

## CHAPTER-VII: CONCLUSIONS AND RECOMMENDATIONS

Adaptation to climate is not new. People, property, economic activities and environmental resources have always been at risk from climate hazards and people have continually sought ways of adapting. Broadly speaking, we are adapted to cope with a wide range of climatic conditions and stresses. But variations and extremes do regularly exceed coping ranges, too often with devastating effect. While climate impacts can never be reduced to zero, the heavy and rising toll of weather-related disasters and the burden of less severe variations indicate that we are not as well adapted as we might or should be.

The findings presented in chapter-VI clearly demonstrate that there is, at present, a gross adaptation deficit across scales but the deficit at the village-institution level (i.e. Gram Panchayat level) is the most glaring. There is no formal mechanism through which climate information is passed on to the Panchayat executives, for further action including informing the common villagers. Neither were they specially trained to communicate with common villagers on sensitive information, so that there is no miscommunication or distortion of information to cause undue construction of the impending risk.

Lack of communication was very evident in the case of the 2008 floods, in which only one GP president out of the four villages studied, could take appropriate action to inform the villagers in time and take their help also in spreading the information quickly.<sup>28</sup> Whether this was because of factors such as the president being a young woman from a lower caste, who have herself experienced the fury of Orissa Supercyclone in 1999 when she lived with her parents in a coastal village of Puri district, and the village being a small, homogenous village, could be researched

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<sup>28</sup> None of the villages studied had any Gram Panchayat official, who was responsible for carrying information to the villagers including invitation for scheduled meetings of *Gram Sabha*. This appeared as a big gap in the PRI system, which is supposed to be based on popular participation.

further. The construction of risk by individuals and communities appeared to be important in this regard. During field interviews, the response of those who have personally experienced extreme climatic events (e.g. Supercyclone 1999) or those who have no experience at all of such events was quite different from the response of those villagers who have been experienced some milder form of climatic disasters, such as occasional flooding of farms or cutting off of road connection for few days. Because of their experience or in-experience the former category of respondents appeared highly apprehensive of the impending 2008 floods when the news was first broke to them and they started preparing themselves accordingly. The latter category of respondents, however, were not only very slow in self-assessing the level of risk but also got it wrong as they thought the 2008 floods might only be like the backwater flooding that happens periodically in their village. Why both types of respondents – those who have experienced Supercyclone and those who have experienced none of such event – behaved similarly? The answer, perhaps, could be that risk construction is a “social process” and that “uncertainty” plays critical role in risk construction. The respondent who had experienced the Orissa Supercyclone, which was nothing less than a catastrophe, could relate that memory with the construction of the impending risk of floods in 2008 and in doing so put both events at a similar level of risk quite naturally. On the other hand, the respondent who did not herself experience any catastrophe like supercyclone or devastating flood, but grew-up listening about the supercyclone, could construct the risk of the 2008 impending flood by likening it with her idea about the supercyclone. Similarly, the fact that in Baligudali village, where establishment of instruments for measuring the wind speed etc. by the OSDMA led to the increased level of risk perception at the village level, indicated a correlation between level of technology preparedness and risk construction and communication. An important policy lesson here is that the communication regarding climate change need to be specialised one distinguishes between different target groups as per their risk construction abilities.

Further, the field investigations also revealed that there is almost total lack of any policy-led adaptation, which has resulted in many cases in climate defence turning into mal-adaptation (e.g. flood water drain in Sutana village).

But the field investigation also finds out a variety of autonomous adaptive practices at individual or group level in use that have reduced vulnerability to climate hazards. In most cases these have been adopted in response to multiple sources of risk and only rarely to climate risk alone. General strategies in use in the study areas include increasing the capacity to bear losses by accumulating food surpluses, livestock, financial savings and other assets; hedging risks by using suitable varieties able to bear the climatic shock, diversifying crops, income sources, food sources and locations of production activities; reducing exposures to climate hazards by relocating, either temporarily or permanently migrating; spreading risks through kinship networks, pooled community funds, insurance and disaster relief; reducing the sensitivity of production and incomes derived from natural resources by restoring degraded lands, using drought resistant seed varieties, harvesting rainfall, adopting irrigation and using seasonal forecasts to optimize farm management; preventing climate impacts through flood control, building standards and early warning systems; and increasing the capacity to adapt through public sector assistance such as extension services, education, community development projects, and credit services.

These and other strategies in use are evidence that the vulnerable can and do act to reduce their vulnerability to climate hazards. They also provide a rich base of experience on which to build for adapting to future climate change. But climate change is altering exposures to climate hazards. The frequency, variability, seasonal patterns, spatial distribution and other characteristics of climate events and phenomena are changing in uncertain ways. No respondent in the field villages was certain if there will be adequate rains this year, although past few years have witnessed good rains. The changes will push future climate variations and extremes

outside the bounds of what people have been exposed to and had to cope with in the past, e.g. 2008 floods in Billipada village. An implication is that current practices, processes, systems and infrastructure that are more or less adapted to the present climate will become increasingly inappropriate and maladapted as the climate changes. That is, the adaptation deficit is likely to grow. Fine-tuning current strategies to reduce risks from historically observed climate hazards would not be sufficient in this dynamically changing environment. More fundamental adjustments will be needed. This will require recognizing what changes are happening at the regional (e.g. state or district) level and anticipating (or gathering information about) the range of likely future changes at these levels, understanding the vulnerabilities and potential impacts at the village level, identifying appropriate adjustments in the current livelihoods of the villagers, and mobilizing the resources from various sources, and building the public will to implement the adaptation plans. The Panchayati Raj Institutions (PRIs) in India, as the seat of local governance, are uniquely positioned in this regard as they link the local village with the state and national government institutions in a formal manner to access their resources rather quickly. But PRIs face both opportunities and constraints in this regard. In light of these, the following recommendations are made to make PRIs as effective adaptation change agents, inter-alia also highlighting the areas of future research:-

**Create conditions to enable adaptation.** Vulnerable people have a strong self-interest in adapting. But numerous obstacles impede adaptation, constraining what people can and are observed to do. Common impediments include competing priorities; poverty; lack of awareness, information and knowledge; uncertainty; weak institutions; degraded natural resources; eroded social capital; inadequate infrastructure; insufficient financial resources; distorted incentives; and poor governance. Interventions are needed to create conditions that enable people to surmount the obstacles and take actions to help themselves. Indeed, enabling the *process* of adaptation is the most important adaptation that

the public sector can make. An important first step in this direction would be to explicitly include climate change adaptation as the key responsibility of PRIs, just like disaster management at village level has been done in Orissa state. Besides suitably incorporating this aspect in the National Action Plan for Climate Change, especially the missions on sustainable agriculture, scoping studies may be commissioned to assess if the State Panchayati Raj legislations require any further amendment or executive instructions followed and supported by a programmatic intervention by Government of India is sufficient for this purpose.

**Integrate adaptation with development.** The goals of climate change adaptation and development are strongly complementary. The impacts of current climate hazards and projected climate change threaten to undermine development achievements and stall progress toward important goals. Adaptation can reduce these threats. In turn, development, if appropriately implemented, can help to enable climate change adaptation. Integrating adaptation with development planning and actions can exploit the complementarities to advance both adaptation and development goals. This can be done at the village level, when the Gram Sabha is formulating its Annual Action Plan, which could then be followed up at the Panchayat Samiti and Zilla Panchayat level.

The linking of adaptation with development is not going to be easy though. This is in part because precisely mapping a particular adaptation intervention to a distinct climate change impact is in many cases technically difficult, due to uncertain climate predictions. This is made further complex by the scarcity of resources which must be used most judiciously. By framing approaches to adaptation as a continuum between "pure" vulnerability reduction (e.g. construction of concrete roads to ensure all-weather access) on one hand and very explicit impacts-oriented measures (e.g. construction of multifunctional concrete sheds like the ones under OSDMA) on the other, one could make possible a definition of adaptation that does not depend upon drawing a line between adaptation and development. By better understanding how the relationship between

adaptation and development varies with varying circumstances, a firmer basis could be created for selecting, supporting, and implementing appropriate adaptation interventions. This is an area of future comprehensive research that needs to be supported by the national government.

Another problem in linking development to adaptation is giving priority to adaptation efforts where activities directly target known climate risks runs the chance of neglecting some of the most vulnerable communities, where adaptation investments are most needed. For example, construction/ deepening of village ponds as a risk insurance measure for irrigation in lean season and as a source of income to the GP, have neglected technical innovations in the pond so that small fisher households, whose livelihoods have already become precarious in view of loss of perennial water bodies in the study area, could simultaneously use the ponds for pisciculture also. It follows from these examples that adaptation needs to be regarded as a "big tent," encompassing the full range of responses—from reducing poverty and building capacity, to managing risk and directly confronting climate change impacts. All of these responses have adaptive value in a world with varying levels of need, capacity, and uncertainty. However, it is worth emphasizing that a "big tent" is not the same as "anything goes" with adaptation. On the contrary, the seriousness of the adaptation challenge calls for rigorous processes that enable the adaptation community to identify and replicate effective approaches, curtail ineffective ones, and learn from both positive and negative experiences. Such an approach will call for massive capacity building at all levels.

**Increase awareness and knowledge.** The field evidence presented in chapter-VI, highlighted almost complete lack of knowledge at the GP level as a critical constraint on adaptation. In adaptation planning, therefore, efforts to increase and communicate knowledge should rank as the highest priority. This knowledge sharing should not only be about historical climate and future climate change projections and estimates of

climate impacts and risks, but also about the causes of vulnerability, and risk management technologies and practices. Farmers in the study village, for example, were unaware of the flood resistant paddy variety developed by IARI, and, hence depended on local tall varieties, with poor productivity, to tide over impending flood problems. Indeed, respondents voiced much greater need for substantially upscaling the Farmer-Field Schools programme of IARI for participatory research to develop varieties that are adapted to climatic extremes. Similarly, small fishers voiced demand for technologies about the effects of climate variations on fish stock movement and fish catch, forecasts of fishing conditions, and methods and technologies for managing climate variability. These instances demonstrate the need for programs that help advance, communicate, distribute, interpret, and apply knowledge for managing climate risks. Awareness and knowledge may help not only in successful adaptation, but also in avoiding mal-adaptation such as clearing of mangroves for shrimp farming in many coastal villages in Orissa, blocking of drainage channels while constructing road under NREGS, or construction design of the flood drain in Sutana village which in fact elongated flood vulnerabilities during the rainy season. Villagers ought to be educated about various technical options to increase their long-term resilience, e.g. regeneration and planting of food yielding non-timber forest product species in the village forests/ plantations, rather than relying on the traditional relief means, e.g. ration supply by the Block in the case of climatic disaster. Similarly, knowledge about technical options may include information on new technologies (e.g. plantation of salt and flood tolerant fast growing tree species that could drain water much quicker than the ordinary mechanical flood water drains, while providing handsome financial returns on maturity). Handbooks in local language for PRI functionaries, such as the ones prepared by OSDMA, may be quite helpful.

**Strengthen plural institutions.** Institutions are found to play important roles for enabling adaptation. It may be recalled that PRIs are not the only

local institutions; they include community organizations formed by NGOs, farmer associations, local government agencies (e.g. watershed committee, education and health committee, JFM committee, etc.), informal associations (e.g. Youth Clubs, donation-based clubs, etc.), kinship networks and traditional institutions also. They help communities limit, hedge and spread risks, by sharing knowledge, human and animal labour, equipment and food reserves; mobilizing local resources for community projects and public works; regulating use of land and water; and providing education, marketing, credit, insurance and other services. An appropriate form of linkage and networking of such important institutions, which respects each institution in its own right and promotes networking based on the twin principles of "complementarity" and "local embeddedness", should be promoted.

It may also be recalled that in many cases the above supplementary institutions are often poorly resourced, lacking in human capacity, overloaded with multiple responsibilities, and overwhelmed by the demands of their communities. For example, the watershed committee might have been constituted but there may not be any ongoing funded watershed programme in that village, and, consequently, there might be a tendency amongst these institutions to piggyback on the meagre resources of the PRI, which should not actually be the case. The above linkage framework, should, therefore, clearly stipulate that the responsibility of resource generation for a particular climate change adaptation measure should be that of the respective village-level institution. In some other instances, e.g. in Billipada village, traditional institutions have been diminished in role by socioeconomic changes and government policies, but the importance of traditional knowledge inherent in such institutions was much evident in Baliguali village where the JFM committee under the leadership of traditional village elder has developed enduring and harmonious synergy with the village disaster management committee. Indeed, traditional authorities have also been accused of elite-capture and promoting inequalities, but as the illustration of Baliguali



village shows, properly crafted synergy amongst adequately empowered plural institutions do address the weakness of existing institutions.

**Protect and develop forest resources and institutions.** In almost all villages, the local forests/ plantations provided not only the needed physical defense from climate disasters such as flood and storm, but also provided essential livelihoods resources (e.g. food, fodder, fuel, money) for survival needs during the disaster-struck period. As per 73<sup>rd</sup> Constitutional Amendment states may delegate responsibility relating to social and farm forestry to the PRIs, while management of natural forests is in the domain of JFM committees under the Forest Department. There have been long drawn discussions around developing synergy between these two institutions as it will be difficult to separate the planning and management of social forestry / farm forestry plantations from that of natural forests. Both PRIs and JFM committees have their own strengths and weaknesses. For example, a JFM committee being apolitical body is usually able to mobilise support of all inhabitants of a village / hamlet around the issue of forests which are considered a village resource (rather than a resource over which some groups may have preferential claims), than the political Gram Panchayat where decisions are contested on the basis of class, caste and party lines. Many JFM committees vociferously oppose any organic linkage with PRIs, much less working as one of their sub-committees. But under the current constitutional framework, JFM committees can't work in isolation of the PRIs. The new Schedule Tribes and Other Forest Dwellers (Recognition of Forest Rights) Act 2006 has opened up new opportunity in this regard, which must be extended to cover social/ farm forestry plantations and aspects related to climate change adaptation.

**Link SHG movement with climate change adaptation.** Recent successes in the fields of micro-credit and micro-insurance have increased access to financial resources and could play a role in financing adaptation at the local level. The SHG-based schemes of the government should incorporate

climate change adaptation practices as bankable activity, and such activities may be given preference provided these are part of overall village climate adaptation plan endorsed by the Gram Sabha.

**Involve those at risk.** Involving persons at risk in the process of adaptation, the intended beneficiaries, can increase the effectiveness of adaptation to climate change. For example, the participation of at-risk farmers in my focus group discussions provided guidance on risk perceptions and information needs that could contribute to brochures for public education and lead to development of practical options for water and agricultural practices and policy. This experience also demonstrated the potential of participatory approaches for focusing attention on risks that are priorities to the vulnerable, learning from risk management practices currently in use, identifying opportunities and obstacles, applying evaluation criteria that are relevant and credible to at-risk groups, drawing on local knowledge and expertise for identifying appropriate strategies, and gaining local ownership for proposed options. A common result of involving those at risk is that it forces climate risks to be examined in context with other problems that are priorities for the community and gives emphasis to solutions that can be combined to attain multiple objectives. This can help mobilise local support and resources that are necessary for successful adaptation. It might, therefore, be useful to constitute a standing committee of Gram Panchayat on climate change adaptation.

In the end, my field study also provides enough evidence that the experience of flood and other disasters are quite relevance to climate policy makers. It also points out to the fact that there are certain regions of the country, such as the coasts, where occurrence of extreme events especially cyclones and storms is very high. Therefore the people in these regions have not only been especially vulnerable in the past, but there is a higher probability of them being vulnerable in the future periods also because of the projected climate change. Therefore a suitable climate change adaptation policy for them should also include their past

vulnerability also, and in all such cases specialised programmes should be initiated for building the capacity of the PRIs. The need for a special programme, to implement this policy, is based also on the argument that being vulnerable in the past also has an important implication for the future adaptive capacity of the people. The adaptive capacity of the people in these regions becomes less as for the past many seasons they have been vulnerable and this drains out their resources for adaptation at future time periods. Assuming a finite time period and limited resources framework for the people the results can be very interesting. Given the limited resources the people have to allocate these resources throughout the time period of their survival. Therefore being vulnerable for a greater period is like having more strain on their present resources. Therefore these people face a steeper budget constraint. The trade-off between their resources and adaptive capacity is much stricter. All these findings should be addressed and incorporated while forming a suitable climate change adaptation policy for them.

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