Debris management and disposal in the tsunami-affected regions of North-East Japan: Lessons for capacity building in other countries

John Black
Institute of Environmental Studies, University of New South Wales, Australia,

Masaki Arioka
Society of Lifecycle Infrastructure Management (SLIM, NPO), Japan

ABSTRACT: From April 2011 onwards a Japanese NPO, SLIM, regularly visited the tsunami affected towns in Miyagi and Iwate Prefectures documenting debris management and disposal and proposing alternative engineering solutions. Resilient communities of the future required leadership, cooperation amongst key stakeholders, community engagement and capacity building. Opportunities for sharing of experience and capacity building in other countries arise and a case study of Indonesia is presented.

1 Introduction

1.1 *Problem*

The Tohoku Pacific earthquake and tsunami of 11 March 2011, struck a broad, rural area (Prefectures of Fukushima, Miyagi, Iwate), responsible for generating around 4% of Japan's GDP. The coastline of Iwate and Miyagi prefectures is a series of small headlands, indented bays and peninsulas. Settlements cover the flatter land by the side of the ocean. The power of the 10 – 15 m high tsunami wave was funneled onto these coastal settlements destroying virtually everything in its path. According to a Cabinet Office estimate, ¥16 trillion–¥25 trillion (3–5 percent of Japan's GDP) in assets were destroyed, of which ¥9 trillion–¥16 trillion were non-residential private-sector assets. The remaining ¥7 trillion–¥9 trillion in losses were to social infrastructure including houses (125 000), ports, roads, and bridges (Nakamae, 2011: 51).

1.2 *Approach*

From April, 2011, onwards, members of SLIM regularly visited the Sanriku coastline between Ishinomaki to Taro and have made a photographic record of the tsunami debris immediately after the event, the progress in clean up and stock piling debris, and the subsequent sorting of materials, and final disposal through transport to other prefectures willing to take the waste or the coastal shipping of treated wood chips to neighboring towns for incineration. These procedures follow the standard regulations issued by the national government Ministry of Environment on the treatment of waste. The national government has issued a plan for the final disposal of all debris in the prefectures of Iwate and Miyagi by March 2014. A recent Japanese Government report stated that only a little over 5% of the estimated 23 million tons of rubble from three prefectures had been disposed of up to the end of February, 2012. SLIM members have identified the excessive costs and time of this debris removal, and proposed a more efficient engineering solution (Figure 1), called `3.11. Green Hill` (SLIM, 2012), that will make towns more resilient to any future tsunami inundations.

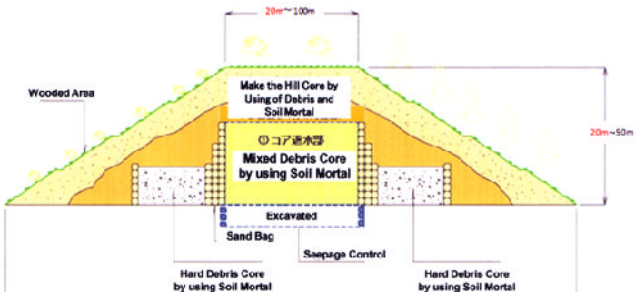

Figure 1. Cross Section of Green Hill Concept

Based on this experience, this paper extracts the key messages should other countries face tsunami disasters, and stresses the importance of institution capacity building using Indonesia as a specific example.

2 Towards Resilient Towns

2.1 *Consultation*

Disasters stretch the capacity of institutions to cope with future events, and although events may not unfold in exactly the same place, collective learning is essential for proper preparedness, and this entails two-way, symmetrical communication by government and communities. The methodology for such community engagement has already been proposed by SLIM to act as

"regional coordinators" for NPOs/NGOs and the people of affected communities (Figure 2). A key concept in consultation is the value of resilience, which refers to a system's ability to accommodate variable and unexpected conditions without catastrophic failure (Victoria Transport Policy Institute, 2011).

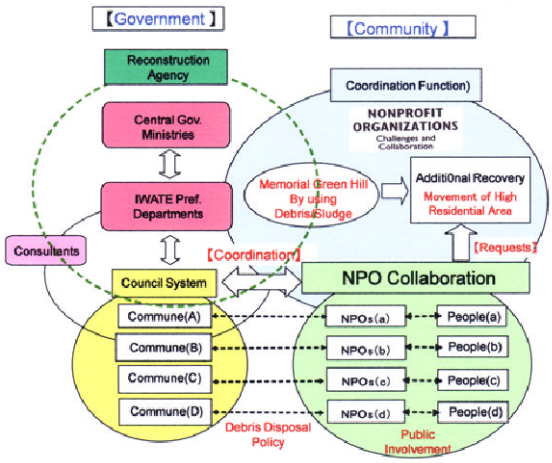

Figure 2. Schema of Community Consultation

2.2 *Evidence-Based Policy*

Sound policy emerges from the robust testing of alternatives and the use of evidence to reach policy positions. There is a role for university consortia, government and the private sector to collaborate on evidence-based policy analysis, as has been demonstrated in Indonesia with respect to infrastructure development (Parikesit, et al., 2008; Parikesit et al., 2012). An independent information base and dissemination of transparent, reliable and independent information lessens investment risk thereby increasing potential investment opportunities when re-building communities. Furthermore, there are opportunities for international collaborative research and development and for consortia formation in the planning, project preparation and delivery phases of infrastructure. In the specific case of tsunami preparedness, there are opportunities for capacity building in skill areas where Japan has strengths (section 2.3).

2.3 *Capacity Building – Sunda Straits Bridge*

In Indonesia, The National Response Disaster Agency was established soon after the Aceh tsunami, and has been effective in Jogjakarta in more recent years. Capacity building in the Agency is important so as to be prepared for the next tsunami event in Indonesia and to make the coastal communities more resilient. Experience from the March 11, 2011 tsunami event can be transferred especially the treatment of debris in situ to create green hills as both recreation areas and as safe ground for future events more likely with rise in sea levels.

Another potential area of capacity building would be initiatives in the Indonesian Economic Development Plan to 2025 which includes a bridge between the islands of Java and Sumatera together with associated economic development around the bridge approaches. This land for potential development is tsunami prone and requires resilient communities of the future.

3 Conclusions

SLIM has documented debris management and disposal in the tsunami-affected regions of Miyagi and Iwate prefectures since April 2011. Alternatives to the national government approach have been designed and subject to preliminary cost estimation, including costs of on-going maintenance of structures. Such experience by SLIM should prove valuable in making communities more resilient, with potential for capacity building programs in Japan and in other countries.

One such case is Indonesia, parts of which are tsunami prone. Discussions are well advanced between Indonesia universities, the government and the private sector to establish a `think tank` that will undertake evidence-based policy analysis and give leadership with capacity building at the three levels of government (national, provincial and local), and for the private sector. Achieving more resilient communities will be high on the research agenda.

Another case is where SLIM approached in July 2012 the Tonga government as an example of the Pacific Island Countries and proposed the Green Hill concept for prevention and alleviation of disaster caused by climate change and rise in sea levels.

4 References

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