2007 Floods in South Asia: Understanding for Action

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From an Effort to Turn Local Tsunami Recovery into Regional Disaster Risk Reduction for the Poor

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Top front page picture:
Sharv Sime slum in Madhubani district, Bihar state. This village was heavily affected during the flood in the last week of July 2007; water logging continued for a week. Many people lost their livelihood and house. AIDMI is currently supporting relief activities in the form of food relief. Later, the Livelihood Relief Fund, insurance and advocacy will start. So far, the 140 families that live here received 25 kg of rice and Rs. 250 from the local government.

Bottom front page picture:
Dabbavas Thakorvas slum in Nadiad. A truck is used to pump water out of the slum during the monsoon. See also the article Floods and communities, page 9.

In this issue

KEY IDEA

How to Work on Floods?

Looking at the history of floods in Southasia, 2004 and 2007 rate as two of the worst flood years of the past two centuries. This time Bihar had to bear the major brunt of the disaster, with 21 million population affected. The increasing trend over the past decades regarding frequency and scale of floods is alarming. Experts already pointed out that floods are not caused by nature's fury alone but also by other factors. With some degree of precision one could observe that with the rising number of embankments, which were meant to regulate the water flow, the areas that are being flooded have increased in a parallel manner. It is therefore not far off the mark to conclude that the prevailing flood management strategy has done more harm than good. Moreover, other factors like population increase, changing settlement patterns and climatic change exacerbate the situation as well.

Humanitarian actors - involved with a certain regularity in flood relief operations in Bihar, Assam or other areas of Southasia - may increasingly feel desperate and hopeless, as there does not seem to be a way out of the catastrophic conditions prevailing in the worst affected areas. Flood disasters do not come alone; hunger, malnutrition, diseases, debt crisis and migration follow in their wake. How to address all these issues? And how to work on more sustainable solutions instead of just repeating the same relief operations, although they may address the need of the day, over and over again?

Only time will tell whether the flood control-establishment will change. But how could it change for the better? It seems that for enhancing more relevance in disaster management solutions participation of local communities with their vast experience in living and coping with floods has to be ensured. This is valid particularly for marginalised groups which normally get most affected by disasters. Therefore, the Government and relevant relief agencies from outside should involve networks representing the interests of local communities and NGOs already working in the affected areas as major stakeholders in disaster management. Well concerted and coordinated efforts of all important stakeholders may lead to a more holistic approach in disaster management, thereby taking into account local needs and expertise to an optimum. ■

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Programme Coordinator, Swiss Red Cross

This special issue of *southasiadisasters.net* is the second of a series of three on flooding in South Asia. In this issue international policies on flood preventation and mitigation in South Asia, lessons from the Tsunami Evaluation Coalition will be discussed. Based on interviews with local governments in Surat, Vadodara, Nadiad and Kheda the way municipalities deal with floods will be explain. Final and article on floods and communities will give more inside in the way vulnerable communities live.

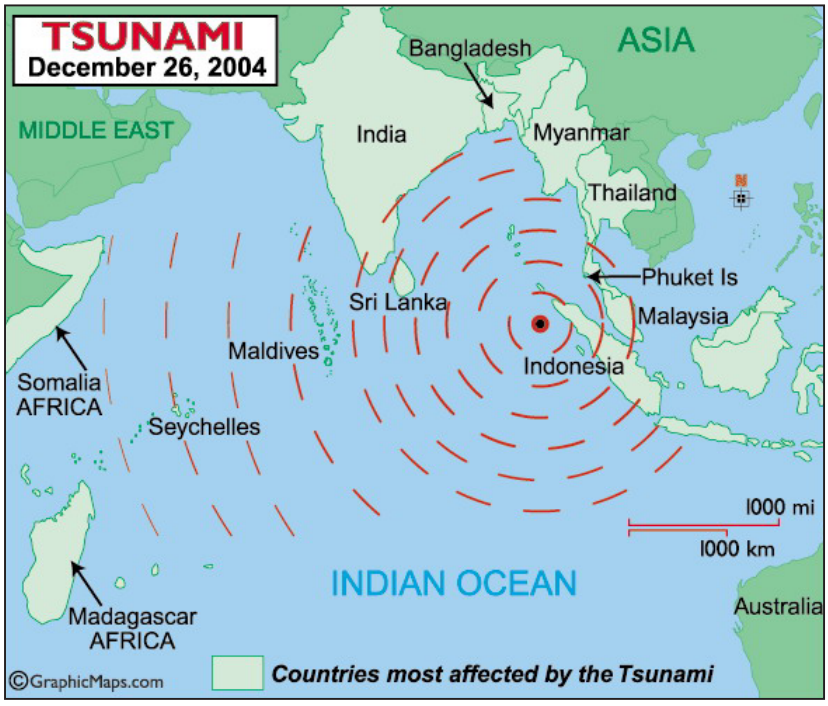
2007 Flood Recovery Agenda for International Agencies: Lessons from the Tsunami Evaluation Coalition (TEC)

Again, heavy monsoon rains caused many rivers to overflow and flooded several South Asian countries. Thousands of people lost their lives, hundreds of thousands have become homeless and jobless, and many more have been affected in one way or another in Nepal, Pakistan, India, Bangladesh, Myanmar, and Sri Lanka. Again, agencies will come to affected areas with relief and rehabilitation packages. Relief materials will be distributed, partially damaged shelters will be repaired, and temporary and permanent shelters will be constructed. Some initiatives such as cash for work (e.g. for cleaning up debris dumped across by floods) and cash for shelter will be taken up to temporarily restore livelihoods of those affected. The agencies will then move out and the same story will repeat with another flooding...if history is to repeat itself.

Disasters undoubtedly bring grave consequences for many. Still, they provide an opportunity for sustainable and hazard-resistant development and social transformation towards disaster resilient communities. The lessons and recommendations offered by the Tsunami Evaluation Coalition (TEC) reviews are highly useful for current flood recovery efforts. The TEC was a coalition of 45 local and international agencies that dedicated themselves to learn, from the tsunami, how to "do" humanitarian work better. **The TEC primarily advocates for a fundamental reorientation of the international humanitarian community from supplying aid to supporting and facilitating communities' own relief and recovery priorities.** The bullets below discuss the lessons from the TEC reports that are especially relevant to 2007 flood recovery in the South Asia region.

Support local communities and institutions in managing their own recovery

- Intervening agencies need an ability to recognise and identify local capacities and the need to include local communities in planning and decision-making through participation and consultation, and commitment to devolve decision-making as far as possible.
- Capacity should be defined in relation to not only skills and training, but also the empowerment of poorer and marginalised groups. The capacity of a community to resist disaster is particularly sensitive to this. It includes not simply identification of such groups but ensuring that



Source: worldatlas.com/aatlas/infopage/tsunami.htm

The Indian Ocean tsunami in December 2004 had devastating effects in many countries on the Indian Ocean. In February 2005, after immediate response to the disaster was over, several humanitarian agencies came together forming the TEC to promote learning from the tsunami response. The coalition aims to improve the quality of humanitarian action by studying the international response to the tsunami, and to provide accountability to donors and affected people.

particularly their voices are heard in decision-making.
- Marginalised groups should improve their position in relation to communities, and communities in relation to district and national authorities. The basis for this process is empowerment through the strategic management of information, and strengthening downward accountability. Advocacy is also an important element but should be based on enhanced local capacities rather than external interventions[1].

Develop a system to rapidly assess disaster damage and needs of the affected

- The international community, and in particular the UN and the Red Cross movement, should either significantly invest politically and financially in a permanent rapid assessment capacity, or abandon the pretence that initial cross-sectoral assessments by external teams guide the immediate international response of governments, the public or humanitarian organisations.
- Donors and agencies should focus their investment on higher quality needs assessment for recovery and rehabilitation.
- In the first few days after a disaster, needs assessment should focus on validating the magnitude and severity of the disaster. For this purpose, donors should assist national authorities in capitalising on remote sensing and other modern techniques.
- Empower the affected individuals or families to assess and prioritise their own welfare needs by using cash subsidies whenever possible.
- Initial assessment teams should routinely include selected mass media representatives[2].

Collaborate with affected communities, government agencies, and civil society organisations

- The international community should ensure that sufficient priority is given to enhancing the coordination capacities of local as well as national government bodies. This would include, for instance, deploying senior staff beyond capitals and helping to build the capacity of local authorities to utilise information systems such as Humanitarian Information Centre. Where large numbers of INGOs are anticipated, the deployment of a senior NGO liaison officer should be considered.
- Effective, consistent and coordinated communication with recipient populations at all stages of the response—and with a concerted effort to include women in the dialogue—should be prioritised. This should entail dedicated staff resources and tools, with efforts made toward reaching a communications protocol with the host government. A common strategy should be developed, including the use of public meetings, broadcast media, newsletters and posters.
- The creation and use of a common beneficiary database, provided and endorsed by a central government body, should be an early priority in the emergency phase[3].

Pay special attention to financial transparency and optimum utilisation of local resources

- Accountability and transparency of intervening agencies should be improved, particularly with respect to financial tracking and reporting.
- Local resources and capital should be valued[4].

Focus on integrating disaster recovery efforts with sustainable development

- Links between Relief, Rehabilitation, and Development (LRRD) must be more firmly rooted in national and local contexts and processes.
- Once links between relief and rehabilitation have been achieved, greater attention needs to be paid to the implications of programming for longer-term development.
- For poverty alleviation, interventions need to be better related to ongoing trajectories.
- More consideration needs to be given to reducing risks of natural disasters, and anchoring such strategies within national structures for social protection.
- Links between policies and programming should be made by sector and through support to national and household efforts to bring together relief, rehabilitation and development[5]. ■

1 Scheper, B., Parakrama, A., S Patel, S., 2006. Impact of the Tsunami Response on Local and National Capacities. Tsunami Evaluation Coalition, London.

2 de Ville de Goyet, C., Morinière, L., 2006. The Role of Needs Assessment in the Tsunami Response. Tsunami Evaluation Coalition, London.

3 Bennett, J., Bertrand, W., Harkin, C., Samarasinghe, S., Wickramatillake, H., 2006. Coordination of International Humanitarian Assistance in Tsunami-affected Countries. Tsunami Evaluation Coalition, London.

4 Flint, M., Goyder, H., 2006. Funding the Tsunami Response. Tsunami Evaluation Coalition, London

5 Christoplos, C., 2006. Links between Relief, Rehabilitation and Development in the Tsunami Response. Tsunami Evaluation Coalition, London.

Urban Risk and Flooding: The International Agenda in South Asia

In order to investigate the international agenda on urban risk and flooding, a selection of organisations that are actively engaged in this field is made. This selection is not meant to show the "best" practices or organisations but to give an overview of several international organisations related to disaster risk reduction in South Asia. The policies and activities of the following organisations will be discussed: the UN International Strategy for Risk Reduction, United Nations Development Plan, Asian Flood Network, Associated Programme on Flood Management, World Bank, Oxfam, Asian Development Bank, Christian Aid and Action Aid.

President Arryo of the Philippines (left) and Haruhiko Kuroda, president of the Asian Development Bank, during the hand over of a grant to the Philippines to assist the country in the aftermath of landslides in 2006.

Source: www.op.gov.ph/photogallery_191206_pc5.asp

The UN International Strategy for Disaster Reduction (ISDR)

As the successor to the 1990-1999 International Decade for Natural Disaster Reduction (IDNDR), the International Strategy for Disaster Reduction was adopted by the United Nations General Assembly to provide a global framework for action to reduce human, social, economic and environmental losses from natural hazards and related technological and environmental disasters[6]. On the UN World Conference on Disaster Reduction (WCDR) in 2005, the Hyogo Declaration and the Hygo Framework for Action (HFA) were adopted. This framework is also highlighted in earlier issues of *southasiadisasters.net*. Among other things, the HFA outlines key elements of disaster risk reduction. The first key element is the involvement of all stakeholders in disaster management during, before and after a disaster. Secondly, the HFA pleas for integration of disaster risk reducion in development plans. The HFA is a general framework for disaster risk reduction, it is not specified for types of disaster or geogaphical location. Additionally, the ISDR developed guidelines for reducing flood losses in 2001. These guidelines focus on socio-economic aspects of water related disaster response, key elements of flood management, flood forecasting, warning and response systems including: conducting a vulnerability assessment, use of Geographic Information Systems, risk mapping, structural measures as dams, diversions and channels, establishment of insurance measures, anticipation of climate change effects, international and inter-agency collaboration and training.

United Nations Development Programme (UNDP)

The UNDP engages in disaster management through the Disaster Reduction Unit (DRU) of the Bureau for Crisis and Prevention. Disaster Mitigation and Vulnerability Reduction has been included as one of the five thematic areas of the 2003–2007 Country Programme. The main objectives under this theme are to mainstream the community-based approach for achieving the integration of disaster management in the national and state development agenda and to enhance capacities at various levels[7]. This reminds us of the goals of the Hyogo Framework for Action. In India, the DRU established a national Disaster

6 www.unisdr.org/eng/risk-reduction/sustainable-development/cca-undaf/*Integrating-DRR-into-CCA-UNDAF*.doc.

7 http://www.undp.org/bcpr/disred/english/regions/asia/india.htm

Risk Management Programme in which the Ministry of Home Affairs and other key stakeholders are involved. In this programme communities are helped in disaster preparedness, drills are facilitated as part of preparedness, a national plan for Disaster Management Training is established and technology transfers in various sectors are done. In addition, a Gujarat Disaster Management Programme was started though activities are mainly related to earthquake preparedness and drought prevention. The DRU started a programme on urban risk in African countries as well; however, no special focus for urban risk and/or urban flooding in the Asian—except for India—context was found.

United Nations Centre for Human Settlements-Habitat (UNCHS or UN-HABITAT)

The mission of UNCHS is to improve the sustainability of human settlements and prepare communities to prevent risks and threats. This is done through the Disaster Management Programme (DMP) by developing techniques for disaster management, initiating training programmes, promoting cooperation and strengthening coordination[8]. Since understanding vulnerability is key in understanding disasters, vulnerability assessments are priority for the DMP[9]. UNCHS is engaged in a partnership with the ISDR. Current programmes in Asia are the Water for Asian Cities Program (WACP) and the Safer Cities Program, which concerns crime and violence in Asian cities. In India, the WACP focuses on the state of Madhya Pradesh. No further specific programmes related to urban risk and disasters are found to be undertaken by UN-HABITAT.

The World Bank

The World Bank is active in the field of urban risk through its Disaster Management Facility, which is now called the Hazard Risk Management unit (HRM). This facility was created in 1998 to establish a mechanism for integrating disaster prevention into development planning and to improve emergency response lending. For the HRM, urban areas form a centre of wealth and human resources; urban areas are identified as areas for investment. The World Bank engages in two types or urban lending in relation to disasters. The first type is lending for reconstruction following a disaster. The second type is proactive lending for mitigation to reduce disaster vulnerability. Projects concentrate on repairing infrastructure and management of the local economy. Mitigation funding is more limited and less widespread than reconstruction funding. Brazil, China, Bangladesh and India account for 40 percent of the mitigation budget, with 93 percent addressing floods, forest fires or droughts. However, the World Bank is striving to give more focus more on the prevention and mitigation of disasters[10]. By making disaster prevention and mitigation activities central components of future project loans, the World Bank is able to put pressure on national planners to integrate disaster planning with development planning[11]. In 1999, the World Bank launched its new urban strategy: The Urban and Local Government Strategy. The goal of this strategy is to (a) improve living standards, (b) provide a competitive environment for the private sector, (c) support effective management and good governance of urban areas based on partnerships, and (d) support consistent and sound financial policy[12]. In March 2007, the World Bank initiated a new policy that establishes a new mechanism that will provide initial funding for critical start-up activities within a few weeks of a disaster. The time taken to disburse funds for longer-term reconstruction will be cut from nine months to a targeted 12 weeks by simplifying administrative and processing procedures in the critical early stages of recovery. Current projects in India include the Gujarat Emergency Reconstruction Project, Mumbai Urban Transport Project, Karnataka Urban Water Sector Improvement and the Third Tamil Nadu Urban Development Project. Around 7–12 percent of lending amounts goes to urban lending.

Though the World Bank is active in urban management and development, the World Bank is heavily criticised for its lending policy, which tends to support large-scale resource exploitation and technical environmental projects. This is also true for its urban development policy where the World Bank has supported large-scale technocratic approaches to environmental risk with investment in physical rather than social infrastructure. The root causes of environmental problems is seen as financial scarcity with targeted and conditional loans as the solution. This

8 http://www.unhabitat.org/content.asp?typeid=19&catid=286&cid=203

9 http://www.unhabitat.org/downloads/docs/866_14075_Vulnerability.pdf

10 http://discuss.worldbank.org/content/interview/detail/1010/

11 Gilbert and Kreimer, 1999. Gilbert, R and Kreimer, A (1999) *Learning from the World Bank's Experience of Natural Disaster Related Assistence*, Urban Development Division working paper series #2, World Bank, Washington DC in: Pelling, M. 2003.

12 http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTURBANDEVELOPMENT/0,,contentMDK:20158153~menuPK:337186~pagePK:148956~piPK:216618~theSitePK:337178,00.html

mode of working stimulates ineffective projects since it overlooks local participation and handling of large investments through government institutions that often lack transparency and accountability[13].

Oxfam International

The activities of Oxfam target poverty reduction through: food and income security, labour and trade advocacy, healthcare, education, emergency response, conflict prevention, promoting political and societal participation and identity promotion. Oxfam International does not have a specific policy on urban risk. Floods are dealt with as part of emergency responses. Examples include the Oxfam response in Peru in 2000, Haiti in 2005, Gujarat, India in 2006 and Jakarta, Indonesia in 2007[14].

Asian Development Bank (ADB)

The ADB recognises the high rate of urbanisation in Asia in the last 50 years. It expects that over 50% of the Asian population will live in urban areas by 2020. Therefore, the ABD marks urban areas as important points of the economy. In order to be more active in urban areas, the ABD developed the Urban Sector Strategy. The strategy focuses mainly on economic development in Asia. The strategy entails the following objectives,

(a) maximising the economic efficiency of urban areas,
(b) reducing urban poverty,
(c) improving quality of life, and
(d) achieving more sustainable forms of urban development.

These objectives are to be achieved through urban sector policies for,

(a) encouraging good governance,
(b) improving urban management,
(c) mobilising financial resources,
(d) reducing urban poverty, and
(e) addressing urban development sectors as water supply, sanitation, solid waste management, land management, transport and housing.

Though these policies can contribute to disaster risk reduction, and in this context flood prevention and mitigation, there is limited focus on disaster management. Urban risk and disaster management are mentioned as a sub section in the policy on improving urban management. The policy on urban management entails,

(a) institutional strengthening and capacity building,
(b) Urban Land management,
(c) urban environmental management.

The mentioned part on disaster mitigation is highlighted in part c: urban environmental management. The following aspects of disaster mitigation are mentioned: an active role for the government, local community and the private sector and preparedness programmes should be in place in order to reduce loss to disasters. Disaster management and risk reduction measures are not included in the policies of Urban Sector Strategy[15]. In the last 10 years, the ADB has engaged in over 200 projects (loans, technical assistance and grants) which were directed at urban development, mainly development of infrastructure, housing and transport. Recent examples of projects in India are the Rajasthan Urban Development and Infrastructure project, Urban Water Supply and Environmental Improvement in Madhya Pradesh and the establishment of the Urban and Environmental Infrastructure Fund. ADB has also recently undergone a review of how it engages community based organisations in disaster risk management.

Christian Aid (CA)

From the point of view of CA, emergency response is one of the compounding elements of addressing poverty in Asia. CA works alongside local partner organisations and builds upon their local knowledge. It provides resources for the local partners engaged in emergency relief. CA provides their partners with technical support and resources to run emergency response programmes and to include risk reduction into the long-term work of the partner organisations[16,17]. Furthermore, CA engages in advocacy in lobbying national governments and international organisations to work on vulnerable conditions of the poor. CA sees community action as the key to emergency response but states that for community based action, early warning systems need to be in place. Christian Aid took action in India in 2006 in the flood-affected states of Orissa and Gujarat[18].

Action Aid (AA)

AA sees disasters as unpredictable events that will have the greatest impact on the poorest in society. Apart from the often-dangerous locations that poor people live in, the lack of awareness and poor access to information and education are marked as compounding elements of

13 Pelling, M. 2003
14 http://www.oxfam.org.uk/what_we_do/index.htm
15 http://www.adb.org/Documents/Policies/Urban_Sector/urban0202.asp?p=policies
16 http://www.christian-aid.org.uk/world/emerresp/emerresp.htm
17 http://www.christian-aid.org.uk/world/emerresp/response.htm
18 http://www.reliefweb.int/rw/RWB.NSF/db900SID/OCHA-64D4JX?OpenDocument

vulnerability. Practical efforts of AA include training local communities in first aid and rescue techniques, equipping community volunteers with radios for more effective communication, disaster education in schools, village plans and making risk maps. AA states that many countries do not acknowledge the importance disaster preparedness. Furthermore, AA has accepted the Hyogo Framework for Action as a guiding thread and is lobbying with countries to comply with this framework. AA focuses on schools as main centres for disaster prevention and mitigation[19]. AA is active in 14 of India's 32 states: main activities include poverty reduction strategies, promoting effective governance, supporting woman's rights, supporting the poor in vulnerable situations, and helping the poor in exploring financial possibilities. These activities are taking place in poor villages and slums in urban areas. Emergency response to natural disasters entails the provision of food, shelter and medicines[20]. During the 2006 floods in Gujarat, AA's partners took action in evacuating people from affected areas, providing meals, working with local authorities to ensure proper sanitation facilities and safe drinking water, and advocating proper government response[21].

Asian Disaster Preparedness Center (ADPC)

The ADPC wants to increase the safety of communities by implementing programmes and projects that reduce the impact of disasters in Asia. ADPC activities include the strengthening of institutional arrangements, spreading and exchanging knowledge on disaster risk management and raising awareness.

From international perspective to local tradition.

Currently, several programmes are running mainly concerning capacity building and urban governance. No further specific programmes concerning urban risk of flooding in the Indian context are currently undertaken by ADPC.

Asia Flood Network (AFN)

The AFN is a flood mitigation initiative in Asia and is jointly implemented by USAID/OFDA, the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Geological Survey (USGS), in cooperation with regional partners in Asia. AFN is expected to continue through August 2008. Since 2001, USAID/OFDA has supported AFN to strengthen the capacity of regional and national institutions in climate, weather, and hydrological forecasting. Through AFN, USAID/OFDA and regional partners directly focus on reducing the vulnerability of high-risk communities to hydro-meteorological hazards by promoting information sharing of hydro-meteorological data and information on trans-boundary river basins[22]. The AFN is not active in relief operations; it assists in obtaining accurate data on meteorological events in Asia and thereby can contribute to preparedness to disasters.

Associated Programme on Flood Management (APFM)

The APFM is a joint initiative of the World Meteorological Organisation and the Global Water Partnership. It promotes the concept of Integrated Flood Management as a new approach to flood management. The programme is financially supported by the governments of Japan and the Netherlands. The APFM is supporting countries in the integrated management of floods within the overall framework of integrated water resources management. APFM is doing this through the concepts of Integrated Flood Management. This concept entails managing water resources in such a way that benefit from floodplains is maximised and losses of lives and assets due to flooding are minimised. First, it stimulates a participatory approach involving users, planners and policymakers, gender and cultural aspects. Second, it promotes integrated land and water management by making analyses on the way land and water characteristics influence each other. Third, it also seeks the positive elements of small-scale flooding such as the availability of fresh water. Finally, integrated hazard management approaches should be adopted by integrating risk management into wider risk management. Additionally, early warning and forecast methods should be refined and strengthened[23]. Activities in Asia so far are three pilot projects in Bangladesh, India and Nepal. These pilot projects focussed on community approaches to flood management. ■

19 http://www.actionaid.org/main.aspx?PageID=188
20 http://www.actionaid.org/main.aspx?PageID=23
21 http://www.reliefweb.int/rw/rwb.nsf/db900SID/HMYT-6TVLJF?OpenDocument&rc=3&emid=FL-2006-000070-IND
22 http://www.apfm.info/ifm.htm (accessed on 4-6-2007)
23 http://www.weather.gov/iao/BLT_AFN.php (acessed on 2-6-2007)

Floods and Cities

In the months of June and July, AIDMI teams visited the local governments of Kheda, Nadiad, Vadodara and Surat. The goal of these interviews was to get more insight in the manner that local governments view and act upon floods. It can be concluded that AIDMI learned a lot from these interviews since many local governments worked-and still work-very hard to deal with the recurring problem of flooding.

Location	Population	Area in km^2
Kheda	24,000	1
Nadiad	192,000	13
Vadodara (Baroda)	1,600 000	96
Surat	4,500 000	155

Indiranagar *slum in the West of Kheda. The thick line above the arrow indicates the flood level. In this slum, AIDMI provided support for livelihood, shelter, road, workshed and drainage building. Affected people were covered under a disaster micro-insurance scheme.*

Kheda

The city of Kheda is surrounded by the Shedhi and Vatrak rivers on the west, south and east side. During the monsoon season, many smaller rivers downstream also feed water into Shedhi and Vatrak rivers, causing the water level downstream to rise. The water that is flowing upstream of these little rivers is thus blocked. Therefore, Kheda City can become flooded when not even a drop of rainwater falls onto it. Especially low-lying areas on the riverbank are prone to flooding. In addition, one small low-lying area in the west of Kheda is vulnerable to flooding. The chief officer in this city emphasised that floods are very different from each other. In 2005, there was only one flood but its' magnitude was very high. In 2006, there were six much smaller floods; however, these floods caused more havoc and damage than the flood of 2005. Hence, here we have two very important characteristics of floods: intensity and frequency.

During floods, accessibility becomes problematic since roads are flooded or destroyed. The floodwaters transport enormous amounts of rubble and especially mud into the city. Layers of mud as thick as 2–3 feet were found in many places after the floods of 2005 and 2006. Another point of concern is water falling from terraces of houses. This water falls some 3-5m and can severely damage cement fillings between road tiles. On several places, roads are damaged and clay and sand under the road becomes humid. This further damages roads in the city. During a situation of flooding, the drainage system in the city is not capable of transporting the surplus of water. Further, drainage systems can also be damaged when the floodwaters reach a level of several meters, causing considerable pressure on the soil and present underground infrastructure. Even when a higher capacity drainage system is available, it would not be able to function properly when the floodwater level is several meters. Due to a lack of funds, Kheda does not have a fire brigade or boats that can be used for rescue operations during floods. When a flood occurs, help from other cities is needed and, fortunately, given. In this case, accessibility of the area is of course essential.

However, damage in the city is not only material. Especially during the repeated floods of 2006, people suffered psycho-social effects when they had to flee their houses six times in one monsoon season.

In what way does the local government deal with floods?

1. A number of vehicles are specially maintained. In this way, vehicles are ready to evacuate people in case of flooding. In addition, spare parts are kept in stock to keep the vehicles operational.
2. Leaflets are spread to inform people about the dangers of flooding.

3. People who can swim are asked to be ready in case of emergency.
4. A list of phone numbers of government officials is spread to improve communication during an emergency.
5. The government places emergency lights on houses and other buildings that provide light during the night.
6. During city planning, the danger of flooding is taken into account, for example in building roads.
7. People can come—and sometimes they do—to the municipal office in Kheda with ideas how to deal with floods.

In the beginning of the monsoon season, contacts are established with control rooms in Kheda district. In case of danger, representatives of the local government will go to flood-prone areas in Kheda and inform the people about the situation. In case of immediate danger people are asked—and sometimes forced when people want to stay—to leave their houses.

What possibilities did and do exist for disaster prevention and mitigation?
The chief officer explained that it might be possible to divert water from the source. This means that river arms further upstream have to be diverted into other directions or plains where the water will not affect populated areas. Protection measures can be built on the riverbanks in the west of the city to prevent the water from coming into the city. Further, roads can be built of better material so that they can survive flooding stress. From the interview, it became clear that for people living in low-lying areas it is not possible to move somewhere else since safer areas are already occupied or are too far away from Kheda City itself.

In Kheda, no concrete disaster management plans are in place. Plans are made by the Gujarat State Disaster Management Authority and then passed on to the cities. All contact with this government goes through the district collector. Further, the training of people—e.g. to learn to swim—is not possible due to a lack of facilities and funds.

We can conclude that despite the few resources that are available to deal with floods, the local government of Kheda is doing its utmost to handle the flood and to prevent disasters from happening. Hence, we see that resources are simply needed; disaster prevention is not cheap and will not be sufficient through quick fixes. Through the experiences in Kheda, we can see that besides the social aspects, technical aspects of disaster risk reduction are very important. Further, hydrological aspects as inflow of other rivers and the blocking of water by other rivers have to be taken into account, since this can cause flooding without rain coming to Kheda City directly.

Hanumannagar slum in the North of Kheda. AIDMI provided livelihood relief, shelter material, communal toilets separately for men and women, a washing and bathing place, a community water tank, road, trees and established a community resource centre as well as an insurance scheme.

Nadiad: Venice in Gujarat

Nadiad City is located about 60 kilometres southeast of Ahmedabad. It did not experience many floods in the past, though the city was almost completely flooded in 2006. What were the causes of this flood?

Nadiad is shaped like a saucer; high lying areas on the edges of the city, low lying areas at the centre. The nearest river is the Shedhi River which flows into the Sabarmati River. During the monsoon however, the high water level in Sabarmati River prevents the water from the Shedhi River to flow into it. This causes the water level in Shedhi River to rise and threaten Nadiad. Additionally, the geography of Kheda district is an important aspect flooding in the southwest of the district. Large amounts of water reach Kheda District from other districts and even from other states. Due to a decreasing slope gradient from the northeast to the southwest of the district, water will slow down as it flows to the southwest. Also, many rivers intersect in the southwest of Kheda District. All these factors combined with heavy rainfall during the monsoon can cause flooding. These geographical and topographical insights help us to understand the flooding situation in a better way.

During the flood of 2006, many people obstructed their neighbourhood or

society thereby forcing the water level to rise slightly and to flow to other areas in the city. Once floodwater enters Nadiad it is very difficult to get it out and in 2006 water logging continued for 1.5 months after about 400 mm of water fell onto Kheda in less than 72 hours. Infrastructure was especially damaged with many roads destroyed. The representative of the local government in Nadiad said that during the flood Nadiad "looked like Venice". Though this is a nice comparison, Nadiad is of course better off when it just looks like Nadiad.

Dabbavas Thakorvas *slum in Nadiad. Here, AIDMI established community resource center and provided livelihood support and insurance scheme.*

In what way does Nadiad deal with floods? Disaster management plans are in place; however, the official of the local government said that one can never plan for a disaster. Nadiad relies on its previous experiences though it has protocols on what to do in case of flooding. Besides plans that Nadiad has in place, the Gujarat State Disaster Management Authority (GSDMA) can always intervene in these plans and make adjustment. In the end, the GSDMA has to approve the disaster management plan in any city.

Medicines are stocked and disinfection powders are ordered. Pumps are ordered and old ones repaired. After the flood of 2006, the construction of a storm drain in Nadiad began and is now almost finished. In this way, it will be possible to drain floodwater out of the "saucer" of Nadiad. At the beginning of the monsoon season, a control room in the city itself is established. Information about rainfall, water level at dams and weather forecasts are updated here every 2 hours. In case of emergency, the local government has two satellite telephones; through this, communication is possible when land and mobile connections cannot be used. Further, a fire brigade is standing by. This fire brigade did a lot of good work during the floods of 2006. Finally, people or families who own tractors are asked to help in case a flood occurs. After the floods of 2006, the local government provided cash and shelter relief to those affected. Further, the official said that there was really a joint effort of the government and local people. People in the city immediately started to act upon the situation.

From this interview, we can conclude that besides the social aspects, challenges posed by topography and geography are also significant. The flood situation in Nadiad cannot be fully understood without taking into account these characteristics. A second important finding is that people immediately acted upon the situation and cooperated with the local government.

Vadodara (Baroda)

This city is located around 80 kilometres southeast of Ahmedabad. The River Vishwamitri flows through the city. The river is very narrow in the city; this causes the water level to rise quickly during times of heavy rain. Further, the Vishwamitri River intersects with a bigger river around three kilometres south of the city. Since the other river is much bigger in size and the angle at which the two rivers intersect is almost 90 degrees, water from the Vishwamitri River has problems in flowing into the other river. When the flow is faster and the water level is higher, the water from the Vishwamitri River is blocked. Consequently, the water level of the river in Vadodara will rise even more. This problem will be even worse when this situation coincides with high tide in the Arabian Sea, since the bigger river flows into it. During the monsoon season, minor floods occur every year. Once every 100 years a flood will occur as significant as that of 2005. In that year the water level rose up to 35 ft (10.7m) and 80% of the city was flooded. Large quantities of mud and clay were deposited by the water flow into the city. The zoo was also heavily affected, some animals died. Pipes for transporting sewage and water were broken and the water transported a lot of trash throughout the city. This choked drainage lines and exacerbated the situation.

In what way did—and does—Vadodara deal with the problem of flooding? As a precaution, empty drums are provided to people living in poor areas. In this way, the people will be able to build some rafts and save themselves. Information is spread through radio, television and leaflets. Also, a fire brigade with sufficient capacity is standing by in Vadodara and enough boats are available. The local government also placed emergency sirens on strategic places in the city to warn the population in case of emergency. Also, the local government is able to send mass-SMS messages to areas in the city to inform and/or warn people for possible danger. In city planning, special building codes are in place for flood prone areas and residential or commercial zoning in the city is restricted in those areas. The local government is planning to deepen and widen the Vishwamitri River in order to prevent the water from rising to quickly during rain and to create a faster and bigger flow in such a way that it can flow into the bigger river south of Vadodara.

Vadodara is able to design its own disaster management plans, though again the Gujarat State Disaster Management Authority has to approve the plan and is always authorised to make changes to the plans. The officials present at the interview said that there is only contact with senior citizens since inhabitants of slum areas do not come to the municipal office.

We can conclude that again geographical characteristics are important. The geomorphologic aspects of Vishwamitri River cause the water level to rise, and a part of the solution to prevent Vadodara from flooding is to deepen and widen the Vishwamitri River. Also, trash forms one of the biggest problems during floods since it will block drainage lines as it is transported by the floodwaters. Further, we can see that Vadodara has a sufficiently equipped fire brigade and boats for search and rescue and transport during a flood.

Aarab no Takiyo *slum in Vadodara. The slum is located near two large ponds that often overflow after heavy rainfall.*

Surat

Since 1968, Surat did not experience heavy flooding, until the 2006. Every three years, minor floods occur but no serious damage is caused. Every 5-6 years, Surat experiences a medium flood, examples are the floods of 1994, 1998, 2004. This pattern is quite regular over the years.

The flood of 2006 was unpredicted; Surat was not prepared. The Tapi River flows through the city to the Arabian Sea. In 2006, heavy rains occurred upstream of the Ukai Dam. The in–and outflow of water through the dam was not correctly regulated, it was a human error. In total, 20 lakh cusec (cu feet /sec) were released from the dam. A dam is one part of a river delta system and size, in–and outflow of the dam depend on the dimension of the catchment area, changes in water level due to rain (location and intensity) and the debit of the river. Based on these variables, water has to be released beforehand. The extra water can then be stored by the catchment area and river upstream of the dam. Further, during the time the water entered the city coincided with the ebb in the Arabian Sea; this caused a flow to the sea which was not smooth and regular. Though there are artificial embankments in the North of the city, the water overtopped these measures and entered the city. As in most in cities, slums were the most affected areas. Located in low-lying areas or near or on riverbanks, these areas are prone to flooding. An important factor in Surat is the high price of land. People in "legal" houses live in risky areas to be able to sell it later for a higher price. The government official stated that, "we can advise the people, but we cannot command them."

Most damage was done to the textile industry, then houses and slums. The highest measured level of floodwater was 24 ft (7.3 m). Also livestock and cattle died du to floodwaters. After the flood, a massive chlorination and insecticides/disinfection programme was started directly after the flood.

The supplies were brought in from all over Gujarat. Corporates and pharmaceutical companies even provided free medicines.

In what way did Surat deal with the floods? Because the flood in 2006 was so unexpected, the city was not prepared. Though some protection walls were built in the north of the city, these were insufficient to stop the flood water. During the flood, a lot of silt and clay was transported into the city. On many roads, the layer of mud was between one and three feet (~ 1m) high. It was not possible to use vehicles, there was no water and electricity and all other civic services were not available. Proper communication was not possible, so coordination and information transfer was difficult.

The government took the initiative in acting upon the disaster. A central control room was started which coordinated the activities. From all over Gujarat Sate, vehicles were provided to help the city clean. Two thousand vehicles were provided and used for the cleaning operation. Four lakh (4,00,000) metric tons of mud were been removed in 30 days through an enormous operation. During the cleaning operation, insecticides and sprays were brought in to prevent diseases. From cities in surrounding areas, many hurried to Surat to help and to serve. The people in Gujarat showed unity. Very soon, there was an enormous shortage of water and milk. Apart from the fact that water is a basic need, in Gujarat making *cha* (tea) is a part of life. Without *cha* people do not have a good beginning of the day. Further, facilities for food distribution were not sufficient. During the flood, the Indian Army assisted on many occasions. As much as 25 helicopters were deployed and saved many people.

New Ranchhodnagar *slum in Surat. This slum was affected by 2005 and 2006 floods. AIDMI provided livelihood support, insurance and established a community resource centre.*

After 2006

Before the flood of 2006, no proper disaster management plans were in place, now there are. A central control room as well as control rooms in every city zone have been established. The central control room is in operation 24 hours a day, the whole year through. There is also intensive contact with weather forecasting services now. In the last five years, disaster management plans have been developed. Each zone in the city makes its own disaster management plan. In making the plans the zones also communicate. The official of the local government further explained that local people do not come to the office with ideas. However, NGOs and experts on flooding were invited for meetings about disaster reduction. Further, risk maps are made for the whole city including elevation, dangerous zones and industrial hazardous locations. As in the other three cities, the local government makes use of newspapers, leaflets and radio to inform and warn people of flood-related dangers.

Protection walls have been repaired and heightened and stone pitching has been done at the Ukai Dam. This entails the placement of stones on sloped riverbanks to prevent erosion and damaging of protection measures. As in the other cities, the GSDMA gives instructions and checks disaster management plans of cities. GSDMA is always able to make changes in the plan according to their knowledge and experience. Trainings are conducted by the GSDMA, but no further training programmes are available.

Conclusion

Cities are very different; hence, problems of flooding in each city are also very different. The most important causes of flooding are:

- Heavy rain
- Geography and topography: the "saucer" of Nadiad, the shape of the riverbed in Nadiad, the slope gradient of Kheda District.
- Hydrological aspects: smaller rivers are blocked by bigger rivers; when small rivers feed into a river, cities can become flooded without a drop of rain falling onto them. Also heavy

rainfall combined with high tide in the Arabian Sea can result in flooding
- Uncollected trash in city streets blocks drainage lines, resulting in conditions for flooding. This is also a social problem; trash is thrown on streets and often not collected and processed in a proper way.
- Technical aspects: absence of protection measures, water falling from terraces causing considerable damage, insufficient quality of roads, absence of pumps and equipment.
- Mismanagement of infrastructure, e.g. of the Ukai Dam causing the flood of Surat, 2006. Very old structures are easily damaged or destroyed by floodwaters, e.g. a bridge in Kheda City, killing two women.

Similar Characteristics:
- When the need is very high, the army was brought in and helped the affected city in every district.
- Control rooms started functioning in the beginning of the monsoon season.
- In every city, enormous amounts of mud were transported into the city.
- In all cities, the population itself was very active during and after the flood.
- In all cities, the poorest were hit the hardest.
- The most important resources—especially in small cities—are the people themselves. As in Kheda and Nadiad, people started to act upon the situation immediately.

Cities cope with floods in the following ways:
- Maintaining a special number of vehicles in case of emergency (Kheda).
- People who can swim are asked to assist the local government in case of flooding.
- Families who own tractors are asked to stand-by in case of emergency.
- A list with phone numbers of key officials of the local government is made and spread.
- Leaflets are spread to inform the population about flood dangers.
- Emergency lights are placed during the night.
- Control rooms are established to keep an overview of the situation.
- Making disaster management plans (in bigger cities).
- Keeping medicines in stock.
- Keeping the fire brigade ready (Kheda does not have fire brigade).
- Cash and shelter relief after flooding.
- Using disinfection powders to prevent diseases.

AIDMI discussing the flood situation in Surat during an interview with Mr. R. P. Patel of Surat Municipal Corporation.

What are the possibilities for flood prevention and mitigation?
- Diverting water from the sources into unpopulated areas (is very expensive).
- Providing funds for equipment (fire brigade, boats, rescue materials).
- Providing funds for training of people in vulnerable locations and facilities (e.g. teaching people how to swim, make rafts, etc.).
- Improving existing protection measures.
- Improving dam management.
- Designing proper disaster management plans, tailor-made in each city itself. Of course, these plans can be discussed with the GSDMA. However, the city itself is the most knowledgeable.
- More involvement of the poor in making plans. Involvement and intensive communication is the only way to come to durable solution for people living in vulnerable areas.

No outbreaks of diseases are reported in any of the four cities due to massive provision and use of disinfection sprays and powders. Further, in every city the GSDMA has a decisive role. Each plan has to be checked and approved by the GSDMA and can be adapted. This might influence the context specific character of the problems in each city. As we can learn from this article, the smaller cities have to endure the most hardships since they are lacking funds to effectively work on disaster risk reduction for the poor. ■

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5. Mr. R. P. Patel, Deputy Town Planer, and Liasoning Officer, Surat

Floods and Communities

This article is based on surveys in Kheda, Vadodara and Nadiad, conducted by AIDMI. Surat was not included in this survey. This short article gives an overview of the situation of people living in urban areas affected by floods and pleas for a context specific understanding of a flood situation.

In all three cities, people in the slums mainly work as small vendors or labourers. Many people lost their houses, worth between Rs. 20,000-50,000/-, although the slum in Baroda was hit the hardest. In addition, many assets of families, such as furniture, utensils and electrical equipment, were damaged. Relief was provided in the cities. Relief was given after approximately three weeks in Kheda, six weeks in Vadodara, and up to eight weeks in Nadiad. Despite the long waiting time, only people Nadiad reported that relief was not on timely and insufficient to meet their basic needs.

Considering the long delay in the arrival of relief, this is understandable. Further, in all cities, all interviewed people carried on with the same livelihood activities after the flood though in many cases income dropped by about 30%. This had a large impact since incomes before the floods were just enough to meet basic needs. Also, all interviewed people continued to live on the same location after the floods. In Kheda, about half of the people have outstanding loans of between Rs. 4000–50,000/-. In Vadodara and Nadiad, very few people in the slums had outstanding loans. After the floods, most people invested in their houses and needed equipment for their livelihoods.

The community resource centre (CRC) in Aarab no Takiyo *slum, Vadodara. Here, the community can discuss problems and have meetings with AIDMI teams. Also, the CRC is used as a small school to educate children who cannot attend primary school. However, this is not a substitution of primary education.*

In Kheda, about half of the people in the slums have opted for microinsurance to protect against future disasters. In Vadodara, most people have insurance, however not for medical issues. In Nadiad, many people do not have insurance. In Kheda, many families declared they would be in great trouble if the man, in most cases the breadwinner, would fall ill or die. In this case, the wife of the man is not earning enough to provide for the family. When children are old enough though, they can assist in making a livelihood. In Vadodara, about half of the families declared to be in serious problems when the income-generating person would fall ill. In Nadiad, most families declared that they could manage when the breadwinner would not be available. In Kheda, Vadodara and Nadiad communities expressed that raw material (such as grain or inputs for livelihood: wood for making bats or bamboo to construct new houses; and money in the form of loans) were the most pressing needs. In being asked what people would do in case of a new flood, most people answered they would go to a safer place faster, keep household kits in a safer place, take important documents with them, save money in preparation and if possible get insurance.

Again, we can see that slums in different cities face a variety of different problems. As mentioned earlier in this edition, every flood situation is different. Every slum needs to be examined in its own context. ■

Bihar Flood Damage and Needs Assessment

Severe floods hit the Northern state of Bihar, at the end of July, affecting over 10 million people leaving over 100 people dead. Immediately AIDMI responded and carried out a damage and needs assessment in Madhubani district, one of the poorest and hardest hit districts in the state. In the next issue of southasiadisasters.net, titled: 2007 Floods in South Asia: From Impact to Knowledge, more information about the Bihar floods and activities of AIDMI will be presented.

Community discussion
Hasmukh Sadhu facilitating a meeting with a local organisation and the community to discuss about immediate and transitional needs in "Navghachia Village".

Discussing with affected people Bihar
Chundari Devi, living in an urban slum in Patna, informed AIDMI about water logging and floods in their slum areas and loss of livelihood opportunities

Discussing with local government
Mr. Chandrabhushan, from a local organization, explaining AIDMI about the loss of livelihoods and constraints to responding.

Temporary shelter
Heavy rains and floods destroyed the house of Kosi Devi and left her in this temporary situation with three children. As their land is also washed away, they are not able to harvest this year.

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Note: This issue of southasiadisasters.net is prepared by AIDMI with major contributions from Jaap Vuijk, Jyotindra Sapkota and Manish Patel.

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