</sup> the topographic effects of the Himalayas on the country’s climate are lost in these coarser resolutions. The RCMs, too, were found to have limited value to adaptation planning at regional and local scales.

## METHODOLOGY USED TO COLLECT LOCAL INFORMATION

The thematic working groups (TWGs) were set up as semiautonomous units by Nepal's Ministry of Environment to work on the preparation and implementation of the NAPA. Their tasks included secondary research, fieldwork, consultations, synthesis, analysis and prioritization of activities, and the development of thematic reports. Each TWG consisted of 10 to 15 members from relevant government agencies, nongovernmental organizations (NGOs) and international nongovernmental organizations (INGOs), special interest groups, researchers, and the private sector.

To collect local-level information, TWGs divided into three mixed teams. Each team visited several locations along a north-to-south transect and consulted with a range of stakeholders. Three such transects were identified on western, middle, and eastern parts of the country along the three major river basins: the Kosi, Gandaki, and Karnali. Members of each TWG in these three transect teams collected information about perceived impacts of climate change and variability, as well as about existing coping strategies for their respective thematic areas. For each transect, the country was divided into high mountains, mid-hills, and southern plains, and the information collected for each thematic area was organized according to these ecological divisions.

Two national and three regional workshops helped build ownership for this approach. Each transect team used methods such as focus groups and structured and unstructured interviews to collect information. The teams made only limited attempts to ensure consistency among their different methods, but they did agree on the broad parameters for the type of stakeholders who could be involved in these consultations.

As an example of the type of information collected during these exercises, members of the water thematic group involved in the western transect found that in the mid-hills ecological zone, landslides during the wet season and droughts during the dry season were common. They also found a loss of agricultural productivity and emerging but localized conflicts over water rights due to the drying up of springs and rivulets. However, they also identified several coping strategies already being used to respond to these challenges. These included development of greenhouses for cash crop production, slope stabilization practices, household water conservation strategies, rain water harvesting, and seasonal male migration to India for work.

An additional study by Practical Action in 2009 analyzed observed monthly precipitation and temperature data from 166 weather stations maintained by Nepal's Department of Hydrology and Meteorology since 1976. This study showed a general increasing trend in temperature across the country. However, it had difficulty saying anything definitive about precipitation trends and concluded that existing national data sets did not capture micro-level variations in precipitation in Nepal.

### Consultations Along Three National Transects for Gathering Information from Local Levels

Consultations among government officials, academics, NGOs, and donors helped kick-start the NAPA process and set the tone for how the varying types of information could be gathered to inform urgent and immediate adaptation needs.<sup>12</sup> For example, participants in the first consultation on the NAPA held in the capital, Kathmandu, identified the need for a national policy based on local threats and capacities and emphasized that local level plans should also be developed to complement the creation of a NAPA. Partly in response to this demand and following the UNFCCC guidelines for stakeholder participation, the NAPA process focused on using information on climate, community characteristics, and impacts gathered at the local level to inform decision making on the selection of options. The MOE subsequently also commissioned LAPAs to create a method for developing place-based, local-level adaptation plans, including mechanisms for implementing plans and disbursing national funds.<sup>13</sup>

Local-level consultations included meetings with villagers, Village Development Committee officials, government line agencies, and civil society representatives. These consultations formed the core strategy through which local information was fed into the NAPA planning process. More than 60 government officials from different ministries participated in these consultations and collected both lists of climate impacts for each TWG theme along ecological regions, and existing coping strategies that local populations in each transect region used<sup>14</sup> (see Box 1 for details).

### Creation of a Climate Vulnerability Index

With the objective of creating climate vulnerability maps for the entire country, the MOE also commissioned a vulnerability index<sup>15</sup> and a mapping study as supplements to the NAPA process. This project created individual indices for sensitivity, exposure, and adaptive capacity — the core components of the Intergovernmental Panel on Climate Change vulnerability framework<sup>16</sup> — and created composite indices to rank climate vulnerability in all 75 of the country's districts. The framework for assessing vulnerability and the choice of indicators for assessment were based on a similar mapping exercise conducted by the Economy and Environment Program for Southeast Asia in 2009.<sup>17</sup> Secondary sources of data — though often of poor quality, from different time periods, or

simply incomplete — were used to construct the indices (see Box 2 for more details).

The study identified Kathmandu and Bhaktapur (relatively wealthy urban districts); Mugu, Dolakha, and Jajarkot (very poor districts); and Ramechhap, Udayapur, Lamjung, and Saptari as the country's most vulnerable districts to climate change. It also produced risk-specific vulnerability rankings of the 75 districts. Yet in the recommendations section, the report states that the three wealthy urban districts of

because “these three districts are the outliers in the vulnerability analysis.” The report went on to claim that the size of the districts, their urban character, and their limited forest cover are reasons for their high ranking, but it did not explain why this qualified them as “outliers.”<sup>18</sup>

## ANALYSIS OF INFORMATION USE

Secondary sources of information, local information, and the national vulnerability index study were used differently in the NAPA development process and had varying impacts on its overall outputs. An analysis of how all three of these products were used during the NAPA development is presented below.

### Secondary Sources

The country faces significant gaps in data and information for assessing and monitoring various biophysical and socioeconomic indicators. This limitation caused challenges in the establishment of robust baseline conditions necessary to prepare profiles for adaptation under the NAPA. Literature and data review by the TWGs revealed that the water, agriculture, and health sectors were likely to be highly impacted by climate change but needed to be further analyzed before appropriate options for adaptation could be developed.

Given these limitations, planning for adaptation in Nepal is a challenge. Information and analysis about climate change impacts in particular

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Nepal — Kathmandu, Bhaktapur, and Lalitpur, which all scored highly on the vulnerability index — should be disregarded while planning for dedicated adaptation interventions”

## VULNERABILITY INDEX METHODOLOGY

As a supplement to the NAPA process, the Ministry of Environment commissioned the study “Climate Change Vulnerability Mapping for Nepal,” which constructed a national index for comparing the vulnerability of Nepal’s 75 districts. The study defined vulnerability as a function of sensitivity (human and ecological), exposure and risk (temperature and rainfall, landslides, floods, drought, glacial lake outburst floods, ecology), and adaptive capacity (socioeconomic, infrastructure, and technology). Direct or proxy indicators with existing information were determined for each of the above categories. For example, total population and land area (population density) were identified as proxy indicators of human sensitivity. And a series of global indices like the Human Development Index, the Human Poverty Index, and the Human Empowerment Index were identified as direct indicators or indices of the socioeconomic components of adaptive capacity.

These indicators were then aggregated, averaged, and normalized to fit a 0 to 1 scale. Each of the normalized indicators was assigned a weight using the expert judgment of the study authors. For example, rainfall and temperature were given the same weight to construct a rainfall and temperature risk sub-index. The study team created sub-indices using these weights for each of the categories identified in the paragraph above. These sub-indices were again assigned weights to create combined indices for exposure, sensitivity, and adaptive capacity. As another example, the combined adaptive capacity index consisted of socioeconomic (0.5), technological (0.25), and infrastructure (0.25) components.

Finally, the sensitivity, exposure, and adaptive capacity sub-indices were combined to generate an overall vulnerability index for each of the 75 districts in Nepal, as well as risk-specific vulnerability indexes for each of the six climate risks identified above, such as droughts and floods.

are generally sparse or unavailable. As discussed previously, in their current form GCMs do not provide outputs at resolutions that are viable for regional planning, nor do they take into account regional weather variations such as the monsoon or the topographical effects of the Himalayas. These gaps limit the usefulness of such climate model outputs for making decisions on adaptation.

### Local Information

The MOE instead based its approach to identifying urgent and immediate needs for the NAPA on the insights gleaned from local consultations. These local consultations by the TWGs fulfilled several functions. First, they provided momentum to help complete the NAPA process because the TWGs and the consultations they conducted were conceived as one of its core components. Second, they helped incorporate local knowledge about coping strategies and impacts from climate variability in specific eco-regions into a national policymaking process. Finally, these consultations gave the TWG members a firsthand account of the needs and opportunities at the local level and helped the relevant line ministries take ownership of the final results. The information from these assessments played a key role in raising awareness about the risks, vulnerabilities, and adaptation needs, and in identifying and prioritizing adaptation options. However, the NAPA did not assess if the options thus identified will actually help improve resilience and adaptive capacity to reduce climate change vulnerabilities.

The transect methodology for holding consultations works well given Nepal’s geography and the presence of different eco-regions from the

north to the south of the country—capturing the nuances among the high mountains, mid-hills, and the southern Terai plains. Three different transects done across the country made up for the lack of an east-to-west variation in the method. A similar approach to the collection of information to determine vulnerability could be useful in other information-deficient developing countries. However, the design of the local consultations, the structure of the teams to collect information, and the nature of information they collect would need to be specifically tailored to each context.

### Climate Vulnerability Index

The vulnerability index study commissioned by the MOE, in contrast, was not able to inform adaptation options identification in the same way that the transect consultations did. Except for a few project options that mention explicitly mountain, mid-hill, or plains ecosystems, most of the profiles identified in the NAPA focus on the TWG themes with very limited geographic focus. For example, one profile included the promotion of community-based adaptation through the integrated management of agriculture, water, forests, and biodiversity, but it did not specify where. In fact, the options seem to have been identified with the hope that they could be tailored for implementation in different parts of the country. This suggests that the index came too late for it to be well-integrated into the process and add much value. The index was completed in September 2010, the same time as the rest of the NAPA. The transect consultations were already completed and the findings from the index could neither be woven into the overall NAPA process nor

help identify urgent and immediate adaptation needs.

Moreover, if a vulnerability index is going to be constructed, it needs to be conceived and designed through a transparent, consultative process to identify the kinds of biases evident in the Nepal study. The methodology did not address the likelihood that the design of the index could have prioritized urban areas, either through heavier weighting of population density or through emphasis on components of vulnerability more prevalent in urban areas. In calling the wealthy urban districts outliers, the authors failed to explain how the factors that led to these being identified as the most vulnerable did not equally influence the rankings of other vulnerable districts. Moreover, there was limited discussion of the choice of vulnerability indicators — for example, it is not clear why indicators used to construct an index for vulnerability in Southeast Asia were applied to measure district-level vulnerability for a country like Nepal.

## CONCLUSION

Nepal's NAPA was novel in its use of TWGs and the transect approach to consultations to promote integrated, cross-sectoral adaptation strategies and aggregate information from the local level to inform national-level priority setting. In these two respects, Nepal's NAPA process tackled quintessential information challenges in national adaptation decision making. The critical success factor, however, was an institutional innovation — the TWGs — rather than an innovation in data-gathering or analytic methods.

The preparation of the NAPA was also one of several factors that led the government to commission the LAPA, and it also helped start a larger discussion about the role of the government in helping local communities adapt. As this decentralization of adaptation decision making moves forward, information flow could reverse directions, with localities demanding tools and information

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from national agencies to support LAPA development. For future iterations of the NAPA, or other national adaptation plans and policies, a successful LAPA should help to further systematize the national aggregation of information on local vulnerability, adaptation needs, and priorities. This process could be buttressed by further innovations at the local level: if the LAPAs are inclusive, democratic, and evidence-based, upward flow of adaptation information can take Nepal's future national adaptation plans and policy to a new level of legitimacy and public relevance.

In the meantime, however, the Nepali government needs to track the many adaptation activities ongoing since the NAPA document was completed. As NAPA profiles are gradually funded and implemented, lessons can be harvested from practical experience to help inform the development of more effective climate change plans and actions. Systematic research into implementation successes and failures is an important component of successful adaptation, both to inform choices about specific projects and actions and to continue improving the overall adaptation decision-making processes. Unfortunately, the government of Nepal has yet to commit domestic funds for the profiles identified through the NAPA, which currently depend on the LDCF and other potential external sources of funding. As a result, it seems likely that other types of adaptation activities, like the LAPA, will move forward more quickly than information on the effectiveness of adaptation activities can be harvested from implementation of the NAPA profiles.

Systematic research into implementation successes and failures is an important component of successful adaptation, both to inform choices about specific projects and actions and to continue improving the overall adaptation decision-making processes.

## ENDNOTES

1. Nepal has initiated or completed a number of important adaptation related processes in the last few years. These include (1) the completion of NAPA in 2010, (2) the development of the Climate Change Policy 2010/11, (3) launch of the Mountain Initiative in 2009 and the organization of the International Conference of Mountain Countries on Climate Change in April 2012, (4) approval of the Local Adaptation Plan of Action (LAPA) framework and the launch of the Nepal Climate Change Support Programme, targeting 14 climate vulnerable districts of the midwest and far west, (5) commencement of the Pilot Program on Climate Resilience under the Climate Investment Fund, and (6) launch of two large climate change projects: NORAD's Reduced Emissions from Deforestation and Degradation (REDD) Project in 2008 and USAID's Hariyo Ban project in 2011. All these activities have significant adaptation components.
2. Ministry of Environment, *National Adaptation Programme of Action* (2010), [http://www.napanepal.gov.np/pdf\\_reports/NAPA\\_Report.pdf](http://www.napanepal.gov.np/pdf_reports/NAPA_Report.pdf).
3. In 2001, the United Nations Framework Convention on Climate Change (UNFCCC) mandated that least developed countries (LDCs) complete NAPAs in order to identify urgent and immediate climate change adaptation needs. Nepal was one of the last LDCs to complete its NAPA. The annotated UNFCCC NAPA guidelines can be found at [http://unfccc.int/files/cooperation\\_and\\_support/ldc/application/pdf/annguide.pdf](http://unfccc.int/files/cooperation_and_support/ldc/application/pdf/annguide.pdf).
4. World Resources Institute, World Bank, United Nations Development Programme, and United Nations Environment Programme, *World Resources Report, 2010-11: Decision Making in a Changing Climate* (2011), <http://www.worldresourcesreport.org>.
5. Gyanendra Karki, B. Regmi, and J. Ayers, "Local Adaptation Plan of Action," NAPA discussion paper (2010), [http://www.napanepal.gov.np/pdf\\_reports/Local%20Adaptation%20Plan%20of%20Action\\_discussion%20paper.pdf](http://www.napanepal.gov.np/pdf_reports/Local%20Adaptation%20Plan%20of%20Action_discussion%20paper.pdf).
6. The LDCF was established to address the special needs of the least developed countries under the UNFCCC. Specifically, the LDCF was tasked with financing the preparation and implementation of NAPAs. The Global Environmental Facility serves as its secretariat. More information can be found at <http://www.thegef.org/gef/LDCF>.
7. GON wanted to use the NAPA as a basis of a sustainable framework for national climate change action. A knowledge management and learning platform has been established and is currently operating in the National Academy of Science and Technology. Similarly, a Multistakeholder Climate Change Initiatives Coordination Committee (MCCICC) that includes government ministries, academics, development partners, local government representatives, and representatives of national and international NGOs was established in April 2010 with more than 21 members from GON. It serves as a coordination body, providing strategic guidance on international climate change negotiations, improving communication and coordination, and providing a platform to articulate needs for international financing. The Climate Change Management Division at the Ministry of Environment serves as its secretariat.
8. Many of these sources can be found in the final NAPA document: Ministry of Environment, *National Adaptation Programme of Action*.
9. The two studies are Nepal Climate Vulnerability Study Team [NCVST], *Vulnerability through the Eyes of the Vulnerable: Climate Change Uncertainties and Nepal's Development Predicaments* (Kathmandu: Institute for Social and Environmental Transition-Nepal [ISET-N]; and Boulder, Colorado: Institute for Social and Environmental Transition [ISET], 2009), [http://www.preventionweb.net/files/12565\\_ClimatescenariosReport1.pdf](http://www.preventionweb.net/files/12565_ClimatescenariosReport1.pdf); and Practical Action, *Temporal and Spatial Variability of Climate Change over Nepal (1976-2005)* (2009), [http://practicalaction.org/file/region\\_nepal/ClimateChange1976-2005.pdf](http://practicalaction.org/file/region_nepal/ClimateChange1976-2005.pdf).
10. NCVST, *Vulnerability through the Eyes of the Vulnerable*, 51.
11. See, for example, the state of model capabilities shown by H. Annamalai, K. Hamilton, and K. R. Sperber, "The South Asian Summer Monsoon and Its Relationship with ENSO in the IPCC AR4 Simulations," *Journal of Climate* 20 (2007): 1071-92.
12. Two national and three regional consultation workshops were conducted along with various other consultations with civil society groups. The report of the first inception workshop can be found at [http://www.napanepal.gov.np/pdf\\_reports/Inception%20Report%20August%2009%20for%20circulation.pdf](http://www.napanepal.gov.np/pdf_reports/Inception%20Report%20August%2009%20for%20circulation.pdf).
13. The LAPA was initiated in 2010 and approved in early 2011 as a means of implementing the NAPA projects and integrating adaptation options into development policy and planning processes at the local level. More information can be found at Karki, Regmi, and Ayers, "Local Adaptation Plan of Action"; and Batu Uprety and T. N. Bhattarai, "Adaptation to Climate Change: NAPA to LAPA," Ministry of Environment and IDS-Nepal, CDKN Brief (2011), <http://www.idsnepal.org/nseu/knowledge%20products/NAPA%20TO%20LAPA.pdf>.
14. Ministry of Environment, *TWG Summary Report* (2009), [http://www.napanepal.gov.np/pdf\\_reports/NAPA%20TWG%20Summary%20Report.pdf](http://www.napanepal.gov.np/pdf_reports/NAPA%20TWG%20Summary%20Report.pdf). These findings from the TWGs are also listed in the final NAPA document as an annex.
15. Ministry of Environment. "Climate Change Vulnerability Mapping for Nepal" (GON, 2010), [http://www.napanepal.gov.np/pdf\\_reports/CLIMATE%20CHANGE%20VULNERABILITY%20MAPPING%20FOR%20NEPAL%20INNER.pdf](http://www.napanepal.gov.np/pdf_reports/CLIMATE%20CHANGE%20VULNERABILITY%20MAPPING%20FOR%20NEPAL%20INNER.pdf).
16. The IPCC defines vulnerability as a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity. IPCC, "Annex B: Glossary of Terms," in *Third Assessment Report* (2001), <http://www.ipcc.ch/pdf/glossary/tar-ipcc-terms-en.pdf>.
17. Arief Anshory Yusuf and Herminia Francisco, "Climate Change Vulnerability Mapping for Southeast Asia" (Economy and Environment Program for Southeast Asia, 2009), [http://web.idrc.ca/uploads/user-S/12324196651Mapping\\_Report.pdf](http://web.idrc.ca/uploads/user-S/12324196651Mapping_Report.pdf).
18. Ministry of Environment. "Climate Change Vulnerability Mapping for Nepal" (GON, 2010), [http://www.napanepal.gov.np/pdf\\_reports/CLIMATE%20CHANGE%20VULNERABILITY%20MAPPING%20FOR%20NEPAL%20INNER.pdf](http://www.napanepal.gov.np/pdf_reports/CLIMATE%20CHANGE%20VULNERABILITY%20MAPPING%20FOR%20NEPAL%20INNER.pdf).

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## ABOUT THE AUTHOR

**Aarjan Dixit** is an Associate with the Vulnerability and Adaptation Initiative at the World Resources Institute.  
Contact: [adixit@wri.org](mailto:adixit@wri.org)

## REVIEWERS

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Priya Barua, World Resources Institute

Su-Lin Garbett-Shiels, United Kingdom  
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Ailun Yang, World Resources Institute

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SUITE 800  
WASHINGTON, DC 20002, USA  
+1 (202) 729-7600  
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