CHAPTER THREE
REVIEW OF LITERATURE

Review of Literature

Introduction

Review and Assessment of Literature

Introduction:

Research on Social Vulnerability and Resilience to Climate Change is a very rare topic of research in India. The researcher has contacted many academic institutions and libraries and found out that this topic has not been touched upon. There are many researches on disaster management but very few on climate changes. Most of the researches on climate change are in the field of environment sciences but almost none on social sciences especially social work.

Hence the researcher has tried to do justice to the topic by first highlighting on the resilience theory in social work practice. Social work has always focused on vulnerability in terms of individuals, groups and communities and the resilience factor for a along time had been on back front but slowly, this factor is coming to the forefront. The review focuses on the paradigm shift to the strengths perspective from late 1990s onwards in social work.

This chapter than focuses on the use of social indicators as used by people from different fields for research purpose and how they are important for the society and development. It tries to capture the developmental history regarding the social indicators. Since climate change is closely related to natural hazards and disasters in case of extreme events, the researcher has tried to highlight the use of indicators for hazard, disasters, climate change and vulnerability. The review further focuses on social vulnerability and development of social vulnerability index and Social Vulnerability Maps.

It then focuses on Social Vulnerability and Resilience in the context of climate changes and provides some case studies to support the entire review of literature.

The review tries to do justice to the topic of research in the best possible manner.

Thus this chapter contains theoretical inputs made by various scholars as well as researchers done on the above mentioned aspect or efforts undertaken by them to develop vulnerability and social indicators and index

Social Work and Resilience Theory

Social work's commitment, as a profession, to resilience and strengths has a confusing history. At face value one may think social work has always thought and worked within a resilience framework, even if it was without calling it by that name. Generally speaking, social work's origins included a commitment to developing client strengths. Social work as a professional community led to an alliance with psychoanalysis with its pathogenic worldview focusing on client's vulnerability. Only more recently, with the emergence of the ecological perspective, has social work begun to reclaim its strengths-based roots. Social work's first roots lie in the Charity Organization Society and the Settlement House Society at the end of the nineteenth century. Industrialization at that time resulted in greater levels of social pathology than seen before – unemployment, child abuse, homelessness, poverty. Workers in form of friendly visitors and case workers had to develop innovative ways to meet these challenges. Gradually, family and community oriented interventions evolved. The workers from the Charity Organization Society, a religious organization, attributed social problems to individual-level moral deficits. Poverty was attributed to drunkenness, intemperance, ignorance, and lack of moral will. Change was to come about not through provision of monetary assistance but through persuasion and friendly influence. By contrast, the workers from the Settlement House Movement emphasized environmental factors as causative of social pathology. They believed that resources such as housing, sanitation, education, neighborly assistance, and enriched social interactions would enable people to move beyond the limits of their situations.

This saw the emergence of community work. This focus removed the view of individuals as dysfunctional, but simply transferred the deficit and pathology oriented perspective to the community level. It cannot be said that either of these approaches was based in some conception of resilience or strengths.

In the first decades of the twentieth century social work began a process of professionalizing. Mary Richmond advocated a more empirical, rational or scientific approach to helping, rather than a moral or intuitive approach. Increasing attention was paid to defining the problems in people's lives so that a rational, rather than a moralistic, strategy of intervention could be pursued. In Richmond's work the individual perspective continues to dominate, but she advocated the need to assess both pathology and strengths or resources.

The psychosocial casework models of Hamilton and Hollis in the 1950s and 1960s attempted, through the incorporation of the person-in-environment concept to promote an approach to social work that (1) focused on both individual and environmental problems and (2) focused on both weaknesses or deficits and strengths. Perlman's problem-solving model of casework initiated the movement of social work towards a greater appreciation of strengths and resilience. He was able to teach the use of strengths in helping clients solve problems. The concept of coping itself implied a strengths potential when defined as a person's conscious, volitional effort to deal with himself and his problem in their interdependence.

Social work theories and models which have evolved over the past few decades tend to provide a greater opportunity for the incorporation of a strengths or resilience perspective: Germain and Gitterman's life model, Shulman's interactional model, Middleman and Goldberg's structural model and Pincus and Minahan's systems model. These models all integrate the person and environment components of social work interest, and provide a more holistic and system oriented explanation for human functioning.

Recent models and theories of social work practice, such as the strengths perspective and the narrative approaches support a resilience framework.

The Strengths Perspective

The strengths perspective is a new paradigm for social work theory and practice, in which the focus is on the strengths and capacities of clients, rather than the problems of clients. Strengths can be described as follows (McQuaide & Ehrenreich, 1997): **The capacity to cope with difficulties, to**

maintain functioning in the face of stress, to bounce back in the face of significant trauma, to use external challenges as a stimulus for growth, and to use social supports as a source of resilience. The list of strengths is lengthy. Saleeby (1997) has identified several groups of strengths, including: What people have learned about themselves, others and their world, ... personal qualities, traits, and virtues that people possess, ... what people know about the world around them, ... the talents that people have, ... cultural and personal stories and lore, ... pride, ... [and] the community.

Clearly, a great deal of further work is required of social workers to explore and integrate resilience theory into the profession. Given the history of social work, it is likely that such integration will be appropriate but conflictual.

Social Indicators

Social indicators have been in use since the Roman Empire when it was used for the administrative and policy making purposes. It was in 1960's that the social indicators research and its use gained momentum in United States and United Kingdom. The whole two decades of 1960 and 1970 saw emergence of use of social indictors by experts from social sciences.

In Europe, in the 1960s a "social indicator movement" was initiated. While in the 1960s social indicators were primarily developed to assess societies economic growth, social indicators are nowadays adopted in a broader sense and are also related to the assessment of technologies or the assessment of political strategies, especially in reference to sustainable decision making strategies. For this, various surveys on indicators were carried out.

In United States, one of the most famous is the U.S.'s Index of Leading Economic Indicators, a composite of ten economic variables used to estimate future economic activity. There is a rich tradition within the social and environmental sciences on the development of indicators beginning in the 1940s with economic indicators. Social indicators were more prominent in the 1960s and 1970s, followed by environmental indicators. The 1990s witnessed more emphasis on the development of indicators for environmental

sustainability as well as for vulnerability. A special report states 394 studies carried out for social indicators during 1960 to 1999 in U.S.

In India, so far, it's the HDI which is being used by majority. India is yet to come out with its own social indicators at local, regional or national level. Much sporadic work has been done in India especially in terms of developmental or sustainability at community level or project levels.

Vulnerability Indicators:

The 1990s witnessed more emphasis on the development of indicators for environmental sustainability as well as for vulnerability.. The use of indicators and indices to measure attributes of interest for a system continues to gain momentum. With hazards vulnerability, issues such as social networks trust in the government, and institutional capacity and disaster readiness, which are difficult to quantitatively measure, are evident. The result is that vulnerability indices are limited in the scale of analysis (geographic unit and timeframe). There are further limitations in the comparability between various indices because each uses a different set of variables, geography, or approach to the construction of the index. Because of these problems, vulnerability indices are better cast as descriptions of existing and anticipated conditions rather than as predictive tools. In this regard, vulnerability indices can guide policy development on vulnerability reduction at national and sub-national scales, and serve as a means of measuring progress towards that specific goal

Hazards, Disasters, Climate Change and Vulnerability Indicators

Research continues on the development of quantitative indicators of climate variability and adaptation to climate-related hazards at multiple scales of analysis Indicators for vulnerability and adaptation to climate change and climate variability face many of the same challenges as other vulnerability indices

The development of indicators is still in its infancy. One of the issues is how to incorporate hazard or disaster vulnerability indicators into climate change vulnerability assessments. For example, Brooks and Adger (2003) argue for the inclusion of natural disaster risks, particularly climate-related disasters in assessing vulnerability to climate change and variability. Using data on the number of fatalities and individuals affected by climate-related disasters to construct global climate risk indicators, they provide information on individuals who will be better able to adapt and deal with the long term impacts of climate change and variability, what we refer to **as resilience**.

O'Brien et al. (2004) used the IPCC definition of vulnerability, which includes the elements of exposure, sensitivity, and adaptive capacity to map vulnerability of agriculture in India to both climate change and globalization at a sub-national level. Comprised of three sets of biophysical, social, and technological indicators, they used a combination of mapping techniques and local case studies to identify the high-vulnerability districts of Jhalawar, Anantapur, and Chitradurga(Carried out by TERI). Like O'Brien et al. (2004), Deressa et al. (2008) also examined vulnerability to climate change and variability by local farmers based on the IPCC's definition of vulnerability. Using a combination of socioeconomic and biophysical indicators, they developed a vulnerability index and applied it to a case study of seven regions in Ethiopia.

The Livelihood Vulnerability Index developed by Hahn et al. (2009), used several indicators to assess the impacts of climate change and variability among individuals residing in two districts in Mozambique. They use primary data gathered from household surveys in the study area based on the following components: socio-demographic profile, livelihood strategies, social networks, health, food, water, and natural disasters and climate variability. This index weights all indicators equally when assessing those factors that determine sensitivity and exposure to climate change impacts.

The **Dynamic International Vulnerability Assessment (DIVA)** tool developed by Torresan et al. (2008) employ the methodology to assess

vulnerability to climate change and sea level rise along the coast of Venetia, Italy. The majority of indicators that are used are biophysical encompassing dimensions like geomorphology, topography, and vegetation. Because there are so few regional vulnerability assessments of climate change in coastal environments, they perform their analysis at the regional scale, and compare it to the global scale using the same variables.

Moss et al. (2002) developed a **Vulnerability-Resilience Indicator Prototype (VRIP) model** that assessed the ability of different groups to adapt and cope with climate change in 38 different countries. Indicators that reflected sensitivity and coping capacity included a combination of environmental and social factors like food, water, health, environment and economics. The proxies were scaled against global data to get the overall national baseline of vulnerability and resilience for each of the countries. Brenkert and Malone (2005) in an extension of that work applied the **VRIP model to India** for a more in depth analysis of climate change vulnerability. Finally, Sullivan and Meigh (2005) developed a Climate Vulnerability Index comprised of six indicators encompassing resource, access, capacity, use, environment, and geospatial dimensions. They suggest their index has applicability and comparability across various scales of analysis from small island developing nations (SIDs) to the national level. However, there is no theoretical discussion of indicator choice or the specific indicators.

Social Vulnerability (Hazards)

Social vulnerability describes those characteristics of the population that influence the capacity of the community to prepare for, respond to, and recover from hazards and disasters. Social vulnerability interacts with natural processes and the built environment to redistribute the risks and impacts of natural hazards and in this way creates the social burdens of hazards (Cutter et al. 2003). Social vulnerability helps to explain why some communities experience the hazard differently, even though they experience the same level hazard. Unlike biophysical vulnerability or other exposure indicators, social vulnerability is present, independent of the hazard type or threat

source. In other words, social vulnerability is a pre-existing condition or an inherent property of existing communities, irrespective of the natural hazard of interest.

To understand the Race, Class, Gender and other Correlates of Social Vulnerability within the social science and disasters literature, researchers generally focused on those social factors that increase or decrease the impact of specific natural hazard events on the local population. These include socioeconomic status (wealth or poverty); age; special needs populations; gender; and finally, race and ethnicity.

Socioeconomic status influences the ability of individuals and communities to absorb the losses from hazards. In general, people living in poverty are more vulnerable than the wealthy to hazard impacts as they have less money to spend on preventative measures, emergency supplies, and recovery efforts. The losses sustained by the poor are far more devastating in relative terms. Poor people are more likely to live in substandard housing, which can be a major disadvantage when disasters occur and during disasters, are less likely to have access to critical resources and lifelines, such as communications and transportation. Some research suggests that working class families tend to experience long-lasting impacts from disasters (Dash and Morrow 2007).

The influence of race and class has a long history of producing social inequalities . These were highlighted in the differential impact of and response to Hurricane Katrina (Cutter et al. 2006). The impacts associated with it were more related to the underlying socioeconomic inequalities within the affected population rather than the hurricane's intensity. Racial and ethnic minorities are more vulnerable to hazards because minorities are more likely to live in poverty. Discrimination also plays a major role in increasing the vulnerability of racial and ethnic minorities. Ethnic communities are often geographically and economically isolated from jobs, services and institutions. Where minorities are immigrants from non-English-speaking countries, language barriers can greatly increase vulnerability to a disaster and recovery (Peguero 2006; Leong et al. 2007a,b; Trujillo-Pagan 2007).

Gender also affects social vulnerability Women are more vulnerable than men to disasters, mainly because women— especially single mothers or women headed households — are more likely to live in poverty. Women often suffer the impacts of a disaster disproportionately. For example, women are more likely than men are to hold low-status jobs in the service industry, which often disappear after a disaster strikes (Morrow 2008). Women are also more vulnerable to disasters because of their roles as mothers and caregivers: when disaster is about to strike, their ability to seek safety becomes restricted by their responsibilities to the very young and the very old, both of whom require help and supervision.

Both the young and the elderly may be unable to respond to disasters without outside support. (Smith et al. 2009). Children who lack adequate family support are at a major disadvantage for disaster response. Disruptions created by a disaster can have significant psychological and physical impacts on children (Kar 2009). Generally, the elderly are more likely to lack the necessary physical and economic resources to respond effectively to a disaster. They are more likely to suffer health problems and experience a slower recovery. The elderly also tend to be more reluctant to evacuate their homes in a disaster. In addition to the physical difficulties imposed by evacuation, the elderly become distressed at the prospect of leaving their own homes and living even on a temporary basis, in a group setting (Gladwin and Peacock 1997).

People living with mental or physical disabilities are less able to respond effectively to disasters and require additional assistance in preparing for and recovering from disasters (McGuire et al. 2007). Emergency managers need to target areas with high concentrations of disabled people, particularly in group-living quarters, for early evacuation and other preparatory measures (Morrow 2008).

It is important to note from the discussion above that the proportion of residents characterized by these broad categories is important, but also how

each factor or variable interacts to produce socially vulnerable populations. It is often the intersection of gender, race, class, and family circumstances that most influence the social burdens from natural hazards.

The Social Vulnerability Index

In 2000, Cutter et al. operationalized the Hazards-of-Place model to reveal the vulnerability of populations living inside hazard zones for Georgetown County, South Carolina. To quantify social vulnerability, nine indicators were chosen deductively, based on *a priori* knowledge from the existing literature. These included total population and total housing units (i.e. proxy of people/ structures at risk); number of females, number of nonwhite residents, number of people under age 18, and number of people over age 65; mean house value (i.e. proxy for wealth, resilience); and number of mobile homes (i.e. proxy level of structural vulnerability). Indicators were collected for block groups using 1990 US Census Statistics. Rather than using simple percentages to represent indicators, each social variable was standardized by determining a ratio of that variable in each census block to the total value of that variable for the entire county to create a comparative proportion for each variable in each block. To produce an aggregate value for social vulnerability, standardized values were summed for each block. This score was then combined with the aggregate values for biophysical vulnerability (derived from frequency of hazard occurrence) using a GIS. Lacking the reliable theoretical or statistical evidence needed to assign weights, all indicators had the same relative importance (equal weight) within the GIS.

Chakraborty et al. (2005) used those methods developed by Cutter et al. (2000) to develop the **Social Vulnerability for Evacuation Assistance Index (SVEAI)** for block groups in Hillsborough County Florida. SVEAI used ten indicators, similar to those chosen by Cutter et al. (2000) with some minor changes to reflect those populations that may have special evacuations needs (i.e. disabled) and those who have differential access to evacuation resources inside their home (i.e. no telephone or vehicle). Rather than simply summing the standardized variables, values were averaged yielding aggregate

vulnerability normalized between zero and one. In further contrast from Cutter et al.'s (2000) metric, Chakraborty et al. presented four alternative approaches for grouping the variables to calculate social vulnerability for evacuation and for examining the spatial distribution of each approach within the study area. These characteristics are listed below, along with the number of variables associated with each approach: Approach 1: Population and structure (three variables); Approach 2: Differential access to resources (three variables); Approach 3: Special evacuation needs (four variables); and Approach 4: All three characteristics (all 10 variables). Each approach addresses a specific dimension of evacuation assistance need that can be examined and visualized independently, a process that recognizes the different issues that local emergency managers face in developing evacuation plans. Using the methods of Cutter et al. 2000, SVEAI was combined with a geophysical risk index (hurricane risk and flooding). The resultant values indicate overall evacuation assistance need.

In 2003, Cutter et al. developed the **Social Vulnerability Index (SoVI)**. Based on the social dimensions of the Pressure and Release and Hazards-of-Place models. SoVI is a multidimensional, scale dependent, spatially reliant algorithm for quantifying the relative socio-economic and demographic quality of a place as a means of understanding vulnerability. Using an inductive factor analytic approach, 42 socioeconomic variables (derived from US Census and County Data Books) reduced to 11 statistically independent factors, which accounted for about 76 percent of the variance at the county level for the entire United States. These factors were aggregated using a simple additive model to compute a summary score (i.e. the SoVI score) (Cutter et al. 2003). Again, no *a priori* weights were assigned during any point of aggregation. Those factors that contribute to the overall score often are different for each county, underscoring the interactive nature of social vulnerability—some components increase vulnerability while others reduce or moderate the SoVI score. SoVI attempted to uncover places having an uneven capacity for preparedness and response; places where resources might be used most effectively to reduce the pre-existing vulnerability). Unlike previous indices, SoVI is designed as a stand-alone indicator. This is concurrent with the

accepted theoretical understanding that social vulnerability is independent of hazard type. Zones of differential exposure to any or all hazards combine with SoVI to create place vulnerability (Burton and Cutter 2008).

A common critique of comparative statistical research, particularly those focused on national level analyses, is that it fails to capture the sub-national spatial and social differentiation of vulnerability and local conditions that mediate the capacity to adapt.

Social Vulnerability and Resilience in the Context of Climate Change

Vulnerability assessment has become a noteworthy subject in the field of applied global change (McCarthy et al. 2001). The acknowledgement of a probable increase in the frequency and intensity of hazard events such as hurricane storm surge, flooding, and the potential exacerbation caused by sea level rise has yielded an increased interest in pre-hazard planning and emergency preparedness for climate related hazards (Adger et al. 2004). Most of these studies focus on the physical dimensions of climate hazards answering more the "What, Where and When" of climate hazards, rather than the "Who and Why". Earlier assessments of the human dimensions of climate impacts focused more on specific impacts in developing countries, such as food scarcity (Bohle et al., 1994). SoVI and variants of it now are beginning to appear to quantify local-scale social vulnerability to climate variability impacts.

Vincent's (2004) index of **Social vulnerability to climate change in Africa (SVA)** uses the conceptual implementation of the global climate change community's alignment of social vulnerability with adaptive capacity (Adger 2006; Gallopín 2006; Klein et al. 2003). The SVA concentrates, then, on social vulnerability to climate change, particularly water availability. The framework unites concepts of social vulnerability, coping range, and adaptive capacity. SVA uses 9 indicators as a proxy for social vulnerability ranging from amount of population in poverty to the presence of household and community telephones.

The Predictive Indicators of Vulnerability Index (PIV) (Adger et al. 2004) focuses on vulnerability to climate variability and climate change. The PIV rests on the conceptual framework that risk (outcome) is a function of both biophysical and social vulnerability. The PIV's goal is to identify driving factors of **social vulnerability and adaptive capacity** (Adger et al. 2004). The PIV consults hazard fatalities to conclude on driving vulnerability factors. The PIV aggregates climate-related mortality from the EM-DAT database per decade from 1971 to 2000, and then standardizes hazard mortality by population size. The PIV subsequently reduced a collection of 45 social vulnerability variables to a final set of eleven indicators based on correlations with decadal hazard mortality. To arrive at a final PIV score, the authors simply average the eleven indicators of social vulnerability without imposing weights (Adger et al. 2004). While the PIV's aggregation structure is simple, its approach to normalizing indicators differs significantly from most indices. The PIV normalizes indicators by grouping them into quintiles and assigns scores ranging from one to five to each quintile. It adjusts for the direction of an indicator by equating the top quintile of a vulnerability-increasing indicator with a score of five whereas the top quintile of a vulnerability-reducing indicator receives a score of one. Thus, the higher the aggregated PIV score, the smaller a country's adaptive capacity to climate change and the greater its vulnerability. The Index of Predictive Indicators of Vulnerability (PIV) mimics development-oriented indices such as the Human Development Index (HDI) rather than social vulnerability.

Case Study 1

Title:

Urban Governance for Adaptation: Assessing Climate Change Resilience in Ten Asian Cities

Source:

Urban Governance for Adaptation: Assessing Climate Change Resilience in Ten Asian Cities

Thomas Tanner, Tom Mitchell, Emily Polack and Bruce Guenther

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Assessment framework:

(1) decentralization and autonomy, (2) accountability and transparency, (3) responsiveness and flexibility, (4) participation and inclusion and (5) experience and support.

Method:

Assessment with the help of survey

Table 3.3 Summary of climate resilient governance indicators

City	Decentralisation and autonomy	Transparency and accountability	Responsiveness and flexibility	Participation and inclusion	Experience and support
Bangkok	– decentralised municipal authority overlapping functions and poor coordination between governments – financial decentralisation and autonomy – local responsibility for flood control	– access to information legislation – little oversight by citizens due to bureaucratic procedures	– improvements in responsiveness to flood management – planning in response to climate change mitigation	– low levels of participation among marginalised groups – public consultation on urban planning – top-down decision-making	– experience in flood management, disease control and early warning systems – active civil society
Chennai	decentralised municipal authority – conflict between national, state and city governments – increased autonomy has had mixed results	– access to information legislation	– responsive disaster management – poor city planning capabilities – poor coordination between departments	– large budget allocations for slum dwellers – public consultation on urban planning but lack of representation for the lower class	– membership in associations relevant to climate change – active civil society
Chittagong	decentralised departments and agencies responsible for local service delivery – city disaster management committee – lack of financial autonomy	– lack of transparency and access to information	– clear lines of responsibility in disaster management – poor enforcement of land use policies	– increasing involvement of stakeholders in decision-making	– experience in disaster management – little experience in prevention and preparedness
Cochin	decentralised municipal authority – state level disaster management but no municipal organisation	– improving accountability but little transparency – access to information legislation	– no direct municipal role in disaster management	– inclusive and participatory decision-making including participatory budgeting	– lack of institutions and infrastructure to deal with climate hazards
Da Nang	– 'separate planning city' controlled by central governing party local disaster management – lack of financial autonomy and capacity	– transparent delivery of public services	– evidence of collaboration for environmental planning	– lack of participatory decision-making	– some experience in disaster risk reduction through integrated coastal management
Dalian	– 'separate planning city' controlled by central governing party	– lagging access to information in comparison to other Chinese cities	– responsive disaster management planning – investment in flood management – presence of Emergency Management Office	– no specific agency responsible for implementing adaptation	– experience in dealing with extreme weather events
Hangzhou	– 'separate planning city' controlled by central governing party – financial autonomy – no municipal authority for dealing with adaptation	– access to information legislation	– investment in flood management – presence of Emergency Management Office	– limited public participation in decision-making	– good practices in early warning systems and emergency planning
Ho Chi Minh	– highly centralised urban planning – decentralised disaster management – lack of financial autonomy	– lack of transparency and access to information	– reactive disaster management – lack of capacity and coordination limit responsiveness	– lack of participatory decision-making	– experience in dealing with storms and flooding
Ningbo	– 'separate planning city' controlled by central governing party – financial autonomy	– access to information legislation	– investment in flood management – presence of Emergency Management Office	– limited public participation in decision-making and planning	– good practices in early warning systems – large financial investment in water conservation and flood management
Surat	– decentralised municipal authorities	– access to information legislation	– responsive to growing informal settlements	– broad stakeholder consultations in urban planning	– experience with previous disaster situations

Case Study: 2

Title:

Social Vulnerability to Climate Change and Extremes in Coastal Vietnam

Source:

Neil Adger

World Development Vol. 27, No. 2, pp. 249±269, 1999

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Assessment framework:

Table 2: **Collective and individual vulnerability to climate change: determinants and indicators**

Type of vulnerability	Causes in relation to climate variability	Indicators of vulnerability	Causes and indicators of vulnerability to climate change
Individual vulnerability	Relative and absolute poverty; entitlement failure in the face of extreme events.	Poverty indices; distribution and proportion of income dependent on risky resources; expected potential resource losses.	*Causes*: change in occurrence of extreme events, involuntary adaptations including migration. *Indicators*: changes in probability of extreme events; thresholds in physical (topographical, climatic) parameters
Collective vulnerability	Absolute levels of infrastructure, market development; institutional and political factors -insurance and formal and informal social security.	GDP per capita; relative inequality, qualitative indicators of institutional arrangements.	*Causes:* change in hazardous zone area leading to real economic costs of public interventions. *Indicators*: change in proportion of population vulnerable.

Method:

Quantitative household survey, Qualitative household survey, KII with district officials and secondary data for Xuan Thuy District of Vietnam

Findings:

In general the population exhibits resilience through its use of available natural resources, but the liberalization process has had, at best, an ambivalent impact on vulnerability as a whole by undermining some institutional practices which acted as security and coping mechanisms in times of stress. The causes of social vulnerability are the characteristics of the climatic threat; the political economy context in which the institutions of decision-making, primarily the state in all its manifestations, attempts to minimize or manage threat for the benefit of society but also the benefit of the institutions themselves; and the economic structure and cultural context of adaptation at the individual level. By addressing

Vulnerability in a comprehensive manner current populations are enabled to address today's climatic extremes and other threats and are better equipped to cope with future uncertainties.

Case Study: 3

Title:

Building Social Resilience into human marine communities in and around MPA (Marine Protection Area)

Source:

Nadia P. Abesamis, Colleen Corrigan, Mark Drew, Stuart Campbell, Giselle Samonte, MPA Networks Learning Partnership, Global Conservation Program, USAID, September 2006

Assessment framework:

The case studies at community level covered terrestrial or marine ecosystems in the US, Caribbean, Europe, Africa, Southeast Asia and Melanesia. (also see exhibit based on social resilience principles and variable from folke et all 2003)

Method:

Working groups for various sub topics were formed. For this particular section, intense review of literature, case studies with the help of various tools like focus groups, survey research, socio economic impacts, rapid assessment, Participatory Coastal Resource Assessment, Ethnography, Contingent Valuation, Predictive modeling, Content Analysis, Cost Benefit Analysis , Comparative Research, Historical Research, Secondary Research Analysis and Case Study Method.

RESILIENCE PRINCIPLE	VARIABLE	REFERENCE	CASE STUDY
Learning to live with change and uncertainty (adaptability)	Vision and leadership	Christie et al 2003b	Supportive and committed local leadership enhanced the community-based coastal resources management in San Salvador Island, Philippines Over reliance on a small group of leaders can however result in "burn-out" and the narrowing of community participation
		Olsson et al. 2004b	A key leader played an instrumental role in directing change and transforming governance in southern Sweden that led to the adaptive co-management of a wetland landscape
		Adger et al 2005	Strong leadership confined the impact of Hurricane Andrew to manageable portions in Florida
		Cinner et al. 2005a; McClanahan et al. 2006	Village leaders in Papua New Guinea had the authority and autonomy to develop and adapt harvesting rules in MPAs to reflect ecological and social conditions
	Multi-level social networks and building social capital	Brown et al. 2001 as cited in Adger 2001	When linkages between civil society and the central government were strengthened in an MPA community in Tobago, novel institutional arrangements such as co-management emerged
		Olsson et al. 2004b	A broad social network was assembled from several key organizations at different levels in society to support the management of wetland ecosystems in Kristianstad, Sweden
		Cinner et al. 2005a	For communities in Indonesia and Papua New Guinea, high social capital brought about by a high degree of group interaction likely facilitated the high compliance with periodic closures (*taboos*)
		Harkes and Novaczek (manuscript)	Strong bonds between traditional and formal institutions in Indonesia make traditional fisheries management and seasonal closures (*sasi laut*) highly resilient
	Demographic changes	Adger et al. 2002	In Nam Dinh Province, Vietnam, migration and its associated remittance income to the communities increased investments in

			business and new enterprises and reduced pressure on the coastal resources, e.g mangroves However remittance income also increased economic inequality among households, limiting access of poorer members of the community to coastal resources and encouraging greater risk of unsustainable exploitation
		Cinner 2005, Cinner et al. 2005a	Low or negligible migration contributed to the effectiveness of customary marine tenures and periodic closures in certain villages in Indonesia and Papua New Guinea
		Cinner et al 2005a; McClanahan et al 2006	Relatively small population size was related to strong and effective traditional management systems (customary marine tenure and taboos) in Indonesia and Papua New Guinea
Nurturing diversity for reorganization and renewal (diversity)	Diversity of livelihood	Luttrell 2003	Livelihood diversification was a form of adaptation for people in Nam Hai and Da Rang Communes, Vietnam in response to changes in property rights and tenure over mangrove forests
		Adger et al. 2005	Reduced livelihood options and loss of traditional income sources due to already degraded ecosystems in parts of Indonesia reduced the potential for rapid economic recovery after the 2004 Asian tsunami
		Marschke and Berkes 2006	Fishing communities in Kompong Phluk, Cambodia adapted during periods of resource decline by building a portfolio of livelihood options – diversifying their fishing activities (specialization in different gears) and operating small businesses
	Resource use and dependency	Adger 2000	In Quang Ninh Province, Vietnam, high dependence of communities on mangroves for their livelihood led to low resilience at the household level when the resource was converted to private mariculture areas, reduction in income was significant At the community level, loss of part of the mangrove resource also led to increased conflicts over remaining resources
Combining different types of knowledge for learning (learning & knowledge)	Traditional and local knowledge systems	McCay 1978 as cited in Davidson-Hunt and Berkes	In Fogo Island, Newfoundland, fisherfolk perceptions of codfish population cycles across time and space provided them with the means to formulate adaptive strategies, e.g maintaining several

		2000	fishing spots, using a variety of gear, and livelihood diversification
		Olsson et al 2004a	Cree and Inuit communities of James Bay Canada documented changes in their environment (changing sea-ice patterns, distribution of sea mammals, damage to eelgrass) based on tradition ecological knowledge combined these into a regional picture and used it as baseline for management in the face of additional hydroelectric projects
		Cinner et al. 2005a	Local decision makers in Indonesian and PNG villages used their understanding of social-ecological systems to interpret threshold levels of social or ecological indicators used to implement reef closures
	Transformational learning	Olsson et al 2004b	The change of policy of the Municipality of Kristianstad initiated transformational learning and collective action among stakeholders for the management of their wetlands
	Collaborative planning & participation	Tompkins and Adger 2004	In response to declining conditions of Buccoo Reef in Trinidad and Tobago, management enhanced ecological and social resilience by including stakeholders in a learning-driven and iterative decision-making process, with stakeholder preferences elicited and fed into a multi-criteria analysis model
		Granek and Brown 2005	Community members in Mohéli, Comoros Islands were included in the processes of park boundary delineation and guideline creation, and were responsible for coordinating monitoring and enforcement within the marine park
		Lebel et al. 2006	The Great Barrier Reef Marine Park Authority in Australia initiated an ambitious consultancy and public participation exercise with stakeholders to assist with plans for enhancing the level of protection of reef resources
Creating opportunity for self-organization (self-organization)	Multilevel polycentric governance and accountability	Toengkagie 2002	Management of Bunaken National Park improved with the creation of the Multistakeholder Management Advisory Board that included villagers, private tourism sector, environmental NGOs, academe and government officials at the city, district and province levels
		Christie 2004	Insertion of central government agency control over a community-based MPA in Balicasag Island, Philippines undermined

			community support (loss of social resilience)
		Alcala and Russ 2006	30 years of experience in community-based marine protected areas in the Philippines has shown that, at least for this country one must initially devolve decision-making power to the community and then spend enormous amounts of effort, time and money in large-scale integrated coastal management programs that integrate up again at the national level
	Conflict resolution mechanisms	Christie 2004	For two MPAs in the Philippines, there were no formal conflict resolution mechanisms in place thus interpersonal and inter-stakeholder conflicts ensued. Initial successes of the MPAs and social networks in general were eroded by these conflicts.
		Marschke and Berkes 2006	A local resource management committee in Koh Sralao, Cambodia stopped local fishers from destroying confiscated fishing gear, and instead encouraged non-violent conflict resolution strategies such as negotiation and paint-marking crab traps to discourage gear theft
	Capacity	Christie et al. 2003b	Capacity-building of key community members on sustainable resource management supported the co-management regime setup in San Salvador Island, Philippines
	Monitoring and feedback loops	GBRMPA Strategic Plan	A comprehensive monitoring and evaluation program for the Great Barrier Reef Marine Park aims to ensure public participation, establish mechanisms for data exchange, and encourage stakeholders to review the efficiency and effectiveness of management

Case Study: 4

Title:

A Household Social Vulnerability Index (HSVI) for Evaluating Adaptation Projects in Developing Countries

Source:

Katharine Vincent and Tracy Cull.

Kulima Integrated Development Solutions (Pty) Ltd, Johannesburg, 2010

Assessment framework:

A theoretically-derived index of household level social vulnerability to climate change, based on the multiple dimensions of vulnerability identified in the sustainable livelihoods framework (based on access to natural, human, physical, financial and social capital) was developed. The index was formed from the weighted aggregation of 5 composite sub-indices, themselves formed from one or more indicators- Human Capital, Physical Capital, Financial Capital, Social Capital and Natural Capital (the weighted average of five composite sub-indices: financial capital (20%); human capital (20%); social capital (20%); natural capital (20%); and physical capital (20%))

Method:

Household Level Social Vulnerability to Climate Change tool was used in Maangani, South Africa.

Household number	Vulnerability Index	Vulnerability Rank	Human capital						Physical capital		Financial capital			Social capital				natural capital	
			Dependency ratio	working population	dependent population	rank dependency ratio	illness	rank illness	House category	rank house	livestock assets	transposed livestock so 1 = most vuln	rank livestock	Social capital- contacts	rank social capital- contacts	Social capital- groups	rank social capital- groups	dependence on farming	rank farming

Result:

The index has been presented with indicators and weightings as appropriate to one village in Limpopo province, South Africa, the theoretical nature of the index means that it is appropriate for modification and use in other rural

settings. This fills an important policy and practical need in terms of the growing field of climate change adaptation. Since the effectiveness of adaptations are only realized after exposure to the hazard in question, development agencies, funders and NGOs need a way of both targeting their interventions, and then monitoring and evaluating their success. By using the HSVI to rank households at the beginning of the intervention, the most vulnerable can be targeted. And then reapplying it during the intervention and afterwards shows how the relative vulnerability of targeted households changes relative to others in the location.

Case Study: 5

Title:

Exposed Social vulnerability and climate change in the US Southeast

Source:

Oxfam America Report
Oxfam America Headquarters
226 Causeway Street, 5th Floor
Boston, MA 02114-2206
(800) 77-OXFAM

Assessment framework:

The application of SoVI to climate change-related hazards was developed by Dr. Susan Cutter and Dr. Christopher Emrich at the Hazards and Vulnerability Research Institute at the University of South Carolina. The SoVI statistically examines the underlying social and demographic characteristics of the population and how they impact certain segments of the population in disabling ways when it comes to climate change-related hazards. The research uses

Method:

SoVI provides a way to measure the difference in social vulnerability across states and regions within states. The SoVI uses 32 variables to define the

multiple dimensions of vulnerability —called components—and then adds them up to arrive at a single reference point to measure vulnerability. Eight components account for most of the variation in social vulnerability in the study: wealth, age, race, gender, ethnicity, rural farm populations, special needs populations, and employment status.

Result:

The result includes a series of layered maps that depict social and climate change-related hazard vulnerability. The maps assist in identifying hotspots in the US Southeast, which are at significant risk in the face of four particular climate change-related hazards: drought, flooding, hurricane force winds, and sea-level rise. The specific region of focus is the 13-state region of the US Southeast: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia. Roughly 80 percent of all US counties that experience persistent poverty (defined as a county in which at least 20 percent of the population experiences poverty for three decades or more) lie in this region.

Case Study: 6

Title:

Climate Change Adaptation in India

Source:

Gorakhpur Environmental Action Group, Gorakhpur, UP, India, 2008

Assessment framework:

The study was carried out in 7 UNDAF states in India (Bihar, Chattishgarh, Jharkhand, Orissa, Madhya Pradesh, Rajasthan and Utter Pradesh). It was the Human Development Index (HDI) that was the basis of most of the findings of the seven states. The study focused on the impacts of climate change, adaptation and disaster risk reduction based on vulnerabilities and resilience, the National Scenario and the state level situations in the 7 states. The study identified substantial research gaps and identified many research needs. The study also identified many possible actions, experiments and demonstrations

Method:

Desk review and consultation with stakeholders for current initiatives and programmes in the seven states by various agencies including government was used.

Result:

The study brings out the following:

1. Due to climate change, the vulnerability of the poor people increases due to dependence on natural resources for their livelihood due to depletion of natural, social, financial, physical and human asset.
2. Usually Disaster Risk Reduction and adaptation focuses on the hard resilience in terms of structures but more importance needs to be given to the softer resilience in terms of skills, processes, institutions, social systems, policies and programmes. This depends on factors like flexibility, diversification, ability to learn from events, mobility, education, risk pooling, convertible assets etc.
3. The seven states have various programmes going on with focus on poverty elevation yet large portion of population are deprived of their benefits.
4. There is serious lack of vulnerability mapping in the states for planning subsequent disaster risk reduction or climate change adaptation programmes.
5. Impetus to research - Core areas of scientific and multidisciplinary research.
6. Need to develop climate change vulnerability –adaptation framework at National, State and local level.
7. Development of national adaptation framework
8. Developing multi and inter ministerial coordination
9. Upgrading the National Disaster Management Authority to deal with climate change
10. Developing regional level climate adaptation model with inter linkages of rural and urban areas.

11. State department's capacity building in coming up with state level climate change adaptation plans
12. Integrating adaptation interventions with existing programmes and policies
13. Redefining role of NGOs in increasing the adaptive capacity of the local communities

Case Study: 7

Title:

Study of changing flood and drought patterns and documentation of community coping practices in Assam

Source:

http://www.aaranyak.org/Programmes/WCP.htm

Assessment framework:

The Water Climate and Hazard Programme (WATCH) of AARANYAK .Programme has been conceived to carry out intensive scientific study of the key issues related to water and climate of the region(North east- Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura) including the human and societal dimensions of these issues. Designed initially for a period of five years (2001-2005) the WATCH programme covered activities like Comprehensive assessment of eco-systems of important river basins of the region and assessment of environmental impacts of ongoing and proposed water resources projects such as large river dams. To study the adaptation of people and communities was one of the three objectives of the study.

Method:

Case studies of different communities were done and multi layered hazard maps especially of flood and droughts were used.

Result:

Studying response to water stresses, coping mechanism and adaptation strategies that communities have practised traditionally and have improvised or developed to adjust to changing water environment in recent times yielded information and knowledge about adaptation practices necessitated by climate change impacts in the local context. In addition to the knowledge and practices systems of communities that have evolved from within the community structure, external interventions by non-Government and Government agencies such as information and knowledge input, introduction of new technology and best practices methods in water management, agriculture, disaster preparedness etc. also lead to new adaptation techniques or influence the existing ones to make them more innovative.

Case Study: 8

Title:

Assessing Local Adaptation Strategies to Climate Induced Water Stress and Hazards in the Greater Himalayan Region: A Case Study in the Eastern Assam Flood Plains of the Brahmaputra Basin in India

Source:

International Centre for Integrated Mountain Development (ICIMOD), Kathmandu

Assessment framework:

The study was carried out between July 2008 and September 2009 in five highly hazard-prone villages of Lakhimpur and Dhemaji districts of Assam. study mainly explores the ways and means through which the local communities of the study sites have so far coped with and adapted to changing nature of climate and water induced hazards like floods, flash floods, sand casting, river bank erosion, rainstorms etc. This study looks into community coping practices from the perspective of climate change adaptation.

Method:

Case studies of different communities were done and multi layered hazard maps especially of flood and droughts were used.

Result:

'Adaptation' as a means of dealing with impacts of climate change has gained extra-ordinary importance worldwide. Regions like northeast India located downstream of the Himalayan water flux, possessing delicate ecosystems rich in biodiversity as well as ethnic, linguistic and cultural diversity need special planning, policies and action programmes to empower the vulnerable communities so that people can acquire or strengthen the adaptation skills and capacities to deal with impending effects of a changing climate. Such steps must be supplemented with change in the present development paradigm to make the pursuit of development more environment and people friendly.

Thus the review of literature captures the various indicators development by different practitioners.