REVIEWED PAPER

33rd WEDC International Conference, Accra, Ghana, 2008

ACCESS TO SANITATION AND SAFE WATER:
GLOBAL PARTNERSHIPS AND LOCAL ACTIONS

Integrating environmental sustainability into the water and sanitation sector: Lessons from tsunami disaster response

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During the recovery phase following a disaster, humanitarian aid organizations are uniquely positioned to implement water and sanitation activities that go beyond disaster recovery to provide beneficiaries with systems that are more environmentally sustainable than pre-disaster conditions. Oftentimes, however, the pressure to rapidly restore post-disaster water and sanitation systems leads to a lack of coordinated planning and missed opportunities to implement innovative technologies that can make communities more resilient to future disasters and reduce long-term ecosystem impacts. Following the 2004 Indian Ocean tsunami, several humanitarian aid agencies recognized the importance of integrating environmental sustainability concepts into their water and sanitation relief operations. This paper examines methods and strategies for addressing environmental stewardship within the humanitarian aid water and sanitation sector through global partnerships with environmental organizations, with case studies from Indonesia, Sri Lanka, and Maldives. Lessons learned from application of environmental stewardship approaches in this disaster response can be used to remodel and improve future humanitarian aid relief operations.

Introduction

The humanitarian aid community performs vital functions on a scale of global significance. During the period 1996 to 2005, more than 2.5 billion people were affected by over 6,400 natural and technological disasters (IFRC, 2006). In 2006 alone, humanitarian contributions amounted to over US$7.3 billion (UNOCHA, 2007). Given the sheer scale of the international aid response, humanitarian aid organizations have a tremendous opportunity and responsibility to rebuild communities that are healthier, stronger and more resilient to future threats while ensuring minimisation of negative impacts that rebuilding efforts may have on the natural environment. The importance of integrating environmental sustainability into humanitarian aid and development, especially with respect to water and sanitation, is entrenched in the United Nations Millennium Development Goals. The seventh goal is "to ensure environmental sustainability" which includes as an objective to "reduce by half the proportion of people without sustainable access to safe drinking water" (UN, 2000). During the recovery phase following a natural or man-made disaster, humanitarian aid organizations are uniquely positioned to implement water and sanitation activities that are more environmentally sustainable than the systems that existed prior to the disaster.

Oftentimes, however, pressure by donors, governments and the media, to rapidly restore post-disaster water and sanitation leads to a lack of coordinated planning and missed opportunities to implement innovative technologies that can make communities more resilient to future disasters and reduce long-term ecosystem impacts (WWF, 2006). Without well-coordinated, cross-sectoral watershed management planning, aid beneficiaries and the environment can be left more vulnerable to future disasters. In places that have been affected by both natural disasters and civil war, access to land and water supplies are significant causes of conflict that can be exacerbated by unwitting redevelopment programs. By engaging stakeholders at all levels in natural resource management, the humanitarian aid sector can help defuse future conflicts and crises (FAO, 2000).

Following the 2004 tsunami, several international humanitarian aid agencies and conservation organizations identified the need to form multisector partnerships with the goal of integrating environmental stewardship into the reconstruction process and ensuring that recovery activities were grounded in sound ecosystem management principles. Two examples include partnerships formed between CARE and The World Conservation Union (IUCN), as well as the American Red Cross and World Wildlife Fund (WWF).

American Red Cross and WWF jointly developed a five-year project to achieve improved environmental sustainability in post tsunami recovery activities across sectors including water and sanitation. As a result American Red Cross and WWF work together on reconstruction activities in Indonesia, Thailand, Sri Lanka and the Maldives (WWF, 2006).

This paper takes a closer look at different ways in which humanitarian aid and environmental agency staff have integrated environmental stewardship into the water and sanitation sector with a focus on examples from the recovery effort from the Indian Ocean tsunami in Indonesia, Sri Lanka and the Maldives.

Organisational development: co-location of environmental specialist staff

Owing to the large number of water and sanitation interventions in Sri Lanka, under the aegis of the American Red Cross-WWF partnership, WWF placed an environmental professional at the American Red Cross Colombo office. In Banda Aceh, Indonesia, WWF intends co-locating three environmental professionals, including a watershed management officer to focus on water and sanitation activities. Co-located staff is responsible for building capacity in sustainable water and sanitation technologies, provision of technical advice and implementation support on techniques for minimizing the environmental impacts of humanitarian aid activities and identifying ways to integrate sound natural resource management planning into infrastructure projects, such as the establishment of water resource management plans (WWF, 2006). Interviews with staff from CARE, IUCN, American Red Cross and WWF, have shown a high level of receptivity and an overall positive attitude to the co-location of staff with the recognition that both institutional partners gain from such co-locations (N. Perera, IUCN, personal communication, 2007; A. Ouvry, American Red Cross, personal communication, 2007). Co-location has allowed environmental professionals to gain better insight into humanitarian partner project objectives and has facilitated the provision of more effective, timely and locally applicable technical support. Being embedded in the operations office allows environmental professionals to become a part of the humanitarian agency team; the humanitarian staff are in turn continuously reminded of the core motivation for the partnership and the opportunity to access environmental expertise to support the success of their projects. The physical presence of environmental professionals in the office also promotes greater uptake by humanitarian staff in incorporating environmental aspects into their projects despite budget and time constraints (A. de Vos, IUCN, personal communication, 2007; A. Usoof, American Red Cross, personal communication, 2007).

Some limitations of the co-location of seconded environmental staff are noted. This includes the perception that recommendations by co-located staff are sometimes viewed as optional or advisory and are hence not always rigorously implemented. Additionally, the learning generated through the partnership at the ground level may not be institutionalized within the broader humanitarian aid institution policies and procedures (N. Perera, IUCN, personal communication, 2007). These limitations could be rectified through the formation of an environmental unit with specialized staff within the humanitarian organization to provide such services in future, in partnership with other organizations.

The use of environmentally beneficial appropriate technologies

Most humanitarian aid agencies allocate a majority of their water and sanitation funding for the provision of new, rehabilitated or upgraded infrastructure such as the establishment of spring catchments, piping for water supply, wells, or septic tanks for sanitation (Davis and Lambert, 1995). The tsunami reconstruction effort provided a platform for several humanitarian aid agencies working in rural areas to pilot the use of alternative, environmentally beneficial small-scale, appropriate technologies. These technologies not only provide public health benefits through the provision of clean water and treatment of wastewater, but also have improved environmental performance over conventional alternatives. Alternative technologies benefit both humans and the environment by reducing demand on limited water supplies and decreasing the inflow of nutrients to natural systems resulting in higher water quality and quantity (Crites and Tchobanoglous, 1998).

Constructed wetlands in Indonesia and Sri Lanka

Naturally occurring wetlands are known and proven to remove inorganic and organic materials from water through natural physical, chemical and biological processes. Constructed wetland systems have been widely used throughout the world to reproduce naturally occurring wetland environments to treat industrial and domestic wastewater. In recent years, many civil works departments, housing developers and consultants have used wetlands in treating domestic wastewater (Corea, 2001, Crites and Tchobanoglous, 1998).

In April 2007, the Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ), Oxfam, IFRC, U.S. Agency for International Development Environmental Services Program (USAID-ESP) and UNICEF in Aceh Indonesia, compiled "*Guidelines for the Selection and Implementation of Sustainable Systems for the Reconstruction in Aceh and Nias*." The guidelines advise, among other recommendations, that all sanitation systems include primary and secondary treatment and describe in detail the use of subsurface wetlands or vegetated leachfields as an appropriate secondary treatment method. Many INGOs in Aceh, including American Red Cross, have incorporated wetlands as an integral part of their household sanitation system design and at present their performance is being monitored at field level. A comprehensive analysis of such performance reviews in future would be required to demonstrate their implementation success. In Sri Lanka, Corea (2001) has demonstrated improved performance of treatment wetlands over conventional systems at field scale and authorities have incorporated his recommendation in setting guidelines through SLS 745: Part 2 (*Draft),* 2003, for the design and construction of such systems. The American Red Cross in Sri Lanka has used these guidelines in designing wetland systems for secondary treatment in combined systems treating effluent from many housing units and individual household systems treating onsite. The performance monitoring of these wetlands is presently in progress. Initial reports indicate a high degree of community satisfaction of treated effluents physical parameters such as colour, turbidity and odour.

Anaerobic filters in Sri Lanka

Anaerobic filters have been used for secondary treatment of domestic wastewater in Sri Lanka for many years and their enhanced performance over conventional systems has been demonstrated at field scale by Corea (1998 and 2001). The anaerobic filter basically comprises a watertight tank containing a bed of submerged media. In constructed anaerobic filters, the typical filter medium used is crushed stone or gravel which is supported by a perforated filter floor. In the prefabricated anaerobic filter systems available in the market (brand names include Biocell, Biotech, or Biofil), a plastic floating medium is used and the system combines a primary treatment chamber. The prefabricated systems can provide a higher level of treatment than traditionally used systems such as pre-cast cylindrical septic tanks and soakage systems (E.J.H. Corea, personal communication, 2006). Many humanitarian aid agencies prefer to use the prefabricated system rather than constructed anaerobic filters mainly because of immediacy of need (Navaratne, 2006) and their popularity has grown with tsunami reconstruction. Further, the failure of many newly installed cylindrical septic tanks and soakage systems due to their non-compliance with the Sri Lanka Standards for septic tank construction, SLS 745: Part 1, 2004 (Navaratne, 2006), has led to many of the septic tank systems being replaced with prefabricated systems combining the anaerobic filter. User satisfaction based on treated effluents aesthetic appearance has been high and complains related to odour has been minimal in these systems (E.J.H. Corea, personal communication, 2006). At present performance monitoring of prefabricated systems that combine anaerobic filters is in progress.

Rain water tanks in Maldives

Rain water collection is an inexpensive water supply alternative for humanitarian groups to promote in comparison to piped water systems and can be easily installed and maintained by community members themselves (Waheed, 2006). In the humanitarian aid context, the typical rain tank set-up includes rooftop collection and a storage chamber. It can be beneficial for the environment in that it reduces the demand on springs and groundwater (via boreholes). However, since rainfall is widely variable by season in many regions, it is often not possible to rely on rain as the main water source. In such areas, harvested rainwater can be used as a supplementary source of water. As research has shown that an increased quantity of water can decrease disease burden (Esrey, 1990) the additional water supplied from rainwater collection can contribute greatly to improve sanitation and health outcomes.

Following the 2004 tsunami, household rainwater collection tanks were installed in 17,000 homes on 90 different islands in the Maldives by IFRC, UNICEF and the Maldives Island Development Association. The Maldives was considered an ideal location for this water supply option as it receives 1,900 mm of rainfall per year and has issues due to lack of groundwater aquifers and their contamination during the tsunami. In addition, this type of water supply was already well-established and accepted by the local community (Waheed, 2006).

Watershed planning and humanitarian aid in Aceh

Humanitarian agencies often focus on communities rather than regions. Given that watersheds extend over multiple hectares and encompass dynamic hydrogeologic processes, they have the potential to be adversely impacted by a diverse array of aid and development activities. Increased upslope timber harvesting for reconstruction, for example, can lead to soil erosion, which in turn can lead to the siltation and obstruction of spring catchments thereby cutting off essential water supplies (Dudley and Stolton, 2003). While a new borehole or spring catchment system may serve as a reliable source of household water at first, the well system may not be sustainable in the long-run if the preservation of associated groundwater recharge zones is not considered. The lack of a proper assessment of the area's hydrologic cycle and adequate inter-agency coordination increases potential for overdrawing aquifers. Failure to consider downstream impacts of surface withdrawals could permanently and negatively alter the natural hydrologic regime. The lack of cross-sectoral linkages has the potential to lead to uncoordinated water resource development and management resulting in conflict, waste, and unsustainable systems (FAO, 2000).

In the province of Aceh, Indonesia, USAID designed an innovative Environmental Services Program to establish several Integrated Water Resource Management (IWRM) watershed fora. The village-level watershed fora were designed not only to ensure the proper operation and maintenance of water supply infrastructure but also to establish protected areas that can serve as permanent spring source protection zones (Pontius, 2007). Watershed planning activities performed within the protected area included: 1) socializing the establishment of the protected area; 2) land rehabilitation through tree planting within the protected area; 3) posting signs warning people to stay away; 4) training a mobile patrol monitoring unit; 5) surveying the resources; and 6) establishing formal village policies to ensure protected status of designated areas. Since the establishment of action plans, the villagers have taken steps to protect their watersheds by stopping illegal logging and land acquisition, and are conducting participatory mapping activities to assess the current condition of the protected area (Pontius, 2007).

Conclusions

The recovery effort of the 2004 Indian Ocean tsunami has illuminated several different approaches for integrating environmental stewardship into the humanitarian aid water and sanitation sector. Although each approach differs in practical terms, they all contribute towards environmentally sustainable solutions that benefit disaster victims and help to conserve the natural resources upon which they depend. The tsunami response involved many different aid agencies working across multiple countries with a comparatively high level of donor funding which created fertile ground for collaborative innovation between people from different organizations and provided resources to field test some of these models and approaches. The successful pilot programs and lessons learned during the tsunami response could be scaled up or down, as appropriate and applied to future interventions if there is sufficient will as well as financial and technical capacity in the humanitarian aid sector. Additionally, in the years following the 2004 tsunami the continued occurrence of natural disasters in Indonesia have further highlighted the need to address environmental issues. This heightened awareness has in turn positively impacted the on-going tsunami reconstruction programs which are part of the tsunami humanitarian aid response.

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Keywords
humanitarian aid, environmental partnerships, co-location, appropriate technologies, watershed management

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