1. Contents

1.1 List of Abbreviations 5

1.2 List of Figures 6

2. Introduction 7

2.1 Structure of the Paper 8

3. Basic tenets: Human Development, Climate Change, and Disaster Risk Reduction 9

3.1 Human Development **Error! Bookmark not defined.**

3.1.1 An Evolving Aspiration 9

3.1.2 Principles Underlying the Idea of Human Development 10

3.2 Climate Change Impacts and Adaptation 11

3.3 Disaster Risk Reduction **Error! Bookmark not defined.**

3.4 Climate Change and DRR 14

3.4.1 Why Consider Climate Change Impact for Analysing Disaster Risks? 14

3.4.2 Challenges in Incorporating Climate Change Risks into Disaster Planning 15

4. International Frameworks for HD, DRR, and Climate Adaptation 16

4.1 International Frameworks for Human Development 16

4.2 International Initiatives and Frameworks for DRR 17

4.3 International Frameworks for Climate Change 19

4.4 International Frameworks are Converging 20

5. National Policy Framework for HD, CC, and DRR in India 21

5.1 National Policies and Plans for Human Development 21

5.1.1 Critique of the Twelfth Five Year Plan 21

5.1.2 Climate Change in the Twelfth Five Year Plan 22

5.1.3 The Role of Sectoral Policies 24

5.2 National Policy Framework for Disaster Risk Management 24

5.2.1 Flagship National Policies for Disaster Risk Management 24

5.2.2 Human Development Perspective in National Disaster Management Policies 26

5.2.3 Alignment of State Disaster Management Plans with National Policy 27

5.2.4 Human Development Perspective in State Disaster Management Plans 29

5.3 National Policy Framework for Climate Change 29
5.3.1 First and Second Communications to the UNFCCC 30
5.3.2 Review of India's Flagship Policy on Climate Change 31
5.3.3 National Climate Policy and DRR 32
5.3.4 Human Development Perspective in National Climate Policy 32
5.3.5 Alignment of State Action Plans on Climate Change with the NAPCC 33
5.3.6 Human Development Perspective in State Action Plans on Climate Change 34
6. Building an Integrated Planning Framework 35
6.1 Extended Notions of Risk, Resilience, and Vulnerability 35
6.1.1 Associations of Risk 35
6.1.2 Explorations of Vulnerability 35
6.1.3 Building Resilience 36
6.2 Linkages between CC, DRR, and HD37
6.2.1 Climate Change and DRR 37
6.2.2 Interface of DRR and CC with Human Development 38
6.2.3 Components of a Resilient Planning Framework 39
7. New Sites for Integrated Interventions 42
7.1 Vulnerability Reduction and Exposure Modification 42
7.1.1 Mapping Risks and Vulnerabilities 42
7.1.2 Early Warning Systems 43
7.2 Livelihood Protection and Diversification 43
7.2.1 Livelihoods Diversification 43
7.2.2 Universal Access to Basic Services 44
7.2.3 Social Protection Programmes 44
8.0 Enabling Mechanisms 45
8.1 Structures and Processes for Integrated Planning45
8.2 Capacity Building for Integrated Planning and Implementation 46
9.0 Conclusions 47
Appendix 1: Characteristics of the Human Development Approach49
Appendix 2: Paradigm Shift in Theoretical Perspectives on Disaster Risk Management 49

Appendix 3: Global Financial Institutions' Engagement with Climate Change 51

Appendix 4: City Climate Adaptation Projects 52

Appendix 5: Climate Influence on Livelihood Resources 54

Appendix 6: Case Study of City Level Disaster Management Plans 55

Appendix 7: Review of City Disaster Management Plans and Climate Change Plans against HD Principles 60

References / End Notes 65

1.1 List of Abbreviations

ACCCRN	Asian Cities Climate Change Research Network
CC	Climate Change
CCA	Climate Change Adaptation
COP	Conference of Parties
DDMA	District Disaster Management Authority
DDMP	District Disaster Management Plan
DFID	UK Department for International Development
DM	Disaster Management
DRR	Disaster Risk Reduction
ECOSOC	Economic and Social Council
GAR	Global Assessment Report
GFDRR	Global Facility for Disaster Risk Reduction and Recovery
GHG	Greenhouse Gas
GIZ	German Development Corporation
GO	Governmental Organisation
GoI	Government of India
HadCM3	Hadley Centre Coupled Model
HD	Human Development
HDR	Human Development Report
HFA	Hyogo Framework for Action
HRVA	Hazard, Risk, and Vulnerability Assessment
ICLEI	International Council for Local Environmental Initiatives
IFC	International Finance Corporation
IIHS	Indian Institute for Human Settlements
IPCC	Intergovernmental Panel on Climate Change
MDG	Millennium Development Goal
MIGA	Multilateral Investment Guarantee Agency
MNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MoEF	Ministry of Environment and Forestry
NAPCC	National Action Plan for Climate Change
NDMA	National Disaster Management Authority
NDMP	National Disaster Management Plan
NGO	Non-Governmental Organisation
NIDM	National Institute for Disaster Management
NPDM	National Policy on Disaster Management
OECD	Organisation for Economic Cooperation and Development
PPP	Public Private Partnership
SAPCC	State Action Plan for Climate Change
SDMA	State Disaster Management Authority
SDMP	State Disaster Management Plan
SES	Social Ecological System
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNISDR	United Nations International Strategy for Disaster Reduction

1.2 List of Figures

Figure 1: Occurrence of Hydro-Meteorological Hazards, (1987-2006). Source: Centre for Research on the Epidemiology of Disasters (CRED) – Annual Disasters Statistical Review 2006, Brussels, May 2007	13
Figure 2: Growth in Flood Exposure in low–income Countries (1980-2010). Source: GAR, 2011	13
Figure 3: An Integrated Framing of Development Planning, Climate Change Adaptation, and Disaster Risk Reduction by using a Human Development Lens	25
Figure 4: Details of Legal or Institutional Framework for Disaster Management in India as per the DM Act Source: Report No.5 of 2013, Comptroller and Auditor General of India	33
Figure 5: Climate impacts: a Compound Effect of Direct Impact, Indirect Impact, and Pre-Existing Vulnerability. Source: da Silva et al 2012	47

DRR, and (b) there is an inconsistency in the treatment of HD considerations at the state level CC and DRR plans.

This paper recommends that a HD framework integrating a DRR and CCA needs to be developed, through the formulation of State and city level plans, and the Twelfth Five Year Plan, to have positive developmental outcomes. This planning effort cannot be housed in a single State department, but must aim to bring about convergence in overall State and city planning. This paper argues that HD approached in the Plan as 'inclusive growth' generates numerous strategic levers to enable integrated planning, which needs to be carried through into State Five Year Plans and their implementation. The paper recommends 'Resilience Planning' at the state level to achieve resonance with progressive international discourses on poverty and vulnerability reduction, while incorporating the regional and local context that affects the positive outcome of any planning initiative. The local context includes social, environmental, and economic aspects of a State or city, which guide its HD aspirations.

The paper will also act as the basis for teaching a series of UNDP-IIHS short courses that seek to align the three thematic areas of climate adaptation, DRR, and poverty and vulnerability reduction through an integrative framework. These courses will target public officials entrusted with the preparation and implementation of state level Five Year Plans, and state and city level CC and DRR plans.

2.1 Structure of the Paper

The working paper has three distinct parts to it:

- In the first part (sections 2 and 3), conceptual and policy level discourses on the three themes of DRR, CC, and HD are spelt out, indicating good progress on achieving coherence in at least international arenas.
- In the second part (sections 4 and 5), linkages between the thematic areas of DRR, CC, and HD are distilled around the key concepts of risk, resilience, and vulnerability; an integrated planning framework is developed and distinct sites for intervention are also explored.
- In the third part of the paper (sections 6), India's national, sub-national level policy, and planning documents are critiqued, indicating fairly rapidly evolving paradigms at the national level, but challenges the way State and city plans are conceived.

Section 2 establishes the definitions, concepts, and terms which stem from the thematic areas of HD, DRR, and CCA. It also makes explicit the multi-dimensional linkages between CC risks, DRR, and climate adaptation efforts.

Section 3 discusses the international policy processes at work in all the three areas, some of which are clearly signalling an integrative approach that links disaster and climate risk mitigation to poverty and vulnerability reduction.

The HDR 2010 reiterates how equity, sustainability, efficiency, and empowerment expand people's choices.

3.1.2 Principles Underlying the Idea of Human Development[iv]

While expanding the choices available to individuals, the HD approach aspires to achieve the values of Equity, Productivity/Efficiency, Participation, and Empowerment and Sustainability.

Equity: Equity refers to a concept of justice and impartiality or fairness. It recognises that those who have unequal opportunities should receive differential treatment to put them at par with others. Equity is not to be confused with the idea of equality, which implies equal treatment of all people. For example, children, women, differently abled, and ethnic minorities face different kinds of deprivation. Their specific needs have to be addressed to enable them to make choices and utilise opportunities.

Efficiency or Productivity: Efficiency or productivity broadly refers to the effective use of available resources. From the HD perspective it implies maximising the use of material, human, and community resources. Any effort made to enhance well being should make use of all available resources in the best possible manner. This will have the maximum impact on widening choices. Like equity, efficiency too is a dynamic concept, what may be efficient today may not be efficient in the long run and efficiency may mean different things to different people and communities. This dynamism needs to be understood before efficiency is aspired for.

Participation and Empowerment: Empowerment is a foundational principle of HD. People have to be empowered to be able to shape their lives and to exercise choice. People experience a sense of empowerment when they are involved in the planning and decision-making process of initiatives that affect them. People no longer remain mere beneficiaries of change but can pursue the goals they value.

Sustainability: The HD paradigm aspires to make development sustainable. Sustainable development broadly refers to development, which is undertaken in a manner that it does not jeopardise the opportunities available to future generations. Sustainability is a multidimensional concept, which concerns itself not only with the environmental, but also cultural, financial, and social aspects of life. For example, developmental agendas that lead to excessive spending, increase in debt servicing burden, and an eventual debt trap are unsustainable.

The HD approach requires that all four principles are adhered to. Paying attention to one dimension while ignoring others would be self-defeating. In this paper, plans for DRR, CC, and poverty and vulnerability reduction (at State and/or city levels) are assessed in terms of whether they adhere to the principles underlying a HD approach.[1]

[1] For an overview of the four key characteristics of an HD approach, see Appendix 1

The impact of regional CC is compounded by alterations in the global economy. CC in India can be seen as part of a three-part transition: a demographic transition that will see the country's population stabilize at about 1.6 billion in the 2060s, a rural to urban transition that will see an increase in urban population by 500 million people, and an environmental transition.[x] CC will impact both urban and rural areas, affecting water and energy access, agriculture, and health.[xi]

Climate change mitigation efforts often focus on resource conservation and management, reforestation, and development of clean and renewable sources of energy. Regulations stipulate standards for increased energy efficiency of electrical appliances and modes of transport, and specifications for less energy and water intensive buildings[xii]. Mitigation is also targeted through policies which encourage increased use of public transport, ecologically-sensitive water supply and treatment methods, and low carbon waste management systems[xiii]. Mitigation follows a top-down agenda implemented through national policies and sector-specific regulations towards industrial, infrastructure or systems transition.

Adaptation to CC, according to the IPCC refers to adjustments in human and natural systems in response to actual or expected climate stimuli, or their impacts that moderate harm or exploit beneficial opportunities. Adaptation to CC is highly complex and requires collaborative action from multiple stakeholders. Evidence related to the impact of CC impact in a specific location and vulnerability of people in that location builds a repository of information, useful for guiding future adaptation measures and policies by city governments, businesses, and civil society. Building adaptive capacity and resilience at household, community, and local level can help prepare for future uncertainties and risks.

There is a close and complex link between CC and urbanisation**.**[xiv]These can be broadly explained through at least two feedback loops. First, cities contribute to increasing levels of GHG emissions, especially cities of rapidly urbanising countries such as India. Second, city residents are increasingly vulnerable to the direct and indirect impacts of CC. Poor and vulnerable communities in urban centres, which lack adequate access to infrastructure and services, stand to face worse shocks and stresses due to CC.[xv]

Urbanisation is one of the key factors that is increasing the vulnerability of and risks to people, properties, and economy. The world is passing through great urban upsurge; the number of people living in cities equalled those in villages in 2007 and has been rising ever since. Since people, properties, infrastructure, and capital stock are concentrated in cities, the impact of climate-change-related hazards in urban areas can be catastrophic as shown by floods in Mumbai (2005), Pakistan (2010), and Thailand (2011).

City-based informal settlements are often located on dangerous sites such as steep slopes and low lands next to insecure riverbanks or coasts, and utilise structures that do not adhere to building codes.[xvi] These locations in urban areas become 'hot spots'

where CC exacerbates human exposure to natural hazards.[xvii] Among the residents of such settlements, the groups most vulnerable to CC impacts are women, children, the health-compromised, and the elderly, due to multiple reasons, including reduced mobility (e.g., women and children with household responsibilities), fewer resources, or lack of bodily strength.[xviii]

3.3 Disaster Risk Reduction

Disasters are usually understood as catastrophic events of natural or human origin that lead to a serious disruption of the normal functioning of a socio-ecological system (SES) that is exposed to the event.[xix] Natural disasters include drought, floods, earthquakes, cyclones, and storm surge; while human induced events are related to chemical and transportation accidents, biological or nuclear accidents, arson, armed conflict, civil unrest and terrorist attacks. While most of these have a rapid onset, some like drought are slow-onset disasters.

Events such as earthquakes, floods, and droughts have the potential to cause grave harm to people, which may or may not be acknowledged as actual disaster. These events are called '**hazards'**, i.e., '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'.[xx]

All hazards act within a spatial-temporal limit, within which grave harm may be caused leading to a potential disaster. Within these limits, all 'elements at risk' from people, to ecosystems, buildings, and infrastructure are deemed to be 'exposed' to that particular hazard.[xxi] '**Exposure**', and subsequently the '**degree of exposure**' is a key determining factor in the probable loss of life, morbidity, livelihood, or assets of poor and vulnerable groups who are often pushed into high risk areas that are exposed to high flooding or cyclonic storms and accompanying surges. Exposure reduction is an important measure to reduce the potential loss to people, their livelihoods, and assets.

DRR has conventionally focused on the disaster-recovery cycle that starts post an event with response, recovery, and closes with rehabilitation. Much of the focus of DRR has been on large, relatively low frequency catastrophic events, or 'intensive risk', which also dominates the policy and public imagination. However, more recently, small, everyday 'intensive risk' is shown to be as significant and important when added up across many regions of the world, as the larger, more intense events.[xxii]

Integrated DRR involves establishing mechanisms, measures, and systems and capacities that reduce the exposure and vulnerability of people and other elements at risk from all momentary hazards in a particular location. The practice stems from the understanding that not all hazards can be halted, avoided, or predicted accurately. However, most factors that determine vulnerability and exposure could be addressed by appropriate development measures, risk mitigation, and early warning. The new

paradigm for DRR is increasingly 'vulnerability-centred' as disasters are understood as a phenomenon linked to physical, social, economic, and institutional vulnerability. This approach also tends to look at specific vulnerabilities of various groups of people such as women, children, elderly, disabled, ethnic/racial, or religious minorities, etc.[xxiii] [2]
In the next section, the multi-faceted connections between CC and DRR are explored, as they converge towards the integrated notions of risk and vulnerability assessments, and reduction.

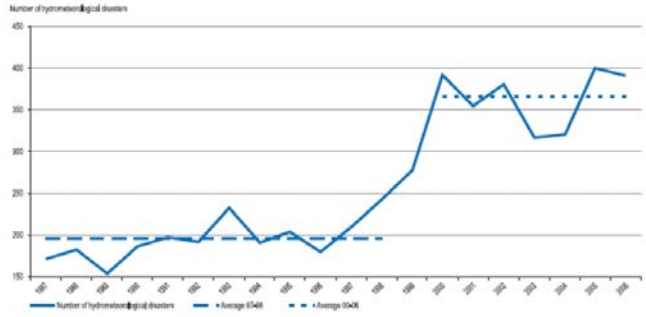
3.4 Climate Change and Disaster Risk Reduction

This section describes disaster risks induced by CC impacts and at the same time, makes explicit the challenges faced in incorporating CC risks into traditional DM responses.

3.4.1 Why Consider Climate Change Impact for Analysing Disaster Risks?

Hazards connected with climate variability and change are typically hydrological, for example; heavy rainfall and flooding, or meteorological such as; windstorms, cyclones, El Nino, and climatological, for example; drought, extreme hot dry winds, snow melting, cloudburst, and avalanches. [xxiv] CC is expected to alter the frequency and intensity of extreme events and shift their relative frequency. From 1988 to 2007, 76 per cent of all disaster events were hydrological, meteorological, or climatological in nature. These accounted for 45 per cent of the deaths and 79 per cent of the economic losses caused by natural hazards.[xxv] The likelihood of increased weather extremes in future causes concern that the number or scale of weather-related disasters will also increase.

Figure 1: Occurrence of Hydro-meteorological Hazards, 1987–2006



Source: Centre for Research on the Epidemiology of Disasters (CRED)—Annual Disasters Statistical Review 2006, Brussels, May 2007.

In the period between 2000 and 2007, of more than 230 million people affected annually by disasters, about 98per cent were due to climate related hazards, predominantly floods and windstorms, followed by droughts. During the period 1987–2006, the number of reported disasters related to hydro-meteorological hazards (droughts, floods, tropical storms, wild fires) showed a significant increase; from an average of 195 per year in 1987–1998 to 365 per year in 2000–2006. Needless to say,

[2] For a detailed discussion on the theoretical paradigm shift which has accompanied the policy focus from disaster risk management to integrated disaster risk reduction, see Appendix 2.

were to operationalise these ideas by setting targets and indicators for poverty reduction in order to achieve the rights set forth in the Declaration on a 15-year timeline. There were eight goals with 21 targets, and a series of measurable indicators for each target.[xxvii]

While the eight MDGs were aimed at reducing poverty and vulnerabilities, and increasing resilience by improving social and economic indices, they attempted at addressing issues related to CC and risk reduction for the overall environmental sustainability. Strategies linked to disaster risk for moving ahead on this goal were outlined in the Road Map towards the implementation of the Declaration, which included:[xxviii]

- Developing early warning systems, vulnerability mapping, technological transfer, and training.
- Supporting interdisciplinary and inter-sectoral partnerships, improved scientific research on the causes of natural disasters and better international cooperation to reduce the impact of climate variables, such as El Niño and La Niña.
- Encouraging governments to address the problems created by megacities, the location of settlements in high-risk areas and other manmade determinants of disasters.
- Encouraging governments to incorporate DRR into national planning processes, including building codes.

The UN Secretary-General's report 'In larger freedom: towards development, security, and human rights for all' (2005) includes a section on 'Other priorities for global action', in which natural disasters have been identified as an obstacle to achieve the development goals.[xxix]

In the post-2015 phase, with disaster risk increasing globally due to increasing vulnerability to natural hazards, whose intensity and frequency are increasing with CC, the MDGs will require a risk-sensitive approach to ensure their accelerated achievement and sustainability. The above discussion indicates a high degree of recognition and inclusion of disaster risk and climate risk by international frameworks (HDRs) and international indicators (MDGs) for HD.

4.2 International Initiatives and Frameworks for Disaster Risk Reduction

The International Strategy of Disaster Reduction (ISDR) was adopted by United Nations Member States in December 1999, aiming to guide and coordinate the efforts of a wide range of partners to achieve substantive reduction in disaster losses and build resilient nations and communities. The strategy played an important role in bringing about a conceptual shift from response to risk reduction.

The HFA (2005–2015) adopted at the World Conference on Disaster Reduction in 2005 stated one of its strategic goals as more effective integration of disaster risk considerations into sustainable development policies, planning, and programming at all levels, with a special emphasis on disaster prevention, mitigation, and preparedness, and vulnerability reduction. The HFA observes that DRR is an important element for the achievement of internationally agreed development goals, including those contained in the Millennium Declaration.
The HFA is the first plan to explain, describe and detail the work that is required from all different sectors and actors for integrated DRR, outlining five priorities for action[xxx]:

- Ensure that DRR is a national and a local priority with a strong institutional basis for implementation.
- Identify, assess, and monitor disaster risks and enhance early warning.
- Use knowledge, innovation, and education to build a culture of safety and resilience at all levels.
- Reduce the underlying risk factors.
- Strengthen disaster preparedness for effective response at all levels.

The goal of the HFA is to substantially reduce disaster losses by 2015 by building the resilience of nations and communities to disasters. This means reducing loss of lives and protecting social, economic, and environmental assets when hazards strike.
UNISDR has worked to promote DRR throughout the world. In 2009, it published the first in a biennial series of reports on DRR, the GAR on DRR. The second report, published in 2011, points out that that some 130 nations are assessing their progress towards the HFA. It is clear that governments are now realising the importance of DRR[xxxi]. These developments have led to a growing role for local authorities, community leaders, and other stakeholders in the ongoing UNISDR 'Making Cities Resilient - My City is Getting Ready!' campaign.
Regional inter-governmental organisations have increasingly taken responsibility to follow up on risk reduction activities and HFA implementation. This has transformed into multi-stakeholder platforms for DRR in Africa, Asia and the Pacific, the Arab States, Europe, and the Americas. They provide an opportunity to exchange information and knowledge among national stakeholders, as well as determining pathways for DRR action in a given region. National Platforms are nationally owned and led multi-stakeholder committees responsible for coordinating the implementation of the HFA and mainstreaming DRR into development policies, planning, and programmes.
India has set strategic goals for the three main areas as articulated in HFA, namely[xxxii]:

- The more effective integration of disaster risk considerations into sustainable development policies, planning, and programming at all levels, with a special emphasis on disaster prevention, mitigation, preparedness, and vulnerability reduction.

- The development and strengthening of institutions, mechanisms, and capacities at all levels, in particular at the community level, that can systematically contribute to building resilience to hazards.
- The systematic incorporation of risk reduction approaches into the design and implementation of emergency preparedness, response, and recovery programmes in the reconstruction of affected communities.

Some actions have already been undertaken to meet these strategic goals, which are elaborated in Section 6.2.

4.3 International Frameworks for Climate Change

International frameworks for CC are increasingly focused on CCA, especially in the context of vulnerable populations in low-income countries. While adaptation is still a new field of work, the recognition that inevitable impacts of CC need to be dealt with, has resulted in efforts from national to local levels, to integrate this agenda into ongoing policy and planning frameworks. A much larger and more diverse literature on current and potential CC risks for both urban and rural populations has been produced, as is knowledge with regards to vulnerabilities of different regions.

The UNFCCC was introduced in 1992. Initially, the Convention was strongly focused on reducing the emission of GHGs. Stabilisation of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system was the ultimate objective of the Convention. Despite global agreement on the benefits of reducing emissions, action has been slow, and differentiated across nations. Adaptation to CC is necessary because of its impact on people, especially those who are least able to cope with those impacts, are already underway. Major milestones in adaptation under the UNFCCC include the Special CC Fund and the Least Development Countries Fund under the Global Environment Facility, set up by the Marrakesh Accords; the Nairobi Work Programmes and the Buenos Aires Programme of Work; the Adaptation Fund under the Kyoto Protocol; the Copenhagen Accord; and most recently and importantly, the Cancun Adaptation Framework of 2010.[xxxiii]Some interventions achieve both mitigation and adaptation benefits, while also addressing the goals of sustainable development.

Guided by the UNFCCC framework, climate policies have been developed by governments worldwide. Recognition of people's vulnerability to CC has resulted in laws with a heavy emphasis on adaptation, particularly in developing countries. For example, South Africa's Vision, Strategic Direction, and Framework for Climate Policy mandates government departments to include adaptation strategies as key performance indicators and to include better early warning and DRR systems. The National Mission for Sustaining the Himalayan Ecosystem and the National Water Mission are designed to help protect India's water supply, while the National Mission for Sustainable

It is important to note that poverty reduction is only one of the many components of inclusive growth; however distributional concerns remain an important policy focus. The inclusive growth paradigm and its stated role as a focus of the Twelfth Plan make it a good site of intervention to impact current policies and practices.
There are two main interventions for addressing the inter-linked developmental challenges of poverty, group inequality, regional balance, inclusiveness, and empowerment which are espoused in the Plan:

- The first is focused on employment programmes such as the MGNREGA, which has reduced poverty and prevented acute distress during times of drought, thus addressing vulnerability of the poor.
- The second intervention is focused on large-scale infrastructure development to address backlogs, and roll-out of universal access to basic services.

Importantly, for this paper, these interventions are also recommended as key levers for building resilience in the context of climate risks and other natural threats to people, from a HD approach. Investment in infrastructure and service networks is proposed through PPPs. Various social protection programmes receive special mention in the 2011 HDR with potential for addressing both environmental deprivations and equity.[xlii] Basic services are emphasised in the Plan with a view to developing human capabilities and include longevity, education, skills development, health, nutrition, water and sanitation, and information technology. These dimensions of human capability are seen as enablers for accessing economic opportunities for all sections of the society, and for the achievement of HD goals. According to HDR 2011, addressing energy deprivations, and access to clean water and sanitation help build resilience in vulnerable communities.

5.1.2 Climate Change in the Twelfth Five Year Plan

The Twelfth Five-Year Plan delineates sectoral programme priorities. CC has gained considerable space in the preamble as well as across the major sectors in this plan. The plan establishes that the NAPCC will be the prime policy guiding domestic CCA initiatives in the near future.

Energy and Transport Sectors and Climate Change

The plan gives energy efficiency and renewable energy special emphasis. It focuses on specific initiatives needed to put the country's development on a low carbon growth trajectory, so that India can meet its Copenhagen commitments.[xliii](The report on Low Carbon Strategy for Inclusive Growth looked at the emission intensity reduction potential of different sectors of the domestic economy in four broad areas—increasing efficiency of thermal energy, changing electric power supply towards renewable, nuclear and hydel energy, suggesting alternate energy options for industries like steel and cement, and the transport sector.

The low carbon growth strategy in the Twelfth Five Year Plan focuses on mitigation or carbon emissions reduction. The working group on urban transport in the National Planning Commission recommended that all Indian cities with a population of more than 2 million should start planning rail transit, and cities of more than 3 million should start constructing rail transit over the next five years, as a means of providing public transport to a rapidly urbanising population.[xliv]Such recommendations are expected to generate mitigation benefits as well as inclusive development for the Indian people. However, the Low Carbon Strategy for Inclusive Growth, and the NAPCC have not addressed the distributional effects of green policies sufficiently; in particular, sustainable innovations to solve energy deprivation in rural areas of India. Attention to risk reduction in water, energy, mobility, and telecom infrastructure is also absent.

Agricultural Sector and Climate Change

The plan clearly acknowledges the present and future crisis of the agricultural sector due to CC and climate variability. It positions the National Mission for Sustainable Agriculture, promulgated under the NAPCC as the most important new addition to the policy framework in the agriculture sector vis-à-vis CC and climate variability. It is interesting to note how this has affected policy direction. A major departure from earlier policies in the agriculture sector, which were designed around the logic of production to protect domestic food security, has taken place in the Eleventh and Twelfth Plans,

'…since sustaining agricultural productivity through climate and other challenges to the natural resources base is the focus of this mission, it will have to go beyond its programmatic interventions to bring mind-set changes required in transiting from the past focus on irrigated, chemical intensive agriculture'.[xlv]

Secondly, the plan enshrines greater responsibility on the government to become the 'prime mover' and 'facilitator' in leading the agricultural transition towards a knowledge-based, farmer-centric, and institutionally supported system, which builds upon several years of grassroots work by government and civil society organisations.

The plan also somewhat indirectly acknowledges the alarming ground water depletion in the northern parts of the country due to paddy cultivation, when it talks about the need to change current cropping patterns in the context of CC and initiate a shift towards sustainable and climate resilient agriculture.[xlvi]

The Twelfth Five Year Plan articulates the need to use a gender perspective and have inbuilt mechanisms within various CC mitigation/adaptation measures. The Plan intends to make sure that while National and State level Action Plans on CC are being formulated, a gender assessment of these plans including gender-specific objectives, indicators, monitoring and evaluation dimensions, and capacity building are undertaken. This is to ensure that CC plans are more responsive to women's concerns and needs.[xlvii] The inclusion of a gender dimension within climate adaptation strategies takes the initiatives much closer to integrative HD goals.

5.1.3 The Role of Sectoral Policies

In addition to the overarching development plans and policies, several sectoral processes are relevant for HD, and as they address poverty and vulnerability reduction, they are also relevant for CCA and disaster mitigation,[xlviii] such as:

- urban development;
- rural development (guaranteed employment for the rural poor for part of the year, investments in rural infrastructure);
- spatial planning (land use planning, zoning regulations);
- environmental regulations;
- water policies and planning (integrated water management approaches, water tariffs);
- agricultural pricing (tariffs, subsidies and minimum price guarantees); and
- risk management measures (insurance, seed banks, contingency plans).

Sector policies for manufacturing, transport, fiscal management, and skills development are also relevant for development through employment generation and sustenance of those jobs.

5.2 National Policy Framework for Disaster Risk Management

There has been a sea-change in the institutional framework of disaster risk management within the Indian national governance framework over the last decade (2003–2013). The first noteworthy change in the Central Government's perspective was to shift the responsibility of National Centre for DM, established in 1995, from the Ministry of Agriculture to the Ministry of Home Affairs. This centre renamed as the National Institute of Disaster Management (NIDM) became a statutory body under the National Disaster Management Act 2005. It is worth noting that these changes took place while the world was observing the International decade for Natural Disaster Reduction.[xlix]

This also indicated a shift in the policy discourse from the drought—food insecurity—famine—relief vision of disaster, centred around food security and agricultural production, to taking cognizance of a much broader spectrum of geological, hydrological hazards, and their impact on the population of the country.

5.2.1 Flagship National Policies for Disaster Risk Management

The National Disaster Management Act, 2005 and The NPDM, 2009 are the most important DRR-related legislation and policy respectively, in India.

The act brought about a paradigm shift in DRR in India by introducing new concepts to the policy discourse within the Indian administration. Mere relief was to be replaced by 'DM' and 'disaster preparedness', and coordination and measures for 'mitigation, or reduction of risk of any disaster, or its severity, or consequences' were brought into the fold.[l] The following structures were institutionalised: NDMA, headed by the Prime

are supposed to be reviewed periodically to identify safety gaps from seismic, flood, landslide, and other disasters, and suitable modifications be made to align them to the revised building codes of the Bureau of Indian Standards.[lii]

The NPDM also takes cognisance of land use planning as integral to the DM approach, especially in the context of urban habitats. According to Article 6.3.1, the Central Ministries and Departments concerned in consultation with scientific institutions are supposed to carry out an analysis of environmental and hazard data to formulate alternative land-use plans for different geographical and administrative areas with a holistic approach. This is more relevant to mega cities, metros, and high-density urban settlements for safer location of habitat and other critical facilities. A review of Master Plans, and their compliance on priority, will be essential and regarded as the paramount responsibility of the states and union territories. At the macro-level, the need for preparation of land-use planning based on the inventory database of various uses is advocated. As far as urban settlements are concerned, future land use is to be assessed keeping in view the anticipated intensity and vulnerability of development.[liii]

The Tenth Five Year Plan of India, 2002–7, for the first time, acknowledged the need to consider a sustained approach to incorporate DM in the planning process. The Eleventh Five Year Plan took this further by acknowledging the importance of disaster preparedness, mitigation, and risk reduction within all departments and working of the government mechanisms available. This plan also featured the increasing threat due to CC and the need for policies and tools to be geared towards adaptation within different sectors. However, climate adaptation gains a strong and focused prominence in the Twelfth Five Year Plan due to the National Action Plan on CC (NAPCC) being promulgated in 2008. The Twelfth five-year plan is informed by the NAPCC in terms of scientific evidence and a specific focus on sectoral adaptation. Disaster preparedness, mitigation, and risk reduction do not progress significantly in the Twelfth Plan from the Eleventh Plan.

5.2.2 Human Development Perspective in National DM Policies

The rights and entitlements—promulgated through the NDM Act should ideally be grounded in an appreciation of the multiple sources and variable nature of (human) vulnerabilities or relativity of risk and exposure. The purpose of the Act is to ensure the rights of disaster-affected people. Vulnerability is explicitly addressed in the Act, albeit from a spatial perspective by emphasising ‘location’ or hazard-prone ‘area’. Relative differences across habitats and different needs according to varying capacity of people to cope with risks are not well defined. The relative importance of risks (across region, people, hazards, etc.) is not directly reflected within the provisions of the act.

The NDM Act however, has brought about all types of disasters under its purview. It describes a ‘disaster’ as ‘a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or manmade causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of,

property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area'.[liv]
In terms of human exposure to disasters, the NDM Act takes on a community-centred perspective of people but only for relief purposes. One clause attempts to address exclusion or the denial of rights based on a 'no-discrimination' perspective, 'while providing compensation and relief to the victims of disaster, there shall be no discrimination on the ground of sex, caste, community, descent or religion'.[lv] The Act makes it compulsory for the Union and state governments to devise 'Guidelines for minimum standards of relief', with 'special provisions to be made for widows and orphans'. Therefore, there is some consideration for vulnerable groups as far as post-disaster relief is concerned. The act does not take into consideration measures for pre-disaster mitigation and preparedness.
Contrary to the act, the NPDM has made great advances in defining vulnerability from a nuanced, exposure-linked perspective. The NPDM clearly delineates the different categories of vulnerabilities per hazard types and differential vulnerability. The policy also acknowledges the relative nature of vulnerability in its preamble:
'In the context of human vulnerability to disasters, the economically and socially weaker segments of the population are the ones that are most seriously affected. Within the vulnerable groups, elderly persons, women, children—especially women rendered destitute, children orphaned on account of disasters and differently abled persons are exposed to higher risks'.[lvi]
The NPDM approach and its objectives made 'resilience' and 'community-based' DM part of the policy discussion for the first time. The NPDM can be regarded as a path-breaking policy, grounded in the integrated risk reduction approach of the UNISDR that paves the way for a robust DM system in India in the recognition of an integrated perspective and review and realignment of other policies, guidelines, and legal instruments to achieve that. It recognises that communities just don't need aid, and that many years of development are rendered futile through inadequate preparation for disasters.
For the first time, insurance has been introduced as a DRR mechanism through the mention of 'innovative fiscal incentives' for probable losses of 'individuals, communities, and the corporate sector'. However, the policy does not go further to explain how and through what mechanisms these intents will come into effect especially for the poor and vulnerable.

5.2.3 Alignment of SDMP with National Policy

Based on the recommendations of the NPDM, states and union territories are required to prepare SDMPs. These plans are required to address the following:

- Check unplanned urbanisation and ensure safer human habitat against all forms of disasters.

- Land-use planning considerations: in consultation with scientific institutions are supposed to carry out analysis of environmental and hazard data for formulation of alternative land-use plans for different geographical and administrative areas with a holistic approach.
- Urban mapping of infrastructure of spatial resolution will be taken up for development of Decision Support System (DSS) for managing urban risks.
- Development control regulations.
- Building bye-laws and structural safety features.
- Improve urban drainage systems with special focus on non-obstruction of natural drainage systems.
- Micro-insurance schemes and market-based mechanisms.

SDMPs have been prepared for 14 Indian States. A review of these plans suggests that there is a diversity in the coverage of these aims in the contents of the SDMPs. For example, the Karnataka SDMP, 2009 focuses on enhancing safety of built structures, safe spacing between buildings, and recommendations for the basic structure necessary for cyclone-resistant buildings and a safer habitat. The Orissa SDMP, 2005 mentions the need for training masons in disaster-resilient building structures without engaging hat do not comply with building by-laws and zoning regulations. None of the SDMPs reviewed, list alternative land-use plans as an important policy instrument. None of the three SDMPs reviewed feature a well-articulated and detailed action plan to mitigate or minimise risks in urban settlements. The West Bengal SDMP, (2009–10) contains a paragraph on problems of urbanisation; it does not articulate a strategy or action plan to address it. Similarly, the Jharkhand SDMP, 2011 does not offer a strategy or programme to address urban issues.

The Tamil Nadu SDMP, (2010–15) articulates the role of the Department of Urban Local Body in addressing urban (pluvial) flooding and pre-disaster actions to prevent or minimise urban flooding, actions to be taken during floods, and actions for rehabilitation. The approach is primarily response-based and a strategic management of sewage systems, urban mass transit systems, or sustainable energy usage does not feature in this plan. The Gujarat SDMP mentions urban and rural land use planning in the context of post-disaster transformation. However, the specifics of such transformative planning are not provided.

Other aspects such as micro-insurance or market-based mechanisms for DRR do not feature in the SDMPs reviewed. It is clear that NPDM is forward-thinking in its scope, and recommendations and substantial capacity among government officials responsible for developing DM plans needs to be built. Cohesive strategy alignment between different departments at the State level is also required, to implement the integrated vision espoused in the NPDM.

5.2.4 Human Development Perspective in State Disaster Management Plans

The SDMPs reviewed were highly prescriptive and response-centric with little or no emphasis on mitigation or vulnerability reduction. HD perspective is missing in the plans as only superficial references to risks and vulnerability are made. One of the main reasons is that detailed HRVAs have not been undertaken at the State level due to lack of data or a clear methodology and therefore, specific vulnerable groups like differently abled, elderly, women, and children are not identified or addressed. Undertaking a detailed HRVA is a long process which most States have not found fit to commission. SDMPs and DDMPs are therefore rather difficult to prepare, leading the SDMPs to have unclear strategies to mainstream DRR into development.

Furthermore, there is very little evidence of engaging non-government stakeholders including the communities during plan preparation. While some States formed committees and prepared the plans in-house, most others were completed by consultants.[lvii] While a consultancy-based approach often brings relevant issues to the fore and ensures quality analysis, it often lacks involvement and ownership by the stakeholders. Since the involvement of stakeholders has not extended beyond the realm of attending meetings, the end product is perceived as a mere academic exercise by them, which is not sustainable.

The first step for preparation of an SDMP is a desktop review of the information already available with the SDMA/Department by the nodal officer or consultant. This is followed by a consultation with relevant departments to discuss the need for the plan, its contents, and the stakeholders to be involved in preparing the plan including their roles and responsibilities. Even when the States manage to identify a nodal person in each Department, the availability of these functionaries for orientation and ability to collate the requisite information continues to pose a challenge. In the process, a set of functionaries end up collecting information from various files without an integrated learning taking place to ensure effectiveness in managing disasters. This leads to a major gap in the assessments based on which the DDMPs and SDMPs are prepared. Moreover, the process/system for periodical review of these plans is rarely in place. Some States have taken steps to mainstream the process of DM planning by either issuing circulars or office memorandum to periodically update the plans. This creates scope for periodically updating the contents of the plan. Integrating cross-cutting themes and linking DRR with a sectoral development planning process are areas that need major improvement in order to integrate a HD perspective in disaster risk management planning.[5]

5.3 National Policy Framework for Climate Change

To some extent, national climate policies are driven by the dynamics of international CC negotiations, which are informed by government-approved findings of a global

[5] For case studies of 2 city-level disaster plans, please see Appendix 6.

community of natural and social scientists, the IPCC. National climate policies are also motivated by scientifically-collected evidence on CC impacts, as they are translated into risks and vulnerabilities for key economic sectors, social groups, regions, and urban centres. India's first and second communications to the UNFCCC capture a scientific assessment of CC impacts on different sectors in India, as well as the progress on achieving policy commitments.

In 2008, India was one of the lowest per capita emitters of GHGs, and yet it is one of the top ten emitters in the world. The Indian government recognises the vulnerability of the country's population to CC impacts, and is committed to finding an equitable global solution to the CC challenge.[lviii] India's flagship CC policy, the National Action Plan on Climate Change (NAPCC) was adopted in 2008 and includes current and future programmes which address CC mitigation and adaptation.

The Twelfth Five Year Plan of the Union GoI acknowledges that CC is a global threat and a concerted global effort is necessary for effective adaptation. An Expert Group on Low Carbon Strategy for Inclusive Growth has made its recommendations to the Twelfth Five Year Plan. These recommendations provide a list of options to reduce the carbon intensity of critical sectors of the Indian economy, such as transport, energy, industry, construction, and forestry. In addition, a ninth mission for bio-energy is to be launched during the Twelfth Five Year Plan.

5.3.1 First and Second Communications to the UNFCCC

Parties to the UNFCCC must submit national reports on implementation of the Convention to the Conference of the Parties (COP). The core elements of the national communications for both Annex I and non-Annex I Parties are information on emissions of GHGs and details of the activities undertaken to implement the Convention.[6] National communications usually contain information on national circumstances, vulnerability assessments, financial resources, transfer of technology, education, training, and public awareness.

The Ministry of Environment and Forest (MoEF), GoI is the focal point for CC in India. A comparison of the 'India's Initial National Communication to the UNFCCC, 2004' and 'India's Second National Communication to the UNFCCC, 2012' shows some differences in terms of the initiatives undertaken.

A major change since the first communication is the promulgation of the NAPCC in 2008. Both the communications contain the latest available data on major CC variables in the country. Unavailability of time series data and inadequate data management is mentioned in both the communications as a gap. In terms of progressive CC and climate variability assessment the second communication also reports the 'Climate

[6] Parties to the UNFCCC listed in Annex I of the Convention are industrialised countries and countries in transition. Annex II Parties are made up of members of the OECD.
Non-Annex 1 Parties are mostly low-income developing countries that may volunteer to become Annex 1 Parties when they are sufficiently developed.

Criticisms of the NAPCC include the wide scope of the plan, the lack of coherent strategy which ties up the eight missions, the absence of equity commitments even as equity informs India's international stance on climate negotiations, and the diffused objectives of some of the missions.[lix] The Water, Green India, and Sustainable Agriculture Missions are particularly criticised for lacking a strategic prioritisation, which could have resulted in a shift in the country's development trajectory.[lx]

If the over-all guiding principle of the NAPCC is indeed sustainable development, or developmental co-benefits through mitigation, then the missions are lacking in linking initiatives that reduce emissions to those that can contribute to HD or environmental sustainability.[lxi] For instance, a critique of the solar mission is that it does not address energy access for the urban or rural poor through off-grid solar energy. Similarly, the Sustainable Agriculture Mission misses the opportunity for pushing low-chemical processes which reduce emissions and at the same time, are less harmful to the environment.

5.3.3 National Climate Policy and Disaster Risk Reduction

The interface between CCA and DRR is articulated in the NAPCC, where for the first time the phrase 'extreme climate event' enters into policy lexicon. Acknowledging the change in policy approach from 'relief' to 'prevention-mitigation-preparedness' from the Eleventh Five Year Plan onwards, the NAPCC emphasises infrastructural risk reduction through better design and strengthening of communication networks and DM facilities. In the context of response to extreme climate events the NAPCC further recommends collaboration with insurance providers to insure infrastructure and mainstreaming DRR into existing programmes such as the Jawaharlal Nehru National Urban Renewal Mission.[lxii]

5.3.4 Human Development Perspective in National Climate Policy

Certain HD concerns are mentioned in the national climate policy. Among other principles, the NAPCC is guided by the principle of, 'protecting the poor and vulnerable sections of society through an inclusive and sustainable development strategy, sensitive to CC'.[lxiii] For example, the National Mission for Sustaining the Himalayan Ecosystem acknowledges the threat of increasing vulnerabilities of the people in the Himalayan region.[lxiv]

The NAPCC further articulates vulnerable sections:

> The impacts of CC could prove particularly severe for women. With CC, there would be increasing scarcity of water, reduction in yields of forest biomass, and increased risks to human health with children, women, and the elderly in a household becoming the most vulnerable. With the possibility of decline in availability of food grains, the threat of malnutrition may also increase. All these would add to deprivations that women already encounter and so in each of the adaptation programmes, special attention should be paid to gender aspects.[lxv]

The espoused actions through the eight missions are likely to face serious challenges of implementation.[lxvi] The intent of creation, modification of public services, and facilities (such as urban waste management, public transportation) based on traditional, new and emerging technology and practices, which can serve to fulfil the HD needs of vulnerable people in particular, requires action from different government departments across national and sub-national levels. Some of these challenges stem from the very design of the national climate policy, which is aligned with the existing silo department/ministerial structure, instead of creating new institutional structures with a cross-cutting mandate.[lxvii]

5.3.5 Alignment of State Action Plans on Climate Change with the NAPCC

The Ministry of Environment and Forests (MoEF) provided a common framework for the development of State Action Plan on Climate Change (SAPCC) in 2010. The rationale for the SAPCC is the recognition that State governments have jurisdictions over several of the implementation areas covered in the NAPCC missions, particularly climate adaptation.[lxviii] However, State departments' limited capacity to mainstream CC concerns into ongoing development practices was also recognised. Therefore, development agencies: GIZ, UNDP, DFID, and World Bank were invited by the MoEF to technically assist selected States in the development of SAPCC.[lxix]

All State governments in India are at different stages in the process of developing State-level action plans aimed at integrating CC mitigation and adaptation into the States' political agenda and ongoing departmental programmes. The incentives for States to implement these missions, and resource allocation from central to State governments still need to be articulated adequately.

The respective administrations in States and Union Territories in India have produced the first draft of the SAPCC. The draft action plans of the following States have been reviewed for this paper. Delhi was the first state to come up with a state-level CC agenda for action and Gujarat was the first State to form a CC Department.

- Endorsed by the National Steering Committee on CC: Rajasthan, Madhya Pradesh, Sikkim, Tripura, and Arunachal Pradesh.
- Considered by Expert Committee on CC: Andhra Pradesh, Assam, Meghalaya, Mizoram, Odisha, and West Bengal.
- Others: Haryana, Karnataka, Nagaland, Puducherry, and Delhi

Most of the above-mentioned SAPCC have been prepared and their content has been arranged on a similar template. The themes covered across all SAPCC are governed by the NAPCC and are guided by the eight missions delineated therein. For example, urban context ofDM and CCA focus on better facilities for waste management, water use efficiency, and energy efficiency are covered across all SAPCC, taking a cue directly from the National Mission for Sustainable Habitat under NAPCC.

Ideally, a broad participatory process should inform climate-related planning and involve all major stakeholders such as government officials from different departments, policy-makers, academics, NGOs, scientists, the private sector, and local communities.[lxx] This has rarely happened.

5.3.6 Human Development Perspective in State Action Plans on Climate Change

A reading of the SAPCC shows that CCA takes on a prominent role. The concept of disaster risk linked to climate events is incorporated across most of the SAPCC. Vulnerability is defined primarily as event-specific hazards borne out of geological, hydrological, and human induced conditions such as flood, erosion (in river banks and sea coasts), earthquake, and pollution. Risks have been defined as per the respective states' hydrology, geology, extent of urbanisation, energy production and demand, forest resource, and agricultural contexts, and are explained in detail. However, vulnerability assessment from an economic, social, gender, or institutional standpoint is absent.

All SAPCCs provide a detailed backdrop of sectoral status quo. Few states, such as Karnataka and Rajasthan, have used more detailed predictive models. For example, in the case of Karnataka, modelling of hydrological conditions in river basins is conducted to understand the impact of CC on water resources, using the HadCM3, version 3.[lxxi] Integration as an 'objective', across CCA, DRR, and developmental programmes, recurs in the SAPCC prominently but serious gaps in the framework and implementation plans militate against this. The framework takes a sectoral (departmental) approach to action and implementation. For example, agriculture has been taken as an area of action under all SAPCC, as guided by the NAPCC, from a (resource) sustainability point of view, but building resilient livelihoods for the vulnerable is not clearly articulated. The Karnataka SAPCC mentions ongoing crop insurance schemes and programmes. Given that the SAPCC is guided by the NAPCC, which is criticised on several fronts, including missed opportunities for creating linkages across different missions, shifting developmental pathways, and targeting sustainable development outcomes, it is entirely possible that similar lacunae can be identified in the SAPCC.

The mechanisms for mobilisation of resources remain unclear as only a few states have articulated allocation of financial resources for various actions that have been planned. Therefore, in the Indian climate policy arena, shortcomings in the co-design and articulation of CC and development goals between leading national policies are widespread in state-level plans. In addition, SAPCC will need to adopt a people-centric and sustainability-driven approach in order to address HD issues. Effective intervention on several fronts is required to address this challenge.

6. Building an Integrated Planning Framework

This section explores whether it is possible to build an integrated planning framework across CC, DRR, and HD centred on the three key concepts of *risk, vulnerability, and resilience*. Each of the sectors understands and defines these concepts slightly differently by drawing on distinct academic disciplines. However, overlapping concerns from the three thematic areas can assist in developing an integrated framework.

6.1 Extended Notions of Risk, Resilience, and Vulnerability

Development practitioners and the private sector are increasingly using the concept of 'risk', with a growing recognition of the need to assess, reduce, and manage multiple risks faced by communities, states, and enterprises.[lxxii]

6.1.1 Associations of Risk

HD associates risk with economic shocks, conflict and violence, death within the household, or illnesses. However, the onset of such risks can be triggered by environmental or non-environmental factors, which are increasingly linked in a globalised world. CC events such as flooding or heat spells can translate very quickly into economic or welfare shocks, cause conflict, illness, or death.

Disaster risk is defined as a product of the probability of hazard risk, exposure, and vulnerability. If exposed to the same probability of a hazard, some people with high exposure and vulnerability will face more risk compared to people who demonstrate low vulnerability. CC is impacting the nature of hazards and exposure to these hazards. Furthermore, factors such as urbanisation, poverty, and environmental degradation compound the risks to lives, properties, and economy.

6.1.2 Explorations of Vulnerability

Vulnerability from a HD perspective draws from social science disciplines, including development economics. UNDP's own assessments define vulnerability as 'the likelihood that an individual or a group of people will have some stress in their livelihood which will have negative consequences on their well-being in future.'[lxxiii] Other definitions include Alwang and Sigel (2000) who define vulnerability 'as the propensity to suffer a significant welfare shock, bringing the household below a socially defined minimum level.'[lxxiv]

CCA literature draws upon systems ecology, a multi-discipline with its roots in the discipline of ecology, i.e., the study of ecosystems. Vulnerability as a concept from 'resilience thinking' is used to describe and explore qualities of 'robustness' or 'weakness' in an ecological or a social-ecological system (SES) such as a community, a village or a city, in the face of unforeseen risks and events.[lxxv]

As per the IPCC, vulnerability is the degree to which a human-environment system is susceptible to, or unable to cope with, adverse effects of CC, including climate variability and extremes. Yamin et al. (2005) argue that vulnerability is high if CC increases the

exposure of people, economic sectors, and infrastructure to more frequent and intense extreme weather events, where the capacity to deal with extreme events is limited.[lxxvi] Therefore, in the context of CCA, vulnerability is the degree to which an SES or a population is exposed and sensitive to or unable to (lacks the capacity to) recover from adverse effects of CC. The DRR conception of vulnerability is linked to hazards and exposure and is defined as the characteristics and circumstances of a community, SES or asset that make it susceptible to the damaging effects of a hazard.
All approaches agree that vulnerability of a population is linked to exposure, susceptibility or sensitivity, and the capacity to recover from shocks.[7] All three practice areas converge around an understanding of vulnerability that varies significantly across members of community by gender, socio-economic class or age and that differential levels of HD can induce vulnerabilities to different types of future shocks. The important, common factor between the HD and CC/DRR understandings is the recognition that vulnerability to hazards needs to be identified and responded to. Risks can be reduced to a level that is economically and psychologically acceptable, by systematically identifying and reducing human vulnerabilities to various climatic and non-climatic hazards.[lxxvii]

6.1.3 Building Resilience

Resilience is described as 'the capacity of a system to absorb disturbance and reorganise while undergoing change so as to retain essentially the same function, structure, identity, and feedback'.[lxxviii] In view of both expected and unexpected outcomes of CC, resilience-building qualities of diversity, flexibility, and adaptive learning are required of SES. One of the ways of building resilience is to draw from and strengthen adaptation knowledge systems which exist at the community level, improve early warning capacities which are already in place, and recognise the potential of different projects to increase or decrease vulnerability. Climate-resilient communities, settlements, cities, and nations will need highly adaptive institutions, infrastructure, and economies in order to mitigate climate risk and recover effectively from unavoidable and unforeseen climate disasters.[lxxix]
Resilience is a dynamic quality of a system or a community, and therefore charting pathways for achieving it are specific to particular SES and their interactions with other SES at scales above and below the scale of reference. However, if the nature of vulnerabilities can be understood and interventions are designed to reduce those vulnerabilities, then resilience can be built.
For instance, if poor environmental management causes livelihood vulnerability, then instituting sustainable management of natural resources, be it of fisheries, forestry or agricultural land, will build general resilience in the affected community. This may involve a series of interventions such as changes to planning practices, private sector

[7] For a table that demonstrates how livelihood resources are affected by climate, see Appendix 5.

poverty and vulnerability reduction measures such as **income protection** and **livelihood diversification**.

- Allocation of **sufficient budgets and effective institutional structures** that support risk reduction and adaptation agendas are required.

6.2.2 Interface of Disaster Risk Reduction and Climate Change with Human Development

HD and climate risk and DRR interact at multiple levels. Unlocking these interactions will generate synergies for integrative planning:

- Low levels of HD are a contributor to vulnerability and thereby a significant component of disaster risk. When disasters occur, their impact is deeper on communities/households with low HD, impacting their ability/rate of recovery, or exacerbating their susceptibility to risk. **Therefore, a HD approach enables resilience against disaster risk.**
- The impacts of CC are expected to be felt through long-range impacts on land- and water-based resources, on which poor and marginalised populations depend heavily for food and fuel. This calls for **sustainable management of human-environmental systems**, be it fisheries, forestry, grassland, scrub land or agricultural land, to build resilience in the affected community.
- CC will also have significant impacts on the health of vulnerable populations in cities, through increased incidence and intensity of extreme weather events like heat waves and floods. **Reducing basic service deficits**, including housing and building resilient infrastructure systems could significantly reduce climate risk and improve HD**.**
- Quality and affordable housing provides for city-wide adaptation and has significant HD outcomes. Low levels of HD can occur at multiple levels and be driven by multiple stressors ranging from poor nutrition and health; income poverty and income inequality; limited access to education and health care services and inadequate living conditions (which include water supply, sanitation facilities and energy access); and lack of affordable mobility options. **Therefore, HD for resilience to CC and disasters will include improved housing and provision of water and energy services, linked to improvements in health, nutrition, access to economic opportunities and skills and livelihood development.**
- **Social protection programmes** can improve access to basic services as well as create a buffer for vulnerable populations against extreme weather events and other disasters.
- And finally, development and poverty reduction are possible where climate resilience at the level of households and communities is supported through **competent local administration and well-informed national policies, implemented through a strong governance framework**.[lxxx]

6.2.3 Components of a Resilience Planning Framework

The linkages between DRR and CC interventions and HD aspirations articulated in previous sections suggest that planning for adaptation and disaster reduction should not be undertaken in isolation of ongoing development planning processes. It is vital that development strategies incorporate measures to strengthen community resilience through economic development, income diversification, drought and flood resistant cropping strategies, hazard resilient infrastructure (schools, hospitals, bridges, roads, etc.), early warning systems, as well as through protection of ecosystems.

Sectoral policies and programmes for housing, water and sanitation provision, health, skills development and social protection programmes hold great potential for achieving HD objectives of equity, empowerment, efficiency and sustainability. Existing development policies, programmes and schemes can either incorporate disaster and climate risks or exacerbate them. This leads the paper to argue that development planning which guides poverty and vulnerability reduction through a multi-sectoral approach, must give consideration to risks and resilience. At the same time, development strategies at national and sub-national levels should ensure that development projects do not encourage mal-development, exacerbate risks, and enhance disaster-resilience[lxxxi]

An integrated, multi-scalar, resilience planning framework will consist of the following critical components:

1. National level:
    a. An overarching, development plan such as the Indian Five Year Plan which guides development in all sectors to incorporate disaster risks and not promote development action which exacerbates risks.
    b. Development and investment strategies in transport, energy, and industrial sectors to incorporate measures to strengthen community resilience through economic development, income diversification, drought and flood resistant buildings (schools, hospitals) and hazard resilient lifeline infrastructure (bridges, roads, communication networks), early warning systems, as well as through protection of ecosystems.[lxxxii]
    c. Policies for housing, water and sanitation, energy, poverty reduction, health, skills development, and urban and rural development to balance long-term vulnerability reduction and resilience building over short-term development gains.
    d. Standards and regulations for safe and ecologically-sensitive land-use planning and zoning, industrial standards for optimal resource consumption, building codes for hazard resilience, passive heating and cooling, and low energy requirements and the enforcement of such standards.

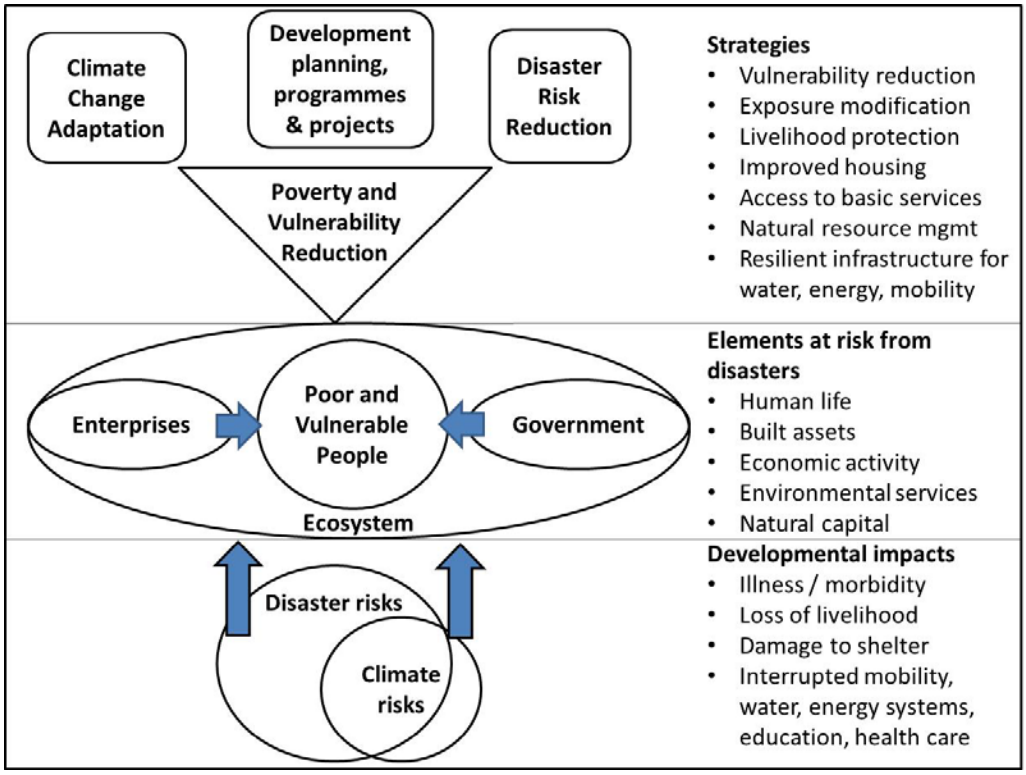
e. Policies for CC to encourage the utilisation of DRR tools and techniques for designing climate adaptation interventions, and incorporate vulnerability reduction as a core principle.
f. Policies for disaster risk management to incorporate the basic tenets of integrated DRR, focussing on a multi-hazard approach, including climate risks, and disaster preparedness and mitigation, in addition to disaster response and relief.

2. State level:
    a. A comprehensive state-level development plan, such as the Five Year Plan and Annual Plan, which guides development in all sectors to incorporate disaster and climate risks.
    b. State Five Year Plans and Annual Plans to incorporate HD aspirations, as espoused in the Strengthening State Plan for HD Project, run jointly by the UNDP and the Planning Commission.[lxxxiii]
    c. Development plan formulation to draw on wide stakeholder engagement, especially where regional and local opportunities and barriers to resilience building need to be identified.
    d. Plans for housing and urban planning, employment generation, electricity, water supply and sanitation, infrastructure expansion and programmes for public works, and regional, industrial and economic development, to choose long-term vulnerability reduction and resilience building over short-term development gains.
    e. State Action Plans on CC to identify vulnerable groups, address adaptation requirements, and utilise DRR techniques for designing climate adaptation interventions, such as vulnerability mapping and assessment tools.
    f. State Action Plans on CC to illustrate interventions that support or advance the applicable missions of the National Action Plan for CC.
    g. State DM Plans to incorporate the basic tenets of integrated DRR, focussing on a multi-hazard approach, including climate risks, as well as disaster mitigation and preparedness.
3. District and city level:
    a. A comprehensive city and district development plan which guides development in all sectors to incorporate disaster risks and not promote development action which exacerbates disaster and climate risks.
    b. Infrastructure projects to avail opportunities for achieving HD goals such as poverty reduction, livelihood diversification, and gender equity.
    c. Plans and programmes for improving mobility and energy access, and urban and rural development to choose long-term vulnerability reduction and resilience building over short-term development gains.

d. Programmes for housing, health, water supply and sanitation, and waste management to incorporate physical, environmental, economic, and governance risks.
e. City and district spatial plans to adhere to regulations for land-use planning and zoning.
f. City and district level enforcement of industrial standards for optimal resource consumption and building codes for hazard resilience and low energy requirements.
g. City plans for CC to utilise DRR tools, identify vulnerable groups, assets and economic sectors, and seek local knowledge for designing and implementing climate adaptation interventions.
h. DDMPs to incorporate the basic tenets of integrated DRR, seek alignment with national- and state-level DM plans, and incorporate locally relevant, traditional methods for disaster preparedness and mitigation.

Figure 3 captures climate and disaster risk policy responses and strategies which can bring about a reduction in vulnerability to risks as well as poverty, by adopting a HD approach and drawing on key linkages between development planning, CCA, and DRR practice areas.

Figure 3: An Integrated Framing of Development Planning, Climate Change Adaptation and Disaster Risk Reduction, Using a Human Development Lens



Source: Adapted from the UNDP-IIHS Joint Programme Inception Report

7. New Sites for Integrated Interventions

Seven sites for integration of CC and DRR policies and plans towards improved HD are proposed in this paper, and are broadly clustered around the following themes:

- Vulnerability reduction and exposure modification
- Livelihood protection and diversification
- Enabling mechanisms

7.1 Vulnerability Reduction and Exposure Modification

Tools developed within DRR such as risk monitoring and vulnerability assessments of local communities are increasingly relevant for CCA and climate risk preparedness. Drawing upon local knowledge on past and future climate hazards, risk and vulnerability is a key component of integrated DRR, and resilience planning. Based on early warning systems, community, and household exposure to risks can be modified through either direct relocation of habitat or redesign of structures.

7.1.1 Mapping Risks and Vulnerabilities

Strategies for building resilience at locations which are more prone to extreme weather events or carry high vulnerability at household and individual levels need mapping when necessary data is not available, to inform future land-use and disaster mitigation planning.

Multi-hazard mapping includes mapping of disasters in the past, both natural and manmade. It can also include charting utility failures such as water supply (both demand and supply), sewage system, solid waste management, electricity, transport, and telecommunications. In addition to calculating exposure due to location and geology, vulnerability assessment can attempt at identifying socio-cultural and other vulnerable demography exposed to varying hazards. This would cover detailed documentation of various types of critical infrastructure in a district or a city including heritage structures, religious centres, tourist centres, government/semi-government establishments, educational facilities, health facilities, and places of mass congregation. It would also include mapping of key lifeline infrastructure for transport, power, telecommunications, and water.

A city climate risk assessment framework developed by Mehrotra (2012) unpacks risk into three vectors—hazards, vulnerabilities, and adaptive capacity. These vectors consist of a combination of physical science, geographical, and socio-economic elements that can be used by city governments to create and carry out CC action plans.

Beyond multi-hazard mapping for disasters, community-led vulnerability and resource mapping has demonstrated great effectiveness. Examples include Mount Vernon, one of the poorest communities in Jamaica where community-led disaster mapping highlighted flooding problems and led to agreement on low-cost solutions such as footbridges.[lxxxiv] Similarly, in flood-prone settlements of the Brahmaputra River Basin,

building houses on raised stilts, as practised by the Mishing and Deori tribes of Assam, was found to reduce risks of flood disasters.[lxxxv]

7.1.2 Early Warning Systems

Understanding that not all hazards can be halted, avoided or predicted accurately requires early warning systems in place, which can allow communities and government officials to modify exposure by taking immediate, protective steps, and avert the worst impacts of disasters and extreme-weather events when they occur.

Often risk-prone areas will have some form of administrative or civil body identified as a nodal agency in the event of a disaster, which monitors various parameters linked to disasters such as precipitation levels or incidence of fires. Resilience planning requires that the capacity of existing early warning systems be enhanced and integrated to other disaster operations in the area. If such systems or nodal agencies are absent, then a multi-stakeholder initiative which involves community members, especially women, in risk monitoring would engender empowerment.

7.2 Livelihood Protection and Diversification

The economic impact of disasters may not just vary across sectors, but also among groups, especially those who are most vulnerable, e.g., the socially marginalised, urban poor, people with disabilities, single parents, women, and children. Livelihoods diversification can build resilience among those social groups, who depend upon threatened ecosystems for their primary source of income, are landless and work for subsistence wages, or are informal workers. Social protection through targeted cash transfers, employment schemes, weather-based crop insurance, and asset transfers can buffer the poor and vulnerable from extreme events linked to CC or other natural disasters.[lxxxvi]

7.2.1 Livelihoods Diversification

Marginalised groups often live in high-risk areas, have lower coping capacities, and have limited or no risk cover in the form of insurance or other safety nets. Furthermore, they are heavily dependent on climate-sensitive primary industries—notably agriculture, forestry and fisheries. Thus they risk both injury/death and major disruption to their livelihoods. Other livelihood activities of marginal groups such as labour for construction, selling fruit and vegetables, etc. belong to the informal economy, making it difficult to assess disaster impact on them through frameworks and indicators designed for formal economic sectors.[lxxxvii]

There are strong functional connections between the formal and informal economies and poor recovery in informal, urban manufacturing, trade, urban gardening, and rural food, fibre and fish production can seriously delay full national economic recovery. In addition, such livelihood activities are critical for the immediate, medium—and long-term survival and well-being of the poor, many of whom may not receive much official

relief for months, as one saw in Haiti after its 2010 earthquake, and in Gujarat after the 2001 earthquake.

Although urban and rural economies have their own characteristics, disruption in urban economies due to disasters may negatively affect the demand for goods and services from fringe and outlying regions and reduce the flow of remittances to rural areas. On the other hand, disasters in peri-urban and rural zones may stimulate an increased influx of people into cities because people in rural areas who were already experiencing livelihood stress chose to rebuild in places where they saw better prospects for their children.[lxxxviii]

The **Sustainable Livelihood Approach**[lxxxix] to poverty reduction is a tool widely used by development workers for better understanding livelihood strategies and identifying ways to strengthen and improve them. It can also be used in the context of DRR, to analyse vulnerability according to the six different livelihood assets: natural, physical, social, human, financial, and political. These assets together determine people's resilience. Resilience in this case is very specific to the community, to households, and individual women and men.

7.2.2 Universal Access to Basic Services

Reducing basic service deficits, including housing through innovative, decentralised solutions or building resilient infrastructure systems could impact HD, reduce the susceptibility of vulnerable groups to short- and long-term climate and disaster risks, and build their capacity to recover from extreme events**.**

The recognition that access to clean water and sanitation is integral to the realisation of all human rights becomes the basis for encouraging small-scale innovations for cleaning water and treating waste water, which are implementable at household or community level by the beneficiaries. Such solutions empower communities and improve human living conditions in rural and urban areas before large-scale public infrastructure for water supply or waste removal reach under-serviced settlements.[xc] Decentralised energy provision through renewable sources is a mechanism that addresses energy deprivation among the rural and urban poor, while at the same time has a lower carbon footprint than centralised, fossil-fuel based energy sources.

7.2.3 Social Protection Programmes

Social protection programmes, which include assistance and transfers to assist poor and vulnerable people to escape poverty and manage risks and shocks, are known to do so by enabling families to maintain stable consumption and meet broader distributive goals. Examples of social protection for adaptation and DRR, which combine equitable and sustainable outcomes, are found in some developing countries and are examined by Davies et al. (2009). They include South Africa's Working for Water, part of an Expanded Public Works Programme launched in 2004 where an employment

programme increased stream flows and water availability, improved land productivity, and biodiversity in some ecologically sensitive areas.
India's MNREGA provides 100 days of employment on demand in rural areas, constructs infrastructure, including projects that enhance community resilience against CC impacts, and provides a guaranteed income to combat seasonal variations in income.[xci] MNREGA cost about 0.5 per cent of GDP in 2009 and benefited 45 million households, about a tenth of the labour force.

8. Enabling Mechanisms

Enabling mechanisms include both institutional structures and processes for achieving integrated planning at national and sub-national levels; as well as learning among public sector officials to generate the necessary changes to current configurations, such that integrated plans are designed for implementation.

8.1 Structures and Processes for Integrated Planning

The call from the UNISDR is to 'incorporate risk considerations in development policies and poverty reduction strategies', making sure that development projects do not exacerbate risks and are disaster resilient.[xcii] Conversely, adaptation and disaster reduction efforts should not be undertaken in isolation of development processes.

> It is at national and local levels that most efforts to reduce disaster and CC risks must be made and here the fragmentation of sectoral policies is often an impediment to integrated approaches. DRR is not itself a sector, and to be effective it requires informed action in and across many sectors, from education and health to infrastructure and environmental management. In practice, DRR is usually handled by civil defence or emergency management departments, which typically have few operational links with either the environmental ministries that usually lead CC policy, or the economic ministries that oversee national development policy. [xciii]

This paper advocates a second look at the manner in which DM and CC planning is undertaken at the sub-national level, because that is where the maximum potential for incorporating local threats to resilience and adaptive capacity can be recognised and addressed. However, there are several caveats to this, which can explain why the DRM and CC plans studied for this paper reveal a major disconnect at two levels: first, with the national policy framework which is substantially evolved and cognisant of international discourses on integrated approaches and second, with the four overarching principles of HD—efficiency, equity, sustainable development, and in particular, empowerment through participation.

Following aspects of decentralisation: mandate, functions, and capacity which require interventions, in order to facilitate CCA and DRR planning outcomes with strong inter-sectoral understanding and consideration for HD parameters.

Ownership for CCA and Disaster Risk Reduction plans among elected representatives, officials and residents[xciv]

The human dimension of CC and DRR planning dictates that adaptation demands must emerge from the local people. Local people include elected representatives, officials, and community members. Political concerns and issues are therefore an important component of the local institutional conditions which need to be factored in. While decentralisation is mandated through national policies and legislation, local officials may lack capacity, feel burdened with existing planning and management responsibilities, or feel under pressure to conform to national schemes. Engaging with local communities and incorporating their priorities may have to become part of a government department's planning process. Executing locally relevant plans may also require flexibility in implementation, supported through governance structures which ensure accountability.

Additional funds for climate adaptation or Disaster Risk Reduction[xcv]

The increased responsibilities for realising CCA at local level are not necessarily accompanied by additional resources for delivering on the new expenditure for information gathering, participatory processes, awareness programmes, and settlement relocating and upgrading. Even when funds are transferred, remote and risk-prone municipalities, districts and States may require capacity-building to be able to spend the funds.

Synergies between economic growth imperatives and vulnerability reduction goals

While there are opportunities for finding win-win solutions or co-benefits such that the vulnerability of households to disaster is reduced while at the same time economic development for a region or city is achieved, such solutions often require harder work from government officials and commitment from political leaders. In reality, when development strategies and projects are envisioned, due attention needs to be paid to the potential for disaster risk creation, including the short- and long-range impacts of CC.[xcvi]

8.2 Capacity building for integrated planning and implementation

The paper has highlighted the linkages between climate adaptation and DRR planning by using a HD lens. This has resulted in the development of a risk, resilience, and vulnerability framework. For an integrated framework to translate into tangible actions, decision-makers need to understand these linkages and their implications in practice.

The paper will provide the high level framing for teaching a series of UNDP-IIHS short courses aimed at developing capacity of various stakeholders, in particular State government officials, in achieving the above integrated planning and implementation outcomes. Capacity building is necessary to increase accountability in the public sector, a gap which is well recognised in the Twelfth Five Year Plan.

The next section reviews the current policy framework for development planning, CC, and disaster risk management in India, to identify gaps in the content and process issues, relative to the resilience planning framework proposed as table 1.

9. Conclusions

HD as it is approached in the Twelfth Five Year Plan as 'inclusive growth' generates entry points to achieve integrated planning, but also presents key gaps with regards to mainstreaming of CCA and DRR across sectoral plans and policies.

The Plan guides development in certain sectors such as agriculture to incorporate disaster risks and not promote development action which exacerbates risks, such as intensive chemical use. However, it is not clear as to how policies for housing, water, energy, poverty alleviation, sanitation, health, skills development, and urban and rural development can emphasise long-term vulnerability reduction and resilience building over short-term development gains. Based on an integrated planning framework which uses a HD lens, this paper recommends development strategies to strengthen resilience through income diversification, drought and flood resistant cropping strategies, hazard resilient infrastructure (schools, hospitals, bridges, roads, etc.), early warning systems, as well as protection of ecosystems. These strategies are not mentioned in the plan. Income protection through employment programmes and universal access to basic services, espoused in the plan, address the inter-linked developmental challenges of poverty, inclusion, empowerment, and regional imbalances and should also build resilience in poor and vulnerable communities towards CCA and DRR.

It is clear that the National Policy for Disaster Management (NPDM) of 2009, which incorporates international frameworks for integrated DRR, is forward-thinking in its scope and recommendations. The NPDM gives due consideration to the growing incidence of climate risks, and the need for disaster response to mitigate the vulnerability of certain population groups. However, the National Disaster Management Act of 2005 lacks the broader and people-centric approach of the NPDM. Moreover, substantial capacity among government officials responsible for formulating and implementing DM plans at state level still needs to be built. Cohesive strategy alignment between different departments at state level is also required, to implement the integrated vision espoused in the NPDM.

The National Action Plan on Climate Change (NAPCC) has been criticised on several fronts including the wide scope of the plan, the lack of coherent strategy which ties up the eight missions, and most importantly from a HD lens; the absence of equity

commitments and due consideration of environmental sustainability. Some missions, especially those for water and agriculture are criticised as being diffuse, and not seizing the opportunity for resolving longstanding developmental dilemmas. For instance, the issues of discontinuing chemical use in agriculture and roll-out of decentralised, renewable energy for addressing energy deprivation in rural areas could have been resolved by using the synergies between CCA and HD paradigms.

Shortcomings in the design and articulation of CC and development goals in the NAPCC are reflected in the State Climate Action Plans. This is in addition to the difficulty that state governments will face in incorporating regional contexts when crafting relevant initiatives, and while mainstreaming CC risks into sectoral plans.

This working paper suggests that there is considerable scope for re-crafting national policy documents in the arenas of CC, DM, and development planning to achieve integrated planning towards poverty and vulnerability reduction in India and that this re-crafting is possible by using a HD framework.

The working paper recommends 'Resilience Planning' at the state level to achieve resonance with progressive international discourses on poverty and vulnerability reduction, while incorporating regional and local contexts that affect the positive outcome of any planning initiative. The local context includes social, environmental, and economic aspects of a state or city, which guide its HD aspirations.

The HD impacts of CC and DRR national and sub-national level plans (at state, city, and district levels), need to be recognised and targeted. The formulation of coherent strategies requires building capacity in nodal officers responsible for the preparations of these plans to be able to draw on the essential linkages without relying on external consultants. However, formulating these plans is not enough. It is also essential to develop procedures for their implementation and monitoring within existing institutional processes. Moreover, working with various stakeholders across different disciplines also requires improved communication and negotiation skills.

However, over the last few decades there has been a paradigm shift in this conceptual understanding of disasters that resulted from ineffectiveness of techno-centric approaches. In the eighties and nineties decades of the last century, disaster theory took on a new meaning in the field of social sciences with research on the societal response to various disasters. Accordingly, disaster vulnerability extended beyond the mere probability that someone is killed, injured, or suffers loss. It was also seen to embrace the relative ease or difficulty with which an individual, family group or social group recovers following a disaster.[c]The new approach to disaster got rid of the overwhelming notion of agent such as earthquake. Starting from an analysis of disaster seen as a process tightly tied to social vulnerability, the new paradigm considers the causes of disaster as explained on structural as well as contextual grounds.[ci]
The new paradigm is increasingly 'vulnerability-centred' as disasters are understood as phenomenon linked to physical, social, economic, and institutional vulnerability. Besides, this approach also tends to look at specific vulnerabilities of various groups of people such as women, children, elderly, disabled, ethnic/racial or religious minorities, economically poor, etc.[cii] Vulnerability is subsequently analysed by identifying 'underlying factors' and 'root causes' embedded in everyday life, which give rise to dynamic pressures affecting particular groups, leading to specifically 'unsafe conditions'.[ciii]

Implications of conceptual shift for links between disasters and development
A consequence of this shift has been much closer linkage between disaster and development. Disasters impede development but ill-conceived development may cause disaster. Rapid and unplanned urbanization in the developing world is a consequence of development. The latter relationship is also particularly relevant when it comes to the vulnerability of urban and rural poor in the developing world who have little access to the resources, power, and choice mechanisms needed to radically change their life circumstances. The mismatch between assets stock and consumption stock contribute towards aggravating vulnerability of those who are at the bottom end of the pyramid.

Focus on risk, vulnerability and resilience
There has also been an increasing focus on capacity to reduce disaster risks, face them (resilience), and cope with their consequences. In fact both vulnerability and capacity are considered together as reduction in one can lead to increase in the other. Mary Anderson and Peter J. Woodrow[civ] have categorized these as physical/material, social/organizational and motivational/attitudinal. These get manifested as traditional knowledge and skills for example those of building artisans who possess rich wealth of knowledge gained cumulatively over the years ranging from construction systems that can perform effectively against hazards such as earthquakes to indigenous management systems. Gradual loss of knowledge is contributing towards increasing disaster vulnerability.

The employment of the concept of social vulnerability as a tool in and by the community also involves a thorough analysis with and by the residents of their own resources and capabilities. Therefore the new approach lays emphasis on community driven approaches for disaster risk management and engagement of various stakeholders. Vulnerability centred impact approach thus seeks to consider physical, social, psychosocial, economic and political causes as well as impacts of disasters.

Towards a multi-hazard approach

Another implication of the changing paradigm is a shift to multi-hazard approach that seeks to consider all hazards that contribute towards risk in a given area. Rather than focussing on implications of a single hazard, the new paradigm considers key questions for complex disaster scenarios: (1) What might possibly happen? (2) How likely it is? (3) What damage, injury and loss may result? (4) What will be the impact of the event? and (5) What can be done about it?[cv]

Furthermore, the critical link between DRR and factors of sustainability are more likely to be addressed by a local rather than central authority. Reaching out to local governments to help them build capacity, acquire knowledge and resources and provide them with decision-making authority is essential for loss reduction in hazardous events and building resilience in human settlements.[cvi]

Appendix 3: Global Financial Institutions' Engagement with Climate Change

The World Bank is increasingly paying attention to the long term impacts of CC on countries' development trajectories. Through climate-dedicated finance, the World Bank is working to support climate actions in country-led development processes; mobilise concessional and innovative finance; facilitate the development of market-based financing mechanisms; leverage private sector resources and support development and deployment of new technologies; in addition to stepping up policy research and knowledge building. It is also piloting innovative climate risk insurance.

The World Bank report titled 'Turn Down the Heat: Why a 4°C Warmer World Must be Avoided,' warns of a 4°C warmer world marked by extreme heat-waves, declining global food stocks, loss of ecosystems and biodiversity, and life-threatening sea level rise. Moreover, adverse effects of a warming climate are 'tilted against many of the world's poorest regions' and likely to undermine development efforts and global development goals, says the study by the Potsdam Institute for Climate Impact Research and Climate Analytics, on behalf of the World Bank.

The report, reviewed by some of the world's top scientists, is being released ahead of the next comprehensive study by the IPCC in 2013/14, and follows the Bank's own Strategic Framework for Development and Climate Change in 2008 and the World Development Report on CC in 2010.

Action on many fronts by the major global financial institutions represents the shift underway, which recognises the impact CC will have on development projects in the

- *Integration between resource flows, urban form, and spatial development:* A one-system approach that enables cities to realize the benefits of integration by planning, designing, and managing the whole urban system.
- *Emphasis on new frameworks of accounting and valuation:* An investment framework that values sustainability and resiliency by incorporating and accounting for life-cycle analysis, the value of all capital assets (manufactured, natural, human, and social), and a broader scope for risk assessment in decision-making.

Implementation focus is on application of the framework in specific pilot cities. Implementation will be a combination of city-by-city approach and mainstreaming and scaling up through programmatic national approaches. The framework briefly touches upon HD issues: mentions urban poverty, migration as issues that need to be dealt with. However, this seems to be a high-level framework. It does not mention CC much, and only briefly touches upon resilience.

DFID's Future-Proofing Cities Report[cix]

This approach looks specifically at different types of environmental risk of cities in developing countries. It does briefly touch upon the issue of integrating solutions such that they not only impact environmental risk, but also focus on development outcomes. The framework examines urban vulnerability. However, it doesn't go a long way to integrate the three together. The 2012 report focuses specifically on environmental risk, and on possible ways of reducing it.

Appendix 5: Climate Influence on Livelihood Resources[cx]

Resource type	Definition (Scoones, 2007)	Examples of climate influence
Natural Capital	The natural resource stock (soil, water, air, genetic resources, etc.) and environmental services (hydrological cycle, pollution sinks etc.) from which resource flows and services useful for livelihoods are derived.	Less frequent but intense episodes of rains could limit groundwater recharge; prolonged dry seasons could cause forest fires.
Economic or Financial Capital	The capital base (cash, credit/debt, savings, and other economic assets including basic infrastructure and production equipment and technologies) which are essential for the pursuit of a livelihood strategy	Typhoons or cyclones and floods destroy bridges, farm-to-market roads, and other agricultural infrastructure

Human Capital	The skills, knowledge, ability to labour, and good health and physical capability important for the successful pursuit of different livelihood strategies	Outbreaks of climate-related diseases such as malaria (which often follow periods of increased rainfall and/or temperature), limit labour availability for agriculture; incidence of water-borne diseases increases as water sources dry up or become contaminated.
Social Capital	The social resources (networks, social claims, social relations, affiliations, associations) upon which people draw when pursuing different livelihood strategies requiring coordinated actions.	Repeated climate shocks may cause social dislocation and hence, could weaken social capital.

Appendix 6: Case Study of City-Level DM Plans

Based on the recommendation of G Padmanabhan, Officer in Charge DM Unit at UNDP, DM plans of two Himalayan cities of Gangtok and Shimla were undertaken to showcase the wide disparity in the content of these plans. While the Gangtok plan adheres minimally to the recommendations of the national policy, Shimla takes the recommendations more fully.

Gangtok City Disaster Management Plan

Understanding of risk

Although a multi-hazard approach is adopted, with all natural and manmade hazards identified and mapped for identified zones in the city, the return periods and probabilistic data is not available and hence not used. Also, an occurrence of a disaster due to another hazard is not considered. Exposure assessment is based on the existing development patterns, overlaid with the 'high risk' zones. It also identifies zones with 'low risk' profiles (based on geological aspects like slopes, land profile, etc.). Risk is not defined on the basis of densities of populations, or specific to vulnerable populations. It also does not address issues arising due to unplanned urbanisation, which is pertinent to ensure safer human habitat against all forms of disasters.

Risk is assessed on the basis of geographical, geological, and environmental context of the city. A mere 'visual assessment' of the land stability map is used to identify 'suitable for development' portions of land. Some critical infrastructure is identified, which are potential shelter areas and otherwise necessary during a disaster. This list however, is

also not exhaustive of high risk facilities like schools, hospitals, public work structures, services, etc. where more vulnerable populations (like children, disabled, old, women, etc.) are found in plenty, or the functioning of which is critical during an event of a hazard.

Vulnerability and Capacity

There is huge scope for adopting a vulnerability and capabilities approach, in order to identify ways for preparedness, and eventually reducing the risk to lives, livelihoods, natural resources, and property at the occurrence of an event. Besides headcounts (population), no other characteristics of the demography are considered in the assessment of risk, vulnerability, and capacity.

Presence of an integrated DRR perspective

Although the plan is called the 'Comprehensive Integrated Disaster Management Plan', it focuses much of its attention on rescue alone and not on resilience, reduction, preparedness, and recovery. Besides institutional response, there is a meagre attempt at improving community participation for DRR.

Resilience and Risk Reduction: There is no attempt at increasing resilience of the communities or physical environment to face an event. There are no explicit plans to improve drainage, especially natural drainage. The District Administration and the Urban Development and Housing departments are required to maintain the infrastructure (drains, roads, solid waste disposal units, etc.) in order to reduce the impact of a hazard. There is some attempt at increasing institutional resilience, in order to be prepared for a response at the time of a hazardous occurrence. The aforementioned departments are also required to 'spread awareness regarding the importance of cleanliness'. Use of 'protective walls' is also mentioned, but not specifically to any area.

Preparedness: In addition to an immediate response plan, there is also a contingent plan. While institutional manpower and equipment resources are prepared, communities themselves are not adequately involved in the disaster preparedness plans. There are no provisions for micro-insurance plans or market based risk transfer for either preparedness or recovery.

Response: Like most DM Plans in India, this also remains largely a response plan, and suitable investments and preparedness measures are adopted for the same.

Recovery: Not enough directions are provided for recovery provided. There are some immediate responses planned in terms of food and shelter provisions, but long range socio-economic-cultural recovery besides physical and environmental recovery are not dealt with.

Institutions

Administration and Civil Defence Organisations are identified as nodal Agencies for Response. A District Control Room is established, in order to monitor precipitation levels and incidence of fires. The Incident Command System (ICS) is an 'on-scene, all-risk, flexible modular system adaptable to any scale of natural as well as man-made emergency.' While it collects and maintains data and information, it is also assigned with the task of deploying resources at the time of an emergency. It is also meant to provide for the early warning systems for the area, which is potentially a good step towards an integrative approach to DM.

There is almost no attempt at addressing the development control guidelines, building by-laws or structural safety measures, which could promote disaster mitigation.

Shimla City DM Plan

Understanding of risk

Multi-hazard mapping includes historic data for last 100 years for every disaster in the past, both natural and man-made. Although environmental impact may not be captured for each, but human and animal life losses and economic impact for each of those is recorded. This information is pertinent to arrive at probabilistic data for the return periods. Besides earthquakes and landslides, other hazards included are utility failure, for which a detailed study of water supply (both demand and supply), sewage system, solid waste management, electricity, and telecommunications is included. This puts HD at the core of planning. A ward-wise hazard assessment is conducted.

In addition to calculating exposure due to location, geology, and geomorphology, there is an attempt at identifying socio-cultural and other vulnerable demography in the city exposed to varying hazards.

There is detailed documentation of various types of critical infrastructure in the city including heritage structures, religious centres, tourist centres, government / semi-government establishments, educational facilities, health facilities, places of mass congregation, and other services such as electrical installations, water supply, sewerage system, transportation system, and economic and industrialised centres. This highlights an attempt at a development-oriented understanding of risk.

Vulnerability and Capacity

A ward-wise vulnerability assessment is conducted. The framework includes the analysis of vulnerabilities in the city in the context of various hazards. The rigorous study looks at not just natural and physical vulnerabilities, but it also attempts at addressing vulnerabilities due to socio-cultural, economic, and institutional factors.

Physical: Risk is identified on the basis of geography, geology, terrain, climate, and bio-diversity. It also identifies infrastructure and development processes, including congested areas, areas with rapid unplanned growth, distorted land use and building

utilisation, poorly accessible, poorly resourced, poor building conditions, inappropriately built structures, old structures, and illegal zones. This makes it a more development-oriented assessment of vulnerabilities.

Socio-Economic: People's perception of risk is broadly identified as being low, which in case of Shimla magnifies the actual vulnerability. Poor populations and their choice of habitation (location and type) are considered while assessing the vulnerability to hazards, and thereby risk. Even the 'productive' population is specifically identified, since an impact on them could impact both in the short as well as in the long term. A more detailed geographical identification of different vulnerable populations can be increasingly useful in the planning processes.

Institutional: Current weaknesses in the institutional capacities at various levels of administration as well as social institutions are noted. Community networks and their capacity gaps are also noted. There's an attempt at conducting a response and capacity analysis of the various institutions.

Presence of an integrated DRR perspective

Risk is measured as the probable losses due to hazardous event or events of certain magnitudes occurring in a given area over a specific time period. Multi-dimensional aspect of risk is noted on account of multi-faceted vulnerabilities to different hazards. A complete management plan is prepared; including mitigation, response, and recovery, addressing implementation issues with regards to institutions and communities.

Resilience and risk reduction: The plan clearly identifies the importance of mitigation and the need for providing efforts towards reducing the impacts of disasters. The plan attempts at taking long-term measures for reducing and eliminating risk. Both structural (e.g. building technology) and non-structural (e.g. legislation, land-use planning, etc.) measures are recommended suitable for each type of risk.

Capacity building requirements for different stakeholders and urban institutions involved are identified, and training needs are listed specifically for each.

Preparedness: Emergency Operation Centres are proposed at the level of the municipal commissioner, to gather and disseminate information and coordinate between various departments involved in mitigation and response. Risk insurance is made available, and attempts are planned for promoting the awareness amongst different stakeholders of its need.

Response: Disaster specific response plans are proposed, which include real-time information gathering mechanisms, disaster impact assessment, deployment of teams, information management and helpline, prevention of human trafficking, and assistance to victims. For this purpose, an Incident Response System is proposed, in line with the National Disaster Management Act, 2005. A detailed organisational mapping is included with specific responsibilities and actions.

Recovery: A detailed recovery plan is included. Actions include clearing and disposing off debris, reconstruction and resettlement of the victims, adapting technologies for

safe development, facilitating and providing claims and grants, providing counselling to the victims by the health department, and providing and facilitating long and short term care for the victims.

Institutions

A detailed institutional and legal framework is proposed in the plan which envisions accountability and multi-stakeholder participation for mitigation, response and recovery, and overall sustainable development. It also identifies the need for NGOs to coordinate with GOs, and for all to act in an equitable and non-discriminatory manner for protecting or helping disaster affected communities. This plan is in line with the NPDM, which emphasizes the need for community mobilisation and participation and aims to provide momentum and sustenance through the collective efforts of all government agencies and NGOs. Specific action points are identified for specific stakeholders to address issues including hazard and vulnerability based planning, community participation, gender and disability mainstreaming, focus on most vulnerable rather than physical epicentre, rural-urban diversity, transparency and accountability, etc. It also includes an exit strategy for each, such that it lets the city become self-sustainable, and builds resilience.

Appendix 7: Review of City Disaster Management Plans and Climate Change Plans against Human Development Principles

	Gangtok Disaster Management Plan	Shimla Disaster Management Plan	Delhi Climate Change Agenda	Surat City Resilience Strategies (based on the Asian Cities Climate Change Resilience Network Framework)
Equity	There are no measures taken for this at any stage. ◊	The issues for the underprivileged are addressed at various stages - Response, Recovery, Reduction, and Resilience. The implementation plan lays out action points for the different stakeholders and explicitly addresses issues related to accessibility, hazard and vulnerability planning, mainstreaming disability and gender issues, focus on most vulnerable, and rural-urban diversity.	Equity issues arising out of income, gender, location, and ability disparity are not addressed in the agenda explicitly. ◊	Vulnerability and capacity assessment is done for different income groups, and indices are arrived at for specific hazard risk (floods), risk transfer and insurance, drainage and sewerage vulnerabilities, as well as for social capacity, educational, and income stability. It is referring to these indices, long, mid, and short term strategies are devised to address differently resourced groups differently. Specific actions are not detailed at this strategy level. ◊◊◊

[lxxiii] Institute of Statistical, Social and Economic Research, *West Gonja District Human Development Report 2007: Vulnerability and Attainment of MDGs at the Local Level* (Ghana: Prepared for UNDPGhana:2007),73-75
[lxxiv]J. Alwang and P.B. Siegel, *Towards Operational Definitions and Measures of Vulnerability: A Review of the Literature from Different Disciplines*, (Washington DC: prepared for the Social Protection Unit, Human Development Unit, World Bank, 2000)
[lxxv]B. Walker and D. Salt, 2006: *Resilience Thinking: Sustaining Ecosystems and People in a Changing Work, Island Press*, Washington, Covelo, London.
xx da Silva, Jo, Sam Kernaghan and Andres Luque 2012: A systems approach to meeting the challenges of urban climate change, ARUP; Solecki, William 2012: City of New York Case Study, *EnvironUrb*, 24: 2.
[lxxvi]F. Yamin, A. Rahman and S. Huq 2005: Vulnerability, Adaptation and Climate Disasters: A Conceptual Overview. IDS Bulletin, 36 (4) October, Brighton: Institute of Development Studies
[lxxvii] UNISDR, 2004. Living with Risk: A global review of disaster reduction initiatives. Geneva. URL: http://www.unisdr.org/files/657_lwr21.pdf Accessed 30 March 2013
[lxxviii] B. Walker and D. Salt 2006: *Resilience Thinking: Sustaining Ecosystems and People in a Changing Work, Island Press*, Washington, Covelo, London.
[lxxix] D.M. Smith 2011: Combining the what and how of building climate resilience: water ecosystems and infrastructure. Pp. 201-203 in Waughray D (editor) Water Security: The Water-Food-Energy-Climate Nexus. Island Press: Washington DC.
[lxxx] A. Revi 2008: Climate change risk: an adaptation and mitigation agenda for Indian cities. EnvironUrb, 20(1): 207–229.
[lxxxi] UNISDR, 2008. Links between disaster risk reduction, development and climate change. Geneva. pp4
[lxxxii] United Nations, 2000
[lxxxiii] http://planningcommission.nic.in/plans/stateplan/index.php?state=ssphdbody.htm
[lxxxiv] UNDP, 2011. Human Development Report 2011. Accessed on 20 April, 2013 http://hdr.undp.org/en/media/HDR_2011_EN_Complete.pdf
[lxxxv] Best Practices for Adaptation and Disaster Risk Reduction, Case Study 12, Rural Volunteers Centre, Assam, India. http://www.nadrrindia.org/resources/RVC-standard/BestPractice-for-Adaptation-and-DRR_Case12_Houses-on-Raised-Stilts_RVCAssam2009.pdf
[lxxxvi] M. Davies, K. Oswald, and T. Mitchell, 2009. 'Climate Change Adaptation, Disaster Risk Reduction and Social Protection.' In Promoting Pro-Poor Growth: Social Protection, ed., Organisation for Economic Co-operation and Development. Paris: Organisation for Economic Co-operation and Development (OECD).
[lxxxvii] Rohit Jigyasu2011. Socio-Economic Recovery in eds: Wisner B, Gaillard, JC and Kelman, I. *Handbook of hazards and Disaster Risk Reduction*, Section III: Preparedness and Response. Routledge
[lxxxviii] Ibid. 2011
[lxxxix] Lasse Krantz 2001. The Sustainable Livelihood Approach to Poverty Reduction. SIDA, Division for Policy and Socio-Economic Analysis. URL: http://www.forestry.umn.edu/prod/groups/cfans/@pub/@cfans/@forestry/documents/asset/cfans_asset_202603.pdf. Accessed on 30 March 2013
The Sustainable Livelihoods Approach. The International Fund for Agricultural Development. URL: http://www.ifad.org/sla/. Accessed on 30 March 2013
[xc] United Nations, 2000
[xci] Ibid., 2009
[xcii] UNISDR, 2008. Links between disaster risk reduction, development and climate change. Geneva. pp4
[xciii] For example see
(i) http://www.unisdr.org/files/594_10382.pdf
(ii) https://www.gfdrr.org and
(iii) http://www.preventionweb.net/
[xciv] Ian Christoplos 2008. Incentives and constraints to climate change adaptation and disaster risk reduction – a local perspective. Commission on Climate Change and Development. Geneva. March 2008
[xcv] Commission on Climate Change and Development, 2009. The human dimension of climate adaptation; the importance of local and institutional issues. Sweden
[xcvi] GIZ and MoEF, 2011. Adaptation to Climate Change with a Focus on Rural Areas and India. GIZ, Project on Climate Change Adaptation in Rural Areas of India. New Delhi