December 2013

IMPACT OF CLIMATE CHANGE ON LIFE & LIVELIHOOD OF DALITS

An exploratory study from disaster risk reduction lens

SPWD

Dalit Rights are Human Rights - Cast out Caste

NCDHR

A collaborative study by –

National Dalit Watch of National Campaign on Dalit Human Rights &

Society for Promotion of Wasteland Development

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Design and Print: Aspire Design | aspiredesign.in

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ABOUT THE ORGANISATIONS

THE NATIONAL DALIT WATCH (NDW) is an effort spearheaded by the National Campaign on Dalit Human Rights. It works collaboratively with organizations striving for the protection of human rights, and those particularly working for Dalit human rights, in disaster situations. Instituted in 2009, NDW has developed tools and methods to identify, expose and document caste based discrimination and exclusion in disaster management. Based on the primary evidences gathered from inclusion monitoring studies, the process of advocacy and mobilization is initiated to pressurize the state to take corrective steps, institute a policy environment that recognizes and counters such discrimination and defines entitlement of survivors in manner that makes the state accountable. NDW with its constituent Dalit rights organizations, at present, has its interventions in Karnataka, Assam, Andhra Pradesh and Odisha and advocates for recognition of caste induced vulnerabilities and inclusive programming with Humanitarian stakeholders, including the State.

SOCIETY FOR PROMOTION OF WASTELANDS DEVELOPMENT (SPWD), a national NGO since its inception in 1982 has been playing a catalytic role in reversing the process of degradation of land and other related natural resources in partnership with NGOs and grassroots institutions. SPWD's mission is *"To prevent, arrest and reverse degradation of life support systems, particularly land and water, so as to expand livelihood opportunities in a sustainable and equitable manner through people's participation"*. SPWD's focus is on obtaining knowledge from the grassroots level and influencing the larger systems, policies and programmes of the government as well as other concerned agencies. SPWD works on a range of specialist areas) – (a) Natural Resources Management (Forestry, Fisheries, Agriculture, Water Resources, Livestock) and Livelihoods (b) Climate Change Adaptation (c) Biodiversity Conservation (d) Project Design , Planning and Implementation (e) Micro Enterprises and Rural Livelihoods (f) Information & Communication Technology for Development (g) GIS, Monitoring and Evaluation and (h) Rural Infrastructure. SPWD has worked in collaborative projects with over hundred local voluntary agencies, across 17 States in 11 agro climatic zones of India.

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EXECUTIVE SUMMARY

Dalit stakes in environment are high due to their dependence on natural resources for livelihoods. Though climatic uncertainties have implications on many sectors, rural livelihoods are most affected by changes in climatic patterns. Dalits, who are highly dependent on earnings from agricultural labour and, livestock rearing dependent on forests and other common lands have fewer resources and options to combat the damages to the resource base because of climate change. The internalization of discrimination and exclusion continue to deprive them of their social, economic and political rights and opportunities. Their locational, social and economic vulnerabilities place a greater strain on their adaptive capacity to climate change and ability to deal with shocks, stresses and change.

The study by SPWD and National Dalit Watch (NDW) attempts to investigate if there is an imposition of hierarchies of caste in the event of climate change induced disasters. The study becomes significant given that climate change is more and more recognized as a global concern and available data suggests that in India it is increasing the frequency and severity of weather-related hazards. The present institutional mechanisms for disaster management do not recognise caste induced vulnerabilities. Casualties and damage or loss of properties, infrastructures, environment, essential services or means of livelihood on such a scale is beyond the normal capacity of the affected Dalit communities to cope with. Unlike indigenous communities, the state neither recognizes Dalit communities as local minority communities nor acknowledges their contribution to biodiversity conservation. Any policy or programme that does not include Dalit communities among biodiversity-dependent set of communities remains highly subcritical in adopting adaptation and mitigation measures. The study reviews the exclusion of Dalit communities in climate change adaptation programmes and policies through case studies and desk review.

As a part of the study, the issue of inclusion of Dalits in climate change discourses from the disaster risk reduction (DRR) perspective was studied in two locations in India – Assam and Karnataka. The individual case studies were done in the field areas of NDW partners - Human Rights Forum for Dalit Liberation (HRFDL), Karnataka and Rural Volunteers Centre (RVC), Assam. The position of Dalits has been set out in terms of their increased vulnerability to already degraded natural resources base such as land, water and forest because of climate change impacts, and their interest in protecting their environment for sustaining their livelihoods.

There is a need for proper state support to develop the adaptation mechanism of Dalits and support livelihood diversification strategies. Disaster risk reduction and climate change adaptation need to inform the social protection policy so the poor Dalits and other marginalized sections can be shielded from shocks and risks owing to climate change and their livelihoods protected effectively.

The study recommends that the government take up social protection initiatives for transfer of income or assets to the poor marginalized communities like Dalits to protect them against livelihood risks, as well as to enhance their social status and rights. The state and its governance institutions should specifically protect and promote the livelihood rights of vulnerable groups like Dalits during climate change induced disasters. Emphasis should be placed on taking up agricultural development programmes on a priority basis in areas with high Dalit populations.

Institutional systems for both disaster risk reduction and climate change adaptation need to be mainstreamed in the development planning processes. There is a need to implement national programs for Community-Based Disaster Risk Reduction in high-risk communities, such as Dalits. This should be preceded by development of legal and policy frameworks enabling Community-Based Disaster Risk Reduction. This should be linked with local development programmes and the national employment guarantee programme.

The participation of socially marginalized groups such as Dalits in community decision-making and program implementation has to be ensured. Climate change adaptation could involve alleviation of household vulnerability to seasonal food insecurity consumption across the food/ livelihood insecure period.

Developing practical guidance on the design and implementation of appropriate adaptation methods, taking into account the views of affected groups such as Dalits is important. There is also a need to support civil society to help the poor build voice to demand access to social protection instruments.

Given the societal processes of caste-based exclusion the state agencies should directly reach out to the Dalits and vulnerable groups, and avoid powerful interest groups in between. Specific circulars and GOs should be passed giving directions to the administration to visit and enumerate the affected people in the settlements of the Dalits and other vulnerable groups.

Civil society organizations with a record of accomplishment of working with Dalits should be involved in social audit as well as climate change adaptation and disaster risk reduction work. The state should ensure the representation of Dalit rights groups in Task Force / Committees set up by the NDMA, SDMAs and DDMAs. These agencies should do adequate capacity building of their staff on inclusion of Dalits in climate change adaptation and disaster response work.

Efforts should be made make public disaggregated data on the households affected and share of Dalits in the response programme. In the event of skewed allocation, mechanisms should be available for mid-term corrective measures. Mechanisms should also be available for monitoring the inclusion of Dalits at various levels of the administration – planning, implementation and governance of disaster management and climate change adaptation interventions. The entitlements of the Dalits should be clearly spelt out and the preparedness of the administration to reach out to Dalits and other vulnerable groups in the event of any disaster should be improved.

INTRODUCTION 1

1.1 DALIT STAKES IN ENVIRONMENT ARE HIGH

Before dealing with Dalit dependence on natural resources for livelihoods and the manner in which climate change induced disasters affect Dalits, it is important to understand the term Dalit. This section deals with this and is followed by a review of the work on Dalit environmentalism.

An important political development in India in the last few decades has been the Dalit struggle for identity and rights. Ambedkar used the term occasionally but it was "first used by Jotiba Phule in the nineteenth century"[1] to describe the oppression faced by the 'untouchable' castes of Hindu society in India. The principle of purity and pollution was central to the relations between the upper and lower castes in India and ritually impure occupations were historically associated with the Dalits. In an inequitable social order, Dalit dignity was violated in heinous ways. The term Dalit became popular in the 1960s amongst Marathi writers and neo-Buddhists. Victor Premasagar states that the term expresses their "weakness, poverty and humiliation at the hands of the upper castes in the Indian society."[2]

The term does not have a reference in the historical texts but is said to be derived from Sanskrit. It means "suppressed" or "crushed". "However, if the principle of exploitation is applied, all the socially, politically and economically oppressed sections of Indian society are Dalits. This latter formulation makes it akin to a class – like formulation, though the existence of social practice of discrimination makes Dalit exploitation more thorough."[3]

Built on an anti-caste plank, Dalit has moved beyond the framework of caste and represents a symbol of change. It is a struggle for challenging the hegemony of the upper castes. It is not a caste but an identity of the oppressed people. "Dalit identity not merely expresses who Dalits are, but also conveys their aspirations, struggle for change and revolution." (Gopal Guru, 1997)

Yet again, like most groups Dalits too are not a homogenous group, according to Mukul Sharma. Around 16.2 per cent of the population of the country is Dalit as per 2001 census.[4]

As per Sachar Committee report[5], 90 per cent of Buddhists, 9 per cent of Christians, 31 per cent of Sikhs and 22 per cent of Hindus belong to Scheduled Caste category. According to Arjun Sen Gupta Committee Report, Dalits constitute 81 per cent of India's vulnerable. The term Scheduled Castes is used in administrative parlance in India to denote the erstwhile 'untouchable' castes of India. In fact, the term Dalit was even declared unconstitutional by the National Commission for Scheduled Castes in 2008.

1 Oliver Mendelsohn, Marika Vicziany. The untouchables: subordination, poverty, and the state in modern India, 1998: Cambridge University Press, p. 4 ISBN 0-521-55671-6,ISBN 978-0-521-55671-2

2 Victor Premasagar in Interpretive Diary of a Bishop: Indian Experience in Translation and Interpretation of Some Biblical Passages (Chennai: Christian Literature Society, 2002), p. 108.

3 Priyam Manisha, Krishna Menon, Madhulika Banerjee, Human Rights, Gender and the Environment, Dorling Kindersley (India) Pvt Ltd, New Delhi, 2009

4 Scheduled castes and scheduled tribes population: Census 2001". Government of India. 2004.

5 Sachar, Rajindar (2006). "Minority Report" (PDF). Government of India.

1.2 DALIT ENVIRONMENTALISM

Dalit stakes in environment are high due to their dependence on natural resources for livelihoods. Hence there is a need to understand Dalit environmentalism. There are some like K C Das who have argued that the Dalit movement has failed to evolve its own perspective on the problem of environment. Gail Omvedt in "Why Dalits dislike environmentalists," an article published in the Hindu in 1997 says that there is alienation between the anti-caste movement and the environmental movement and discusses the reasons for this. "Indeed, reading environmentalist descriptions and Dalit descriptions of pre-British Indian villages reveals entirely different worlds. One is a world of harmony with nature, of different caste specializations resulting in sustainable filling of "ecological niches" (as Madhav Gadgil and Ramchandra Guha have put it) and non-competitive (i.e. peaceful) relations with each other, almost the autonomous "little republics" described by the British. The world is a picture of domination and tyranny, with significant sections of the village excluded even from its human membership and almost all forced into narrow fragmented lives, closer in fact to Marx's comments about the imprisonment of human minds. Mahatma Gandhi had spoken of "Ramraj" and Ambedkar of "cesspools"; the contrast between these perspectives remains as stark today as they were 50 years ago." (Omvedt, 1997) By and large, Dalit intellectuals have argued that the strengthening of the village system would only lead to the strengthening of the caste system (Viswanathan 2007)

Mukul Sharma in "Dalits and Indian Environmental Politics, EPW, 2012" argues that "Indian environmental paradigms and politics frequently conceptualized and expressed in terms of India's glorious past, often render questions of caste and Dalits invisible. However, it needs to be recognized that caste is one of the central categories that frames environmental politics. Dalit thinkers, organisations and movements have had a wider perspective and critique of environmental articulations that require deeper investigation. On the one hand, we see a caste-blindness in current environmental politics. On the other, we see Dalit views on Indian environmentalism, reflected in their works, words and movements in different parts of the country. This brings forth not only new dimensions on both environment and Dalits, but also helps us in redefining certain key categories such as development, modernity, community, livelihood and social movements."

While illuminating the ecological sensibilities of the Dalits, Mukul Sharma states that the "scholarship on environmental issues has focused on women and tribals". Sharma like Gail Omvedt discusses how mainstream Indian environmentalism is largely Brahmanical, Hindu and conservative, couched in a language of "new traditionalism" (Sinha et al 1997: 65-99). However, Sharma does not "claim in a linear fashion that Dalit attitudes to the environment are somehow "better", or to valorise them."

Kanch Ilaiah refers to secular environmentalism "as exclusive, devoid of any concerns and relationship with the builders of the environment" and argues that "it is not bothered about the nationalist and hegemonic social structure that Brahmanism has built." (Ilaiah quoted in Mukul Sharma)

Some Dalit intellectuals such as Chandrabhan Prasad have argued that the living standards of many Dalits have improved since the economic liberalisation in 1991 and have supported their claims through large qualitative surveys. The arrival of Dalits at the world of capitalism as expounded by the Dalit Chamber of Commerce (DCC) has serious implications on the environment. Gopal Guru in "Dalits in globalising India: Limits of 'mobile millionaire'" wonders if this will "address the mammoth question of Dalit destitution? To what extent this arrival would address the question of Dalit who for example are involved in trash collection and scavenging? Dalits constitute the majority of the population that is counted below poverty line." Guru makes a case for "transformative politics that is normally built up around the language of rights, social justice and equality across all the spheres".

THE STUDY BACKGROUND

2

The National Dalit Watch (NDW) of National Campaign on Dalit Human Rights (NCDHR) has over the last few years uncovered how during a series of natural and human induced disasters, Dalits by virtue of their inherent socio-economic vulnerabilities have been systematically excluded from relief and rehabilitation efforts across the South Asian region, particularly India. Their representation is abysmally low when it comes to recovery and rehabilitation in the aftermath of disasters.

"Committed to the United Nations Framework Convention on Climate Change, the Government of India developed the National Action Plan on Climate Change (NAPCC), agreeing to operate on the principle of 'Protecting the poor and vulnerable sections of society through an inclusive and sustainable development strategy, sensitive to climate change', among other principles. However, it is seen that caste blind laws/authorities in India have fallen short of recognizing Dalit communities as contributors and conservers of nature. Moreover, non recognition of the peculiar caste induced vulnerabilities of Dalits has resulted in discrimination in disaster response and risk reduction programmes." (NCDHR, 2012)

This study becomes significant given that climate change is more and more recognized as a global concern and available data suggests that in India it is increasing the frequency and severity of weather-related hazards. The country is increasingly vulnerable to it and uncertainties in climatic variability have become a major challenge for sustaining agriculture and other rural livelihoods, in the face of an already declining natural resource base.

The country owing to its geo-climatic conditions is also faced with a high degree of socio-economic vulnerability making it one of the most disaster prone countries in the world. "India is considered highly vulnerable to climate change, not only because of high physical exposure to climate-related disasters (65 percent of India is drought prone, 12 percent flood prone, and 8 percent susceptible to cyclones), but also because of the dependency of its economy and majority of population on climate-sensitive sectors (e.g. agriculture, forests, tourism, animal husbandry and fisheries)." (A Framework for preparation of the State Level Action Plans on Climate Change, MoEF, 2010)

Though climatic uncertainties have implications on many sectors, rural livelihoods are most affected by changes in climatic patterns and will be increasingly vulnerable in the future as these variations affect natural resource base on which rural livelihoods are directly dependent. The study attempts to investigate if there is an imposition of hierarchies of caste in the event of disasters. Dalits, who are highly dependent on earnings from agricultural labour and, livestock rearing dependent on forests and other common lands and, have fewer resources and options to combat the damages to the resource base because of climate change. The internalization of discrimination and exclusion continue "to deprive the Dalit community of their social, economic and political rights and opportunities" (Unnati, 2012). Their locational, social and economic vulnerabilities place a greater strain on their adaptive capacity to climate change and ability to deal with shocks, stresses and change. Their pre-existing vulnerabilities are compounded in the event of disasters like floods and droughts, which the country is increasingly susceptible to in the context of climate change.

The present institutional mechanisms for disaster management , viz. National Disaster Management Policy, National Disaster Management Act, 2005 and related guidelines, do not recognise caste induced vulnerabilities (ex-

cept a passing reference to caste in the DM Act Chapter XI: Miscellaneous[6]). Casualties and damage or loss of properties, infrastructures, environment, essential services or means of livelihood on such a scale is beyond the normal capacity of the affected Dalit communities to cope with. Unlike indigenous communities, the state neither recognizes Dalit communities as local minority communities nor acknowledges their contribution to biodiversity conservation. Any policy or programme that does not include Dalit communities among biodiversity-dependent set of communities remains highly subcritical in adopting adaptation and mitigation measures. The study reviews the exclusion of Dalit communities in climate change adaptation programmes and policies through case studies and desk review.

Of the five major sub-groups of disasters categorized in India, we have taken one major sub-group "water and climate related disasters" for the purposes of the study.

6 "Prohibition against discrimination: 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."

IMPACT OF CLIMATE CHANGE

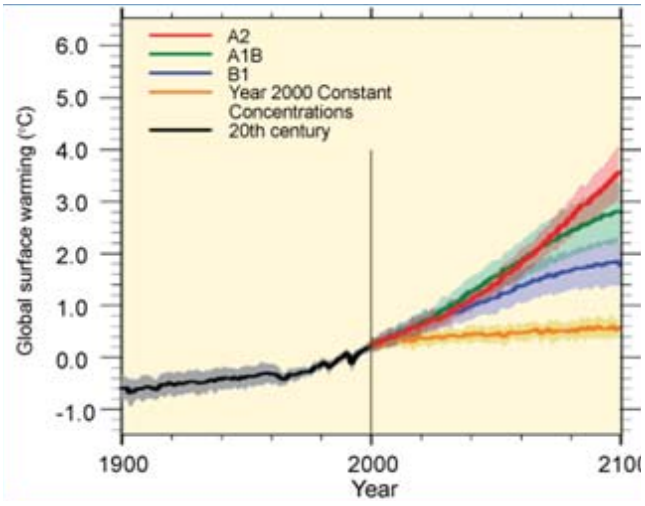
3

Climate change is leading to increase in temperatures, rising sea levels, decreased snow cover, increase in the frequency and severity of some weather events etc.[7] The UN Framework Convention on Climate Change (UNFCCC) refers to climate change as a change that is attributable directly or indirectly to human activity that alters the composition of the global atmosphere in addition to the natural climate variability observed over comparable periods of time (IPCC 2007b)[8]. "Climate change mainly refers to a statistically significant variation in either the mean state of the climate persisting for an extended period, usually decades, or in its variability."[9]

The earth's temperature is expected to increase by 1.8-4 degree Celsius by the turn of the century owing to increase in greenhouse gas emissions if one were to go by the estimates of the Inter-Governmental Panel on Climate Change (IPCC).[10] IPCC had also estimated that during the period 1906 to 2005, the earth's temperature has increased by 0.74 degree Celsius.[11] Scientists have used proxy data[12] inferred from the cores of oceans sediments based on which they indicate that mean global temperatures are 2 to 3 degree Celsius warmer than pre-industrial temperatures.

Temperature simulations for the twenty first century are being done by many. "Results from a wide range of climate model simulations suggest that our planet's average temperature could be between 2 and 9.7°F (1.1 to 5.4°C) warmer in 2100 than it is today."[14] This unprecedented increase is expected to have severe impacts on the global hydrological system, eco-systems, sea level, crop production and related aspects (Sathaye, J. et.al, 2006).

Figure: Projected scenario of climate change[13]



Though there are natural climatic variations, human activities are being considered the primary driver according to IPCC.[15] Climate change impacts are conceived in terms of sensitivity and vulnerability. IPCC points toward the discernible increase in greenhouse gases like carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (NO_2); the combined effect is an increase of seventy per cent during the period 1970 to 2004. This increase in CO_2 is mainly due to fossil fuel use and land use changes, while that of CH_4 and NO_2 is due to agriculture.

7 IPCC, "Summary for Policymakers", Direct Observations of Recent Climate Change, in IPCC AR4 WG1 2007.

8 http://unfccc.int/essential_background/convention/background/items/2536.php

9 http://www.who.int/globalchange/climate/summary/en/index13.html

10 http://www.ipcc.ch/publications_and_data/ar4/syr/en/main.html

11 IPCC 2007

12 Jansen *et al.,* "Chapter 6: Palaeoclimate", Sec. 6.3.2 What Does the Record of the Mid-Pliocene Show?, in IPCC AR4 WG1 2007.

13 IPCC (2007) Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007 M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (eds) Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

14 Herring, D. (March 6, 2012). "Climate Watch Magazine » Global Temperature Projections".NOAA Climate Portal.

15 Albritton *et al.*, "Technical Summary", Box 1: What drives changes in climate?, in IPCC TAR WG1 2001

It should be noted that "over the next several millennia, projections suggest that global warming could be irreversible."[16] According to Meehl *et al*[17] "even if emissions were drastically reduced, global temperatures would remain close to their highest level for at least 1,000 years." Parties to international convention like United Nations Framework Convention on Climate Change (UNFCCC) have pledged to deal with the situation, however.[18]

In light of the above, climate change which poses a greater challenge to the developing countries in the global south is increasingly recognised as a global concern. Available data suggests that in India it is increasing the frequency and severity of weather-related hazards. This is all the more important given that more than seventy per cent of the country's population relies on agriculture directly or indirectly. The country owing to its geo-climatic conditions is also faced with a high degree of socio-economic vulnerability making it one of the most disaster prone countries in the world.

3.1 IMPACT OF CLIMATE CHANGE ON AGRICULTURE

India with its fifteen agro-climatic zones, diverse crop seasons and farming systems is very prone to climate change. Agriculture will on the one hand contribute to climate change and on the other will be impacted by it. As against global average of 13.5 per cent, the agriculture sector in India contributes 28 per cent to the total GHG emissions from the country.

Increased uncertainties in climatic variability have become a major challenge for sustaining agriculture as well as its allied sectors in the face of already declining natural resource base. Agriculture is the main livelihoods system of most of our people and along with allied sectors like livestock and fisheries, contributes to twenty five per cent of the country's Gross Domestic Product. India's food production is likely to be affected by the climate sensitivity of its agriculture. This in turn will impact on poverty and livelihoods.

Climate change is likely to destabilize the agricultural production in India. According to Ninan et al "agricultural productivity is sensitive to two broad classes of climate-induced effects - (1) direct effects from changes in temperature, precipitation, and carbon dioxide concentrations (2) indirect effects through changes in soil moisture and the distribution and frequency of infestation by pests and diseases."[19]

With climate change droughts and floods are becoming more frequent and intense leading to crop failures. Various studies in India, observe an increasing trend in temperature. All this showed that yield would increase if temperature remained unchanged and CO_2 levels increased. However, with increase in temperature, the CO_2 effect is nullified for increase in temperature as low as 0.90 degree Celsius. IPCC projections for South Asia indicate a rise in temperature of 0.5 to 1.2 degree Celsius by 2020, 0.88 to 3.16 degree Celsius by 2050 and 1.56 to 5.44 degree Celsius by 2080 for the various emission scenarios. Estimates[20] indicate that there will be lesser rainfall in the subtropics while the equatorial and sub-polar region will show an opposite trend. Dry regions will become drier and wet regions wetter.

The Indian Meteorological Department (IMD) and Indian Institute of Tropical Meteorology (IITM) estimate that rainfall will increase by 15 to 40 per cent while mean annual temperature will increase by 3 to 6 degree Celsius by 2100. It should be noted that projections of future climate changes at the "regional scale do not hold as high

16 Solomon, S., *et al.* (January 28, 2009). "Irreversible climate change due to carbon dioxide emissions".Proceedings of the National Academy of Sciences of the United States of America (PNAS) (US National Academy of Sciences) 106 (6): 1704. Bibcode:2009PNAS..106.1704S.doi:10.1073/pnas.0812721106. PMC 2632717.PMID 19179281

17 Meehl, G.A., *et al.*, "Ch 10: Global Climate Projections",Sec 10.7.2 Climate Change Commitment to Year 3000 and Beyond to Equilibrium, in IPCC AR4 WG1 2007

18 "Article 2", The United Nations Framework Convention on Climate Change (UNFCCC) (UNFCCC)

19 K N Ninan and Satyasiba Bedamatta, Climate Change, Agriculture, Poverty and Livelihoods: A Status Report, Institute for Social and Economic Change, Bangalore, 2012

20 NOAA (February 2007), "Will the wet get wetter and the dry drier?", GFDL Climate Modeling Research Highlights (Princeton, NJ, USA: National Oceanic and Atmospheric Administration (NOAA) Geophysical Fluid Dynamics Laboratory (GFDL)) 1 (5).

a level of scientific confidence as projections made at the global scale."[21] Temperature will probably increase more in rabi (winter) than in kharif (monsoon) season and this will be more pronounced in north India. Rainfall will increase in all months except December to February, when a plunge is expected. "In general, low-latitude areas are at most risk of having decreased crop yields."[22] "Agronomic models of climate sensitivity indicate that higher temperatures are likely to be harmful in many developing countries where the climate is marginal, water is inadequate, and temperatures are high (Rosenzweig and Parry 1994; Reilly and others 1996)".[23]

There are links between climate change and biodiversity and conserving biodiversity and restoring degraded ecosystems is necessary as ecosystems play a key role in the global carbon cycle and in adapting to climate change. Not only that they provide wide range of ecosystem services that are essential for the livelihood systems of biodiversity dependent communities such as Dalits. Genetic variability is on the decline because of the problem of habitat fragmentation. Conservation and management strategies that maintain and restore biodiversity can be expected to reduce some of the negative impacts from climate change.

21 US NRC (2008). Understanding and Responding to Climate Change. A brochure prepared by the US National Research Council (US NRC). Washington DC, USA:Board on Atmospheric Sciences and Climate, National Academy of Sciences.

22 Schneider et al, "Chapter 19: Assessing Key Vulnerabilities and the Risk from Climate Change", Sec. 19.3.2.1 Agriculture, in IPCC AR4 WG2 2007, p. 790.

23 Robert Mendelsohn and Ariel Dinar, Climate Change, Agriculture, and Developing Countries: Does Adaptation Matter? The World Bank Research Observer, vol, 14, no. 2 (August 1999), pp. 277-93.

IMPACT OF CLIMATE CHANGE ON DISASTERS

4

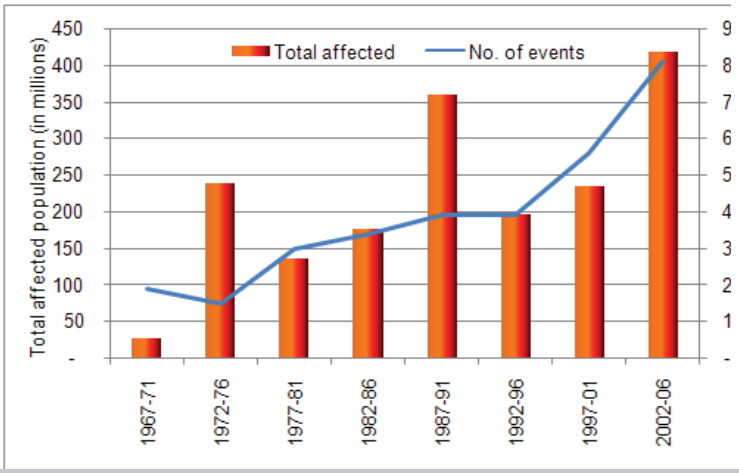
India is among the ten top disaster prone countries of the world and is vastly susceptible to floods, droughts and other disasters. Different parts of the country are prone to specific disasters. While the Himalayan region and the plains adjoining it are prone to disasters like earthquakes, landslides and floods, Peninsular India is known to be more stable. Floods and droughts owing to extreme weather conditions are common though. They are closely associated with the nature of Indian monsoon and its inter-annual fluctuations lead to devastating floods and droughts. Almost 58.6 per cent of the landmass is prone to earthquakes of moderate to very high intensity; over 40 million hectares (12 per cent of land) are prone to floods and river erosion; of the 7,516 km long coastline, close to 5,700 km is prone to cyclones and tsunamis; 68 per cent of the cultivable area is vulnerable to drought and hilly areas are at risk from landslides and avalanches. (ibid) Out of the 68 per cent area which is drought prone, 33 per cent which receives rainfalls between less than 750 mm is considered to be chronically drought prone while the rest that receives annual rainfall in the range of 750 mm and 1125 mm is considered drought prone.

The recession of the glaciers, decrease of rainfall is likely to have adverse impact on water availability. At the same time, there will be increased flooding in certain areas owing to climate change. This will threaten food security and have adverse impacts on natural ecosystems and biodiversity that sustain the livelihoods of rural households.

“Increasing demographic pressure, deteriorating environmental conditions, deforestation, unscientific development, faulty agricultural practices and grazing, unplanned urbanisation, construction of large dams on river channels etc. are also responsible for accelerated impact and increase in frequency of disasters in the country.” (Disaster management in India, NIDM)

“Due to the vast size of the country, the number of disaster events and as well as the losses (death, total affected, and economic loss) are high for India when compared to other south Asian region countries.” (Abhilash Panda, 2011)[24]

Reported disasters and total population affected in India during 1967 – 2006; Abhilash Panda, 2011



24 “Descriptions of National Institutions and Policies - Climate Change Adaptation and Disaster Risk Reduction Institutional and Policy Landscape”

Disasters are likely to become more unpredictable, frequent and of higher magnitude because of climate change. The fourth Assessment Report of Inter-governmental Panel on Climate Change (IPCC) notes, “Climate change is expected to increase the frequency and intensity of current extreme weather events and give rise to new vulnerabilities with differential spatial and socio-economic impacts on communities.” This will severely affect the hydrological cycle leading to extreme events such as droughts, cyclones and floods.

Developing countries like India would be adversely affected; within this, the poor vulnerable communities that are not resilient to disasters will have to bear the brunt. It is well known that poverty and disaster risk are linked and poorer people are the worst sufferers during disasters. Poor are compelled to occupy marginalized spaces because of inadequate land reforms and encroachment of commons by powerful sections. Even when they try to conserve natural resources around them they are pushed further by all kind of ‘development’ activities. They are compelled to ‘encroach’ or ‘exploit’ vulnerable spaces such as steep slopes or flood plains, where they are made to live an insecure life, finding it difficult to eke out the bare minimum necessities. They have to often migrate out leaving their families on unsafe locations/ shelters during disasters. Climate change induced disasters will disrupt community livelihoods, health, education and damage housing and infrastructure of the vulnerable sections.

It is, therefore, important to look at the legislative and regulatory framework at national level related to climate change. The section below provides an overview of the institutional set-up related to disaster risk reduction as well as climate change adaptation and the need for convergence.

INSTITUTIONAL SET-UP FOR DISASTER MANAGEMENT

5

Instead of traditional classification of disasters as natural and human induced, a more modern and social understanding of disasters views it as resulting from the action or inaction of people and their social and economic structures. (Disaster management in India, NIDM) In India, an urgent need is felt for a paradigm shift in disaster management, from a relief centric one to holistic one given the context of changing climate. Institutional mechanisms need to be strengthened for this. A step towards improving response capacity was by preparation of the vulnerability atlas, the constitution of a High Powered Committee in the late 1990s and setting up of a disaster management cell under the Ministry of Agriculture. A series of disasters like the Latur earthquake and the declaration of 1990s by the UN General Assembly as the "International Decade for Natural Disaster Reduction (IDNDR) was the immediate trigger. The disaster management division was shifted under Ministry of Home Affairs (MHA) in 2002 and the National Disaster Management Framework prepared by it in 2003.

The National Disaster Management Act, 2005 was enacted following which the National Disaster Management Authority (NDMA) was set up. The National Disaster Management Act, 2005 recommended institutional mechanisms for monitoring the implementation of disaster management. It also provided for prevention and mitigation of disasters and prompt-response to any disaster situation. It also made it mandatory for States to have a similar structure at the State and district levels. It was only in the Tenth five-year plan (2002-2007) that the need to consider disaster risk as a development issue was stressed. Development projects now require a certification regarding measures taken to ensure risk reduction to secure funding approvals. In sum, the Relief departments in the state were replaced with Disaster Management departments, Disaster Management Authorities. Not only that the outdated Relief Codes were replaced by Disaster Management guidelines/ codes.

The National Disaster Management Policy was declared in 2009.This policy document addresses the concerns of all the sections of the society including differently abled persons, women, children and other disadvantaged groups in terms of granting relief and formulating measures for rehabilitation of the persons affected by disasters. The issue of equity and inclusiveness has been accorded due consideration. However, it does not have specific mention of Dalits.

An Expert Group and later on a Working Group was set up in the Planning Commission (2012-2017) to mainstream Disaster Reduction Risk (DRR) efforts and make them more efficient. National Institute for Disaster Management (NIDM) was established under the Act to do research work. Furthermore, National Disaster Response Force (NDRF)[25] has been set up for response purpose. The States have also been advised to set up their own Specialist Response Force for responding to disasters. While the State Governments may have created the institutional structures, their functioning is far from desirable as evident from the recent disaster in Uttarakhand. The State has begun to look at issues such as early warning systems, monitoring and forecasting of weather based hazards. The disaster management framework also has very clear-cut hierarchical four-tiered structure (centre, state, district and local) now in terms of flow of information, in the form of warnings, alerts and updates regarding the hazard. The District Disaster Management Authority has an important role in planning, coordination

25 The NDRF has been created by up-gradation/conversion of eight standard battalions of Central Para Military Forces i.e. two battalions each from Border Security Force (BSF), Indo-Tibetan Border Police (ITBP), Central Industrial Security Force (CISF) and Central Reserve Police Force (CRPF) to build them up as a specialist force to respond to disaster or disaster like situations.

and implementation of disaster management. The District Authority also has the power to examine the construction in any area in the district to enforce the safety standards and also to arrange for relief measures and respond to the disaster at the district level. Specific Ministries have been assigned as nodal bodies for specific disasters. However, in most States the structure seems to be evolving while the old structure (National Crisis Management Committee) continues.

For water and climate related disasters the institutions like Indian Meteorological Department (IMD) and Central Water Commission (CWC) play an important role as they provide information on the weather and climatic parameters and the potential hazards and threats to the Disaster Management Authority. They also play an important role in disaster planning activities – flood donation and flood plain management in case of CWC, and hazard mapping and database generation in case of IMD. They are provided weather based satellite data and help in undertaking use mapping and hazard zoning by the organizations under the Department of Space. Since its inception, NDMA has so far released various disaster specific and thematic guidelines.

Salient features of the disaster management guidelines issued are as follows:-

Management of Floods: The guidelines aim at measures for preparedness, prevention, mitigation in the pre-flood stage and on prompt and effective response, relief and recovery during and post flood stages. Importance on non-structural measures besides structural measures is emphasized in the guidelines. Setting of basin-wise organisations for flood management and also for setting up a National Flood Management Institute for training, education and research are suggested in the guideline.

Preparation of State Disaster Management Plans: The aim of the state DM plan is to ensure that the components of DM are addressed to facilitate planning, preparedness, operational, coordination and community participation. The guideline suggests outlays for preparation of the plan to include the state profile, vulnerability assessment and risk analysis, prevention measures, mainstreaming DM concerns into developmental plan and programme projects, preparedness measures, response and partnership with the other stakeholders besides providing for financial arrangement.

Medical Preparedness and Mass Casualty Management: A Mass Casualty Event (MCE) is an incident resulting in a number of victims large enough to disrupt the normal course of emergency and health care services. The guidelines for MCE focus on all aspects of medical preparedness and mass casualty management with emphasis on prevention, mitigation preparedness, relief and medical response etc. They aim to develop a rigorous medical management framework to reduce the number of deaths during MCE.

Incident Response System: These guidelines provide directions and guidelines to central ministries and the states for an effective and well-coordinated response. They suggest a multi-disciplinary and systematic approach to guide administrative mechanisms at all levels of the government with scope for participation of private sector, NGOs, PRIs and communities to work together seamlessly in the response activities. The guidelines are applicable to the management of all incidents - natural or human-made.

Management of Dead in the Aftermath of Disaster: These guidelines are aimed at institutionalising the standard procedure for proper management of dead bodies and animal carcasses in the aftermath of disasters.

INSTITUTIONAL SET-UP FOR CLIMATE CHANGE ADAPTATION

6

India has an elaborate institutional set-up off late for addressing the issue of climate change impacts. However, this set-up is most recent and has seen action only recently following the setting up of the National Action Plan on Climate Change (NAPCC). In order to translate the national policy imperatives and adapt to State-level actions, it has also tried to work on building the capacities of stakeholders at both national and State levels. States have been provided support the preparation of State Action Plans on Climate Change (SAPCCs). A Technical Cell is also being supported on Climate Change at the Ministry of Environment and Forests (MoEF) for coordinating the preparation of SAPCCs and capacity building activities at various levels. Furthermore, budget has been earmarked under the Five-year plans, Global Environment Facility (GEF) and other financing windows.

Timeline	Institutional set-up of climate change adaptation in the country
Before 1990	Acts like Air (Prevention and Control of Pollution) Act 1981, Environment (Protection) Act, 1986 & Forest (Conservation) Act, 1980 though not targeted to address climate change facilitated some degree of mitigation.
1992	India became a party to UNFCCC, Vienna Convention, acceded to Montreal Protocol and established the Ministry of Non Conventional Energy Sources.
1994	Ministry of Environment & Forests (MoEF) becomes the nodal authority for all climate change related activities in the country.
2002	India ratified the Kyoto Protocol.
2004	First National Communication to UNFCCC was submitted in 2004
2007	The 11th Five Year Plan for 2007-2012 recognized that a substantial adverse change in climate appears unavoidable, and stated that achieving rapid economic growth as targeted in the Plan is a key element in adaptation.
2008	Government of India created an Advisory Council on Climate Change, chaired by the Prime Minister to guide on matters relating to coordinated national action on the domestic agenda and review of the implementation of the National Action Plan on Climate Change (NAPCC) including its R & D agenda. The council coordinates national action for assessment, adaptation and mitigation of climate change. The NAPCC outlines existing and future policies and programs addressing climate mitigation and adaptation. The Plan identifies eight core "national missions" running through to 2017. The institutional structure comprises of the Prime Minister's Council on Climate Change to which the coordination unit for implementation of NAPCC reports to.
2010	The MoEF launched the sectoral assessment, INCAA report which looked at the trends and as well projected changes to various sectors until 2030. India's primary focus is on "adaptation", with specific niches for "mitigation".

Budgetary analysis of allocations for climate change adaptation

A study by the Centre for Budget Governance and Analysis has in an Oxfam supported study suggested that the "expenditure on adaptation estimated by the study across all the sectors for adaptation stands at 1.7 per cent of GDP for 2006-07 which is in wide variance with the estimation put forward by the government at 2.6 per cent of GDP for 2006-07. For the four financial years (2006-07 to 2009-10) reviewed, expenditure on adaptation increased from 1.7 per cent of GDP in 2006-07 to 2.68 per cent of GDP as per 2009-10 budget estimates." The expenditure analysis was done based on nine broad areas of concern around 146 schemes and programmes that address adaptation needs in India. These nine areas were a) poverty alleviation, livelihood and food security; b) land development, drought proofing, irrigation and flood control; c) health improvement and disease control; d) risk financing; e) water resource management, f) coastal and marine resources management; g) agriculture and allied services; h) forestry and biodiversity conservation; and i) disaster management.

The study finds that the increase in expenditure between the years 2006-07 to 2009-10 is "largely buoyed by the increased allocation in certain areas in the sector of poverty alleviation, for e.g. the National Employment Guarantee Scheme allocation in which has more than doubled. There has also been a significant rise in the allocation within the sector of land development, drought proofing and flood control, specifically on account of the programme Integrated Watershed Management Programme (IWMP)."

In general the study finds that "sectors that are crucial to any adaptation interventions such as food security, health, rural and urban housing for the poor, and infrastructure for education have received inadequate attention from policymakers in India. These critical sectors need to be integrated into the country's adaptation policy network and the policies and budgets for adaptation need to be embedded as an intrinsic part of the policies and budgets for poverty reduction programs."

Also, "the budgetary measures on adaptation seem to be skewed towards poverty alleviation, the policy statements on existing initiatives on adaptation and the proposed national missions are silent on how poverty alleviation should be integrated into the adaptation framework and its linkages with other sectors can be established. Sectors that are crucial to any adaptation intervention such as food security, rural and urban housing for the poor and educational infrastructure have received inadequate attention in the policy response on adaptation."

There is a need to analyse how the programmes/ schemes meant as adaptation measures to address vulnerabilities to climate change reach the vulnerable sections like Dalits.

7 THE NEED FOR CONVERGENCE BETWEEN DISASTER RISK REDUCTION AND CLIMATE CHANGE ADAPTATION AND INCLUSION OF DALITS

Dalits and other socially and economically vulnerable sections are especially vulnerable to climate change because of their resource location/ geographic exposure like land ownership in riverine flood prone areas or rainfed drought prone areas. Their low incomes and greater reliance for their livelihoods on climate sensitive sectors, like agriculture, livestock etc further aggravate the situation. Because of their limited adaptive capacity, Dalits are least able to cope with the most severe climate-related hazards.

Dalits and poverty

It may be observed that as against 27 per cent of all population living below the poverty line in the rural areas in 1999-2000, 36 per cent of SC population and 46 per cent of ST population lived below the poverty line. There was a decline in the poverty ratio of 27 per cent for all population, 25 per cent for SCs and 12 per cent for STs as compared to 1993-94. This implies that the poverty ratio declined faster for all population than for SCs and STs. The poverty ratio among the SCs and STs is higher than that for the other sections of the society.

Percentage of population below Poverty Line (all India and the two Case study States)

	Rural			Urban		
States	Scheduled Castes	Scheduled Tribes	All population	Scheduled Castes	Scheduled Tribes	All population
Assam (For 1993-94)	45.38	41.44	45.01	14.34	7.11	7.73
Assam (For 1999-2000)	44.00	38.73	40.20	19.99	2.70	7.47
Karnataka (For 1993-94)	46.36	37.33	29.88	61.59	62.05	40.14
Karnataka (For 1999-2000)	26.22	25.49	17.36	47.01	51.37	25.25
All India Total (For 1993-94)	48.11	51.94	37.27	49.48	41.14	32.36
All India Total (For 1999-2000)	36.25	45.86	27.11	38.47	34.75	23.65

Source of data: Report of the Task Group on Development of Scheduled Castes and Scheduled Tribes

While determining the criteria for rural development and poverty alleviation programmes, it is suggested that appropriate weightage should given to SC and ST population in different States and districts.

In this regard, given the widespread poverty among Dalits greater social protection[26] to them as a response to the various risks and short and long-term shocks and stresses associated with climate change needs to be recognised. Climate change exacerbates levels of vulnerability for poor and excluded people like Dalits, who are dependent on subsistence agriculture and has negative fallouts on their food and livelihood security. Because agriculture is linked to seasonality, the risks of doing it are embedded in the agricultural practices undertaken by the people who have developed coping and adaptive mechanisms.

At the same time, with climate change negatively impacting rural livelihoods, a large chunk of the poor communities like Dalits are forced to migrate to urban areas and migration becomes a favored "adaptation strategy". Though migration may be an accumulative strategy and some rural agricultural labourers may in the aftermath of a climate change induced hazard use it to shift from the agricultural to non-agricultural sector, most people especially the chronically poor people end up doing causal labour work in urban fringes often in hazardous environments.

There is a need for proper state support to develop peoples' adaptation mechanism and support livelihood diversification strategies. Further, the differentiated social impacts of climate change based on gender, caste, class, ethnicity etc., need to be understood better. Disaster risk reduction[27] and climate change adaptation[28] need to inform the social protection policy so the poor Dalits and other marginalized sections can be shielded from shocks and risks owing to climate change and their livelihoods protected effectively.

The potential adaptation benefits of social protection have been highlighted in an OECD paper (see the Table below).

Social Protection category	Social Protection instruments	Adaptation and Disaster Risk Reduction benefits
Protective (coping strategies)	- social service provision - social transfers (food/cash), including safety nets - social pension schemes - public works programmes	- protection of those most vulnerable to climate risks, with low levels of adaptive capacity
Preventive (coping strategies)	- social transfers - livelihood diversification - weather-indexed crop insurance - social insurance	- prevents damaging coping strategies as a result of risks to weather-dependent livelihoods
Promotive (building adaptive capacity)	- social transfers - access to credit - asset transfers or protection - starter packs (drought/flood-resistant) - access to common property resources - public works programmes	- promotes resilience through livelihood diversification and security to withstand climate related shocks - promotes opportunities arising from climate change
Transformative (building adaptive capacity)	- promotion of minority rights - anti-discrimination campaigns - social funds - proactively challenging discriminatory behaviour	- transforms social relations to combat discrimination underlying social and political vulnerability

Source: Climate Change Adaptation, Disaster Risk Reduction and Social Protection, Mark Davies, Katy Oswald, Tom Mitchell, OECD, 2009

26 Here social protection is referred to not from an instrumentalist perspective but from rights based angle.

27 Disaster Risk Reduction (DRR) describes the development and application of policies, strategies and practices that minimise vulnerabilities, hazards and unfolding disaster impacts throughout a society in the broad context of sustainable development

28 Climate Change Adaptation (CCA) is about reducing the risks posed by climate change to peoples lives and livelihoods (DFID, 2006)

CASE STUDIES

8

As a part of the study, the issue of inclusion of Dalits in climate change discourses from the disaster risk reduction (DRR) perspective was studied in two locations in India – Assam and Karnataka. The individual case studies were done in the field areas of NDW partners - Human Rights Forum for Dalit Liberation (HRFDL), Karnataka and Rural Volunteers Centre (RVC), Assam. The work of these partners suggests that discrimination is entrenched and continues to be widely practiced in rural areas. The case studies have attempted to supplement this understanding with observations from the ground and discussions with stakeholders.

The position of Dalits has been set out in terms of their increased vulnerability to already degraded natural resources base such as land, water and forest because of climate change impacts, and their interest in protecting their environment for sustaining their livelihoods. The study looks at the impacts of changes on different areas of biodiversity/ natural resource based livelihoods of Dalits in rural areas. It tries to highlight the plight of Dalit's in the context of climate change induced disaster situations and makes a case for inclusive community-centred disaster risk-reduction projects. It brings out the hidden issues of exclusion and raises voice for inclusive development. The case studies helped understand the local context and how Dalits respond when disaster strikes and what are their specific vulnerabilities. Their systematic exclusion from relief and rehabilitation efforts in the event of disasters such as droughts and floods has been studied. The idea is to make the government bodies and other development agencies aware of their roles and responsibilities for inclusive development.

8.1. CASE STUDY: ASSAM

This case study discusses climate change induced vulnerabilities on people in Assam and how this impacts the Dalits and Tribals more than others. In particular, it discusses the Assam flood of 2013 and the impacts of it on the poor Dalits and their exclusion from government support/relief. It also looks at the reasons why Dalits are unable to adapt to the climate change induced vulnerabilities and makes a case for state intervention to address the issue.

8.1.1 THE PROBLEM OF FLOODS IN ASSAM

Annual floods between the months of May and August wreak havoc in the valley of the Brahmaputra River in the north-eastern State of Assam. People lose their homes, livelihoods and frequently their family members. If we look at the scale of floods, as much as three-fourths of the State's districts are faced with it annually. The peak discharge in the Brahmaputra River varies significantly from year to year. As per Central Water Commission records, the flood affected area ranged from 4.22 million hectares in 1988 to a low of 0.19 million hectares in 1961. As per the Government of Assam estimates, around 0.475 million hectares equivalent to 19.1 per cent of the Net Area Sown is chronically flood prone in the State.

The history of flood occurrences in Assam indicates that after 1950, floods occurred in Assam in '54, '62, '66, '72, '74, '77, '78, ' 84, '86, '87, '88, '89, '90, '91,'92, '93, '94, '95, '96, '97, '98, '99, '2000, 2011, 2012 and 2013 and is still continuing.(NIC, n.d.) Therefore, floods are not a new phenomenon and many flood based disasters have occurred through the years including the washing away of around half of the town of Dibrugarh in

1954. Floods caused havoc in 1986 in Nagoan district. In 2000, the floodwaters rose as high as 30 feet. This year (2013), 350 villages in 11 districts of Assam were flooded in June-July affecting around 1.1 lakh people. The catchment areas in Arunachal Pradesh received heavy rainfall leading to floods in the Jiadhol River in particular. The waters rose and inundated areas in the district of Dhemaji in Assam. The Brahmaputra flowed above the danger level at Nematighat too in Jorhat district. Its tributaries that flowed above the danger mark are Burhidehing in Dibrugarh district, Desang in Sibsagar and Jia Bharali in Sonitpur. This led to submergence of 6000 hectares of agricultural land and consequent destruction of standing crops mainly paddy.

The River Brahmaputra

Assam, the land of the red river and the blue hills is surrounded by hills and plateau. Brahmaputra, the very soul and essence of North East originates from Mansarovar near Mount Kailash in China where it is known as Yarlung Tsangpo, and then takes a Great Bend or a U-turn before entering India in Arunachal Pradesh where it is called Siang. In Arunachal Pradesh, the river passes through deep gorges, rapids and cascades.

In the fern-shaped Brahmaputra basin, the excess rainfall immediately translates into runoff in the tributaries, which flow into the mainstream of Brahmaputra in a short time leading to floods. The river has a drainage area of 580,000 square kilometres. The river with 28 Northern tributaries and 16 southern tributaries gains volume only after its tributaries- the Dibang and Lohit meet it. After this, the river has an average width of 10 km making it one of the widest rivers in the world. It passes through the fragile Eastern Himalayas, which are comprised of unconsolidated sedimentary rocks marked by heavy erosion. At the Great Bend, just before it enters India, the river shows the world's highest loss of channel gradient (2500 m over a distance of only 200 kms). The reddish tinge of the river water is because of it being the highest sediment load-carrying river in the world. Lot of soft rocks and debris are carried by the fast flowing river that is deposited on the way before reaching Bangladesh. The sediment deposition leads to reduction of channel capacity resulting in catastrophic flooding in downstream areas. This happens to be a very dynamic and complex fluvial system of the world.

Studies indicate that the severity of floods has increased over the period and that "the floodwaters which inundated an area for just few days (*earlier*) continued to remain flooded for several weeks (*now*) causing water logging and damage to crop. This also led to (*increased*) health hazards. Erosion and siltation too have shown a rapid increase. In recent years, the impact of climate change and weather variability on aggravating the situation has been scientifically established. After 1950, floods have been continuously occurring in the State." (Suparana Katyaini) As per Prof. Samudra Dev Phukan[29] "Floods in Assam showed much lesser magnitude of record prior to 1950 … the magnitude increased with time and frequency of flood increased."

8.1.2 FLOODS IN THE BRAHMAPUTRA VALLEY

In Assam, with the onset of the monsoon, the majestic Brahmaputra and its major tributary Barak River's turbulence inundate most of the area. Floods are a way of life here. There is not a good deal of historical material on floods in the Brahmaputra, and floods as a 'problem' appear to be a phenomenon of recent origin. The people take the river for granted. Every monsoon during the period June-September, the Brahmaputra river experiences severe floods that cause extensive devastation in the Assam valley and adjoining Bangladesh. Extremely large magnitude and high frequency characterize the floods in the Brahmaputra basin. During the last few decades, there were heavy floods in Assam almost every alternate year.

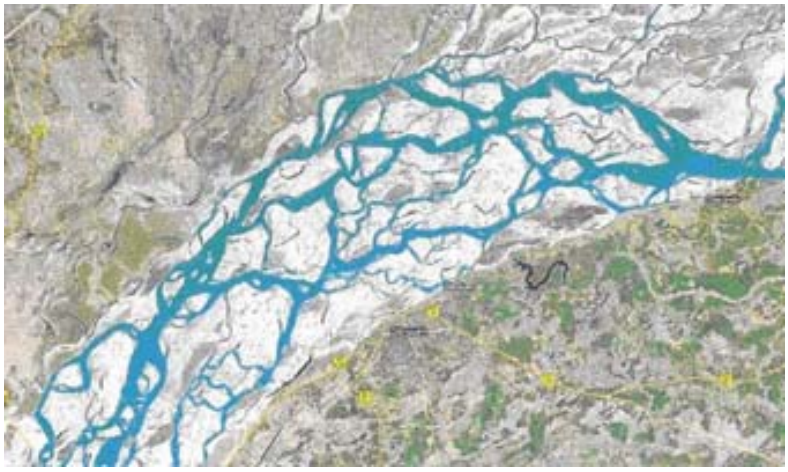
The banks of the river are prone to erosion. The river and its tributaries are braided and change their course every now and then. They do so mainly because of the enormous amount of sediments they carry down the steep hill slopes, which they deposit in the riverbed downstream. The south bank of the river especially upstream of Dibrugarh, where the river enters the plains from the hills is more prone to erosion than the north bank.

The fragile hills in the Brahmaputra basin are prone to major landslides that are getting aggravated due to wide-ranging deforestation, mining in the catchment, rampant construction of embankments and roads and cutting

29 Floods - The annual mayhem in Assam: A technocrat's viewpoint, undated

of hill slopes. The top soil in the catchment areas has loosened and gets washed away during the rains. The spate of dam construction in Arunachal Pradesh for generating hydroelectricity is also leading to adverse consequences during floods.

Braided channels of Brahmaputra



Source: http://www.brahmaputragroup.org

The river changes its course every now and then. It faces the complex problem of flood management, bank erosion and drainage congestion. It is prone to channel migration and is a classic example of a braided river. The river and its tributaries change their course frequently mainly because of the enormous amount of sediments they carry down the steep hill slopes and deposit in the riverbed downstream. The channels get filled up and new courses develop in the subsequent monsoon, and the earlier ones are abandoned.

The seismic instability of the still rising Himalayan region aggravates the problem. The bed of many rivers like Brahmaputra, Dibang, Subansiri etc., got raised by as much as 22 cm (Brahmaputra) following the earthquake of 1950. The beds of several ox-bow lakes and swamps that acted as reservoirs of excess water too got raised. This rise of the bed reduced the volume of water the river channels, lakes and swamps could carry thereby choking them and increasing the chances of floods.

The area is faced with unexpected changes in climate leading to greater floods that impact people. Much of the lasting damage to agricultural fields here was through the dumping of alluvial sand carried by the water. At the same time, there were large tracts in the area, which continue to remain waterlogged.

8.1.3 FLOOD AFFECTED COMMUNITIES IN DHEMAJI

The flood affected communities here are extremely poor. The area mainly comprises of the impoverished communities of Assam like Hajong, Mishing, Sonowal, Bodo, Dewri, Koibarta, and Mallahs. The Schedule Tribe and Schedule Caste population of Dhemaji is 47.29 per cent and 5.33 per cent respectively of the total population. The urban population is just 1.85 per cent while the literacy rate is 41.69 per cent and the female literacy rate is 13.6 per cent. As per NIC, Dhemaji “in general there is a huge chunk of Other Backward Classes (OBC) population comprising of Ahoms, Chutiyas, Konches etc.”

Discussions in the field revealed the occupational and caste structure of the village and the changes in the pattern of land-use caused by the flood. The better lands in the higher areas have been consolidated by well off sections while the lands near the river banks belong to the Mishing Tribal community or the Dalits. In terms of caste composition, most of the households affected by the floods are from Mishing Tribes, Bodo Tribes, Dalits followed by Other Backward Castes. Among the tribes, Mishing households are the most numerous and con-

stitute over a quarter of the total households. Most farmers work on small and marginal farms and the average size of holdings has been falling. The small size of farms, traditional farming methods combined with low levels of mechanisation are significant factors accounting for the low productivity.

Most of the Dalit households reported no education, high rates of unemployment, high engagement as agricultural labour as well as migration outside Assam following the floods every year. Most members of the households who leave at the time of the flood come back to the village every year. Where lands remain uncultivated after the floods, employment effects are high. Most of the households reported that they were not beneficiaries of various state-sponsored poverty programmes.

8.1.4 DOES CLIMATE CHANGE HAVE A BEARING ON THE OCCURRENCE AND INTENSITY OF FLOODS IN ASSAM?

Experts predict that with global warming, the melting of Himalayan glaciers will become faster leading to larger inflows of water into the Brahmaputra. The Brahmaputra basin will be faced with floods and high sediment loads which will block the drainage system with silt, sedimentary rocks, sand, and mining debris.

The State Action Plan on Climate Change, 2012 – 2017, Department of Environment & Forest, Government of Assam has observed the climate variability trends for Assam. The region is characterized by high rainfall but analysis of long-term trends in the annual rainfall indicates a slight decline in the total rainfall received in the region (Das, 2004; Mirza *et al.*, 1998; Tiwari, 2006, ASTEC, 2011).

The pre-monsoon and post-monsoon thundershowers are very dominant over this region due to orography and the humidity available for convection. Kandalgaonkar et al 2005 state that over the North Eastern region the probability of association of thunderstorm with rainfall is quite high when compared to other regions. Also months with high rainfall have been observed to have more number of thunderstorms. Thunderstorms in post-monsoon season have been observed to be with higher intensities than during the pre-monsoon season.

Jamir et al (2009), show that the chances of prevalence of high floods have been observed when monsoon rainfall has been high over Assam. The region has experienced increase in the annual mean maximum temperatures, with increase at the rate of +0.11°C per decade and annual mean temperatures at a rate of 0.04°C per decade in the region. Study by Rajendran et al (2008) showed that the monsoon variability is well represented in the baseline and the future changes over the region shows reduction in rainfall over the Assam region for SRESA1B scenario, whereas the extreme events were found to increase.

Kumar et al 2006, in their study using the PRECIS (Providing Regional Climate for Impact Studies) model showed that the temperature are likely to increase by 2.5°C- 4°C in A2 over the Indian region, with pronounced warming over the Northern and north eastern parts of India. The percentage increase in rainfall is also suggested to increase over the Assam region during 2080s when compared to 2030s and 2050s.

As per Indian Network for Climate Change Adaptation (INCCA) Report, 2010 -

- The annual temperatures are set to increase from a minimum of 26.8 degree C to a maximum of 27.5 degree C in the 2030s The rise in temperature with respect to the 1970's (climatology) shows a range between 1.7 to 1.8 degree C
- Seasonal temperature for all the three QUMP (Quantified Uncertainty in Model Projections) simulations also projects a rise from 1.5 to 2.2°C, with the monsoon months of June, July, August and September showing maximum rise amongst all the seasons
- The mean annual rainfall is projected to increase in the region and found to vary from a minimum of 940±149mm to 1330 ±174.5 mm.
- Rate of increase in rainfall over Assam while projected to increase, is projected to be slightly lesser when compared to the state of Arunachal Pradesh and some parts of North Assam adjoining Arunachal Pradesh.

- On an overall the number of rainy days is projected to decline in Assam, but intensities would increase.
- Changes in rainfall patterns and its increasing variability in the future may have some regions experiencing scarcity of rainfall and others an increase. Drought like conditions might prevail given the climatic variations expected.
- Projected increase in rainfall, rainfall intensities and accelerated summer flows may produce more frequent conditions of floods, flash floods in the Brahmaputra valley.

With climate change, induced higher temperatures the risk of heat stress in the crop cycle will increase leading to requirement of irrigation. Farmers in the state have been adapting to climate change induced disaster situations like floods and droughts. In Assam, to ward off the damage caused by floods to kharif paddy people have shifted to irrigated summer paddy. Year to year people keep switching crops between these two seasons in anticipation of floods. People are more and more shifting to winter vegetables.

The State Action Plan on Climate Change, 2012 – 2017 suggests that drylands crops be given greater thrust and rice area reduced, because rice is a huge source of methane - a greenhouse gas. It also recommends switching over to more C4 plants to increase carbon fixation as well as higher biomass production, adoption of very short duration crops to escape flood/drought, special package of practices for C3 plants like System of Rice intensification (SRI) and varietal selections, sowing time (due to phonological changes), crop rotations, type of tillage operations (minimal tillage, zero tillage, use of rotavators, etc.), water harvesting (watershed management, conservation of traditional water bodies, boundary cropping in smaller field plots etc.).

8.1.5 ADAPTING TO CLIMATE CHANGE IN AGRICULTURE IN THE FLOOD PLAINS OF BRAHMAPUTRA, ASSAM

Agriculture in Assam has grown at a pace slower than the rest of the country, even when it holds huge potential for development of agriculture and allied sectors such as horticulture, fishery and livestock. Located in the foothills of the eastern Himalayas, and in the middle reach of the river Brahmaputra and Barak, the State has an uneven topography, full of hills, plains and rivers. Assam presents a unique geophysical unit spanning the Eastern Himalayan Region and the floodplains of Brahmaputra and other rivers. The State is one of the wettest as well as most acutely flood prone zones of the world. It ranks 14th and accounts for 1.7 per cent of India's total emissions. The State is very prone to climate change impacts and the vision for its development should consider this aspect.

Assam has a rice based farming system that frequently involves pisciculture and rearing of animals/small ruminants, poultry, and piggery. Rice is grown mainly in the kharif season at many places, as a single crop followed by fallow during rabi season. This leaves a possibility of taking a second crop of oilseeds, pulses or vegetables during the rabi season using the residual soil moisture. Wheat, maize, sugarcane and jute are the other important crops in Assam. Summer rice is on the rise under shallow tube wells.

In spite of the fact that the state has fertile soil and a climate conducive to agriculture, during the southwest monsoon season the Brahmaputra and other rivers create new channels and flooding. Wetlands too have a limited possibility of containing floodwaters as they have been encroached leading to decrease in retention capacity of water bodies. The state is very vulnerable to natural hazards such as floods, riverbank erosion, landslides and cyclonic storms. The state receives more than 3000 mm of rainfall in the Brahmaputra valley and surrounding areas and at places water logging is a problem. The geological formations in the state are easily erodible; this increases river expansion and greater sediment flow in the river channel. Around 93 per cent of the area of the state is prone to floods. Frequent floods in the state lower the productivity in the agricultural sector and lead to huge damages to crops, cattle, houses and other utilities. Some other critical problems for the agriculture sector in Assam are "low seed and varietal replacement rates, deteriorating soil health and ground water, high humidity and low shelf life etc." (SAPCC, 2012)

Status of Dalits in Assam as per caste-wise Census, 2001

As per 2001 census, Scheduled Castes (SCs) constitute 6.9 per cent of the total population of Assam. There are sixteen (16) notified SCs in the state and SCs have registered 10 per cent decadal growth of population in 1991-2001. In Dhemaji the percentage of SCs to total population of the District is 5.3 per cent.

The literacy rate among the SCs is 66.8 per cent in Assam, which is above the aggregated national figure for SCs (54.7 per cent). The percentage of SC workers to total population (work participation rate - WPR) is 34.4 per cent, which is lower than the aggregated average for SCs at national level (40.4 per cent). Of the total workers, 74.8 per cent have been recorded as main workers and 25.2 per cent as marginal workers.

The female WPR is only 17.3 per cent, which is lower than their male counterparts (50.3 per cent). The majority of workers among males are main workers (85.4 per cent).

Of the total main workers among SCs, 32.7 per cent have been recorded as cultivators, 8.1 per cent as agricultural labourers, and merely 5.1 per cent in the category of household industry. The remaining more than half of the total main workers (54.1 per cent) have been returned as 'other workers' outside agriculture and household industry.

Of the eleven major SCs in Assam, Namasudra, a traditional cultivating caste, registered 41 per cent cultivators of their total main workers, Hira, who are hand-made potters by their traditional occupation, have recorded the next highest 36.2 per cent cultivators. On the other hand the percentage of cultivators among Muchi (14.9 per cent) is low. But, Muchi have registered a high of 10.5 per cent agricultural labourers among them.

8.1.6 EROSION POSES A GREATER THREAT THAN FLOODS

While floods are an annual phenomenon and submerge land and houses for some time, erosion causes more damage. Agriculture suffers extensive damage, especially the kharif paddy crop. While some shift is being made by the local people to focus on rabi crops, the adjustments to the crop calendar are insufficient so far. The flood-ravaged and erosion-prone region has a very fragile agricultural economy as a result. People are alienated from their lands and have to migrate to faraway places in southern India like Karnataka and Kerala. Their families left behind are compelled to live along the embankments.

The district of Dhemaji lies in the North Bank Plains and is faced with a decline in agricultural productivity owing to flood induced sand deposition. Discussions also point to the fact that embankments are also breached by the Irrigation Department at times to protect the oil installations in the south bank such as Dighboi. The catchment in the area in north Assam receives heavy annual rainfall (on average 3,500 mm).

The area is normally under paddy crop. The other important crops grown in the area are rapeseed, mustard and sugarcane. The increased content of sand following the floods affects the water retaining capacity of the soils thereby reducing crop productivity. Soil quality, an important factor that contributes to farm productivity is getting increasingly adversely affected owing to floods in north Assam, an area where floods have traditionally been used to upgrade the soil quality traditionally. This problem is not given much significance in policy discourse and gets ignored.

A study by Kalyan Das under which soil tests were done in 346 agricultural plots in the Jiadhal basin of the Dhemaji district points to high concentrations of coarse sand, low pH, low organic carbon and nutrients. As per the study, some 39 per cent of the plots tested had sand concentrations greater than 70 per cent. The annual damage costs from sand deposition in the study area are estimated to range from INR 690 to 1845 per hectare as per the study. "Satellite imagery from 1999 reveals that over 11,247 hectares have been rendered unproductive by sand deposition in the district (National Resource Management Foundation, 2006). Further, between 1992 and 2004-5, "the net sown area in the district decreased by about 11 per cent (7,689 hectares) and fallow and uncultivated land increased by 35 per cent (8013 hectares) (GoA, 1996 and 2008)." (In Kalyan Das, 2012)

While floods are known to deposit fertile silt on the crop fields, they sometimes carry high sand content also. Sandcasting on the croplands is a major problem. In Dhemaji, houses have been affected by it. The picture shows a house being reclaimed.

These sand deposits are found mostly along the tributaries of Brahmaputra: Jiadhal, Gainadi and Simen Rivers. Kalyan Das in his study area in 15 sample villages in Dhemaji district found that nearly 83 per cent of the total paddy acreage faces sand deposition. This has implications in terms of not only productivity losses but also biodiversity losses. Based on his observations of the massive piling up of sand in paddy fields in the Jiadhal basin area of upper Brahmaputra valley during a visit in 2004, Kalyan Das says that floods now carry relatively heavy bed sediments. The deposition of finer silts over these silts helps reclaim land to some extent. Goswami and Das (2003) have identified shifting cultivation, rampant tree felling for commercial purposes, and the extraction of boulders in the upstream mountain valleys as the reasons for the accelerated rate of sedimentation. Many blame that the sand deposits are caused by release of excess water from hydroelectric projects.

Simen River changes course in Somkong, Dhemaji

Simen River, which flows through the middle of Dhemaji district, originates in the west Siang district of Arunachal Pradesh. It is joined by Nanyel River in the left side and Jatë, Juri and Igorivers along the right side, during its almost 30 km journey downstream due southwest. Simen takes a southward turn before its confluence with Dipa or Sinyen River and later with Nikbum River. It is a braided river and bifurcates into two streams. The main channel flows southward while the other channel takes an eastward turn. It enters a marshy land after being divided into three parts.

In June 2013, the study team witnessed the change in course of the River at Somkong village. Twenty-nine of the forty-eight villages in the Gram Panchayat had been affected. The proposed channel cutting work worth 5.95 crore had been opposed by the people in the other bank as they feared adverse impacts. The side, which got affected now, would have been protected had the channel been cut.

Prominent indigenous communities like Mishing (ST), Bodo (ST) and Raba (ST) communities, mostly inhabit these 29 villages. People at the relief camp in Somkong said they get rice, dal and salt for 2-3 days and compensation of Rs. 2000-3000 per household every year during the floods. This is highly inadequate. They are promised seeds for rabi season but generally do not get it on time. At times, they have to make their own relief camp over the embankments. While, schemes exist for compensation for damage to their homes, they do not get anything. As per National Disaster Response Fund (formerly known as Calamity Relief Fund) guidelines, they are entitled to compensation but do not get that. Some people had tried to resettle in Arunachal Pradesh but GoAP broke their homes and they had to flee.

Flood affected people took refuge at a relief camp at High School, Somkong, Dhemaji. More than 35 villages in Dhemaji were completely submerged, and several thousands of people had shifted to higher ground. Around 1500 people have been provided shelter in seven relief camps in Dhemaji and Chirang districts. Floods have also affected the Pobitora Wildlife Sanctuary and Kaziranga National Park. Several roads and bridges have been washed away in the flood-affected areas.

Dhemaji has mostly well drained deep alluvial soil with sand and clay present in varying proportions. Lowlands have heavy clays with high organic content. Crops here need to be appropriate for wet conditions. While soil scientists claim that paddy cultivation is possible on silted land, even with high sand content, a higher content of sand generally leads to lower productivity of the soil.

Discussions on the economic background of the families indicate that most households own between 1 to 2 hectares of land. The mean annual income from agriculture was very low. Most people are pushed out to migrate for non-farm jobs in the area such as casual labour (NREGA), road construction, weaving and livestock rearing. Kalyan Das too in his study in Dhemaji notes that the proportion of outmigration form the area is higher than the rest of the country. “This decline in agricultural income has triggered large scale migration of residents to distant places such as the plywood and rubber factories of Kerala and private security service jobs in Tamil Nadu. In fact, most out-migrations in the sample were either to destinations outside the district (26 per cent) or to those outside the state (55 per cent).” (Das) The study has also shown a significant negative correlation between sand deposit and outmigration. Therefore, flood damage acts as an important push factor in migration.

Structural measures implemented by the Government flawed

The government is constantly looking for structural solutions like the construction of embankments, digging of canals and providing sluice gates to release the floodwaters to deal with the very issue of floods and erosion in the river. It is also building sand and boulder spurs, structures meant to deflect floods at spots where bank erosion takes place. Embankments were built after the fifties following the Central Government’s decision to construct these for flood control.

Nearly 200 kms of embankments was constructed until mid fifties, which had grown to 4000 km by late eighties. By this time, the problem of breaches in embankments had surfaced. Experience shows that embankments relocate the problem from the upstream to downstream areas because high floodwaters exert heavy pressure on the embankments whose weaker parts get washed away and inundate downstream areas. These interventions fail to deliver positive results. During the fieldwork, the study team witnessed the floods due to breakage of Jiadhol embankment at Narkhuan village.

Nowadays geosynthetic bags are used as spurs by the government. There are not many studies or pilots to corroborate the usefulness of controlling erosion through these bags. At the same time, the government has not paid adequate attention to the construction of raised platforms near the settlements of flood-prone areas for humans and livestock to take shelter during high floods.

The embankment leads to high flood level within the embanked area, resulting in rise of riverbeds with consequent reduction of fertility of land behind the embankment. In case of a reach, the floodwater submerges the surroundings sometimes with devastating potential. Drainage congestion is a major problem due to construction of embankment even after the floodwater has receded. Water in the surrounding areas does not have an outlet.

8.1.7 ADAPTING TO CLIMATE CHANGE EFFECTS IN FLOOD-PRONE AREAS IN DHEMAJI

In Dhemaji, like in the rest of Assam, to cope with floods the government has taken up structural measures like construction of embankments, digging of canals, providing sluice gates to release floodwaters and building sand and boulder spurs at spots where bank erosion takes place. High floodwaters exert heavy pressure on the embankments whose weaker parts get washed away and inundate downstream areas.

The government has not paid adequate attention to construction of raised platforms near the settlements of the flood prone areas so humans and livestock could take shelter during high floods. The Government of Assam is also working on relief operations and mitigation activities. Over forty embankments and dykes have been constructed in Dhemaji as per District Disaster Management Authority.

People here are into one time paddy cultivation mostly in rabi season. Apart from the local structural measures like changghars, banana rafts, local people also opt for non-structural measures like cropping pattern shifts, crop diversification as adaptation measures. Post floods people try cultivating different varieties of paddy. Some people also plant deep-water rice that is resistant to flooding. All said and done, flood proneness acts as a hin-

drance in promoting productivity enhancement measures in kharif season. Alternative crops and vegetables are also grown on subsistence scale. Locals said that they keep falling into the poverty trap that limits their risk taking abilities. People also opt for alternate livelihoods like sericulture, driftwood business, daily-wage labour (farm and nonfarm), fishing, and migration to cities for labour work. Migration to Bangalore, Chennai, Guwahati, Shillong and Mumbai is common. There is an overall livelihood crisis in the area because of floods as well as sand deposition. Those who continue in agriculture have meagre earnings and a hand-to-mouth existence. Agriculture in the area has got weakened because of widespread migration, says Niku Bharali of Amtola Pokadol village in Lakhimpur district. Livestock too has very poor productivity of about 1-2 litres of milk a day. Besides, whatever milk is produced cannot be marketed in the absence of a collection centre.

People have shifted to summer rice in the floodplains in the area. At times cultivators plant indigenous varieties of summer rice and deep-water rice. As per a paper by K C Talukdar et al[30] the "crop has shown high productivity in the medium land at higher level of technology, which needs repeated application every year." The process has posed threat to the marginal and small farmers who are resource-poor. The study has analysed the growth and stability of summer rice and economics of its cultivation in the flood-prone districts of Assam. It has been observed that summer rice has grown faster than autumn and winter rice during the past four decades. Irrigated High Yield Varieties (HYV) summer rice in the medium land is costly to cultivate but is more productive at higher level of technology. Yield advantage of summer rice has been found to be higher than that of autumn and winter rice. High cost and low product price, land degradation due to over-use of chemical fertilizer, high cost of irrigation, prevailing market distortion, and lack of short-duration photo-insensitive varieties have been identified as main constraints for summer rice cultivation in the non-traditional areas. Absence of strong linkage between commodity and money market has been found in the rice producing areas for marginal and small farms like those belonging to the Dalits.

Because of sandcasting, people cannot do agriculture for six to ten years. A news report in AlertNet "India: Water changes driving large-scale migration in Assam" by Amarjyoti Borah, March 2010 states that "Over half a million people living near the Brahmaputra River in the north-eastern Indian state of Assam are gradually migrating to other areas as worsening floods, drought and sand intrusion into agricultural land force them from their jobs and homes, research and advocacy groups in the area say." Fishermen too have been affected and forced out of riverside livelihoods.

"A government estimate says about four lakh hectare agricultural land - 7% of the state's 78,523 sq km area - has been lost due to erosion since the 1950s. As a result, pressure to expand cultivation area is mounting in

Channels shift so abruptly in Dhemaji that the entire district can be considered a flood plain of a river. Bunds are being used as a flood protection measure here through support of RVC and NREGA programmes.

Constructing bamboo porcupines is common as a flood protection measure in Dhemaji on river Subansiri

30 Cultivation of summer rice in the flood plains of Assam – An assessment of economic potential on marginal and small farms

order to sustain the livelihoods of the 80% of Assam's populace that is agriculture dependent." [Land-related tension on the rise in flood-prone Assam, Naresh Mitra, TNN Sep 17, 2011] Reports also suggest that there have been land-related fight between tribals and non-tribals because of increasing shortage of farmland that has infused a sense of land-alienation in the tribals and other marginalized communities.

Rural Volunteers Centre's work on flood warning systems

Rural Volunteers Centre (RVC), a Akajan, Dhemaji based NGO has been working since 1990 in the flood prone areas with communities and strengthened village level institutions for forecasting and coping with floods. Their focus has been on developing alternative livelihoods of the flood affected people and addressing their health and shelter issues. Alternative crops suited for cultivation during the non flood months have been introduced. Creeper varieties of vegetables and pig rearing have been able to generate good incomes in the area.

Rural Volunteers Centre has worked on designing adaptation strategies at local as well as at community level to flood hazards induced by climate change in the Brahmaputra basin. The traditional local short and long-term responses evolved from their culture, customs and beliefs have been taken into consideration. The organization has developed a network – River Basin Friends of 6,000 volunteers and has been active in the upper stretches of the Brahmaputra and Barak basin. They have worked on developing simple technologies for measuring river levels, land contours and rainfall.

Local community managed mechanisms for data-sharing and facilitation of accurate flood warning systems have been put in place. The model developed by Rural Volunteers Centre bases itself on the approach of "living with floods". The early warning network system was set up by the Duryog Pratirodh Samiti (Disaster Preparedness Committee) to predict the flash floods. Rural Volunteers Centre put in place forty points on the banks of Brahmaputra and its five tributaries in Dhemaji as well as Lakhimpur where village level volunteers take regular readings.

The volunteers are equipped with walkie-talkie (earlier) or mobile phone (now), a rain gauge, a river water level gauge, a torch, and sometimes, a bicycle. They pass on the data to the central team at Rural Volunteers Centre where analysis of the data is done and villages likely to get flooded warned in advance to save lives and to reduce property and livestock losses. The information is also sent to several downstream districts in India and even to five districts in Bangladesh. "Local evacuation teams, rescue teams, and disaster management teams are alerted through communication networks, giving populations adequate time to save lives and to reduce property and livestock losses...The Rescue Team comprises volunteers trained for rescue missions, including operating and navigating speed boats and handling minor repairs. They are equipped with mobile phones, high-power rechargeable torches and first-aid medical kits. Ravi is training villagers to make low-cost life jackets from empty plastic mineral water bottles typically thrown away." (http://india.ashoka.org/fellow/ravindranath)

8.1.8 CONCLUSION AND POLICY IMPLICATIONS

Though climate change will affect people of all ages, race, religions and social status it has specific caste-related impacts. This is largely because the Dalits particularly from the Das caste who we interacted with during our fieldwork, are highly dependent on earnings from agricultural labour, livestock rearing and other labour that forests and common lands provide. They also have fewer resources and options to combat the damages to this resource base when compared to other castes. In fact, they had migrated from Bipariya Majuli after the Bikramnadi floods in the 1960s. During flood relief works, they continue to be deprived of their social, economic and political rights and opportunities. Their lack of connect to public spaces and access to formal and informal social networks acts as a major problem. They got affected more negatively than the other communities because of their lesser ability to deal with shock, stress and change.

Unlike the Mishing tribes, Dalits do not have elaborate coping mechanisms in case of flood hazards. Their pre-existing vulnerabilities compound in the event of disasters like floods, which the region is increasingly susceptible to in the context of climate change. Vulnerability depends in large part on the assets available - physical, financial, human, social and natural. The more the assets, the less vulnerable a person is. Dalits tend to have more limited access to resources that would enhance their capacity to adapt to climate change - including land, credit, agricultural input, decision-making bodies, technology and training services. Furthermore, social, eco-

nomic and political barriers limit their adaptation capacity. During disasters, their opportunity for wage employment declines. Declining food production due to climate change has turned entire populations, particularly men in the Dalit dominated village into migrants. The Dalit women are left behind and are vulnerable to greater sexual harassment. They would have to bear the double brunt of caste and gender; men are more equipped to handle situations of extreme distress as compared to women.

Given the specific context of Dalits, there is a need to strengthen their social security. Efforts should go towards effective implementation of wage employment and rural development programmes. Instead of random short-term structural measures to deal with erosion and floods, an integrated approach is required. Their vulnerabilities need to be properly assessed and the local Dalit and other marginalised people should be empowered. Strengthening of existing institutions is essential for this. There is a need to assess the available adaptation strategies used by people and develop interventions that have the least adverse impact on the environment and society. There is a need to promote to health centers and mobile medical clinics: both inland as well rivers i.e., ambulance in ferries for islands and chapories.

Because climate change has adverse impacts on rural livelihoods and especially on long-term opportunities for the poor Dalits, it is important that the state apart from providing immediate relief should effectively facilitate long-term adaptation. Since a climate change induced disasters like flood produces different landscapes (waterlogging, sandcasting, flooding etc.,), different types of adaptation strategies are required in making the land productive again.

Since labour is the greatest asset of Dalits and other poor people, the fall in labour demand in the event of climate change induced disasters will impact them most. NREGS can act as a stabilization scheme in providing work to the rural poor at a time when they had lost their usual source of employment. Public distribution system as well as the food and cash transfers through the emergency relief fund set up following the flood should work effectively. The case study highlights the importance of the need for social security.

8.2. CASE STUDY: KARNATAKA

The study team visited Bijapur in north Karnataka and had discussions with the district NGO Federation - Human Rights Forum for Dalit Liberation (HRFDL). We met Peter Alexander who works with the network and is also a former member nominated by the Government of Karnataka for the District Environmental Clearance Public Hearing Committee. This case study deals with how misguided and unwise development projects pursued by the government leads to greater disaster risks.

Traditional tanks in Bijapur

Bijapur, earlier called Vijayapur (city of victory) is known for its traditional water harvesting systems. This medieval walled city served as the capital for the AdilShahi dynasty for over two centuries during their reign. Known for the colossal mausoleum – Golgumbaz put up three and a half centuries back whose glory the Archeological Survey of India today has resurrected as a heritage to attract visitors. There is a need for a relook at the traditional water management systems like baudies (famous being Chand baudi and Tajbaudi), talabs and gunjs wherein demand was met effectively with well developed water conservation, storage and distribution structures. Many of these engineering designs are time tested and have withstood a higher population pressure than today.

According to Peter Alexander "The ill-conceived development projects in Bijapur have made the city vulnerable to both floods and droughts. Bijapur was hit with severe floods in 2009 and continues to suffer with drought as a perpetual hazard in the region. In the past, it was a city with a series of natural flowing lakes and water reservoirs, for example, Dam of Ramaling Temple, Begaum Talab and hundreds of such reservoirs. The valuable historical reservoirs, river beds, lakes, and ancient wells are misused for the real estate business."

The reserved forest lands are in total danger due to the dilapidating groundwater table. The use of inorganic manure is causing grave damage to the soil, besides being unaffordable by the poor communities. Dalits

and Adivasis, dependent on aquaculture and agriculture are hardest hit with lack of irrigation facilities and depletion of lakes. In addition to the abovementioned, there is a rise in suicidal deaths and loss of properties." (Peter Alexander, 2012)

Status of Dalits in Karnataka as per caste-wise Census, 2001

As per 2001 census, Scheduled Caste (SC) population constitutes 16.2 per cent of the population of Karnataka. The Scheduled Castes and Scheduled Tribes Order (Amendment) Act, 1976, has notified 101 SCs in Karnataka. This state has the highest number of SCs notified and living compared to other states/UTs of the Country. Two of the SCs namely, Adiya and Bant have been notified with area restriction. Adiya have been notified in Kodagu district only and Bant in Belgaum, Bijapur, Dharwad and Uttar Kannada districts. Of the 101 SCs, Adi Karnataka, Madiga, Banjara, Bhovi, Holaya, Adi Dravida and Bhambi together constitute 85.0 per cent of the SC population of the state.

The growth rate of SC population in the decade 1991-2001 at 16.2 per cent is higher in comparison to the overall 17.5 per cent of the population of the state as a whole. The work participation rate (WPR) of the state SC population is 46.3 per cent in 2001 Census, which is higher than 44.7 per cent reported in 1991 Census. In WPR, Karnataka SCs have sixth position amongst the States in the country. The WPR for male has been 54 per cent and for females 38.4 per cent in 2001 Census. At individual caste level, the WPR varies from the highest 48.5 per cent among Madiga to the lowest 41.6 per cent among Adi Dravida.

There has been a decline in the main workers from 92.6 per cent in 1991 Census to 78.4 per cent in 2001 Census. This has resulted in corresponding increase in the marginal workers from 7.4 per cent in 1991 to 21.6 per cent in 2001. Out of total workers, 'agricultural labourers' constitute 43.8 per cent, which is lower than 1.8 percentage points when compared to 45.6 per cent registered at national level SC population. 'Other workers' accounts for 33.1 per cent and only 20.5 per cent have been returned as 'cultivators'. Remaining 2.5 per cent have been workers in 'household industry'. At the individual caste level, Bhambi have recorded the highest 63.1 per cent agricultural labourers, followed by Madiga (57.9 per cent) where as the lowest 20.4 per cent has been registered in case of Adi Dravida.

8.2.1 IMPACT OF CLIMATE CHANGE IN KARNATAKA

Karnataka is the second most vulnerable State in India to be impacted by Climate Change as the north Karnataka regions have the arid and driest regions (Ravindranath, 2011). This is likely to affect natural resources adversely. As per the Karnataka Climate Change Action Plan[31], the vagaries of the weather – drought and floods are going to play havoc on the livelihood of farmers. The Green House Gas emissions in Karnataka are around 4 per cent of the national emissions while the State accounts for 5.83 percent of the total area of the country. Most of the north Interior Karnataka districts like Bijapur experience lowest (<5mm/day) seasonal mean rainfall in a climatological sense, the report says. The report discusses the current climate variability in Karnataka using the India Meteorology Department (IMD) daily rainfall data for the period of 1971 – 2005 and CRU data for the temperature for the period 1901-2002. It says that the minimum temperature goes up by as much as 2.4 to 3.3 degree Celsius in the winter months (November to February). The maximum temperature goes up by as much as 2.7 degree Celsius in June and November. The average daily maximum temperature is projected to go up to as much as 41.3 degree Celsius in the month of May. This may be detrimental to various crop systems and natural ecosystems.

Past data indicates that there is considerable decrease in precipitation over the Coastal and North Interior Karnataka districts (like Bijapur) during the period 1951-2004. A steady warming trend is observed in both the minimum and maximum temperature over Bijapur, Gulbarga and Raichur. Most of the areas in the state are projected to experience a warming of 1.8 to 2.2 degree Celsius.

The report also makes projections for the frequency of drought incidences in the future (2021-2050), compared to the baseline (1961-1990). In the kharif season, most northern districts like Bijapur are projected to have an increase in drought incidences by 10-80 per cent. In the rabi season, drought frequency is projected to increase in most of the eastern districts of the state. The western parts of the State are projected to have more rainfall

31 Karnataka Climate Change Action Plan, submitted by Bangalore Climate Change Initiative – Karnataka (BCCI-K) to Government of Karnataka, May 2011

and hence less number of droughts in the rabi season. The assessment of climate change scenario for 2035 indicates that the estimated 2.1 °C rise in mean temperature and a 4.5 per cent increase in mean precipitation would reduce net agricultural production in the state by 2.5 per cent for the State as a whole.

The agriculture in interior North Karnataka districts like Bijapur show benefit to a small extent from warming and the indicated gain in productivity is up to 35 per cent in some crops. Bijapur in particular lies in the Northern Dry Zone where the area is under rainfed cotton, wheat and sorghum. These crops are indicated to show higher productivity in the event of climate change. Bijapur falls in Krishna river basin; the principal tributaries of Krishna in Karnataka are Ghataprabha, Malaprabha, Bhima and Tungabhadra. An important issue facing the people here is the construction of large dams like Almatti and Narayanpur on the River Krishna. In a study done on Krishna river basin by Bouwer *et al.* (2006) it was observed that climate variability varied the runoff by 6-15 per cent while the construction of reservoir on the river decreased the runoff by 61 per cent. For rabi season, a decline in rainfall is projected for most districts in the Krishna basin. Runoff is not expected to increase significantly, especially for Bagalkote and Bijapur districts where a decline in runoff is predicted.

In sum, climate change impact assessment indicates increased moisture stress in Krishna basin, especially in the north-eastern districts. The water yield analysis indicates an increase in average water yield in the Krishna basin. The water stress in Krishna basin would be much higher and farmers residing in the Krishna basin may suffer reduced crop yields.

Floods are likely to increase and disrupt agricultural production and cause damage to infrastructure. Also, climate change is predicted to reduce yields of maize and sorghum by up to 50 per cent. It is indicated that these crops being C4 photosynthetic systems, therefore do not have relative benefits at higher CO_2 concentrations.

8.2.2 LIVELIHOOD SYSTEMS IN THE AREA

This semi-arid district of Bijapur lies in the Deccan plateau and is completely dependent on the vagaries of south west monsoon. Much of this region is considered a marginal production environment because it faces severe agro-climatic and resource constraints (GoK, 2006). Also as per (GoK, 2006), Karnataka is one of the States with the lowest proportion of cropped area under irrigation (30 per cent of cultivated land).

Agriculture is the most important component of the livelihood system of the population here. The area is faced with severe water shortages and has been taken under the drought prone area programme, launched in the 1970s. Located in North Karnataka, the area is marked by hot and dry weather. The annual rainfall is about 550 mm, mostly confined to monsoon season but is erratic. Owing to the severe drought conditions year round, the area has a gross annual water deficit of about 1500-1600 mm. The crop growth is therefore restricted to just around 90 days a year. The area has two major growing seasons: kharif (July 2nd week to October 2nd week) and rabi (September 1st week to February 4th week). A study by B Venkatesh and V Jayasree “Mapping of drought severity for a semi-arid district of Karnataka State” suggests that Bijapur is under severe droughts for a period of 10 per cent of the total events with an intensity of more than 1.25.

As per a paper by B P Ratnam, N L Maurya and S A Patil “Water deficiency in Bijapur”, Karnataka Journal of Agricultural Sciences, 1998, the kharif season in Bijapur suffers from moderate water deficiency, ranging from 200 to 240 mm. The area visited had some pockets of medium and deep black soils, mostly rocky shallow soils. The soils are basaltic in nature, derived from volcanic rocks, with high moisture retentive capacity. The depth of the soil was shallow to medium; the moisture storage capacity was limited and evaporation losses were high due to high temperature. UASD-Bijapur station suggests soil loss in the area due to erosion at 12-43 tons per hectare per year.

The area has faced a couple of drought related setbacks in agricultural yields in the last few decades. The low spending on rural development and infrastructure during the nineties has deepened the agrarian crisis. This combined with low private investment has reduced the net income flow into the farm sector. Land fragmenta-

tion coupled with unsustainable land management practices and land degradation has deepened the crisis. The agricultural marketing sector too has not been able to pick up and farmers lack access to resources and technologies to improve agricultural productivity.

As per 2001 census, 18.5 per cent of the population of Bijapur belongs to Scheduled Caste and 1.66 per cent to Scheduled Tribes. As per Karnataka Human Development Report 2005, Bijapur ranks 23 out of 27 districts as regards human development indicators. Forty two per cent of rural families live below poverty line; most of the rural Dalit households are below poverty line. The villages the study team visited were homogenous with all castes present but in distinct caste-denominated sections.

As per (GoK, 2007), more than 73 per cent of Karnataka farmers fall into the category of small and marginal farmers with an average holding of less than 1 ha of land. The report also notes that "Small and marginal farmers in Karnataka, who cultivate only 34.4 per cent of the total cultivable area, account for 72.9 per cent of the total holdings (GoK, 2006). Landless farmers make up 50-60 per cent of the northern Karnataka population (Hanchinal *et al.*, 2007). Of the total number of workers for the agricultural sector in Karnataka, 26.5 per cent are agricultural laborers, most of who are landless" (GoK, 2007).

Bijapur has seen many farmers' suicides in the recent past. An estimated 11,000 Karnataka farmers have reportedly committed suicide since 1996 (Hanchinal, 2007). Because of the decline in the size of landholding, increase in input cost, decrease in output prices, and unfavorable macroeconomic policies during the period of liberalization, agriculture in India is no longer a remunerative activity for farmers (Talule & Rasal, 2008). Apart from increase in suicides, the area has seen widespread migration prompted by poverty, droughts and crop failure. In 2007, a waiver of agricultural loans to provide further relief to farmers had been announced in Karnataka but the cases of suicides continued unabated even after that.

Discussions indicate that people (mostly adult men) from the district migrate to Goa to earn their livelihood during the tourist-season. They also migrate to Bangalore and Mysore city to work as construction labour. In the event of weather based hazards like droughts incidences of migration in northern Karnataka have increased. Usually men migrate while the children were left with the elderly and women to be taken care of making it difficult for them to cope with the physical and emotional pressures.

Large or medium industry in not widespread in the district and rural industry is confined to weaving in some pockets. Infrastructure and institutional facilities are in general inadequate.

According to a GoK report (2007), the average household annual income among smallholder farmers is only Rs 52,650. Dalits (Madiga, Chalavadi, Madari) who own very low size farm holdings or are landless agricultural laborers are worse off. Field study indicates that they depend heavily on wages earned from farm ventures as their main or only source of livelihood. They are not only asset poor but are also socially disadvantaged due to discriminatory social practices based on caste (GoK, 2007). They are mostly unskilled and illiterate and are often involved in labor-intensive work. These sections are vulnerable and cannot sustain savings to cope with economic shocks like crop failures, major illnesses or deaths in the family.

The crops grown in the area include area are drought-tolerant cereal crops such as jowar (sorghum) and bajra (millet), dal (pulses) such as lentil and bengal gram (chickpea), groundnut, and sunflower. In addition to these crops, farmers with irrigation grow cash crops such as onion, garlic, and wheat. Other crops grown to a lesser extent included chilli, maize, kasubi (safflower), horse gram (a type of legume), and agasi (linseed/flax). Those participating in animal husbandry accrue income mostly from sheep/goat-rearing and dairy production from buffalo. Most people raised poultry (small-scale) to supplement their income. No one depended solely on their income from animal husbandry to secure their livelihoods.

Drinking water in these villages comes from few hand pumps placed intermittently within the village. Irrigation

facilities are scarce in the area. As per a study by Lingappa[32] "in the late 1970s because of the improvement in well irrigation, dairying could be developed as an important activity in addition to agriculture. The 1980s and the period after that frequently hit by drought, the water table has gone down making it difficult to have adequate water for agriculture and dairying. People are forced to migrate in search of employment opportunities mostly on a seasonal basis. The study also notes that asset structure continued to be highly skewed and iniquitous over the reference period. Land ownership was found to be the major determining factor in the classification of the relative asset position of the rural households. It was not surprising to find that the forward castes owned the major share of assets, followed by backward castes and Scheduled castes and Scheduled Tribes in that order. Though the inequalities in income distribution persisted to be quite pronounced, it was refreshing to observe that the proportion of poor households dropped conspicuously from 87 per cent to 48 per cent between 1979 and 1992 and real wages of agricultural labourers increased. Nevertheless, the incidence of poverty was relatively high among the SC, ST and backward classes."

The section below looks at the effect of two large scale infrastructure rehabilitation projects undertaken in the area on the livelihood system as well as household well-being. The displacement and dispossession of land due to these projects make Dalits more vulnerable to the impact of climate change. Around 60 to 65 million people are estimated to have been displaced in India since Independence, the highest in the world. According to a report of a Working Group on Human Rights in India and the UN (WGHR), "This amounts to around one million displaced every year since Independence." The report also goes on to say that of the displaced, over 40 per cent are tribals and another 40 per cent consist of dalits and other rural poor. Estimates suggest that just about 20-25% of those internally displaced are ever resettled in India, and a vast majority of them are not recognized as such. In the backdrop of climate change displacements would increase both as a result of disasters and a result of large scale projects like big dams that are being proposed to deal with flood hazards due to climate change.

8.2.2.1 Almatti dam: Rehabilitation and resettlement issues

In Bijapur, the study team visited villages in the submergence area of Almatti dam, the main reservoir of the Upper Krishna Project. The dam began in 1960s. Initially financed by Government of Karnataka it was funded by World Bank for Phase II (Stage I) that got completed in 2005. The project is designed to generate 290 megawatt (MW) of power. After using the water for power generation, the Almatti (storage) water is released in to the Narayanpur (primarily diversion) reservoir to serve downstream command area. This was the largest rehabilitation and resettlement project in the world.

The command area of Upper Krishna Project is in Bijapur, Bagalkot, Gulbarga and Raichur districts. The project was conceived as a multipurpose major irrigation project for irrigation, generation of power and drinking water. The dam has a gross water storage capacity of 130 TMC at 519 meters MSL. When we visited the project in mid 2013 it had an estimated capacity of 90.91 TMC. Large areas of Bijapur and Bagalkot districts have been submerged due to the reservoir. The catchment area of the reservoir is 33,375 sq. km. The Supreme Court of India had restricted the full reservoir level of Almatti dam to 519 meters. The Krishna Water Dispute Tribunal had resolved the dispute between the States and the dam was to be raised to the height of 524 meters MSL with a gross storage capacity of nearly 200 TMC. At present, the Upper Krishna Project authorities are planning to increase the height, which will create more submergence.

As a part of the study, the team met the officials at Rehabilitation and Resettlement office, UKP. By the implementation of Upper Krishna Project Stage-I Phase-I & II, 176 villages have been submerged, of which 136 villages are due to Almatti dam and 40 villages are due to Narayanpur dam. Around 136 rehabilitation centers have been built. 58,720 people have been affected due to the backwaters of Narayanpur reservoir and 2,92,160 people due to backwaters of Almatti reservoir upto FRL 519.60 m. Most of the people (72 per cent) were expected to suffer temporary submergence of village houses and agricultural lands as the level of reservoir fluctuates. They were able to cultivate rabi crop after the reservoir water receded.

32 C, Lingappa, Rural changes in a drought-prone region, Journal of Social and Economic Development, Vol 1, No. 2, July-Dec. 1998

During our field visit we met people who had lost land twice, the first time under the reservoir and later on under road and canal construction. Since in most of the villages people had lost farmlands to varying extents, they did not leave their homes fully. Because most of the loss of property is seasonal, the Phase II of Upper Krishna Project took a one-in-ten year flood zone as the basis for defining liability as regards housing, the R&R officials say. So, this means that if a house is submerged for a few hours once in ten years the people have been moved elsewhere. This poses a problem and people are reluctant to leave their homes.

Monetary compensation paid under the land acquisition act under the Resettlement and Rehabilittaion (R&R) programme during Phase I was inadequate. Lands in command cost Rs.8-10 lakh per acre now (2013) while people were given just Rs. 8,000 per acre then (1980s). The people who lost lands then have become labourers now - some of them under the Almatti dam project. The economic rehabilitation of the households in the submergence area was inadequate and people could not restore their pre-submergence real income levels. Many people were still dependent on draw-down cultivation facility on a long-term basis (seasonally) on the land that belonged to them before the project was taken up.

The study team visited some resettlement centers that had inadequate community infrastructure: school buildings, community halls, panchayat offices and drinking water facilities. People faced psychological trauma owing to involuntary resettlement, loss of land, houses and centuries of historical continuity.

A sample study conducted by the project authorities several years later indicates that just thirteen per cent of compensated families invested wisely in purchase of alternate lands. Most of them spent the money in debt liquidation and consumption. The government had not provided land for land but left them to their own devices to purchase land. At the same time non-land based income generating schemes were also not provided to the people.

Many landed compensated families turned into landless in the process as they were unable to invest in purchase of replacement farmland. The situation of agricultural labour (mostly Dalits) was worse as they did not own any farmland and were hence not entitled to compensation. They lost agricultural labour opportunities bacause of vast submergence of land. Many of them migrated (seasonally) while some found employment in dam construction. Officials claim that the landless people got a monetary grant of Rs. 10000 towards purchase of half a hectare of irrigated land or equivalent dryland or for some income generating scheme.

Public health issues like higher incidence of malaria also came up. As per Peter Alexander, “World Bank funded projects in the region are another threat to biodiversity in the region. Most of the projects funded by it are harmful to the environment. For example, the Almatti Dam, which has, has resulted in submergence of large quantum of fertile lands. It is well known that big dam storages gradually turn into dangerous seismic zones resulting in earth quakes.”

The latest on the project is that the Krishna Bhagya Jala Nigam Ltd (KBJNL) has decided to acquire 1.2 lakh acres to raise the height of Almatti dam. Twenty three villages and 70,000 acres are estimated to be submerged in the wake of the impounding of waters up till 524 m. The major challenge will be of relief and rehabilitation as over 21,000 families in 20 villages with population of 98,000 will have to be relocated. The process of land acquisition is expected to begin in January 2014 and the present compensation is in the range of Rs 8-10 lakh per acre in the area. 10,000 acres would be required for resettlement and rehabilitation of the villages. The Government of Karnataka has been pushing for a height increase of Almatti dam to purportedly provide irrigation for 121 dryland villages while Government of Andhra Pradesh is opposing the construction as it would reduce water availability to its villages which are on the downstream.

Housing and Urban Development Corporation Limited (HUDCO) has approved a loan assistance of Rs 500 crore apart from raising another Rs 500 crore through Upper Krishna Project bonds to take up R&R (Relief & Rehabilitation) work and infrastructure development in the affected area. Karnataka government has sought “national project” status for this project, as it covers over 1 lakh hectares.

The over-sized Almatti dam is not just an inter-state water dispute problem but a serious environmental threat, a resettlement and rehabilitation nightmare and a treat to the right to livelihood of several millions of poor people mostly Dalits.

8.2.2.2 NTPC's proposed super thermal plant at Bijapur

The National Thermal Power Corporation Ltd (NTPC) is setting up the 2,400 MW super critical thermal power plant at Kudgi village in Basavana Bagevadi taluk, Bijapur, Karnataka. An amount of Rs 15,166 crore is being invested over the next five years to set up the plant. The first stage that involves three 800 MW units is expected to be completed by the end of the 12th Plan while the second stage comprising two 800 MW units is likely to spillover to the next plan.

The Kudgi project has been provided environmental clearance by the Ministry of Environment & Forests. A unique feature of the plant is that it will feature super critical boilers known for superior output. The use of this super-critical technology is mainly to reduce the specific emissions from coal based generation and improve the combustion efficiency. The plants based on this technology operate at higher temperature and pressure than the sub-critical ones leading to lower specific emission of 0.83 kg per net kWh. This technology is available and costs almost the same as sub-critical technology.

According to NTPC, on completion of the two phases of the thermal power plant, it will be the biggest in the country producing 4,000 MW at one location. To avoid shortage of coal supply, NTPC has applied for a coal mining license near the Kudgi plant in Bijapur. The company plans to source coal from its coal mine at Pakhri Barwadi, Jharkhand in case there is a delay in new allotments. According to NTPC, around fifty per cent of the power produced at the Kudgi plant will be for local consumption in Karnataka. Power will also be supplied to neighbouring states like Kerala, Andhra Pradesh and Tamil Nadu. The locals who are going to be affected by the Kudgi plant and will have to bear the environmental consequences argue that the power is going to cater to urban industrial needs of Bangalore and Chennai.

NTPC had entered into a power purchase agreement (PPA) with the electricity distribution companies (ESCOMS) in Karnataka for supplying energy from the super critical thermal power project in 2012.

3500 acres of land is being acquired by the state government for this plant. The entire land has been notified for acquisition and the district administration is negotiating with the land owners for fixing the revised compensation. As per the environmental clearance by MoEF dated January 25, 2012 "The total land requirement for Stage – I will be 2440 acres which comprises of mostly barren and rocky with some area under single crop agriculture land. This include 150 acres for township, 75 acres for railway siding, 300 acres green belt, 780 acres ash dyke, 290 acres for water reservoir and 65 acres for miscellaneous. No forest land is involved."

The Karnataka government has agreed to supply five thousand million cubic feet (TMC) [7380 m3/hr for Stage-I] of water to the NTPC project from Almatti dam. Water will be sourced from Almatti dam through a pipeline at a distance of about 18 km from project site.

The environmental clearance stipulates that "sulphur and ash contents in the coal to be used in the project shall not exceed 0.5 % and <34 % respectively at any given time. In case of variation of coal quality at any point of time fresh reference shall be made to the Ministry for suitable amendments to environmental clearance condition wherever necessary."According to Peter Alexander, Public Hearing held on 25.03.2010 for the project was a farce. The ash and sulphur content in coal at ultimate end use will be significant the locals say.

These two cases of Almatti dam and NTPC plant suggest that the ecological and social consequences of large infrastructure projects are extensive particularly owing to the relocation of masses of people. The Dalits bear a greater burden of losing their agricultural lands, forest habitats and labour opportunities with the coming up of

the monuments to political corruption and social inequity. Climate change exacerbates levels of vulnerability for poor and excluded people like Dalits, who are dependent on subsistence agriculture and has negative fallouts on their food and livelihood security. Not only are Dalits least able to adapt to climate change because of their pre-existing vulnerabilities, but are also faced with exclusion in relief and rehabilitation programmes as is evident from the following case (see box).

Exclusion of Dalits in flood rehabilitation in September 2009

The Krishna floods of September 2009 had severely affected the lives of many poor Dalit families who lost their lives and means of livelihood. "In North Karnataka alone, which bore the brunt of the floods, 229 people lost their lives and hundreds of thousands of people sought shelter in relief camps. According to the Karnataka government sources, 6.55 lakh houses have collapsed; 7,882 livestock perished; 4,292 villages have been affected in 75 taluks across 14 districts, of which 346 villages need complete rehabilitation. In all, 4oo schools and 1,050 anganwadis have been washed away, and 3,000 more schools severely damaged." (Savita Hiremath)

North Karnataka had to bear the double brunt of floods preceded by drought. The Karnataka Agriculture Department estimates that "sowing could not be undertaken in 1.66 lakh hectares; in fact, only 69.68 lakh were sown as against 71.34 lakh hectares last year. Post-floods, the region lost standing crops in 22 lakh hectares of land. As for sugarcane, one of the main crops of the area, the loss is estimated to be worth at least Rs 500 crores." (ibid)

Dalits were left out of the relief and rehabilitation programmes designed by the State Government to deal with the flood victims in North Karnataka. "The devastation was so widespread that by the time the relief teams reached the flood-hit places, the victims had already suffered the worst ever crisis of their lives. They lay marooned for over 24-30 hours without food, hung on grimly under the pounding rains, and watched helplessly their houses and crops being washed away by the floods." (ibid)

Both the Central and State governments had provided massive funds to the tune of crores of rupees. Apart from them several MNCs, donor agencies, religious mutts, and NGOs had also provided support for flood relief. Overwhelmingly high proportions of Dalits were flood victims and were still continuing to stay in temporary sheds. The poor quality of relief and rehabilitation work carried out by the State Government is for all to see.

The study by Savita Hiremath done five months after the floods attempted to figure out if Dalits received equal attention and care as did the upper caste people when the relief operations were underway; to check whether the temporary shelters erected by the government have been helpful; to assess whether the compensation given for the losses suffered was sufficient; and also to explore the current situation in general, and the plight of women and children in particular.

An overwhelming 92 per cent of the Dalits answered 'no' when asked if they received suitable compensation as against only 8 per cent who replied in the affirmative. When asked whether they were able to access relief material on time, 90per cent of the respondents replied 'no', while only 7 per cent said 'yes'. Many Dalits regretted how the local officials favoured people of their own caste and ill-treated the Dalits. When questioned if there was any caste-based discrimination while distributing the relief material, 75per cent of the respondents said 'yes', while 24 per cent said 'no'. Caste bias has spawned a number of serious human rights violations. When asked if they thought Dalits had not been treated on a par with people from other castes because of caste prejudice, 80 per cent of the respondents said 'yes', while 20 per cent said 'no'. Similarly, to a question whether they had experienced any discrimination in relief and rehabilitation services in comparison with the dominant caste communities, 76per cent said 'yes', the rest said 'no'.

The report says that the main reasons behind this dissatisfaction is lack of proper survey of Dalit colonies, lack of scientific and professional assessment of the damage caused by the floods, and of course, large-scale corruption especially at the local level.

8.2.3 CONCLUSION AND POLICY IMPLICATION

In the case of northern Karnataka, adaptive strategies need to be considered for mitigating the effect of climate change on agriculture and other sectors. People have based on their understanding of cropping calendars and pattern made changes to deal with climate change impact. These include introducing new cropping sequences, diversifying cropping systems and introducing heat and drought tolerant crop varieties. There is a need to improve the natural resource base and adopt farming systems approach.

Understanding Dalit livelihoods-climate interactions well enough and introducing measures to adapt to climate change based on the present understanding has to go along with the strengthening of efforts to collect, monitor, and disseminate existing experiences of adaptation. This should serve as the basis for an assessment of impact of climate change on Dalits and adaptation activities in the country context. Adaptation measures are rarely taken in response to climate change alone and are in fact embedded within broader sectoral initiatives such as sustainable development, conservation of biodiversity, diversifying livelihoods, and sustainable agriculture.

It is not enough to work on just providing relief supplies to address the needs of those affected by disasters like drought and floods. Long term development needs of the most marginalized populations like Dalits need to focussed on and the approach of the state and civil society should be on breaking their cycle of poverty through agriculture, climate change and disaster risk reduction programmes. This is because poverty affords Dalit communities few resources to prepare for or mitigate the effects of these hazards and even fewer resources to recover. To reduce the risk and impact of hazards the state and civil society actors can foster community preparedness through outreach and awareness material and activities, trainings, and community-developed disaster risk management plans.

RECOMMENDATIONS 9

The government should take up social protection initiatives for transfer of income or assets to the poor marginalized communities like Dalits to protect them against livelihood risks, as well as to enhance their social status and rights. The state and its governance institutions should specifically protect and promote the livelihood rights of vulnerable groups like dalits during climate change induced disasters. Emphasis should be placed on taking up agricultural development programmes on a priority basis in areas with high Dalit populations.

In the context of climate change induced hazards, actions should not only be taken up based on past experience alone, but development processes should be adapted to reduce risks from impacts of climate change. The Global Assessment Report affirms, "efforts to adapt to climate change must be aligned with disaster risk reduction objectives and strategies. For such integration to succeed, institutions must focus on prospective and corrective risk management, as well as building new partnerships at the local level, rather than on compensatory mechanisms" (GAR 2011).

In this context, the actions related to disaster risk reduction need to be linked with those aimed at climate change adaptation. There is a need to implement national programs for Community-Based Disaster Risk Reduction in high-risk communities, such as Dalits. This should be preceded by development of legal and policy frameworks enabling Community-Based Disaster Risk Reduction. The state should provide technical support to community level action on disaster risk reduction which should to start with be taken up on a pilot basis in various locations across the country. Strong partnerships on this should be developed between local authorities, implementing partners and community organization and civil society organizations.

Institutional systems for both disaster risk reduction and climate change adaptation need to be mainstreamed in the development planning processes. The institutional setup that exists at various levels viz. national, state and local level can provide the climate change sector a ready mechanism. Mainstreaming of disaster risk reduction and climate change adaptation poses a challenge at all these levels given the lack of ample interface between the concerned Ministries/ Departments.

This should be linked with local development programmes and the national employment guarantee programme. The capacity of the communities and the civil society groups implementing the programme on Community-Based Disaster Risk Reduction should be strengthened. With limited financial resources and capacity at the local level, it is absolutely imperative that local level implementation of disaster risk reduction and climate change adaptation be closely integrated with development interventions such as water resource management, community-based forest management, eco-system based livelihood promotion and micro finance .

To advance the linkages between disaster risk reduction and climate change adaptation there is a necessity of scientific data, climate information and socio-economic data to understand the climate risks at the community level and design climate-proof sustainable development interventions. Ways have to be developed to disseminate the climate data from scientific institutions to communities. Knowledge networks have to be built at various levels right from the national level to the state and local levels. Further, indigenous knowledge has to be made use of in responding to climate change and disasters more effectively. Institutional systems that are cohesive and facilitate collaboration between the various government levels are also required for implementing the community based disaster risk reduction programme.

Weather-indexed crop insurance can act an instrument for climate change adaptation in the event of floods, droughts etc. A shift is required from insuring against poor crop yields toward insuring directly against bad

weather. An index establishing a relationship between lack of rainfall and crop failure, verified by their long historical records needs to be used. Farmers can get the immediate payouts in the event of the index suggesting bad weather irrespective of the actual losses incurred. This way the farmers will continue to have an incentive to make productive management decisions.

Climate change has to be emphasized as a development issue and a long term perspective to address issues of exclusion and marginalization built. The participation of socially marginalized groups such as Dalits in community decision making and program implementation has to be ensured. Climate change adaptation could involve alleviation of household vulnerability to seasonal food insecurity consumption across the food/ livelihood insecure period. The National Rural Employment Guarantee Act (NREGA) can be used here as a more predictable and targeted safety net for mitigating climate-related risks. This programme can be used as a physical response for building household and community resilience against climate change impacts. These measures are likely to reduce risk and reduce poverty proactively over extended timeframes. To adapt to climate change a sustainable strategy among rural poor sections like Dalits could be to help them build assets such as livestock that can be sold during times of climatic stress or shock.

Developing practical guidance on the design and implementation of appropriate adaptation methods, taking into account the views of affected groups such as Dalits is important. There is also a need to support civil society to help the poor build voice to demand access to social protection instruments.

More specifically –

- The Government of India as well as the State Governments should accept the Hyogo Framework of Action and develop social policies towards achieving disaster risk reduction among the vulnerable and deprived communities. Agencies such as NDMA, the SDMAs and the nodal ministries should take urgent steps to recognize the reality of exclusion of Dalits and other vulnerable groups. The inclusion of Dalits should be taken up on a priority basis and minimum standards for relief and rehabilitation ensured.
- Given the societal processes of caste-based exclusion the state agencies should directly reach out to the Dalits and vulnerable groups, and avoid powerful interest groups in between.
- Specific circulars and GOs should be passed giving directions to the administration to visit and enumerate the affected people in the settlements of the Dalits and other vulnerable groups.
- Civil society organizations with a track record of working with Dalits should be involved in social audit as well as climate change adaptation and disaster risk reduction work. These groups can also play a role in pressurizing the Government to ensure and monitor proportionate allocation of public resources for Dalits and other marginalized sections. The spending on disaster risk reduction and climate change adaptation work should be transparent and accessible to the community.
- The state should ensure that Dalits be represented in institutional decision-making processes related to disaster management and climate change adaptation. It should specifically ensure the representation of Dalit rights groups in Task Force / Committees set up by the NDMA, SDMAs and DDMAs. These agencies should do adequate capacity building of their staff on inclusion of Dalits in climate change adaptation and disaster response work.
- At present granular data is not available with the nodal agencies of the state working on disaster risk reduction and climate change adaptation programmes. Efforts should be made to compile and then make public disaggregated data on the households affected and share of Dalits in the response programme. In the event of skewed allocation mechanisms should be available for mid-term corrective measures. Mechanisms should also be available for monitoring the inclusion of Dalits at various levels of the administration – planning, implementation and governance of disaster management and climate change adaptation interventions. The entitlements of the Dalits should be clearly spelt out and the preparedness of the administration to reach out to Dalits and other vulnerable groups in the event of any disaster should be improved.
- There is a need for focused and in-depth studies on the impact on the livelihood systems of Dalits (as well as all other categories / communities / occupational groups) in order to plan adaptation and mitigation more effectively and scientifically.

ANNEXURE I

RURAL VOLUNTEERS CENTRE'S WORK ON COPING WITH FLOODS

Rural Volunteers Centre (RVC), a Akajan, Dhemaji based NGO has been working since 1990 in the flood prone areas with communities and strengthened village level institutions for forecasting and coping with floods. Their focus has been on developing alternative livelihoods of the flood affected people and addressing their health and shelter issues. Alternative crops suited for cultivation during the non flood months have been introduced. Creeper varieties of vegetables and pig rearing have been able to generate good incomes in the area.

Rural Volunteers Centre has worked on designing adaptation strategies at local as well as at community level to flood hazards induced by climate change in the Brahmaputra basin. The traditional local short and long-term responses evolved from their culture, customs and beliefs have been taken into consideration. The organization has developed a network – River Basin Friends of 6,000 volunteers and has been active in the upper stretches of the Brahmaputra and Barak basin. They have worked on developing simple technologies for measuring river levels, land contours and rainfall.

Local community managed mechanisms for data-sharing and facilitation of accurate flood warning systems have been put in place. The model developed by Rural Volunteers Centre bases itself on the approach of "living with floods". The early warning network system was set up by the Duryog Pratirodh Samiti (Disaster Preparedness Committee) to predict the flash floods. Rural Volunteers Centre put in place forty points on the banks of Brahmaputra and its five tributaries in Dhemaji as well as Lakhimpur where village level volunteers take regular readings. The volunteers are equipped with walkie-talkie (earlier) or mobile phone (now), a rain gauge, a river water level gauge, a torch, and sometimes, a bicycle. They pass on the data to the central team at Rural Volunteers Centre where analysis of the data is done and villages likely to get flooded warned in advance to save lives and to reduce property and livestock losses. The information is also sent to several downstream districts in India and even to five districts in Bangladesh.

"Local evacuation teams, rescue teams, and disaster management teams are alerted through communication networks, giving populations adequate time to save lives and to reduce property and livestock losses…The Rescue Team comprises volunteers trained for rescue missions, including operating and navigating speed boats and handling minor repairs. They are equipped with mobile phones, high-power rechargeable torches and first-aid medical kits. Ravi is training villagers to make low-cost life jackets from empty plastic mineral water bottles typically thrown away." (http://india.ashoka.org/fellow/ravindranath)

The crucial issues of health and shelter are addressed by Rural Volunteers Centre. Training and demonstration is offered on home-grown technologies that ensure safe drinking water and sanitation during flooding. Rural Volunteers Center has taken note of how the Mishing community in the area have been building thatched, stilt houses and granaries on stilts. In fact the other communities too have been building granaries on stilts and houses with high plinths if not on stilts. Discussions in the field point to the fact that the Mishing ethnic group, which has for generations lived a semi-nomadic lifestyle along the river, have developed the coping mechanism and have adjusted to the shifting river course and regular flooding in the area. They have historically built homes on raised platforms over bamboo or wooden stilts at least 6 to 8 feet above ground. Usually this is above the highest flood level in the area. People are also now building two storied structures where grain is stored in upper part and lower part is used as a barn.

As regards shelter, plinth elevation by as much as 6 to 7 feet is being promoted in the area to deal with rising water levels. Traditional wooden pillars are being replaced with reinforced concrete pillars to promote safety. Within the houses people have constructed elevated earth platforms, where temporary tented shelters can be installed swiftly, complete with specially designed PVC toilets.

Houses under floods in Dhemaji. People here along with their cattle take refuge on higher grounds close by in roads and embankments

Rural Volunteers Centre's network is used for imparting training in rescue techniques, flood management, health and hygiene using booklets, leaflets, and posters. A strong network of para-veterinaries and barefoot doctors has been developed to create awareness on flood-related diseases, their prevention and their cures.

Rural Volunteers Centre has also developed a low-cost generic medicine for diarrhea and dysentery. A buffer food and seed security system called Kangali Bharal is being promoted. Under this every household contributes a given quantity of rice and paddy per year for consumption during flood event. The paddy can at the same time be used as alternative seedling for fresh cultivation where those planted earlier get washed by the floods.

Resettlement poses as a big problem as there is no land to resettle people. Rural Volunteers Centre has been able to demonstrate rehabilitation of a hundred per cent Dalit village of 258 households near the road at what is now called RVC village.

Rural Volunteers Centre also has a successful community pig breeding project where pigs are bred in highlands during the flood months and shifted to low lands later. Apart from this, alternative crops like garlic, mustard, peas, and chili have been introduced in the area.

During our fieldwork, we visited sites in Dhemaji and Lakhimpur which had a long history of floods, flash floods, river bank erosion, and land degradation caused by sand deposition. The focus was on understanding the vulnerability and adaptability of the communities to these hazards. Rural Volunteers Centre has been implementing well designed interventions to facilitate communities to face future hazards.

According to Rural Volunteers Centre, the Calamity Relief Fund for the district is unspent in these riverine areas. A "political list" of relief is prepared following quick assessments. Those who are truly affected are excluded. If a Dalit village did not vote a politician, it is likely to be excluded in relief works. Rural Volunteer Centre strongly feels that for SC/ST/other minority groups there should be special hearings and a special watch group at block level to ensure that they do not get excluded.

Raised handpumps have been introduced in several villages in Dhemaji to provide safe drinking water during floods.

Rafts made out of banana trees being used for transportation during floods. Most of the locals are good at swimming and know how to use boats and rafts. The houses on 'stilts' in the background have survived the floods

To overcome the problem of sandcasting as well as floods Rural Volunteers Centre, a local NGO based at Akajan village in Dhemaji has constructed raised houses

Raised toilets in several villages in Dhemaji provide safe sanitation during floods. Women in particular are most concerned about sanitation and health issues during the incidence of floods.

ANNEXURE II

THE WORK OF HUMAN RIGHTS FORUM FOR DALIT LIBERATION-KARNATAKA (HRFDL-K)

Human Rights Forum for Dalit Liberation (HRFDL) is a unique platform comprising12 Dalit networks constituted by 175 Dalit grass root NGOs and movements. HRFDL is active in 4229 villages in 25 districts of Tamil Nadu and in more than 4000 villages in 13 districts of Karnataka.

HRFDL works for the social, economic and political empowerment of Dalits and seeks to protect and promote Dalit human rights. The human Rights Forum for Dalit Liberation- Karnataka (hRFDL-K) activists were actively involved in several social movements, in particular the Dalit Sangharsh Samiti (DSS). hRFDL-K was envisioned to hasten the Dalit struggle in Karnataka with a human rights perspective.

The network promotes Dalit women leadership through a transparent, decentralized, and participatory approach. In the last ten years, the network has been involved in a sustained struggle towards the liberation of Dalits in Karnataka. It has built a critical mass base in 11 districts, 22 taluks, 44 ZillaPanchayats, and nearly 1,200 villages in Karnataka. The members of the network have been consistently leading campaigns and issue-based advocacy efforts.

“Its major target groups include community-based organisations (CBOs) headed by women, Dalit lawyers, Dalit Panchayat members, and Dalit students. Lobbying and advocacy efforts at the State level are complemented by campaigns at the grass-roots.

They include land struggle, panchayat election campaign, campaign for justice in caste violence and violence against Dalit women, right to education of Dalit children, food security [ICDS & NREGA], right to health campaign, campaigns for SC/ST hostels, implementation of reservation especially in the private sector, struggle against the impacts of globalisation, and against the hindu fascist groups. hRFDL-K has been able to build its own identity, while extending solidarity to various other progressive peoples’ struggles at State and national levels.” (Savita Hiremath)

ANNEXURE III

THE STUDY OBJECTIVES AND METHODOLOGY OF NDW-SPWD COLLABORATION

The objectives were -

1. To prepare a study on (i) the effects on Dalits, particularly dependent on biodiversity for survival with the changing climatic patterns and consequent hazards like floods and droughts; (ii) Illustrate the need for policy and legislative measures, and (iii) good practices and action to facilitate socio-economic inclusion of Dalits in climate change adaptation models; &
2. To compile and prepare a critical overview of provisions in the Indian national standards, authorities, guidelines, policies on climate change adaptation and programmes for the marginalised and what is required to make them inclusive of Dalits; draft recommendations towards ensuring inclusion of Dalits.

The study focuses on the issue of inclusion of Dalits in climate change and biodiversity discourses from the disaster risk reduction (DRR) perspective in India. It furthers NDW's work on challenging caste-based discrimination in relief and recovery measures in the disasters of this decade (www.nationaldalitwatch-ncdhr.blogspot.com).

It will set out the position of Dalits in terms of their increased vulnerability to already degraded natural resources base such as land, water and forest because of climate change impacts, and their interest in protecting their environment for sustaining their livelihoods. The focus of the study was almost exclusively be on vulnerability assessment and adaptation rather than mitigation (reduction of emissions).

This study looks at the impacts of changes on different areas of biodiversity/ natural resource based livelihoods of Dalits in rural areas. Of the five major groups of disasters, as defined by the High Power Committee on Disaster Management, constituted in 1999, which categorises 31 types of disasters this study has taken the water and climate related disasters – floods and droughts as its subject. At a global level, estimates by Centre for Research on Epidemiology of Disasters (CRED) indicate that 78.4 per cent of the disaster events are accounted during the period (1900-2010) were hydro meteorological events. The study broadly tries to highlight the plight of Dalit's in the context of climate change induced disaster situations and makes a case for inclusive community-centred disaster risk-reduction projects. It brings out the hidden issues of exclusion and raises voice for inclusive development and make the government bodies and other development agencies aware of their roles and responsibilities for inclusive development.

The study looks at the legislative and regulatory framework at national and state level (Karnataka and Assam) related to climate change and the inclusion of Dalits given their inherent socio-economic vulnerability. It provides a wide-ranging overview of national/state level policy documents related to climate change and Dalits, based on a comprehensive literature review and analysis of relevant reports. The objective was to better understand these vulnerability and adaptation issues in order to make policy recommendations for adaptation to climate change.

DESK STUDY

The initial literature review will focus on understanding and evaluating the state of adaptation to climate change in agriculture/other rural livelihoods in the country. The key interventions/ programmes/ institutions/ agencies operating in the disaster risk reduction area will be reviewed and key barriers and challenges for climate change adaptation will be identified. Relevant supporting documents constructed from a variety of sources, including case study databases, meeting reports, studies and reviews, web resources, and other reports will be reviewed.

Because of the wide variety of sources, the studies examined will include a mixture of published and peer reviewed literature, grey literature, informational websites and videos. References will be provided to allow more detailed examination of each of these activities than is possible in this review. Where appropriate, the review will be supplemented by direct communication with peoples' organisations reporting on-the-ground impacts.

Specifically the attempt would be to seek answers to the following questions –

- What are the impacts of and vulnerability to climate change in Indian context?
- What climate change adaptation policies, plans and strategies exist in India?
- Are they appropriate in relation to current knowledge of vulnerabilities at the national level?
- Who are the main institutional actors involved in climate change adaptation policy and responses in India, and do they have adequate capacity and efficacy to implement adaptation policies in the disaster risk reduction sector?
- How much awareness exists about climate change, and particularly adaptation by Dalits, within the public sphere?
- What is the role played by state and non-state actors in climate change adaptation by Dalits? \

CASE STUDY

Two case studies will be based on field visits. This aspect of the study will act as a tool to facilitate social analysis by the community and mobilization around issues of social inclusion and justice. The individual case studies will be done in Assam and Karnataka with NCDHR partners whose work suggests that discrimination is entrenched and continues to be widely practiced in rural areas. The case studies will supplement that understanding with careful participatory research. The case studies will pave the way for consistent advocacy with stakeholders. In addition to this, SPWD will also develop a similar case study in Uttaranchal with VISION, its partner NGO.

Diverse methods including surveys, focus group discussions, will be employed for developing the case studies. Appropriate qualitative and quantitative methods will be used for collecting and analysing the present biophysical and socio-economic data in the case study location, covering agriculture, natural resource use/ access/ management, livelihood systems, food and income security and the institutional context of development of the Dalits.

The study would aim at reaching at collective understanding on the components of the case study specific to each location and the steps to be followed for their development.

Sampling will be purposive concentrating on two villages each in Bijapur (Karnataka) and ? (Assam). The selection of these 2 villages for the study will be done on the following criteria: One village with predominant Dalit population and another village with minority Dalit population.

This will help understand the local context and how Dalits respond when disaster strikes and what are their specific vulnerabilities. Though the area in Bijapur is essentially drought prone, issues of submergence from the Almatti dam will be studied.

One of these selected villages owing to a relatively large proportion of Dalit population would be headed by a Dalit Sarpanch. This will help understand whether devolving power to the local level and giving local government relatively greater autonomy has helped in increasing space of Dalits to challenge, engage and participate more fully in the decisions that affect them?

The study will try to detail the forms of discrimination experienced by the Dalit community in their everyday life with respect to accessing relief services. It will assess impact of discrimination with respect to participation of

Dalits in decision making processes of villages, ownership of assets or land, access to resources and quality basic services. In all these villages purposive sampling of individual households belonging to the Dalit community would be carried out so that the study could focus on objectives of the research. Detailed questionnaire administration will be done separately for men and women in Dalit households to probe the gender related vulnerabilities for each of the five categories (a) Small and marginal cultivators (b) Landless labourer (c) Sharecroppers (d) Artisans and (e) Migrant Labour. In addition focus group discussions would be held with the Dalit community in each locality. Information will be gathered through group discussions of Dalit men and women separately. Social mapping (Participatory Rural Appraisal tool) will be used to engage the community at the start of discussions and get an overall understanding of the village. Marking amenities, hamlets, concentration of localities will help in jointly analysing and understanding social relations, power dynamics, access and control over resources and the like. During the survey, while discussing with people in the study area, different incidents and examples related to the subject of the study will be included.

Their systematic exclusion from relief and rehabilitation efforts in the event of disasters such as droughts and floods will be studied. The study will use diverse methods including surveys, observation, focus group discussions, key informant interviews, expert judgment, secondary literature and household data collection for gathering required mostly qualitative and some quantitative information.

Documentary material reviewed for the case studies will include -

- Desk review studies/ reports related to the subject
- Acts, policies, rules, guidelines related to climate change, social justice, relief and rehabilitation and disaster management and other allied aspects
- District [District Gazetteers, District Handbooks, Census Data]
- Disaster management plan/ reports
- Resettlement and rehabilitation (R&R plans).

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