

**THE DIFFICULTIES OF REBUILDING THE WATER AND SANITATION  
SECTOR IN POST-TSUNAMI, ACEH, INDONESIA.**

**By**

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**A Professional Field Report (2006), submitted in partial fulfillment of the  
requirements for the degree of**

**MASTER OF ARTS**

**In**

**HUMAN SECURITY AND PEACEBUILDING**

**We accept this Field Report as conforming  
to the required standard**



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**March 2007**

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## ACKNOWLEDGEMENTS

I am most grateful to Dave McCracken in Thailand, my academic advisor for this field report. As my mentor, I thank him for introducing me to Hatfield Consulting, my internship sponsor. In particular, I also want to thank Thomas Boivin, President, and Grant Bruce, Vice President, of Hatfield Consultants, Vancouver, B.C., who offered me the six month internship in 2006. The experience in Aceh, Indonesia has changed my life and I am forever grateful.

I want to acknowledge John McKnight, Vice President of PT Hatfield Indonesia, who was my Supervisor. He expanded my knowledge and awareness of the good, the bad and the ugly of working in the international development sector. I thank him for his advice, mentoring, honesty, and friendship. I also want recognize to Pak Bambang Tri SasongkoAdi, President, PT Hatfield Indonesia, for his advice and making me feel comfortable. Thanks to all of the staff in Bogor, West Java and especially Selly Rosidah for her help in keeping me on track. I appreciated their openness and support and enjoyed working with them while in Indonesia. Thank you to Ian Hatton of Hatfield, for all the introductions to key people in Aceh, which allowed me to network with so many people for this report.

For my partner Paula, who has supported me in so many ways, I thank you for your patience, support and tolerance of my absence during the past 2 years. To my daughters Natasha and Ashley and my son Jordan, I thank you for your generous patience and understanding for my absence in pursuing this degree.

Lastly, I would like to recognize the people of Aceh, Indonesia. I witnessed these people trying to rebuild their lives. Their resilience and determination for independence was inspiring. I am happy that you now have the beginnings of peace in Aceh. It was an honor to have met you all.

## **ABSTRACT**

This report reflects my personal observations of the difficulties rebuilding the water, sanitation and hygiene structures in post-tsunami Aceh, Indonesia. As an Environmental Specialist sponsored by a private Canadian consulting company, conducting development work in Aceh, I experienced first-hand several of the issues associated with water and sanitation humanitarian interventions rebuilding the region. The field report examines the water and sanitation sector in Aceh both before and after the 2004 tsunami within the context of regional security issues of a 30 year armed conflict and subsequent peace deal in 2005.

The long conflict in Aceh partially contributed to the low standards in the water and sanitation sector prior to the tsunami. The subsequent impact of the tsunami destroyed the limited water and sanitation structures that did exist. The observations captured in this report focus on the humanitarian and development responses by international community and the significant challenges and gaps in undertaking interventions of this magnitude. The perspectives of local key informants and organizations highlight the importance of public participation and the frustrations that developed when they were not engaged. I witnessed the plans for a housing development project that in this report is used as a model example of a sustainable water and sanitation project, underpinning the need for a clear development process.

Large gaps remain in the capacity of governments, organizations and the local community to effectively manage the rebuilding effort and long term maintenance of infrastructure. These on-the-ground observations of effectiveness and challenges in the development sector provide insights that could contribute better understandings for dealing with future natural disasters. The report concludes with specific recommendations that could lead to improved sustainability of the water and sanitation aid by the international community.

## **Definitions:**

**Bottled Water** - means potable water in bottles

**Clean Water** - means water for daily washing and drinking only after boiling

**Drinking Water** - means water from the tap, even though it is not potable to drink.

**Hygiene** - the practice of washing, especially hand washing with soap & water and the practice of maintaining a clean water, bath and toilet area.

**Potable** - mean drinking water safe for human consumption

**Sanitation** - the process of collecting, storing, treating and disposing of human excreta and liquid waste in a hygienic way that protects people from bacterial and viral disease and does not contaminate the local environment.

**Septic tank** - generally consists of a one or two chamber tank, that must be water tight and usually made of concrete, fiberglass, or plastic that is buried below the ground surface

**Sustainability** - an attempt to provide the best outcomes for the human and natural environments both now and into the indefinite future. It requires integration of information between agencies and departments, public and civil society participation and influence.

## **Acronyms:**

**BRR** - Badan Rehabilitasi dan Rekonstruksi (The Government of Indonesia's Rehabilitation and Reconstruction Agency)

**GAM** - Free Aceh Movement

**GTZ** – Deutsche Gesellschaft für Technische Zusammenarbeit (German Technical Cooperation Agency)

**IDP** – Internally Displaced Person

**EIS** - Environmental Impact Survey

**IRFC** – International Federation of the Red Cross and Red Crescent Societies

**INGO** – International Non Government Organization

**PDAM** - Perusahaan Daerah Air Minum (Drinking Water Supply Company)

**UN** – United Nations

**UNICEF** - United Nations International Children's Education Fund

**UNORC** - United Nation Office of Recovery Coordination

**FAO** - UN Food and Agriculture Organization

**Watsan** – The Water and Sanitation sector

**YPNA** - Yayasan Peuduli Nanggroe Aceh (An Aceh Conservation Group)

## **THE DIFFICULTIES OF REBUILDING THE WATER AND SANITATION SECTOR IN POST-TSUNAMI, ACEH, INDONESIA.**

### **1.0 Introduction**

#### **1.1) The Tsunami's Destructive Impact**

Today, several years on, I clearly remember watching the television at home on Boxing Day 2004 shocked by what I saw on the screen. The scale of devastation from the tsunami in the Indian Ocean was colossal. It took only 45 minutes after the 9.1 magnitude earthquake for the tsunami wave to strike the Aceh coast, instantly destroying some 800 km of shoreline or 10% of the province (Haider, 2006 a, p.2). Over 137,000 human deaths were recorded and over 38,000 people were reported as missing. The tsunami's impact also displaced over 500,000 people, forcing them to flee higher ground and eventually to life in hastily constructed tent cities.

The number of dead and displaced was only the beginning. Approximately 130,000 homes were destroyed, 85,000 homes needed repair. Over 3,000 km of roads became impassable, thousands of bridges were destroyed, 15 sea-ports were destroyed; as well 8 airports, 2,000 schools, 8 hospitals, 14 health centers, 4800 fishing boats were all destroyed and over 20,000 hectares of fish ponds ruined. In the agriculture industry some 60,000 farmers were displaced and almost 65,000 hectares of agriculture lands were severely damaged (BRR1, 2005). Like millions of other people watching the news from the comfort of my living room, sympathy and compassion for the victims resulted in the need to contribute through a favorite charity or relief agency in the hope that some good could be provided to relief the suffering. For most people that act of giving becomes enough for them, and most never ask where the money goes and how was it spent.

Amazingly, in the months after the tsunami, there were no major disease outbreaks among the internally displaced persons (IDP's). This heroic effort of disease control was a result of a rapid deployment of emergency water and sanitation supplies and infrastructure (water tankers, storage tanks, bladders, pit latrines) by UN agencies, international governments and several large international non-government organizations (INGOs), like Oxfam and International Federation of the Red Cross and Red Crescent Societies (IFRC) as leading examples. These same agencies



continue to take lead roles in the water and sanitation sector now over two years after the tsunami (Haider, 2006 b). Although, there were no reported large disease outbreaks, there were several reported cases of skin rashes and chronic diarrhea within many of the tent camp cities and temporary IDP shelter barracks (Aceh Kita, 2005, p.17). These conditions were likely a direct result of poor hygiene practices among the victims and their temporary living conditions (vant Hoff, N., personal communication, November 2, 2006).

The tsunami devastation along coastal Aceh was immense and crippling for the half million people who survived, but lost everything they owned including their incomes. For me, it was rare to have seen such images of coastal wreckage and human suffering.

## **1.2) Objectives**

The objectives of this Professional Field Report are: 1) to document, reflect and present my observations, experiences, discussions, and research related to the intervention difficulties associated with rebuilding efforts of the water and sanitation sector in Aceh; 2) to identify the intervention challenges and gaps in rebuilding the sector, and 3) through a critical analysis process develop recommendations that may serve towards achieving a lasting sustainability of the donated aid water and sanitation infrastructure.

## **1.3) The Field Placement**

A requirement of my Masters degree from Royal Roads University was the completion of a six month field placement. This field placement was designed to compliment my existing professional skills in the water and sanitation (watsan) sector with my studies in human security and peacebuilding. I was fortunate to have completed my internship with PT Hatfield Indonesia, a joint partnership with Hatfield Consultants, a private environmental consulting company from Vancouver, B.C. The internship was in the tropical region of Aceh, Indonesia, which is in the equatorial zone of northern Sumatra. I was based in the city of Banda Aceh and worked as an Environmental Specialist for the Hatfield International project office.

Hatfield had contractual arrangements with two major international non-government organizations for post-tsunami environmental governance and impact assessment work. My duties were primarily related to completing environmental assessments and management planning for the

INGOs, who were engaged with the construction of permanent housing and implementing livelihood training programs for Internally Displaced Persons (IDP) of the 2004 tsunami. Other duties involved writing proposals for new environmental contracts from other NGOs. During the internship period, I met and discussed water and sanitation issues with several key professionals in the development aid industry, ranging from UN agencies, major financial institutions, NGOs, in addition to local organizations and individual victims.

At the field, level I conducted field visits observing the colossal rebuilding effort that was being undertaken. I actively sought out key people and information and learned the challenges in complex rebuilding tasks for both houses and livelihoods. The internship exposed me to the essential skills required for effective functioning in the intervention process. These included; the ability to network in a dynamic and ambiguous environment, controlling emotions and remaining objective, having patience when working within cultural norms, diplomacy and respect for individuals, adaptation and tolerance of customs and culture, critical thinking and analysis. Of course, any attempt to learn the local language goes a long way in building relationships. I also learned that trust building amongst clients and cohorts is central for cooperation and personal effectiveness.

#### **1.4) Report Overview**

This field report advances by providing historical and contextual information for both before and after the tsunami time periods; including my perspective of the watsan sector. The information allows for an analysis off the watsan intervention, local perspectives and response, project examples that could lead towards sustainability and an assessment of the enormous challenges in rebuilding the sector. Based on the research, the report concludes with several recommendations and rationales leading towards accountability, transparency and sustainability within the water and sanitation sector during and at the end of the massive rebuilding project.

## **2.0 ACEH HISTORY**

### **2.1) From Conflict to Peace**

The history of Aceh is a past filled with conflict and colonization. The Dutch claimed Aceh in 1871 and the Aceh people maintained a continuous struggle for independence until the conclusion of the Second World War. The Acehenes then fought the nascent federal Indonesian government for independence. By 1959, after years of violent conflict, the Government of Indonesia (GoI) granted Aceh leaders a special status with regards to education, social, culture and a conservative version of Islam. Although despite special status, the GoI maintained control over the region's natural resources and little of the resource profits were benefiting the people of Aceh. In 1976, the political wing of Free Aceh Movement (GAM) became militant over the flash point issue of access to natural resources and the perceived inequitable distribution of wealth by the central government. For the next 30 years Aceh remained fiercely independent and strongly conservative in terms of its adherence to Islam and its customs. GAM fought for independence against the Indonesian military for almost 30 years. Both sides were accused of disregarding basic human rights and international law, as several thousands of people were either murdered, disappeared, tortured, kidnapped or raped (McGrory, n.d. a).

In 2000, a political shift in Jakarta and changes in the Indonesian government allowed a door to open for peace talks with GAM. The Autonomy Law was passed allowing Aceh to keep 70% of the province's oil resource royalties and to maintain strict (Sharia) Islamic law. However, the Autonomy Law was never implemented and the Indonesian military continued to try to weaken the GAM militia through the provocation of violence, fear and retaliation. By 2003, the government had lost all patience with GAM and imposed Marshal Law in Aceh. What followed was a full-scale and brutal military assault against GAM members and their supporters (LP, 2004).

However, the tsunami's destruction changed everything. The GoI could not cope with the impact of the disaster by itself and needed assistance from international agencies. The influx of the world community to Aceh placed the longstanding conflict in the international arena, and provided the impetus for change.

## **2.2) The Aceh Peace Deal:**

On August 15<sup>th</sup>, 2005, eight months after the tsunami, the GoI and the GAM signed an historic peace accord in Helsinki, Finland that ended the 30-year armed conflict that resulted in over 15,000 deaths and thousands displaced (Pan, 2005, p.3). To date, the peace deal has been upheld, yet there are still many layers of challenges ahead. The peace deal outlined just the bare bones of a settlement and many issues remain unresolved. Key issues of the peace agreement were;

- a. the surrender of GAM weapons; disbanding the military wing of GAM.
- b. a withdrawal of most of the Indonesian military troops from Aceh.
- c. amnesty for many military figures; and
- d. the implementation of the Autonomy Law with local elections (Kuppuswamy, 2007 a, p.3).

Criticisms of the peace agreement were the limited number of consultations with civil society groups and affected communities. An example of these challenges is the 30,000 ex-combatants that will have to be reintegrated back into Acehenes society (Hasibuan, R., personal communication, November 8, 2006). However, there has been good news with the improvements in security that has brought with it new investment opportunities and economic gains which will hopefully put people back to work again and reduce the high poverty rates. For the conflict in Aceh to truly end and peace to be sustainable, it will depend on the creative ways in which the various actors, including the ex-combatants, work through the numerous issues that will be faced in the future (Barron, 2006).

Overall, it has been the peace agreement that has allowed the implementation of international aid from the hundreds of organizations and agencies involved in the reconstruction.

## **3.0 Regional Background**

### **3.1) Socio-economic Conditions**

The Province of Aceh is rich in natural resources, minerals, fossil fuels and is environmentally biodiverse. Indeed, it is not surprising that the economy of Aceh relies predominantly on revenues from natural gas and oil extraction, although little of this wealth trickled down to the people of Aceh (McGrory, n.d. b). The population of Aceh Province is approximately 4.3 million people with 95 percent of the people belonging to the Muslim faith. Approximately, 50 percent of the

population lives in poverty and Aceh remains Indonesia's second poorest province (Aceh World 1, 2006). In spite of the large natural gas and oil sector, the area is largely agrarian with rice production dominating the market. People living in rural communities outside Banda Aceh lead simple subsistence agriculture or aquaculture-based lifestyles. Other small production crops include mixed gardens of fruit trees, palm trees, vegetable crops and chilies. Many areas are suitable for coconut, cocoa, coffee and other tropical crops (Caldecott, 2006 a).

Although, the tsunami destroyed much of the economy in Aceh, now two years later the economy is rebuilding and experiencing a short-term boom due to large injections of cash and investments by international relief agencies and larger government budgets. The economic boom has also brought a high inflation rate of over 15%, effecting tsunami victims and the poor the most (Renner, 2006 a). Thirty years of brutal civil conflict had eroded many important institutions and the Aceh social system. In 2004, an estimated 1.2 million people (28%) were living below the poverty line of 130,000 Rupiah (\$14 USD) per capita per month. Approximately 30 percent of the population was unemployed in 2004. However, the tsunami pushed the unemployment rate to over 50 percent (Renner, 2006 b). From my experience in Aceh, there were very poor public services. It appeared that local governments had devoted lots of money to building bureaucracies, but the needs in health, education, and infrastructure remained largely unmet. Even though Aceh had the highest per-capita education expenditures in Indonesia in 2004, more than half of all villages in Aceh did not have a primary school (ADB & GoI, 2005 a).

As with most regions of Indonesia, illegal harvesting of Aceh's rich and abundant forests for tropical hardwoods is reported to be common place, with lumber fetching high prices on world markets. Despite the appearance of concern by government, this illegal sector does exist here and does contribute to the regional economy. During my travels, I observed several private lumber yards and large clearings in rural forest areas.

The fishing industry is active again after the tsunami with most fishermen receiving new donated boats; however, there are reports from the UN Food and Agriculture Organization (FAO) that there are now more boats than before the tsunami, and all competing for a declining fish stock off the coast. Prior to the 2004 tsunami and currently the industry is relatively small, as there are no industrial processing facilities in Aceh (Rassmusen, P., personal communications, October 30, 2007).

### **3.1.1) Poor Health Services**

The local English newspaper titled *Aceh World* reported that for the past several years there has been little government spending within in health care sector and that this reflects the current poor and unreliable service. This condition exists despite the fact that Aceh has one of the highest numbers of doctors, nurses and medical facilities in Indonesia (Aceh World 2, 2006 a ). There has been a steady increase in transfer of financial resources from the central government in Jakarta, but this has not been matched by a commensurate improvement in local government capacity (Renner, 2006 c).

Indeed, the health status of Aceh people has been one of the lowest in Indonesia (ADB & GoI, 2005 b). A study for the UN World Food Program (WFP) released in September 2006 found that primary school children suffer from inadequate nutrition, health care, and poor sanitation facilities. In combination with poor hygiene, the result is widespread parasitic infections, stunted physical growth and retarded intellectual development. Despite Aceh having the highest per capita expenditures on education in Indonesia, educational facilities are in poor conditions with limited access to basic teaching supplies is commonplace. There are teachers, but they tend to be centered in urban areas leaving several shortfalls in rural areas (Aceh World 2, 2006 b).

An example of poor health care services in Aceh came from my own experience while in Aceh. During the first week of the internship, I became very sick and needed to see a doctor. I was taken to a private Indonesian doctor to whom I described my symptoms as fever, nausea, tiredness, sore muscles and a lack of appetite. Unfortunately no blood samples were requested and I was misdiagnosed by the doctor. With no improvement in my condition, a co-worker took me a UN doctor stationed in Banda Aceh who requested blood samples, and later determined that I had acquired Typhoid Fever, and ultimately provided me with proper medical care. I would later learn that a misdiagnosis such as this is a common experience in Aceh.

### **3.2) Historic Election in 2006**

One of the key provisions of the 2005 peace deal was that the Special Autonomy Law would finally be implemented, allowing for the first ever democratic regional election. This historic election

occurred on December 11, 2006, just two weeks after completion of my internship. The people of Aceh voted for the former GAM leader and ex-political prisoner, Pak Irwandy Yusuf to be their new Governor. Now the hard part begins for the new leader and government. Priorities for the newly elected Governor that need attention include; economic development and the investment climate of the province, improving living conditions for the poor, improving infrastructure and speeding up the pace of the post-tsunami reconstruction process. Another important challenge includes the re-integration of some 30,000 ex-combatants back into society, police and security reform, and improving the overall health, education and welfare of the people. If GAM can make political gains in these areas, they would be in a good strategic position for the more important parliamentary elections in 2009 (Kuppuswamy, 2007 b).

## **4.0 Pre-Tsunami Conditions of Water and Sanitation**

### **4.1) Pre-Tsunami Water Supply Conditions**

Water supply and distribution infrastructure throughout Aceh was in poor condition before the tsunami (Clasen, 2005 a). Years of violent conflict in the region resulted in limited investment by government and by communities into the maintenance and upgrades of the basic infrastructure (Johnson, D., personal communication, November 16, 2007). The drinking water supply for coastal Aceh came from sources including surface water (creeks, rivers, lakes, springs), and groundwater (shallow or deep aquifers).

In the City of Banda Aceh, the Aceh River is the predominant water source. In areas with no piped water distribution systems access to water is through hand-dug wells, boreholes, and through transfer from a truck tanker delivery to storage tanks. In rural areas the most common sources of drinking water supply were shallow wells (usually <10 metres deep). It was common to see water wells open and unprotected from surface contamination. Most of the shallow aquifers along the Aceh coast are contaminated with high concentration of sewage waste (fecal bacteria) and salt. Many wells produce no water whatsoever during the long dry seasons between monsoons in most of the region (Clasen, 2005 b). Unfortunately, the practice of 'rainwater harvesting' is only sporadically practiced in the region. This minimal use of rain water appears to be the result of

cultural perceptions about rainwater purity, as many people believe that once rain comes in contact with the roof the water is no longer fit to drink. This is despite the fact that the well water supply is likely more contaminated. (vant Hoff, N., personal communication, November 2, 2006).

#### **4.1.2) Drinking Water Supply Companies (PDAM)**

In urban areas of Aceh, piped water distribution systems are managed by 11 regional entities. They are called Perusahaan Daerah Air Minum (PDAM), which are drinking water companies regionally owned by provincial governments. The PDAM program was created in 1962 and there are now 290 drinking water agencies in Indonesia. By contrast, in rural areas water supply and distribution infrastructure (if any) and its management is undertaken by small local entrepreneurs or even community associations. Both urban PDAMs and small rural systems had similar problems that were well known according to a local magazine Perick Magazine focused on the water sector in Indonesia. Perick Magazine indicated that in 2004 there was minimal human and financial capacity to effectively administer and manage water systems, which resulted in minimal service coverage for people and the delivery of unsafe drinking water (Mungkasa, 2004 a).

To exacerbate the problem, most of the existing sources of water are of poor quality and there is a growing scarcity of acceptable supply sources. Furthermore, most PDAMs rely on meager government subsidies and often the management of water treatment and distribution is not seen as a priority. Most PDAMs are also in financial debt, as there is only a minimum effort to recover costs through user pay schemes. Past inspections revealed that some 30 percent of the PDAM pipelines suffer from leakage, and more importantly there is a lack of skilled operators and managers, and little maintenance.

Although PDAM are called a 'drinking' water provider company, it is ironic that they are not able to provide potable (safe) drinking water to customers (Mungkasa, 2004 b). In the city of Banda Aceh, the local PDAM has less than 30 percent service coverage and only 9 percent of the City's population has piped water connections. The remaining population relies on small community based systems that use springs or shallow groundwater wells (BRR 2, 2005 a). The house/office I lived in was plumbed to both a shallow groundwater well and piped water line from PDAM. The groundwater quality was high in iron and solids and sometimes smelled earthy, while the PDAM water was quite clear. However, neither water sources provided potable water to the house.



### **4.1.3) Water Supply Disinfection**

Treating water at the household level for low income families was recognized as cost effective intervention against waterborne disease. Forms of household treatment include: boiling, pasteurization, chemical disinfection, solar disinfection, filtration, and improved household water storage vessels. For most people boiling is a common approach for treating drinking water at the household level (Clasen, 2005 c). In one study, 48 percent of the water sampled from 400 households in Aceh tested positive for E. coli bacteria. The same study revealed that almost 50% of households found it sometimes difficult to boil water, mainly due to the unavailability and cost of fuel (Clasen, 2005 d).

The disinfection of raw and tap water supplies have become a small scale business venture in Aceh. For example, large proportions of people in Banda Aceh drink bottled water and often take their empty 19 L water jugs to small shops where they can use ultra-violet light (UV) for disinfection purposes. During my time in Aceh I saw many of these little UV street side shops. I was not successful in determining which government department regulates the small UV water disinfection businesses or to what standard.

### **4.2) Importance of Forests**

Approximately 60% of Aceh Province is within the higher elevation tropical forests of the Leuser-Ulu Masen ecosystem. This is important because the relatively intact Leuser ecosystem provides vital environmental services to much of the population of Aceh (Caldecott, 2006 b). The forest regulates the hydrology of the area and the major watersheds of the Aceh River and Teunom Rivers, plus numerous smaller catchments that provide water for the majority of the inhabitants of northern Aceh. Forests help stabilize the steep slopes found in much of the area, preventing landslides and erosion, help to filter water and help to regulate the climate of northern Aceh, ensuring the continuity of rain needed to support subsistence agriculture activity. Intact forests also moderate seasonal storm effects and smooth out drainage delivery to rivers. A UN study concluded that these intact ecological functions had a monetary value worth several hundreds of millions of dollars annually, with most of the benefits flowing to communities in the downstream environment

(Caldecott, 2006 c). However, in the post-tsunami reality, there is strong demand for lumber and keeping the forest safe from illegal loggers is difficult.

### **4.3) Pre-Tsunami Sanitation Situation**

#### **4.3.1) Access to Toilets**

People's ability to access adequate sanitation is a pillar of foundation for human development, but access to a decent toilet is a luxury unknown to almost half of the world's population. To deny people basic sanitation is not just inhumane, but it also greatly stifles economic development. In this report, sanitation is defined as the process of collecting, storing, treating and disposing of human excreta and liquid waste in a hygienic way that protects people from bacterial and viral disease and does not contaminate the local environment. It is common knowledge that poor sanitation practices and minimal hygiene awareness will lead to reduced health conditions and increased outbreaks of diarrhea, which kills 2.2 million children a year. The effects of poor sanitation also consume precious funds in health care costs that prevent families and communities from climbing the development ladder (Khan, 1997 a).

#### **4.3.2) The Sanitation Background**

In Aceh most of all sanitation methods have made use of on-site septic tanks or pit latrines, both in urban and rural areas. There are important differences between the two in relation to the risk of groundwater contamination. Septic tanks discharge at higher levels in the soil profile than pit latrines and such conditions are preferable as far as the elimination of bacteria is concerned. For instance, pit latrines are often deep excavations and the soil may be entirely removed, thereby offering little opportunity for biological treatment to kill bacterial (Khan, 1997 b). Pit latrines are more common in rural and remote communities and are not appropriate for urban areas, but such latrines are found in the City of Banda Aceh.

#### **4.4) Pre-Tsunami Hygiene Awareness**

For this field report, I defined 'hygiene' as, the practice of washing, especially hand washing with soap after the elimination of bodily waste, and the practice of maintaining a clean water source, bath and toilet area. It was my experience in Aceh, that local people generally have minimal understanding of hygiene and the spread of disease. In the urban centers it generally seemed that the practice of hygiene was more frequent, however, as one went further into the rural setting, hygiene awareness and practices seemed to be at a reduced level.

In street side restaurants, where the cooking and washing was done in an open setting, I would routinely observe how staff would clean their work area, tables, dishes and utensils. Certainly by western standards these same restaurants would have been given 'public health citations' on the spot. The preventive control of the spread of bacteria appeared to not be a priority.

Public washrooms within moderate to lower quality businesses were unclean and soiled. Many bathrooms in Aceh consisted of floor toilets where one needs to squat. It is also common in the bathrooms to share a communal plastic pail that is dipped into a small reservoir of water, and then poured into the floor toilet to flush the waste. Furthermore, toilet paper was often not present in bathrooms and the use of soap in bathrooms was not common. In the absence of hygiene and good sanitation, one can easily imagine the spread of bacteria, viruses, and subsequent health risks from disease.

For the first 3 months, I would often experience some gastronomical sickness, although over time my stomach fauna did adapt and became more tolerant of the new bacteria. Gastronomical sickness was also a common ailment of the staff I worked with. Agencies like the UN and government health departments do try to promote hygiene awareness through various campaigns in both urban and rural areas. Such crusades require behavioral change and long term support and championing, or they are likely doomed to failure (Johnson, D., personal communication, November 15, 2006).

### **5.0 Post-Tsunami Conditions of Water and Sanitation**

#### **5.1) The Impact**

It should be no surprise that water and sanitation (watsan) infrastructure was either severely damaged or outright destroyed by the tsunami. The infrastructure included several water treatment

plants, dozens of truck water-tankers and vacuum sludge trucks, kilometers of water distribution piping networks, approximately 60,000 groundwater wells contaminated, 15,000 hand pumps, tens of thousands of septic tanks and pit latrines flooded, along with bio-sludge treatment facilities. Most of the widely used shallow aquifers in coastal areas have become saline, and it is not known how long they could take to become desalinated (BRR2, 2005 c). In addition, the numerous damaged and flooded septic tanks and latrines (urban and rural) have contributed to the already contaminated shallow aquifers with harmful fecal and E-coli bacteria. In urban regions the shallow aquifers were also contaminated with a toxic soup of chemicals and petroleum products, although the extent of damage was not assessed (Clasen, 2005 e).

## **5.2) Site Drainage and Disease**

In Banda Aceh, like most other cities in Indonesia, there is the omnipresent network of concrete open storm-water drains. As Aceh's elevation is at sea level, drainage is a problem. The pumping infrastructure system, put in place to resolve the drainage problem, was neglected before the tsunami and then subsequently destroyed afterwards. With no pumping system there was minimal to no drainage of the predominantly stagnant, foul, polluted, garbage-filled, mosquito-infested public drains. Under these conditions mosquitoes carrying dengue and malaria have thrived because their natural predators cannot live in the same polluted conditions.

It was common occurrence to witness people throwing household waste items into the open drains such as fish, meat, cooking oils, motor oil, and solid waste consisting mainly of plastic bottles. Within the first week of my arrival in Banda Aceh, I became infected with the typhoid bacteria, despite being vaccinated against the bacteria. I believe I contracted the bacteria from eating cold chicken on the street. A week later, I was bitten by a mosquito and became infected with dengue fever and was almost flown to a hospital in Jakarta for medical attention.

## **5.3) Sewage Bacteria Contamination**

Apart from water salinization, another important problem for drinking water sources is contamination with fecal and E-coli bacteria, predominantly from human sewage. This

contamination, which was known to already exist prior to the tsunami, has increased according to recent well data by various agencies. Deeper aquifers are less affected but are still susceptible to a lesser extent. There is little data regarding this issue (BRR1, 2005 b). The tap water in Banda Aceh is seriously contaminated with coliform bacteria. However, most people are used to this problem and deal with it by boiling if they can, or they buy treated drinking water in bottles from street vendors. At our company office/residence in Banda Aceh we purchased drinking water in 20 L reusable plastic bottles.

#### **5.4) The Cholera Outbreak in Bireuen**

An example of the potentially fatal consequences of poor sanitation, minimal drinking water treatment, and poor hygiene practices was in the small town of Bireuen, southeast of Banda Aceh City. In early November, I learned that six people were suffering from cholera symptoms and they eventually died from the waterborne disease, apparently within hours after showing the symptoms of vomiting and acute diarrhea. The Bireuen Public Hospital reported admitting 33 people with severe dehydration due to continuous vomiting and diarrhea. Other clinics in the Bireuen area also reported patients who had suffered from vomiting and acute diarrhea. The source of the contaminated water was later linked to crushed ice used in people's drinks (Aceh World 5, 2006).

##### **5.4.1) The Department of Health**

Following up to the cholera outbreak, I visited the Director of the Provincial Department of Health in November 2006 to become familiar with local capacity to address this disease in the Bireuen area. The health office building, like all government buildings in Aceh are remarkably large in size on the outside, but stark and empty on the inside. All the employees wore brown uniforms complete with shoulder flashes, badges and metal pins. One would think this was a military facility. Although the people were most pleasant, it appeared that staff performed a minimal amount of work. The office tables were small and there were no modern luxuries like computers and printers present. The original health office building was destroyed in the tsunami and dozens of staff were

killed. Most of all health records and most equipment were also lost and UNICEF helped in the rebuilding of the facility.

According to the Director of Health, there was no outbreak or deaths from cholera. I did not ask any other questions after that. This incident outbreak confirmed the limited governance capacity to manage health.

## **6.0 The Unprecedented Intervention Response**

### **6.1) International Donations**

People and governments from all over the world collectively donated some US \$7.7 billion towards tsunami relief and reconstruction, an unprecedented amount in human history following a natural disaster. The US \$7.7 billion exceeded the estimated replacement cost of US \$6.1 billion. This excess money has provided an opportunity to 'build back better' for Aceh, which has now become a common public relations theme from donors (World Bank 1, 2006 a).

The water and sanitation sector was allocated US \$240 million, which ranked in eighth place amongst the top ten funding allocation sectors. The estimated cost to rebuild in the housing sector continues to increase in cost, which is now more than a 100 % increase since reconstruction started. The World Bank's estimate for housing construction is US\$1.28 billion (World Bank 1, 2006 b). The UN Special Envoy for Tsunami Recovery, Former US President Bill Clinton, visited the Aceh region in early December 2006 and reported that only 40% of the required houses have been built to date. Bill Clinton has personally set out to evaluate some of the challenges associated with the reconstruction (UNSETR, 2006).

### **6.2) The Intervention Actors**

What followed from the tsunami catastrophe was an unprecedented intervention response also known in Aceh as the "tsunami of INGOs." At the height of the emergency response in 2005, there were a total of 540 NGOs, both international and local, operating in Aceh. Several international financial institutions such the World Bank and Asian Development Bank continue to be involved in the rebuilding effort. Countries including Germany, Japan and The Netherlands are also significantly involved in the watsan sector and its reconstruction. As with all congregations of

international groups in emergencies, they also come with their own ideological agendas, large budgets, and inherent organizational strengths and weaknesses. In Aceh, I was able to observe and experience firsthand some of the inside operations within some of the INGO actors. Given the enormity of the humanitarian need in relation to the past conflict, it was inevitable that the intervention from the international community would be a difficult and complex undertaking.

### **6.3) The Rehabilitation and Reconstruction Agency (BRR)**

One cannot discuss the rebuilding of the watsan sector without crediting the role of the Rehabilitation and Reconstruction Agency, which is the Government of Indonesia's hand picked agency, known as 'Badan Rehabilitation dan Rekonstruksi' (BRR) in Bahasa Indonesian. The agency is by far the largest and most influential actor involved in rebuilding Aceh, controlling US \$5.7 billion (75%) of the total financial resources (World Bank 2, 2006 d). BRR was established in April 2005 by a Presidential decree with the mission; "To restore livelihoods and strengthen communities in Aceh and Nias by designing and implementing a coordinated, community-driven reconstruction development program with the highest professional standards" (BRR 2, 2005 d). Although the agency is the victim of much deserved criticism in project delivery, the agency is credited with developing strategic governance and financial control framework that reports directly to the President of Indonesia. This type of framework was rare in Indonesia and it took people working with the system a long time to adjust. A primary objective of BRR was to be transparent with the international donor's money, as the entire world was watching. In Indonesia, transparency with money is sometimes a challenge for people and so BRR created an internal agency aimed to prevent corruption and the misuse of funds (BRR 1, 2005 c). In the watsan sector, BRR entered a partnership with UNICIF who played a significant and influential role in the planning, design and the setting of standards within the sector. There will be further discussion about BRR in succeeding sections.

#### **6.4) The United Nations**

With so many organizations and agencies, local and international, involved in the rebuilding of Aceh's infrastructure, it is impossible to discuss them all. There are a small number of high level organizations that continue to be influential in the intervention response, organizations including; Oxfam, International Federation of Red Cross and Red Crescent Societies (IFRC), World Vision, Catholic Relief Agency, CARE, The World Bank, The Asian Development Bank, and several foreign governments including the European Union. There were also several different agencies within the United Nations committed to the rebuilding effort.

During my internship, I was able to learn about the role of the UNICEF which was already working in Aceh prior to the tsunami, providing assistance to children and the victims of the past conflict. After the tsunami, the GoI requested assistance from UNICEF, to play a lead coordinating role in humanitarian intervention. Given the scale and complexity of the humanitarian crisis and the large number of intervention organizations involved, an effective coordination body was crucial for overall efficiency in managing the aid resources for the benefit of affected people. In cooperation with BRR, Oxfam and the IRFC, the UNICEF remains significantly involved in the planning of the water and sanitation sector. In post-tsunami Aceh, at the height of the intervention, there were 79 NGOs (international and local) working directly in the watsan sector. With that many agencies involved in the rebuilding and the implementation of watsan infrastructure there needed to be a coordinated approach, to be proficient and efficient in managing the aid for this sector.

UNICEF also helped local water agencies with pipe distribution repairs in several urban areas, rebuilt health service buildings led the reconstruction of several schools. In cooperation with the Provincial Public Works Department, twenty nine water delivery tanker trucks were delivered to affected communities; as well, five hundred emergency sanitation latrines were distributed and built. As with all UNICEF projects there was a strong focus on hygiene and sanitation promotion (Johnson, D., personal communication, November 16, 2006). The other influential UN agency was the United Nation Office of Recovery Coordination (UNORC) who helped build numerous temporary shelters (barracks) for the half million displaced people.



#### **6.4.1) Watsan Coordination Committee Meetings**

Watsan coordination committee meetings were held on a bi-weekly basis in Banda Aceh and other larger urban centers. The meetings were either chaired or co-chaired by UNICEF, Oxfam and BRR. In an effort to improve communications in the watsan sector, a web-based discussion board was also created. I signed up to the website and observed the dialogue of the watsan coordination committee and attended one meeting in mid-November 2006. There was clearly an effort made to collaborate and coordinate the groups involved.

The committee's objectives were to provide all of the watsan participants with linkages, communications and centralized information management to the fellow groups operating in the sector. The meeting agenda covered the development of a draft technical guidance manual for the standardization of water and sanitation design and installation. In attendance at the same coordination meeting was a provincial government representative for the environmental assessment department. I personally thought the coordination committee meetings were progressive and a bright point or positive aspect within the reconstruction activities. However, documented minutes from a coordination committee meeting reported that attendance and participation at these important meetings was low (Johnson, 2006).

#### **6.5) The Draft Guidelines for Sanitation System in Aceh**

A successful example of how cooperation and coordination among the actors can be beneficial was the recently released draft document titled, *Guidelines for the Selection and Implementation of Sustainable Sanitation System for the Reconstruction in Aceh & Nias, (February 2007)*. Through the UNICEF coordination committee, it provided a venue to begin dialogue for the creation of this much needed document. This document was prepared by the German international development agency (GTZ), UNICEF, IFRC and Oxfam. The guidelines are targeted to all the international organizations and local governments to help them determine appropriate technology and design standards related to septic and leach field installations.

As indicated there was little coordination, planning and implementation among the players in the rebuilding of the sector. This has resulted in an ad hoc, unregulated and unmonitored approach to construction. The guidelines were to help make those improvements and lower the health risks

associated with waterborne diseases. After the public seminar on sanitation issues and the draft guidelines are reviewed, it is hoped these guidelines will become final and universally adopted throughout Aceh and elsewhere in Indonesia (GTZ, 2007). However, there remains no regulatory enforcement or monitoring obligation at this time. It is hoped that the adoption of the sanitation guidelines by those working in the sector will lead to improve standardize design and construction processes including an increase in cooperation between all participating organizations. Only time will tell if this can be accomplished.

## **7.0 Local Reaction to Intervention**

### **7.1) Local Perspective of Water and Sanitation**

To attain a local perspective of the watsan issue, I met with a local man, his wife and their one child. The couple's other two children had been swept away by the tsunami and were killed, and their home destroyed. Many families have been living in a temporary shelter (barracks) in Banda Aceh for the last fifteen months. The simple wooden barracks were quickly built by the UN and INGOs after the devastation. Water for the people was supplied in tanker trucks operated by an INGO. The trucked water is regularly delivered to several 500 L tanks throughout the barrack compound. A simple pipe and tap valve system connects to the water tank.

The husband told me there are often several women waiting in line for water access. Indeed, the water tank was the central location for washing and bathing, with the drainage migrating into a hand dug ditch full of domestic waste and other debris. The ground in the area is flat and wet, and the groundwater table is high to the surface. As such, the ditch was full of stagnant and polluted water. He indicated that the water collected from this tank is not good for drinking and needs to be boiled prior to consumption. His son has experienced routine bouts of diarrhea during their stay in the barracks and occasionally they all get red rashes on their bodies. The husband then showed me his family's toilet facilities. The structure was primitive with a floor toilet that was merely a cement foundation of 5 m<sup>2</sup> with a hole in the corner. The area was shielded by large metal sheets, there was neither a door nor roof, and the place was sordid. Indeed, on the dirty floor was a large metal jug full of water and a plastic bucket for washing away the excreta. He shared this communal pit latrine with 20 other families, and a clear lack of maintenance was evident. The floor area was

wet and worn and the stench of sewage was strong. There was no soap or wash-basin present in the constructed latrine. The floor drain disposed human waste into a buried tank of which no one knew how it was either constructed or installed. However, the immense lush green vegetation around the latrine suggested it leaks untreated effluent into the adjacent swamp area and contributes to further fecal bacteria contamination of the shallow groundwater aquifer. Apparently no one was maintaining the latrine and people were now starting to walk to a nearby drainage channel and defecate there as it was somewhat cleaner.

## **7.2) Local Conservation Group**

I met another local person, Marc van der Berg, who represented a local environmental conservation NGO. The group known as, Yayasan Peuduli Nanggroe Aceh (YPNA) was active in lobbying the Aceh parliament to remind them of the importance of water resources and community health, and seek protection for what forest cover they have left. Marc indicated that the government of Aceh needs serious expert technical assistance and capacity building programs in order to undertake the responsibly of governance. He also mentioned that corruption is an endemic problem in Indonesia and all efforts to curb it need to be strengthened.

By late November 2006, BRR was preparing to adopt a better septic system (standard) design and to purchase approximately US \$1 million worth of pre-fabricated septic tanks, in an effort to distance themselves from the historical and common use of the concrete rings (locally called “cin cin”). These tanks have a horrible record of failure (leakage) thus contributing to widespread groundwater contamination. Already, most of the shallow groundwater in populated coastal areas was contaminated and apparently skin rashes and chronic diarrhea were common (van der Berg, M., personal communication, November 17, 2006).

I talked with a rural doctor working in the Lhok Nga Health Centre near Banda Aceh, and she indicated that she was not aware of any serious health problems associated with contamination of water or poor sanitation in the region. This was an interesting to learn, given that I had heard from Marc of YPNA, that rashes and diarrhea were common in the Lhok Nga area and within the temporary shelters. Perhaps rashes and diarrhea are so common that this doctor did not consider them to be a serious health problem?

The YPNA conservation group challenged the BRR decision to adopt a new standard design and lobbied Aceh politicians that BRR was supporting a bad design for its planned purchase, construction and installation of some 70,000 septic tanks. They argued that BRR was given bad professional advice from inexperienced foreigners with connections to contractors in Jakarta who were to supply the large order of pre-fabricated septic tanks.

YPNA claimed their alternative design (a modified version of the existing concrete ring system) was less expensive, made of local materials, easily maintained by its owner, and built by local contractors leading to greater overall sustainability of the system. It was interesting to note, that YPNA was barred from further public meetings on sanitation for allegedly being out of control.

The YPNA group ultimately wanted BRR to be;

- a. responsive to their interests; demonstrate a greater understanding of their culture;
- b. undertake more field visits and greater oversight of the distribution of aid;
- c. greater coordination amongst the INGOs and communication within all the players;
- d. implement low-tech and culturally sensitive water and sanitation hardware; and,
- e. ensure greater environmental protection, especially in terms of forestry conservation and greater enforcement to curb rampant illegal logging (van der Berg, M., personal communication, November 17, 2006).

### **7.3) One Man's View**

I was fortunate to meet another young man named Romi Areif, who was our company's translator in Aceh for first 3 months of my internship. He later took a job with an international NGO working as a community facilitator for tsunami reconstruction and development projects. Romi is a chemical engineer trained at the local university, and was born and raised in Aceh. He was proud to be from Aceh and I certainly considered him a positive role model for his active engagement of local civil society. I discussed with Romi some of his observations from having worked in the community development facilitation area. In his community facilitation work, he was frustrated to see selfish INGOs who tended to only think about their image back in their home countries.

In his opinion, too many of the organizations made construction and benefit promises that they were unable to keep. He also criticized BRR for not communicating and engaging the local people and those affected on important issues of rebuilding, including water and sanitation hardware. He

compared BRR to the "Great Wall of China", in that local people cannot get inside the offices of the BRR. He made an interesting comment, noting that it was better to rebuild the community's capacity first, then give them aid and training, as this would enhance their sense of ownership and responsibility to maintain what they were given. Romi showed me photographic slides that he had taken at a BRR housing construction project in nearby village. The numerous images revealed stark examples of poor installations and incomplete homes. Ironically, BRR had claimed the housing project was complete and that IDPs could move in. However, there were no installations for household water or sanitation facilities for the hundreds of shelters. The people refused to move in there new homes (Areif, R., personal communication, November 20, 2006).

#### **7.4) The People's Frustration**

An indication of the people's frustrations regarding BRR was that this central agency in charge of rebuilding was both the target and the impetus of the large protest rally held in Banda Aceh (by the poorest of the internally displaced people). The September 2006 protest turned violent and the BRR head man (Kuntoro) and his staff, were blockaded in their office overnight (Sandjaja, 2006).

Another example indicative of peoples frustrations with the reconstruction took place on the west coast of Aceh in Aceh Jaya Regency, where many people have complained about the 'snail's pace' of getting new homes and the generally poor quality of their construction to date (Aceh World 4, 2006). Frustration was also evident for watsan professionals working on the ground in Aceh. Norm vant Hoff, sent me an email stating that;

" It has become clear that overall, things go better if you employ your own workers and manage your own projects, rather than hiring contractors. But this requires that 'experts' actually get involved in jobs rather than hiding in offices behind 'standards' and technical fine points. Also, the whole process of rebuilding would have gone better with far more builders and far fewer engineers who have limited experience actually building things" (vant Hoff, 2007).

## **8.0 Example of a Potentially Sustainable Project**

### **8.1) Atlas Logistique**

Unfortunately, there were few good news stories in the watsan sector from the locals I met in Aceh; however, there was some optimism regarding the work of Atlas Logistiques a French NGO.

I had the opportunity to develop a contractual proposal for Atlas Logistique as a result of my networking in the reconstruction community. Atlas requested a proposal from Hatfield to complete an Environmental Impact Survey (EIS) for their reconstruction project in a village outside of the City of Banda Aceh. Atlas and UNICEF had partnered to implement a housing reconstruction and community mobilization project. Atlas proposed to construct 274 permanent houses and a few public buildings. To complement their housing program, Atlas had a strong livelihoods component to assist people in acquiring basic skills and getting them back to work, either for themselves or an employer. The Hatfield proposal would have assessed the potential environmental impacts of the project in terms of water source supply, the distribution of drinking water (not potable) to all of the homes, the design of an experimental biological treatment process for sewage and wastewater, and assess the design of an innovative site drainage structure that would eliminate standing water in the drainage system.

#### **8.1.1) Elements of Sustainability**

From my perspective, the Atlas proposal was unique in that it promoted a sustainable approach to project design, public participation, and environment and health. Elements of project sustainability included; community involvement in the planning and decision making (including financial) of the water supply system, sanitation design, implementation and maintenance, training, and active participation in a hygiene promotion campaign program. Early on Atlas achieved a positive relationship with the village leaders, who then encouraged the community to accept the Atlas plan and to work with its field staff in the area. A fully staffed field office was established in the village early and open communication with the village was established. Furthermore, participatory community planning and consensus building was established. Housing beneficiaries would also be

involved in the construction of their own homes, and “train the trainer” workshops in home building techniques were established with Atlas bringing in experts from various sectors, including watsan.

### **8.1.2) Biological Treatment**

Atlas was the only NGO I was aware of who planned to construct a biological wastewater treatment system for each of the houses. The proposed waste treatment system was based on the ability of tropical plant roots to absorb waste nutrients from the first anaerobic treatment section in a waterproof septic tank. This biological treatment process would occur in constructed garden tanks with 25 specific tropical plants per m<sup>2</sup>. Atlas claimed the system guarantees a substantial improvement in wastewater quality compared to the conventional (inefficient) septic tanks system using concrete rings. This alternative design also offered increased protection of groundwater resources. A pilot study for 20 houses had begun and would be monitored for one year to validate the design. The intention was for the each of homeowners to participate in the study’s activities. Achieving sustainability within the watsan sector requires a progressive change in people's behaviors relating to sanitation and hygiene practices. This change in behavior will likely require a long time (years) to change, thus a long term commitment by Atlas to community is necessary to see the long term benefits desired. However, such long term commitments are rare in the development business and post-disaster relief. If the constructed biological treatment process and other elements described become successful, it could represent a desperately needed sustainable model for the numerous NGOs working in the post-tsunami re-construction sector.

## **9.0 Challenges of Rebuilding the Watsan Sector**

There are several key challenges associated with rebuilding the watsan sector in post-tsunami Aceh. Based on my observations, research and experience, I identified several broad gaps, represented in **Table 1** below.

**Table 1. Gaps and Challenges in Rebuilding the Watsan Sector**

| <b>Challenges of Rebuilding</b>     | <b>Analysis:</b>  |
|-------------------------------------|---|
| <b>Scale of Devastation</b>         | <ul style="list-style-type: none"> <li>The sheer scale of the destruction and an intervention requiring hundreds of agencies was unprecedented. It's inherent that coordination problems would exist.</li> </ul>  |
| <b>The Geography of Aceh</b>        | <ul style="list-style-type: none"> <li>Aceh topography is predominantly flat and drainage issues limit some development improvement.</li> <li>The water tables are high (&lt; 1 m) from the surface in Aceh, and after rains even higher to the surface.</li> <li>Soil conditions are varied, but the tsunami impacted the coastal surface through scouring and the deposition of soils.</li> <li>Land availability and title issues are complicated, with most land for water and sanitation needing to come from predominantly privately owned sources.</li> </ul>  |
| <b>Weak Governance Capacity</b>     | <ul style="list-style-type: none"> <li>Having worked in various sectors within environmental governance for over 16 years, I was left with the impression that certain provincial government bureaucracies were sufficiently lacking in institutional capacity to effectively manage and monitor the shelter programs, including the water and sanitation sectors, in the reconstruction effort.</li> <li>Provincial government departments and even municipal government have limited capacity (skills, funding, support services, planning, and leadership) to effectively manage its natural resources, community infrastructure, public utility systems, health and social programs, including water and sanitation systems.</li> </ul> |
| <b>Limited Public Participation</b> | <ul style="list-style-type: none"> <li>Several international organizations were alleged to be ineffective when it came to communication with the affected people on important issues relating to reconstruction, including water and sanitation hardware and design.</li> <li>Local civil society groups expressed frustration with BRR for not listening or even asking the local people for their input. There have been large public demonstrations on the slow pace of rebuilding houses and the substandard temporary living conditions, putting their health at risk.</li> </ul>  |



|  |   |
|--|---|
| <p><b>Weak Coordination &amp; Cooperation by Organizations</b></p> | <ul style="list-style-type: none"> <li>• Of the 79 agencies involved in the watsan sector only a dozen such groups participated in its coordination.</li> <li>• It is well known that overall the rebuilding effort lacks integration and coordination by most of the water and sanitation organizations. Despite the UN playing a lead coordinating role, participation among all groups was poorly represented.</li> <li>• Little continuity of staff in the INGO community and retaining trained staff has proven difficult. Most westerners are only on yearly contracts and then move on.</li> <li>• Egos and friction between personalities actually held up or killed partnerships and development projects. There was competition between most agencies and information sharing was not common. Many agencies were busy and had little time for meetings to share information and lessons learned. Within the sector there were problems of a number of houses built without proper water hookups and buried septic tanks, duplication, inefficiencies, and oversupply of hardware material.</li> </ul>   |
| <p><b>Weak Strategic Planning</b></p>                              | <ul style="list-style-type: none"> <li>• There was a large need for small scale maps for infrastructure work, including the collection of baseline data and water table information for both urban and rural areas.</li> <li>• There was a lack of spatial plans at the district level to guide housing construction activity, including water distribution, hook ups and sanitation planning, and shelter construction. Without the plans, houses are likely to be built without essential network connections and other infrastructure will have to be retrofitted later at increased cost, and some major works will simply be put on hold.</li> <li>• It was the project experience and expertise of completing ‘spatial planning’ projects that brought Hatfield Consulting to Aceh in January 2006. Hatfield with support from the Canadian International Development Agency (CIDA) completed a spatial planning project for the restoration of thousands of destroyed fish ponds (tambacks) in 2 locations in Aceh. I can confirm the importance of having these spatial plans on hand, when completing environmental assessment and management planning. The INGOs I worked with had recently completed their spatial plans for their community housing construction projects. The spatial plans significantly improved the assessment and management recommendations.</li> </ul> |
| <p><b>Post Conflict Impacts</b></p>                                | <ul style="list-style-type: none"> <li>• Years of conflict has eroded away government services, regional security, respect for military, health services, education, agriculture, and the economy.</li> <li>• Half of the population in the province is poor with many relying on subsistence agriculture. The sense of community is weak, although religious leaders are influential in decisions. (cont.)</li> </ul>  |

|  |   |
|--|---|
| <p><b>Post Conflict Impacts</b></p>                            | <ul style="list-style-type: none"> <li>• Despite the presence of police, there appeared to be minimal enforcement of laws and regulations in Aceh, other than Islamic morality (Sharia) law. Correspondingly, respect for the law and order by the people was low.</li> </ul>   |
| <p><b>Minimal to No Monitoring and Quality Control</b></p>     | <ul style="list-style-type: none"> <li>• Just because it's built doesn't mean it will be used. A good design on paper can fall apart if given to a bad contractor and if nobody monitors the work.</li> <li>• There were situations of housing projects built with minimal to no provision for water or sanitation facilities. Most organizations planned the installation of watsan services after the building of houses. Of the communities that have new houses and the required water and sanitation systems, many houses were installed improperly or in isolation by unqualified contractors (Kuntoro, 2006).</li> </ul>   |
| <p><b>Corruption &amp; Transparency Gaps</b></p>               | <ul style="list-style-type: none"> <li>• There was a shortage of skilled and reliable contractors, and taking shortcuts in construction appeared to be common. Procurement transparency and process had been challenged within several organizations, including BRR.</li> </ul>   |
| <p><b>Changing Behavior and Adaptation to Good Hygiene</b></p> | <ul style="list-style-type: none"> <li>• Awareness of good sanitation practices and efforts to improve access to sanitation didn't seem to be a priority. I observed minimal public health promotion. It was quite common to witness people defecating in rivers and creeks.</li> <li>• In the rural areas, there was little awareness of hygiene related activity or behavior, and the use of soap for hand washing is almost nonexistent.</li> <li>• Communal latrines were common in the rural villagers and now these people will receive a floor toilet in the home or beside it. For many people in Aceh, such a toilet is foreign and behavioral change to maintain. The method used for behavior change must be culturally sensitive and will take time.</li> </ul> |

## 10.0 Recommendations for Improved Sustainability in Watsan Aid

Based on my observations and research, I have identified several important recommendations that need to be implemented in order to improve the sustainability of watsan aid and associated systems. These recommendations and their rationale are presented in **Table 2** below.

**Table 2. Recommendations for Improved Sustainability in the Watsan Sector**

| <b>Recommendations for Improved Sustainability</b>   | <b>Rationale:</b>  |
|--|--|
| <p><b>1) Strengthen &amp; Support Governance Capacity - at the Provincial, District and Sub-District level</b></p> | <ul style="list-style-type: none"> <li>• There is a need to develop watsan institutions, not just infrastructure.</li> <li>• Although BRR is currently the chief actor in the reconstruction effort, the agency's mandate will expire in 2009. It is therefore crucial that the provincial and local governments learn to take a leading role in the reconstruction effort of the region to ensure a smooth transition when both BRR and the major donors scale down their activities (World Bank-1, 2006).</li> <li>• At present the overall local government capacity to manage public financial monies is weak and local government ability to play a major role in the reconstruction is severely limited.</li> <li>• Provincial and local governments need technical (international) assistance to support project design, adopt best standards, review, and preparation work. The region also needs expertise in environmental sanitation rehabilitation, water quality engineering, health and hygiene promotion, and financial management and monitoring. There also needs to be the provision of community facilitation team coordinators at the district level to lead the local recruitment, training, equipping, management and administration of the teams.</li> <li>• Water governance is important to sustainable water management and can lead to improving poverty conditions. It refers to the range of political, social, economic and administrative systems that are in place to develop and manage water resources and the delivery of water services at different levels of society. It includes the community who can communicate their priorities, exercise their rights, meet their obligations and mediate their differences. Water governance requires water quality monitoring and inspections programs, integrated with watershed management policy initiatives (UNDP, 2004).</li> </ul> |
| <p><b>2) Community Capacity Needs Strengthening &amp; Support</b></p>  | <ul style="list-style-type: none"> <li>• In post-tsunami Aceh, a key component towards the sustainability of watsan hardware and systems is public engagement and their role in decision making. The affected community knows best what their needs are as well as their limitations. INGO's and the Aceh government need to allow local communities greater influence and to participate in the development and management of new water infrastructure and delivery systems (water committees and/or cooperatives).</li> </ul>  |

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| <p><b>2a) Public Participation &amp; Education</b></p>                       | <ul style="list-style-type: none"> <li>• Public participation in managing water infrastructures could also benefit local watersheds as local people may be aware of the need for forest conservation and the protection of the local environment and surrounding water resources (ADB, 2006). This could lead to a reduction in illegal logging, which has been so prevalent in Aceh and continues to threaten a significant amount of existing forests in the province. In addition, the reconstruction of watsan infrastructure could put hundreds of jobless persons back to work (Ardiani, 2006).</li> <li>• Long-term funding arrangements and skilled people are required to support programs.</li> <li>• Financial support for local civil society groups that promote positive values for the community.</li> <li>• Enact realistic water rates and user pay collection systems</li> <li>• Begin public education campaigns that support civil society engagement and that are culturally sensitive. Public awareness for sanitation and environment, and public health and hygiene needs to be improved.</li> <li>• Training should be launched, with a strong focus on the responsibility of local government to improve sanitation services, treatment and disposal, and to facilitate the development of sustainable service delivery.</li> </ul> |
| <p><b>3) Centralize Information &amp; Data Management</b></p>                | <ul style="list-style-type: none"> <li>• There is a large amount of data on water quality coming from many different government institutions and aid agencies. These data are not always either valid or reliable and need to be validated and managed.</li> </ul>  |
| <p><b>4) Increase Coordination &amp; Cooperation of Organizations</b></p>    | <ul style="list-style-type: none"> <li>• All players in the rebuilding effort need to realize the benefits of coordination. Through integration, partnerships and collaboration, projects are more likely to be sustainable over time.</li> </ul>   |
| <p><b>5) Improve People's Access to Sanitation with Maintenance</b></p>      | <ul style="list-style-type: none"> <li>• A community-based sanitation system developed over years provides a locally-devised model that will likely last longer.</li> <li>• A critical element of a successful sanitation strategy, which is often overlooked, will be to develop sustainable sludge removal and treatment systems with management plans and facilities.</li> </ul>   |
| <p><b>6) Increase Monitoring &amp; Enforce Standards and Regulations</b></p> | <ul style="list-style-type: none"> <li>• Important steps towards the installation of a water monitoring system has been made by the implementation of the CIDA funded an Environmental Monitoring Capacity Development project and the rehabilitation of the key government laboratory. The Asian Development Bank has also initiated a program to help Environmental</li> </ul>  |

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|                                       | <p>Department with field monitoring and reporting.</p> <ul style="list-style-type: none"> <li>• Adopt the Sustainable Sanitation Guidelines once the final version is completed.</li> <li>• Increase funding and training for Building, Health and Environmental Inspectors.</li> </ul> |
| <b>7) Work to Reduce Corruption</b>   | <ul style="list-style-type: none"> <li>• Strengthen anti-corruption programs and increase penalties if caught. Begin education campaigns in schools.</li> </ul>   |
| <b>8) Increase Strategic Planning</b> | <ul style="list-style-type: none"> <li>• BRR along with technical assistance should increase efforts and resources towards improving the strategic planning process using an integrated method.</li> </ul>  |

## 11.0 Conclusion:

The tsunami of December 26, 2004, inflicted unprecedented destruction upon the people of Aceh long suffering from a 30 year civil war. Ironically, the tsunami led to a peace deal allowing a historically unparalleled international intervention response to assist rebuilding Aceh. The poorly developed watsan sector did not survive the tsunami, and the opportunity for building a better watsan infrastructure was presented as a result of the natural disaster.

The watsan intervention provided tsunami victims with access to drinking water and improved sanitation facilities, with some larger organizations focusing on the promotion of hygiene awareness. The resulting early emergency interventions were relatively successful evidenced by no major outbreaks of waterborne diseases, which most experts had feared and anticipated.

However, as the intervention response changed from an emergency relief phase to a development and rebuilding phase, the weaknesses in the humanitarian intervention strategies and plans became evident. While the overall goals of the watsan sector are relevant and good short term results have been achieved, I believe the key element for sustainability is lacking.

My field observations and analysis of the situation in Aceh leads me to believe that good governance, leadership and institutional capacity building is vital to sustainability of the watsan sector. If local government and communities are not able to substantially improve their ability to govern and manage the watsan sector, there will be an even greater long-term risk of experiencing major disease outbreaks. Building sustainable government and community institutions relies initially upon international generosity to coordinate action without duplication and direct involvement of the beneficiaries in the development process.

A central challenge for the reconstruction of Aceh is to build back infrastructure that can adequately and sustainably serve the needs of the population for future years. Based on my observations and research, it is not apparently clear how the donations of water and sanitation infrastructure and projects can be sustainable in terms of their use and to protect people from outbreaks of disease relating to poor design, installation of watsan infrastructure. The ability and capacity of local governments and communities to manage these facilities and systems is severely limited. Without investments in governance and collaboration to strengthen their capacity, all that what was given and built may not be sustainable that may result in major disease outbreaks, further impacting on these people. The recommendations presented in this report could lead towards sustainability gap.

In summary, I hope the lessons learned regarding the challenges of rebuilding the watsan sector in Aceh are documented and shared among the international organizations. The intent being that when other serious natural disasters occur, the required humanitarian intervention can operate more efficiently and sustainably bringing greater equity and reducing the trauma of those affected most.

## REFERENCES

- Aceh Kita Magazine (2005) *The second catastrophe post-tsunami; epidemics*, July 2005, pp.16-17, Jakarta, Indonesia.
- Aceh World 1, (2006) *Aceh population ranks second poorest in Indonesia*, Vol. 01, No.39, September 20-26, 2006, p. 5, Jakarta, Indonesia
- Aceh World 2, (2006 a, b ) *Water crisis on the coast area*, Vol. 01, No. 37, September 6-12, 2006. p. 7, Jakarta, Indonesia
- Aceh World 4 (2006) *Aceh Jaya is still left behind in rehabilitation and reconstruction*, Vol. 01, No. 38, September 13-19, 2006. p.8, Jakarta, Indonesia
- Aceh World 5 (2006) *Diarrhea outbreak in Bireun*, Vol.1, No. 42, October 10-17, 2006. p. 6, Jakarta, Indonesia
- ADB - Asian Development Bank, (2006) *Public participation as solution to water scarcity*, Earthquake and Tsunami Emergency Support Project (ETESP), Water Action Briefs, p.3, Banda Aceh, Indonesia
- ADB & GoI, (2005 a,b) Development Bank & Ministry of Health, Government of Indonesia, Disease Control and Environmental Health, *Community water services and health in Aceh-Nias/North Sumatra project, project proposal*, October 2005, pp.6-7, Jakarta, Indonesia
- Ardhiani, N., (2006) *A report on public participation as a solution to water scarcity*, Coalition for People's Rights of Water (KRUHA), pp.1-5, Banda Aceh, Indonesia.
- Barron, P., (2005) *An assessment of conflict dynamics options for supporting the peace process*, The World Bank, Conflict and Recovery in Aceh, August, 2005. pp ii-v, Jakarta, Indonesia
- BRR1, Badan Rekonstruksi dan Rehabiltasi (2005 a,b,c) *Aceh and Nias one year after the tsunami, where do we stand?, Stock taking of the reconstruction efforts, December, 2005 report*, pp. 4, 83-86. Banda Aceh, Indonesia
- BRR2, Badan Rekonstruksi dan Rehabiltasi (2005 a,b,c,d) *Rebuilding a better Aceh and Nias, October 2005 report*, pp. 84-88. Banda Aceh, Indonesia
- BRR3, Badan Rekonstruksi dan Rehabiltasi (2006) *Press Release; Kuntoro's speech at global consortium, November 15, 2006* [Retrieved Online, December 12, 2006]  
<http://e-aceh-nias.org/news/news.aspx?id=42>

- Caldecott, J., (2006 a,b,c) *Environmental issues in Aceh and Nias 2006: ecosystems and biodiversity, (draft -September, 2006)* UNEP Disaster Management Branch, pp.1-4,12,17,27. Banda Aceh, Indonesia
- Clasen, T., et al., (2005 a,b,c,d,e) *The drinking water response to the Indian Ocean tsunami*, World Health Organization, Sustainable Development and Healthy Environments, Water Sanitation and Health, pp. 10-15. Geneva
- GTZ, (2007) *Draft Guidelines for the Selection and Implementation of Sustainable Sanitation System for the Reconstruction in Aceh & Nias,( February 2007)*. pp. 1-4. Banda Aceh, Indonesia. (Electronic Version from email, February 19, 2007)
- Haider J., (2006 a, b) *Environmental aspects of reconstruction in Nanggroe Aceh Darussalam Province (Indonesia) Two years after the tsunami, October 2006*, UNEP, pp. 1-2, Banda Aceh, Indonesia
- Johnson, D. (2006), *Water and sanitation (watsan) coordination, Nanggroe Aceh Darussalam (NAD) and Nias*, UNICEF, August 22, 2006, pp.1-2, Banda Aceh, Indonesia
- Khan, A., (1997 a, b) *The sanitation gap: development's deadly menace*, UNICEF, The Progress of Nations 1997, pp.1,10. [Retrieved Online, December 30, 2006]  
<http://www.unicef.org/pon97/water1.htm>
- Kuntoro Mangkusubroto Speech at Global Consortium, November 15, 2006, New York.  
[Retrieved Online, January 19, 2007] <http://www.e-aceh-nias.org/news/news.aspx?id=42>
- Kuppuswamy, C., (2007 a, b) *Aceh, Indonesia, beginning of a new era*, South Asia Analysis Group, Paper no. 2084, January 5, 2007, p.2-5. [Retrieved Online, January 19, 2007]  
<http://www.saag.org/%5Cpapers21%CPaper2084/html>
- LP - Lonely Planet Guidebook, Indonesia, 2005 pp 469-470, Melbourne
- McGrory, J. (n.d a, b) *One world, In depth country guide: Indonesia*, p.8  
[Retrieved Online, February 2, 2006]  
<http://www.oneworld.net/guides/Indonesia/development>
- Mungkasa, O., (2005 a,b), *A glimpse of the drinking water and sanitation condition in Indonesia*, Perick Magazine, October 2005, p. 8, Jakarta, Indonesia
- Pan, E. (2005) *The Aceh peace agreement*. September 15, 2006. Council on Foreign Relations, p. 3.  
[Retrieved Online, December 13, 2006] <http://www.cfr.org/publication/8789/Indonesia.html>
- Renner, M. (2006 a, b) *Global security brief #9: Post-tsunami Aceh: Is the World Watching?*, February 13, 2006. Worldwatch Institute, p.3 [Retrieved Online, December 13, 2006]  
<http://www.worldwatch.org/node/3902>



Sandjaja, F, (2006) *Sheltered lives*, Tempo Weekly News Magazine, September 26 - October 2, 2006, pp. 16-17, Jakarta, Indonesia

World Bank 1, (2006 a,b) *Brief: Reconstruction progress, disbursement and physical outputs*, World Bank support for post-tsunami reconstruction in Aceh and Nias, Indonesia, p.1-3, Jakarta [Retrieved Online, December 14, 2006].  
<http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/INDONESIAEXTN/0,contentMDK:21153188~pagePK:141137~piPK:141127~theSitePK:226309,00.html>

World Bank 2, (2006) *Brief: Housing Financing and Progress Report*, World Bank support for post-tsunami reconstruction in Aceh and Nias, Indonesia, p.1-3, Jakarta [Retrieved Online, December 14, 2006].  
<http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/INDONESIAEXTN/0,contentMDK:21153188~pagePK:141137~piPK:141127~theSitePK:226309,00.html>

UNDP - United Nations Development Programme, (2004) *Effective water management handout* Water Governance Programme, Bureau for Development Programme, New York

UNSETR Office of the Special Envoy for Tsunami Recovery, (n.d) *The special envoy NGO impact initiative*, page 1 [Retrieved Online, December 14, 2006]  
<http://www.tsunamispecialenvoy.org/specialenvoy.asp>

## APPENDICES

### Appendix 1, Letter of Performance Evaluation

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05 December 2006

RE: Kevin Rumsey Internship Evaluation

To Whom It May Concern:

**Kevin Rumsey's Royal Roads University MA Internship with PT Hatfield Indonesia (Hatfield) was from May 31<sup>st</sup> to November 26<sup>th</sup>, 2006.**

It was clearly evident when Kevin arrived in Indonesia that he was keen to learn and experience as much as he could about the current social, political and environmental conditions of post-tsunami Aceh Province in Sumatra, where he spent the majority of his internship. From his academic training, and prior travel and work experience in developing countries, Kevin quickly understood the need to experience the environment firsthand through ground-truthing and to establish from which organizations and individuals; reliable and valid information could be obtained.

Although the issues surrounding the pre-tsunami conflict between the Free Aceh Movement (GAM) and the Government of Indonesia and the related peace building process captured much of Kevin's initial attention, he quickly realized that there was a multitude of interesting and important issues also related to the massive reconstruction effort being undertaken by the international NGO community, the United Nations and major lending organizations such as Asian Development Bank and the World Bank. The reconstruction effort in Aceh is an excellent example of the many challenges and constraints that arise when multiple aid organizations attempt to fulfil their respective mandates, while the delivery of aid to beneficiaries on this scale clearly requires a high level of cooperation and coordination between the NGO community and the Government of Indonesia.

Into the final third of his internship, Kevin was able to fully grasp both the complexity of the problems associated with the reconstruction effort and the need to focus his research on one small, yet critically important development aspect – the provision of proper water and sanitation infrastructure for the 120,000 homes being constructed in Aceh. This particular problem is an excellent research topic for Kevin given his professional background and experience in watershed and water supply management in the Yukon.

In addition to his personal research efforts, Kevin made an effective and professional contribution to the consulting services of Hatfield. Kevin maintained communications and effectively managed consulting relationships with some of Hatfield's key clients in Aceh, including CARE Canada and CARE International Indonesia. Also for CARE, Kevin personally revised and presented the final draft of an important environmental impact assessment (EIA) of housing reconstruction activities for a beneficiary community. Finally, Kevin prepared professional proposals for other NGOs (such as HELP of Germany and Atlas Logistiques of France), requested from Hatfield for environmental assessment services.

Kevin clearly gained a lot both personally and professionally from his internship with Hatfield. And as with every individual, there are certain professional development aspects that Kevin should take away with him. One aspect is the importance of 'cultural perception,' and the need for Kevin to be more sensitive to social and cultural norms and how others might perceive or react to his behaviours or actions. Secondly, Kevin needs to consistently ensure that his written communication with colleagues and clients is constructed without haste, and is both professional and grammatically correct. Finally, yet equally important to Kevin's professional development, is that Hatfield respectfully requests the opportunity to review and recommend changes to the final draft of Kevin's MA Internship Report in order to ensure that it is consistent with Hatfield's professional standards for report publication.

We wish to sincerely thank Kevin for the contribution he made to Hatfield during his Internship, as well as to Royal Roads University for allowing Kevin this opportunity as part of his MA degree programme.

Yours sincerely,

*John K. McKnight*

John K. McKnight

