

RIJS

Volume 1, Issue 10 (October 2012)

ISSN: 2250 – 3994



A Journal of Radix International Educational and
Research Consortium

RIJS

**RADIX INTERNATIONAL JOURNAL OF
RESEARCH IN SOCIAL SCIENCE**



CHALLENGES FOR REHABILITATION OF NORMAL LIFE LIVING FABRIC AFTER 2008 FLOOD DISASTER

A Case Study of Krishna and Tungabhadra River Valley Of Raichur District.

Mr. Sathish S, Phd Student (corresponding author)

Institute of Development Studies,
Manasagangothri, University of Mysore

Dr H.N. Nagendra

Associate Professor in Urban and Regional Planning
Institute of Development Studies
Manasagangothri, University of Mysore

Mr. Ravi G, Phd Student

Institute of Development Studies
Manasagangothri, University of Mysore ,Mysore

ABSTRACT

Krishna and Tungabhadra surrounds the Raichur district in north and south side respectively. Expect the central part of Raichur district, which is called Raichur dob, the area which is around the periphery of district are in plains. Black clay soil which is a major material is a

very fine clay. This clay supports plant life with minimum water requirement. Wetness maintained by fine clay is the best supportive system for growth of plant life. They supply water/moisture for rapid growth, with abundant sunlight and clear sky of plains plant grows to the fullest extents.

Constant soil erosion to the plains brings in much needed salts/nutrient's to the plants and water based life in abundance. Only when there is no rain the area suffers sever draught and creates major stress to supportive system and causes massive migration to greener areas. As weather conditions are often repetitive of the plains, the clouds will float high and move at faster speed to other areas. Since there is no obstruction, the clouds will never come down as rain by using temperature differences. The rains can be expected in the plains only when soil gets heated beyond its critical temperature needed. Rapidly it rises to the sky to push the floating clouds to higher colder zone. Since the clouds are entering the higher colder zone it gets condensed and the clouds precipitate in the form of the rain.

When it rains in watershed areas, the fine black clay will not allow the water to go below 2 meters. Water remains at the top layer for most of the time which creates the rapid water moments on the surface, if there is a higher incidence of continuous rain in a small confined area which brings in rain water at rapid speed resulting in flash floods. If these flash floods happen critically in sensitive areas major disasters take place. Major river courses are already having minimum slope to drain the water, which gets flooded when there is a flash flood to the extent of more than one meter in the surrounding 10-15 km of the river course. Most of the human settlements are very near to the river course and in critical low zones which can be affected severely any time when there is occurrence of flash floods. This flooding can be expected only during October and September where the last instalment monsoons heavy clouds which are passing over the high elevation on plains.

Human settlements get disturbed by flash floods in the study area of Raichur district with a cyclical flood repetition of 35-40 years. It is observed that this gap of cyclicity is getting reduced due to vagaries of climate. Any post mitigation efforts made will only sever the immediate temporary need but will not solve the affected sustainable life fabric. Rejuvenating the affected life fabric is more severe than pre flood mitigation. Adaptive planning and strategic guidelines will retain sustainable life fabric intact during and after floods. This strategic approach to planning will avoid an emergency mitigation effort which takes more the 90 per cent of the post flood funds for bringing back the life fabric into continuous process. These flood mitigation efforts will reduce expensive flood mitigation funding.

Keyword: Flash floods, Sustainable life fabric, Massive migration, Flood mitigation

FLOOD DISASTERS

Normal floods are expected and generally welcomed in many parts of the world as they provide rich soil, water and a means of transport, but flooding at an unexpected scale (damaging flood) and with excessive frequency causes damage to life, livelihoods and the environment. Over the past decades, the pattern of floods across all continents has been changing, becoming more frequent, intense and unpredictable for local communities, particularly as issues of development and poverty have led more people to live in areas vulnerable to flooding. The *Fourth Assessment Report* (2007) of the Intergovernmental Panel on Climate Change (IPCC) predicts that 'heavy precipitation events, which are very likely to increase in frequency, will augment flood risk'. These floods will affect life and livelihoods in human settlements in all areas, e.g., coastal zones, river deltas and

mountains. Flooding is also increasing in urban areas, causing severe problems for poor people.

Floods by nature are complex events caused by a range of human vulnerabilities, inappropriate development planning and climate variability. Floods can be predicted to a reasonable extent, with the exception of flash floods, whose scale and nature are often less certain (ADPC, 2005). Flood disaster striking at long and uneven occurrence in more than 20 years cycle will call for newer strategies than the predicted floods management.

Box 1. Types of floods

Type	Duration	Characteristic impacts
Predictable, regular flooding	Up to 3 months	Blocks access. Damage and displacement of population often relatively low depending on levels of protection.
Increased size of regular flooding	Up to 6 months	Blocks access to many areas. Greater potential for infrastructure damage, livelihoods impacts, and large displacement of population.
Flash flooding	A few days to weeks	Rapid cresting often with little warning. High velocity flood flows can destroy infrastructure. Population displacement often localized.
Urban flooding	A few days to weeks	Can be rapid-onset, often coming from flash floods in urban rivers or from saturation or blockage of urban drainage systems. Potential for infrastructure damage affecting larger service area. Population displacement often localized.
Coastal flooding	A few days	Often combined with wind damage from storms. Damage and displacement along coastline with extent depending on storm size.
Slow-onset from sustained rainfalls	3-6 months	Blocks access. Depending on season, damage to crops may be significant. Population displacement limited and may be dependent on food security.

Adapted from McCluskey, 2001

The magnitude of disaster is not determined by floodwater alone but also by the pattern of vulnerability in which people live. The lives and livelihoods of many poor people are hardest hit by floods. These people, often already vulnerable to other disasters and stresses such as HIV/AIDS, drought, food insecurity, cyclones and on-going conflict, are forced to live in hazardous places, building their homes and growing their food on floodplains.

Many impacts of floods are similar to those of other disasters although their magnitude, nature and scale may vary and these impacts may be caused in different ways. The impacts of floods on lives and livelihoods and the way agencies have addressed them are similar in most parts of the world. The effectiveness of agency interventions has, however, always been conditioned by factors specific to the context and circumstances. In this paper, care has been taken to synthesise the lessons that are relevant in a variety of contexts.

FLOOD RISK REDUCTION

Over the last few decades, there have been many experiments in flood risk management, readiness for response and community preparedness, particularly in South and South-east Asian countries. But they produced effective results only when they were employed in an integrated manner and included vulnerability reduction as an additional but key element. Lessons suggest that structural and non-structural measures for flood risk reduction should be integral parts of both the overall development process and relief and recovery activities in response to floods or other disaster events that occur along the way. Well studied causes for floods can lead to effective flood mitigation strategies. Flood risk reduction will be a challenge because of conditions of previous knowledge of the flood will not suffice to take appropriate decisions.

STRUCTURAL MEASURES FOR FLOOD CONTROL

Structural measures like embankments can provide protection against many types of flooding. Flood control alone, however, often does not provide a robust, long-term solution

for addressing flood risk. Such efforts at flood control in both urban and rural contexts have produced limited solutions, sometimes even exacerbating flooding problems, when applied in isolation from overall policy in the floodplains (ADPC, 2005). However, such structures may offer solutions to critical aspects of the flooding problem if they are used in conjunction with other non-structural measures, are planned and implemented with the participation of local people and with an understanding of possible negative consequences, and are integrated in the overall developmental policy.¹¹

Integrated flood management activities, not stand-alone approaches, are required. City development plans should take into account urban drainage in floodplain areas, including control of water sources and non-structural measures from the planning stage (WMO, 2004). The flow geometry will depend on existing slope, and hence needs alternative engineering solutions. Structural measures for flood control, often aggravated emergency mitigation strategies and leads to excessive budgeting for mitigation efforts .

The process of flood management should be participatory and catchment-wide, with communities being proactively involved. Development policies and projects that ignore vulnerability often exacerbate disaster problems or even create disasters.

Technical considerations should not preclude socio-economic considerations (WMO, 2003). One of the key reasons why projects go wrong is that they are approved on the basis of technical information alone, rather than based on both technical information and local wisdom (ActionAid, 2005).

¹ A group of researchers at Middlesex University examined participation in floodplain management in Bangladesh and England and concluded that there are significant merits to building up from local participation to catchment planning and linking floodplain-specific participatory institutions with existing local government, particularly as evidenced in the Bangladesh experience (Sultana et al., 2007).

STRENGTHENING COPING MECHANISMS

Vulnerable people individually and collectively develop their own means, resources and strategies to cope with flooding. All of these mechanisms, however, have financial, social and/or opportunity costs. A review of a preparedness programme in Bangladesh shows that vulnerable people have little or no surplus income to invest in the measures that can protect them from flooding although they know what to do (Alam et al., 2007b). Social capital, e.g., reciprocal support among neighbours, support from immediate family members and wider kinship networks, is a vital safety net for people in coping with recurrent flooding. The destruction of assets, which function as a buffer, can make people more vulnerable to the next flood. Both flood risk reduction and response are more likely to be effective when they include coping mechanisms in the assessment and programme design. Programmes that directly support Communities and their local organisations have proved to work best for immediate reinforcement of coping and resilience capacities (DipECHO, 2004). Strengthening coping mechanism is of social and psychological dimensions. Appropriate strategies can replace expensive engineering solutions.

COMMUNITY PREPAREDNESS AGAINST FLOOD

Creating functional groups, developing organisational capacities and enabling them to link with the national disaster management mechanisms are effective ways of strengthening preparedness at the community level. Small-scale mitigation, teaching lifesaving skills, contingency planning and even upgrading service provision are some key measures undertaken by non-governmental organisations (NGOs) and governments in Asia. In many cases such good work by agencies on an ad-hoc basis is found to be unsustainable and not often scaled up. Longer-term success requires strong engagement with the community. For

many smaller NGOs, continuity of funding support is a critical limiting factor in maintaining their disaster preparedness (DP) work. Globally, some funding is available for disaster reduction, but little is left to support concrete action, beyond training and planning (IFRC, 2001). The best way is therefore to enable the communities to organise themselves and link them with the national disaster response mechanisms. Community preparedness against the flood is an awareness program and should be exercised as training to cope with situation.

EARLY WARNING OF FLOODS

Flood early warning and forecasting in most parts of the world can produce information with longer lead times. They are useful for both contingency planning and defining immediate actions in responding to a flood (World Bank, 2006; ADB, 2006). Poor people need early warning most, but many of them do not understand weather forecasting or the language of early warning. Early warning has little relevance if people do not have the ability to respond to warnings in terms of taking decisions on preventive actions and evacuation. Needs for warning also vary by livelihood group. For example, pastoralists in Kenya (World Bank, 2006) do not need the same information as farmers. Even the tying of animals in sheds should be of different design, to get released during floods. Early warning system should be understood in terms of action rather than information.

LIVING WITH FLOODS

Key policy-makers frequently discuss living with floods and adapting to their impacts, especially as large-scale floods are becoming common. Some general principles are emerging. The core idea is to address people's critical vulnerabilities to floods and to ensure that the gap between demand and supply of key services (i.e., clean water, sanitation, early

warning, food and health) is met through sustained preparedness and contingency planning. Localised solutions such as flood proofing have shown good results (World Bank, 2002) and have also been integrated into flood response through cash for-work schemes (DEC, 2000a). In South and South-east Asia, such flood-proofing measures include raising the plinths or foundations for homesteads, flood shelters and schools (DEC, 2000a; Kent et al., 2004). Protecting livelihood assets is also important. In Bangladesh, for example, one measure that has proved effective is keeping space for livestock in flood shelters (DEC, 2000a). Living with the floods can happen in areas of frequent occurrence but long cycle flood frequency areas experiences undue stress on living fabric reestablishment. Building ownership and engaging with the local authorities will lead to help in visualizing ownership attitudes than consumption in excess during flood mitigation.

BUILDING OWNERSHIP AND ENGAGING WITH LOCAL CAPACITY

Effective flood responses are those that build on people's existing ways of dealing with floods and complement their coping mechanisms, resources and social capital. In areas where flooding occurs regularly, the community will probably be better prepared than people living in places where floods are rare. Many flood-prone communities have local and traditional institutions dealing with disasters. As the flood season approaches in Sudan, for example, local community leaders on Tuti island, at the confluence of the White and Blue Nile, set up a flood control committee which is in charge of contingency planning, coordinating emergency operations and providing material assistance (IFRC, 2004).

PARTICIPATION

Unless affected people are involved – and not merely consulted – in determining their needs and in participating in project design and management, the impact of emergency or

long-term interventions is likely to be limited. According to an Action Aid impact review, the agency's normal principles, such as participation and gender analysis, were considered difficult to integrate in an emergency in countries with less emergency experience (Action Aid, 2002). Following the Mozambique flood in 2000, the World Bank highlighted that consultation improved the nature of the interventions, but participation leading to empowerment was rare, mainly due to the lack of transparency and equity between negotiating bodies (World Bank, 2005b). Engaging external agencies of non-locational and cross cultural construction agency will provide timely and effective flood mitigation project implementation. This strategy can avoid local authorities with complex relationships in society and local politics. Many times heavy construction projects are drawn during post flood mitigation efforts to consume large funds. A participative post mitigation effort many times leads to show how funds are collected and rapidly deployed without much planning. Sense of ownership in these aspects can conserve against financial disasters.

THE RIGHT TO INFORMATION

Information is a right that enables people to claim other rights. Access to information allows a community's own recovery plan to drive the recovery process. It is essential, therefore, that an affected population can receive useful information (IFRC, 2005). Awareness about both flood risks and rights to humanitarian assistance in the Mozambique flood in 2000, a community survey found that beneficiaries were often poorly informed about recovery plans and activities (World Bank, 2005b). Communities were rarely informed about the amount of money or other support they could expect to receive. Right to information act has led to reassessment and show very cautious approach and may deny

appropriate measure with need in focus. Need assessment and relief rehabilitation is a strategic process. Experience in these areas is to be well documented for future use.

NEEDS ASSESSMENT FOR RELIEF AND REHABILITATION

Conditions on the ground, not artificial programme cycles, should inform programme phases. In the midst of an on-going flood response operation, for example, further flooding may call for a renewed relief phase. This highlights the importance of analysing flood forecasts and their implication for how people cope.

Flood response generally better meets requirements where assessment is an on-going process and is responsive to changing conditions. Following devastating floods in Mozambique in 2000, the DEC noted that while interventions in all phases were generally appropriate, those that took place in the latter stages of the emergency response tended to be less appropriate than those at the beginning. The reasons for this are as follows:

- All agencies underestimated the resilience of the Mozambican population and their coping mechanisms.
- Beneficiary needs and capacities grew in range and complexity over time, making the typical 'one size fits all' solution of standard kits less appropriate.

In a flood response situation, it is often difficult to ensure that vulnerable people can access assistance and take part in the decision-making process, because communications infrastructure and road networks are inundated and other effective means of transport are lacking. Agencies may also face logistical problems in reaching affected people.

People's needs and the flood's impact are not linked solely to the level of water, and the conditions of their lives and livelihoods do not necessarily improve when the water recedes. Often, real misery starts when floodwaters recede and displaced people start going home, which is unfortunately when many agencies declare an end to assistance.

The situation may also change as a result of collective impact and/or the response policies of other agencies. Two months after the start of the flood in Mozambique in 2000, the number of people in accommodation centres rose considerably with the arrival of villagers from outlying areas who were running out of food. They came because food was distributed only to people in the centres (INGC 2001). An agency's new intervention or the phasing-out of an existing one may also affect the work of others. An overall understanding (through better coordination) of other agencies' plans contributes to a more positive impact.

Organisational priorities, assumptions and beliefs, rather than findings from an assessment, often shape the strategy and content of flood response. It is important to allow vulnerable people's own choices, concerns and priorities to influence agencies' response strategy. Holistic assessment and participatory planning can facilitate this process. Commenting on the debate on whether rehabilitation disbursement should be a grant or a loan after the 1998 flood in Bangladesh, DEC noted that 'these debates seem more an issue with an organization's own mandate and choice rather than a function of people's vulnerability' (DEC, 2000a).

Though assessment is primarily done to define an operation, it can also be used for wider influence over key policy and decisions on flood response. Good research during a flood often provides good analysis to help redefine programme approaches and phases. For

example, a nutritional assessment conducted during 1998 flooding in Bangladesh provided accurate and timely information enabling other agencies to design an appropriate food package and target recipients (DEC, 2000a).

Affected communities are not a homogeneous group but have diverse livelihood options, conflicting interests and priorities, and varying levels of power and ability to express their needs. While they have specific rights and needs, they also have capabilities and strengths to offer. Identifying such needs and capabilities in the assessment phase strengthens all phases of the response, whether search and rescue, relief, rehabilitation or preparedness for future disasters. Assessment should go beyond current needs to assess structural causes of vulnerability.

After the Bangladesh flood in 1998, DEC noted that the immediate impact may be better where emergency assistance targeted women, but structural needs are not met as most gender-based analysis tends to be women-focused, rather than looking at the roles of all groups and both sexes (DEC, 2000a). Examples of long-term thinking by agencies in the implementation of activities that influence gender relations include joint land titles; houses registered in the name of the couple or the woman in female-headed households; women's membership and leadership in existing or newly formed local disaster management committees. Need assessment and relief rehabilitation is a strategic process. Experience in these areas is to be well documented for future use.

TARGETING AND MONITORING

A targeting strategy that is flexible enough to adapt to different phases and interventions is the most effective way to reach the most vulnerable people. Ensuring such flexibility requires a monitoring process that uses data categorised by gender, age and vulnerability

(DEC, 2000a), reviews changes in need and can manage the emergence of new categories of people needing assistance.

People whose houses are not inundated may be left out of flood response interventions, even though the flood may adversely disrupt their livelihoods. The targeting strategy should, therefore, not only examine current conditions of people already targeted but also assess developing trends to determine whether they affect people not included in the plan. After the 2000 Mozambique flood a lessons learning workshop noted that many households lived on higher ground but farmed in the valley bottoms, suggesting that people in need of agricultural support should be targeted as beneficiaries (UN, 2001). Targeting can be influenced by conscious and unconscious biases. Agencies with regular programmes often prioritise their regular beneficiaries over non-beneficiaries.

Targeting criteria for development programmes may not be appropriate in relation to vulnerabilities to disaster. After the Bangladesh flood in 2000, an evaluation noted that the micro-credit project, while effective in reaching small farmers and traders, was not the best mechanism for targeting very poor and vulnerable people (DFID, 2001a). Targeting and monitoring the post mitigation measures should have standard approach than emergency efforts taking major fund allocation.

LIVELIHOODS RECOVERY

Quick and effective recovery from the impact of floods depends significantly on how quickly livelihoods are restored. There is no single way to protect livelihoods in the post-flood context. Often it is feasible and desirable to combine relief and recovery in a flood context because recovery can start as soon as floodwaters recede (WFP, 2000). However, adopting

a livelihoods approach (in the operation) is harder to implement where agencies have a limited presence in the affected areas (Oxfam, 1999).

Livelihood assistance in floods

Adapted appropriately, these approaches might serve as models to strengthen livelihood resilience:

Agriculture

- Methods for drying and preserving seed stocks can facilitate the continuation of farming (ITDG).
- Promotion of flood-resistant crop varieties and cultivation practices and provision of seed stock can strengthen resilience.
-
- Crop insurance systems can enable farmers to spread their risk (Hellmuth, 2007).

- Provision of fodder, vaccinations and deworming can ensure livestock survival (ITDG).

Fish Culture

- Pens and trap ponds can help to retain fish during floods (ITDG).

Small Business And Alternative Livelihoods

Repair of roads and other infrastructure, improved access to credit and support for re-skilling can provide a base for developing marketing opportunities or alternative income

sources less prone to flooding (World Bank, 2005b). Livelihood recovery is a non-financial coping mechanism needs deeper study to mitigate in timely manner.

Asset Protection

Helping people to protect their assets during and after a flood not only makes it easier for them to recover quickly but also reduces future vulnerability and poverty. However, according to evaluation reports, people are often forced to sell their productive and household assets to cope, as post-flood support is frequently overlooked.

Floods also destroy productive or livelihood assets. A study by the International Food Policy Research Institute (2001) after the 1998 Bangladesh flood found that 55 per cent of households lost assets, equivalent to 16 per cent of their pre-flood total value of assets. In Mozambique the World Bank noted that ‘during the recovery period these assets were, in general, not replaced, leaving the households more vulnerable to subsequent disaster episodes’ (World Bank, 2005b). Nevertheless, good practices do exist. Many agencies practise ‘asset protection’ as a key part of their flood response in Asia and Africa. This includes supplying livestock fodder, restocking livestock, reconstructing community and household assets and distributing agricultural/business tools (Action Aid, 2002; DEC, 2000a; DFID 2001a; WFP, 2000; Oxfam, 1999; World Bank, 2005b). Asset protection is of prime importance by creating a sense of ownership of post mitigation infrastructure.

Household Food Security

How floods affect food security is a complex matter to which there is no straightforward response. Floods destroy standing crops. Prolonged flooding often limits people’s ability to earn money and replant quickly after floodwaters recede because either the cropping

season is over or agricultural support is not available. Vulnerable people should be given various financial and material options, so that they can choose what works best for them. The decision to provide food, cash, a combination of both or something else should be based on an objective problem analysis and clear aims and not on what resources are available, what the agency has the capacity to distribute or the donor's preferences (ALNAP and ProVention, 2007). House hold food security can be planned with local resources in case of disaster than waiting for food drops. Many times more wastage is expected than usage.

Agricultural Rehabilitation

Many flood-prone areas are also rich agricultural lands. Assistance in the form of tools, seeds, Fertiliser, capital and training, for example, can help people to restore their agriculture. Flood trends are changing and more frequent flooding impacts on cropping seasons, making people food and livelihood insecure. In such cases, a possible response is to distribute alternative, nutritious varieties of seeds (DEC, 2000b; Oxfam, 2003). Agriculture rehabilitation takes more time as top soil disturbances and deposition of excessive salts in the top layers needs through soil analysis.

Local Economy And Market

Floods affect not only household livelihoods, but also the local economy, within which household livelihoods operate. Household livelihood recovery and sustainability are largely conditioned by the local economy. Agencies, however, often overlook the impact of their flood response on the local economy and market. If planned well, assessment and monitoring processes should provide better understanding of the local economy to determine how different interventions may affect it. An evaluation in Wajir, Kenya after the

drought and flood in 1996-1997 noted that relief distribution had stabilised food prices, thus shoring up pastoralists' purchasing power. But, for example, excessive cash distributions over a period of time may also affect the local economy negatively by causing inflation (Action Aid, 2001). Soil analysis leads to appropriate measure to recreate local economy and market.

Economic approaches in flood response

Support to local market activity can broaden the base of livelihoods programmes. And tap community Resources for flood response, however such measures must be carefully designed. For example,

- Markets are dynamic and must be monitored over time and space. The livelihood of the local makers of clay roofing tile was severely affected when agencies distributed metal sheeting in the 2000 flood response in Bangladesh (Action Aid, 2002).

- Livelihood work in urban contexts poses distinctly complex challenges. Natural resources are far less available in urban areas. Many urban dwellers are dependent on single sources of income and on the market; therefore safeguarding measures can vary widely from household to household (IFRC, 2004).

Water, Sanitation and Health

The potential for disease outbreaks is always present after a disaster (McCluskey, 2001). Good understanding of water and sanitation conditions, disease surveillance, and speedy response to warning and above all, preparedness of health agencies are the preconditions

to reduce the spread of diseases and preserve the quality of the environment during and after flooding. Studies show the risks of disease are greatest where there is overcrowding and where standards of water and sanitation have declined (PAHO, 1981). This often happens in situations of massive population displacement away from the flooded area and prolonged stay in flood shelters without adequate water supply. People themselves, national authorities and relief agencies in many flood-prone areas have had to develop mechanisms and technologies in order to sustain populations living in flooded environments. Providing potable water as it is elixir of life during floods is major contention in logistic support. Water supply ,sanitation & health planning should be modified for excess water flows, and avoiding contamination near habitation/ settlements and dry disposal is preferred than water based sanitation.

Initiatives to improve water supply or water systems should incorporate long-term sustainability. Water and sanitation interventions need to be locally appropriate and take into consideration possible problems regarding the availability of water, local perceptions regarding water quality and purity, testing water purity regularly and prevalent sanitation practices and needs. In Bangladesh, for example, agencies distributed water purification tablets, even though lessons from past flood response indicated that people do not use them because they spoil the taste of the water and laboratory tests indicate that they have limited effectiveness.

Water-borne diseases, such as diarrhoeal diseases, acute respiratory infections (ARI) and skin infections, are common among flood-affected people, especially children. They can increase to epidemic levels even in a moderate flood, particularly in rapidly expanding

urban areas with their often poor environmental conditions.² Water-borne diseases are preventable through provision of clean water and sanitation.

Floodproofing Water And Sanitation Services

Past relief and recovery operations have identified a range of approaches, which include:

IN GENERAL

- Incorporating mitigation measures during the rehabilitation of water, sanitation and health systems for future protection (ECHO, 2001).
- Strengthening health volunteer networks to enhance their effectiveness in emergency preparedness and response (WHO, 2000).

Water

- Raising tube-wells and boreholes above flood water level to prevent contamination .
- Including buckets and water containers in relief packages to reduce secondary contamination.

² For example, during the 2007 floods in Bangladesh, more patients than ever before attended the ICDDR,B health centre in Dhaka. Most of the patients lived in Dhaka city. The centre identified Dhaka's continued population growth, which has forced increasing numbers of low-income households to live in areas with poor water and sanitation, as a contributing factor (ICDDR,B, 2007).

Sanitation

- Planning sanitation and shelter together to ensure completion (World Bank 2005b).
- Attention to placement and arrangement of sanitary facilities to limit impact on groundwater and ensure safety for community members.
- Innovative approaches to sanitation in flooded areas, such as raised latrines, pit liners or rings, sealed pits or tanks, or contained leach fields (WEDC, 2007).
- Extending hygiene education to schools and to community groups (ECHO, 2001).

Water and sanitation interventions need to be locally appropriate and take into consideration possible problems regarding the availability of water, local perceptions regarding water quality and purity, testing water purity regularly and prevalent sanitation practices and needs.

Water-borne diseases, such as diarrhoeal diseases, acute respiratory infections (ARI) and skin infections, are common among flood-affected people, especially children. They can increase to epidemic levels even in a moderate flood, particularly in rapidly expanding urban areas with their often poor environmental conditions.³

³ For example, during the 2007 floods in Bangladesh, more patients than ever before attended the ICDDR,B health centre in Dhaka. Most of the patients lived in Dhaka city. The centre identified Dhaka's continued population growth, which has forced increasing numbers of low-income households to live in areas with poor water and sanitation, as a contributing factor (ICDDR,B, 2007).

Water-borne diseases are preventable through provision of clean water and sanitation.

SHELTER AND HOUSING

Shelter is necessary to provide security and personal safety, protect from the climate and enhance resistance to ill health and disease. It is also important for human dignity and to sustain family and community life as far as possible in difficult circumstances (Sphere Project, 2004). Thus shelter and housing are more than just a roof over a person's head. The livelihood activities of many flood-prone communities are home or homestead-based and may be destroyed by flooding. This may cause displacement, the nature and duration of which depend on the duration of inundation. The World Bank report on the Mozambique flood noted the 'improvement in the houses of people displaced through the floods has had a lasting positive psychological effect on the beneficiaries' (World Bank, 2005b). Shelter and housing design can be of type to cope with changing levels of water and other service corrections.

Strategies for post-flood housing programmes need to be based on the impact of flooding on houses and their long-term consequences rather than on the standard housing cycle concept (transitional to permanent housing). The response needs to cover affected people's immediate survival needs up to the point at which durable solutions are reached.

FLOOD-RESISTANT SHELTER

Effective shelter and settlement planning can reduce damage and build resilience. Some examples include:

RECONSTRUCTION

- Raised plinths and foundations (DEC, 2000a; Kent et al., 2004).
- Combining a strong frame with lighter wall material that can be replaced after floods, which has been used successfully in Vietnam by the Vietnamese Red Cross and IFRC (IFRC, 2004)
- Raised shelves to protect valuables.
- Using more durable building materials which resist water damage.
- Planting water-resistant plants and trees to protect shelters from erosion.
- Establishing community committees to monitor construction quality and settlement planning (AIDMI, 2005).
- Community outreach to promote hazard resistant design approaches in future building.'

SETTLEMENT PLANNING

- Prohibiting resettlement in the most hazardous areas, if possible.

- Improving access to safe land. Many people must choose to live in floodprone areas to ensure access to shelter or livelihoods (McCluskey, 2001).
- Limiting obstruction of natural channels, using absorbent paving materials and roof catchments to reduce runoff, and designing drainage to minimize intensity of water flows.
- Community emergency shelters and evacuation routes.
- Early warning systems, including rain or river gauges and community monitoring, to alert communities to flood threats. Flood resistant structure needs newer approaches than standard urban solutions by providing emergency shelters.

Quick provision of temporary shelter reduces exposure, can help to limit the outbreak of disease and allows people to move quickly out of community shelters, which may be needed for schooling or other community facilities. Reconstructing permanent housing in large-scale disasters may take a long time. In such cases, temporary or transitional shelter should have adequate facilities (for water and sanitation and cooking) (SCF, 2005) and a system should be in place to monitor conditions of shelter (AIDMI, 2007). Reconstruction efforts should be minimised in case of post mitigation period to avoid emergency funds to be used for infrastructure.

MANAGING NATIONWIDE RESPONSE AND COORDINATION

A pluralistic institutional environment and decentralised capacity, with horizontal and vertical coordination and information flow, have worked well in responding to large-scale

floods in Africa and South and Southeast Asia. Coordination at both national and local levels is absolutely necessary for nationwide coordination to be effective (DEC, 2000a; World Bank, 2005a).

Under the UN's recently developed regime of 'clusters', key emergency sectors have lead agencies with responsibilities for coordination and delivery in case of last resort. The response to the Pakistan floods in 2007 was one of the first test cases for the clusters and highlighted the importance of streamlining coordination structures to facilitate engagement with local government and NGO partners (IASC, 2007).

Coordination takes time and effort, but done properly it is time well spent. Managing nationwide responsive and coordination can be done using rapidly growing information revolution. Experience sharing and adoption cost reduction strategies to achieve similar goals can be pursued.

CONCLUSION

Flood disaster striking at long and uneven occurrence in more than 20 years cycle will call for newer strategies than the predicted floods management. Flood risk reduction will be a challenge because of conditions of previous knowledge of the flood will not suffice to take appropriate decisions. Structural measures for flood control, often aggravate emergency mitigation strategies and leads to excessive budgeting for mitigation efforts. Structural measures for flood control, often aggravate emergency mitigation strategies and leads to excessive budgeting for mitigation efforts .

Community preparedness against the flood is an awareness program and should be exercised as training to cope with situation. Early warning system should be understood in terms of action rather than information. Living with the floods can happen in areas of frequent occurrence but long cycle flood frequency areas experiences undue stress on living fabric reestablishment. Building ownership and engaging with the local authorities will lead to help in visualizing ownership attitudes than consumption in excess during flood mitigation.

Engaging external agencies of non-locational and cross cultural construction agency will provide timely and effective flood mitigation project implementation. This engagement of external agencies will contain local authorities with complex relationships in society and local politics. A participative post mitigation effort many times leads to show how funds are collected and rapidly deployed without much planning. Sense of ownership in these aspects can conserve against financial disasters.

Right to information act has led to reassessment and show very cautious approach and may deny appropriate measure with need in focus. Need assessment and relief rehabilitation is a strategic process. Experience in these areas are to be well documented for future use.

Targeting and monitoring the post mitigation measures should have standard approach than emergency efforts taking major fund allocation. Livelihood recovery is a non-financial coping mechanism needs deeper study to mitigate in timely manner. Asset protection is of prime importance by creating a sense of ownership of post mitigation infrastructure. House hold food security can be planned with local resources in case of disaster than waiting for food drops. Many times more wastage is expected than usage.

Agriculture rehabilitation takes more time as top soil disturbances and deposition of excessive salts in the top layers needs through soil analysis. Soil analysis leads to appropriate measure to recreate local economy and market. Water sanitation and health planning should be modified for expecting excess water flows and avoiding contamination near habitat/settlements. Dry disposal is preferred than water based sanitation.

Shelter and housing design can be of type to cope with changing levels of water and other service corrections. Flood resistant structure needs newer approaches than standard urban solutions by providing emergency shelters. Reconstruction efforts should be minimised in case of post mitigation period to avoid emergency funds to be used for infrastructure. Managing nationwide responsive and coordination can be done using rapidly growing information revolution. Experience sharing and adoption cost reduction strategies to achieve similar goals can be pursued.

REFERENCES

- 1) *ActionAid (2005). People-centred governance: Reducing disaster for poor and excluded people. Johannesburg: ActionAid International.*
www.actionaid.org/docs/people_centred_governance.pdf
- 2) *ADB (2006). Early warning systems study. Dhaka: Asian Development Bank.*
- 3) *ADPC and UNDP (2005). Integrated flood risk management in Asia. Bangkok: Asian Disaster Preparedness Center and United Nations Development Programme.*
www.adpc.net/maininforesource/udrm/floodprimer.pdf

-
- 4) AIDMI (2007). *2007 floods in South Asia: from impact to knowledge. Special issue 39.* Delhi: All India Disaster Mitigation Institute. www.southasiadisasters.net/downloads/snet/39%20Sadnet%20Bihar%20Flood%20007.pdf
 - 5) Alam, K. et al. (2007a). *Report for the evaluation of the DIPECHO III (RRVC) project implemented by ActionAid Bangladesh 2006-7.* Dhaka: ActionAid Bangladesh.
 - 6) ALNAP and ProVention 2007. *Slow-onset disasters: drought and food and livelihoods insecurity. Learning from previous relief and recovery responses.* www.alnap.org/publications/pdfs/ALNAPProVention_lessons_on_slow-onset_disasters.pdf
 - 7) DEC (2000a). *Bangladesh 1998 Flood Appeal – An independent evaluation. Final report.* London: Disasters Emergency Committee. apps.odi.org.uk/erd/ReportDetail.aspx?reportID=2859
 - 8) DEC (2000b). *Independent Evaluation of Expenditure of DEC Central America Hurricane Appeal Funds. Final report.* London: Disasters Emergency Committee. apps.odi.org.uk/erd/ReportDetail.aspx?reportID=2873
 - 9) DEC (2001a). *Independent Evaluation of Expenditure of DEC Mozambique Floods Appeal Funds.* London: Disasters Emergency Committee. apps.odi.org.uk/erd/ReportDetail.aspx?reportID=2999
 - 10) DFID (2001a). *Evaluation of DFID-B Response to Southwest Bangladesh Floods – October 2000–mid 2001.* Dhaka: UK Department for International Development–Bangladesh (DFID-B). apps.odi.org.uk/erd/download.aspx?rep=summary&ID=3003

- 11) *ECHO (2001). Hurricane Mitch, ECHO Global Plans for Central America 1998 and 1999 Synthesis Report. Brussels: Directorate-General for Humanitarian Aid. apps.odi.org.uk/erd/ReportDetail.aspx?reportID=2929*
- 12) *Flood disasters (2008) Learning from previous relief and recovery operations, Pro-vention consortium*
- 13) *Hellmuth, M., A. Moorhead, M. Thomson and J. Williams (eds) (2007). Climate Risk Management in Africa: Learning from Practice. New York: International Research Institute for Climate and Society (IRI), Columbia University. iriportal.ideo.columbia.edu/portal/server.pt?space=CommunityPage&control=Set%20Community&CommunityID=684&PageID=0*
- 14) *IASC (2007). Inter-Agency Real Time Evaluation Of The Pakistan Floods/Cyclone Yemyin. Inter-Agency Standing Committee.*
- 15) *ICDDR,B (2007). Health and Science Bulletin. Vol. 5 No. 3, September 2007. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh. www.icddrb.org/pub/publication.jsp?classificationID=56&pubID=8886*
- 16) *IFRC (2001). World Disasters Report. Geneva: International Federation of Red Cross and Red Crescent Societies. www.ifrc.org/publicat/wdr2001/*
- 17) *IFRC (2004). World Disasters Report. Geneva: International Federation of Red Cross and Red Crescent Societies. www.ifrc.org/publicat/wdr2004/*
- 18) *IFRC (2005). World Disasters Report. Geneva: International Federation of Red Cross and Red Crescent Societies. www.ifrc.org/publicat/wdr2005/*
- 19) *INGC (2001). Mozambique Floods 2001: Lessons Learned Summary Report. National Institute for Disaster Management. apps.odi.org.uk/erd/ReportDetail.aspx?reportID=2945*

-
- 20) IPCC (2007). *Fourth Assessment Report*. Geneva: Intergovernmental Panel on Climate Change. www.ipcc.ch
- 21) ITDG (date unknown). *An Attempt on Application of Alternative Strategies for Community Based Flood Preparedness in South-Asia (Bangladesh)*. Bangladesh: ITDG Practical Action. www.unisdr.org/eng/public_aware/world_camp/2003/english/Others/Bangladesh.pdf
- 22) Kent, H. et al. (2004). *Linkages between flood and drought disaster in Cambodia and rural livelihood and food security*. International Federation of Red Cross and Red Crescent Societies and the Cambodian Red Cross Society.
- 23) McCluskey, J. (2001). *Water supply, health and vulnerability in floods*. *Waterlines*. Vol.19 No.3 January 2001.
- 24) Oxfam (1999). *Evaluation of the Wajir Relief Programme – 1996-1998*. Oxford: Oxfam Publishing. www.odi.org.uk/hpg/papers/Wajir_Oxfam.pdf
- 25) Oxfam (2003). *External Evaluation of the Project 'Humanitarian Assistance for Populations affected by Floods and Malnutrition in the Atlantic Coast of Nicaragua*. Oxford: Oxfam Publishing. apps.odi.org.uk/erd/ReportDetail.aspx?reportID=3402
- 26) PAHO (1981) *A Guide to Emergency Health Management after Natural Disasters*. Scientific Publication 407. Quoted in McCluskey 2001.
- 27) SCF (2005). *Review of Save the Children in Sri Lanka (SCiSL) Tsunami Response*. Colombo: Save the Children Fund. apps.odi.org.uk/erd/ReportDetail.aspx?reportID=3370
- 28) Sphere Project (2004). *Humanitarian Charter and Minimum Standards in Disaster Response*. Oxford: Oxfam Publishing. www.sphereproject.org
-

-
- 29) Sultana, P. et al. (2007). *Can England Learn Lessons from Bangladesh in Introducing Participatory Floodplain Management? Netherlands: Water Resources Management. www.springerlink.com*
- 30) UN (2001). *Mozambique Floods 2001. Maputo: United Nations Resident Coordinator Mozambique.*
- 31) WEDC (2007). *Excreta Disposal in Emergencies. Loughborough University, London: Water, Engineering and Development Centre. wedc.lboro.ac.uk/publications*
- 32) WFP (2000). *Full Report of the Evaluation of CHINA EMOP 6045 - "Emergency Food Aid to Flood Affected People in Anhui, Hubei and Jiangxi Provinces of China. Rome: World Food Programme. documents.wfp.org/stellent/groups/public/documents/reports/wfp007319.pdf*
- 33) WHO (2000). *Lessons Learned Workshop on the Mekong Floods in 2000. Geneva: World Health Organization.*
- 34) WMO (2003). *Integrated Flood Management Case Study. Bangladesh: Flood Management September 2003. Geneva: World Meteorological Organization.*
- 35) WMO (2004). *Case Study: Brazil: Flood Management In Curitiba Metropolitan Area. Geneva: World Meteorological Organization. www.apfm.info/pdf/case_studies/cs_brazil.pdf*
- 36) World Bank (2005b). *Learning Lessons from Disaster Recovery: The Case of Mozambique. Disaster Risk Management Working Paper Series No. 11. Washington DC: World Bank. www.proventionconsortium.org/?pageid=37&publicationid=40#40*
- 37) World Bank (2005b). *Learning Lessons from Disaster Recovery: The Case of Mozambique. Disaster Risk Management Working Paper Series No. 11. Washington DC: World Bank. www.proventionconsortium.org/?pageid=37&publicationid=40#40*
-

- 38) World Bank (2005b). *Learning Lessons from Disaster Recovery: The Case of Mozambique. Disaster Risk Management Working Paper Series No. 11.* Washington DC: World Bank. www.proventionconsortium.org/?pageid=37&publicationid=40#40
- 39) World Bank (2006). *Natural disaster hotspot: case studies. Working paper series 5.* Washington DC: World Bank Hazard Management Unit. www.proventionconsortium.org/?pageid=37&publicationid=128#128