

RDD

Regional Development Dialogue

Vol. 34, No. 1, Spring 2013

Disaster Risk Reduction and Resilience Building in Cities: Focusing on the Urban Poor

Jean D'Aragon

Disaster Risk Reduction and Resilience Building of
Urban Poor Communities

Ma. Regie E. Ruego

Community-driven Risk and Vulnerability Reduction
Strategies of HPFPI

Ana Hardoy and Jorgelina Hardoy

Working in Collaboration to Improve Urban
Environmental Planning and Project Implementation

John Norton

Two Experiences of Community Driven Vulnerability
Reduction

Rosa A. Flores Fernandez and Jean D'Aragon

Understanding Slums' Vulnerability to Disaster Risks
Through their Spatial Configuration

Graham Tipple

Housing, Construction, Urban Vulnerability and
Sustainability in Rapidly-developing Cities of the South

Marielle Dubbeling

Urban and Peri-urban Agriculture as a Means to
Advance Disaster Risk Reduction and Adaptation to
Climate Change



United Nations Centre for
Regional Development
Nagoya, Japan

RDD

Regional Development Dialogue

Vol. 34, No. 1, Spring 2013

DISASTER RISK REDUCTION AND RESILIENCE BUILDING IN CITIES: FOCUSING ON THE URBAN POOR

EDITORIAL INTRODUCTION

Graham Tipple and Jean D'Aragon iii

ARTICLES

Jean D'Aragon

Disaster Risk Reduction and Resilience Building of Urban Poor Communities 1

Comment: Ian Davis 19

Ma. Regie E. Ruego

Community-driven Risk and Vulnerability Reduction Strategies of the Homeless People's Federation Philippines, Inc. (HPFPI) 22

Comment: Musyimi Mbathi 31

Ana Hardoy and Jorgelina Hardoy

Working in Collaboration to Improve Urban Environmental Planning and Project Implementation 34

Comment: Edmundo Werna and Thi Mai Thoa Tran 47

John Norton

Two Experiences of Community Driven Vulnerability Reduction: The Cases of Viet Nam and Burkina Faso 49

Comment: James Lewis 61

Rosa A. Flores Fernandez and Jean D’Aragon Understanding Slums’ Vulnerability to Disaster Risks Through their Spatial Configuration	63
Comments: Terrance Galvin	83
Allan Cain	86
Jostacio M. Lapitan and Arturo M. Pesigan Learning and Applying Lessons Towards Strategic Urban Health Emergency Management	91
Comment: S. Harris Ali	99
Graham Tipple Housing, Construction, Urban Vulnerability and Sustainability in Rapidly-developing Cities of the South	103
Comment: Vikram Bhatt	112
Oliver B. Frith and Liu Kewei Engineered Modular Bamboo Transitional Shelters for Disaster Relief: A Case Study from the 2008 Wenchuan Earthquake, Sichuan Province, China	114
Comment: Ying Chang	132
Marielle Dubbeling Urban and Peri-urban Agriculture as a Means to Advance Disaster Risk Reduction and Adaptation to Climate Change	134
Comment: Luc J. A. Mougeot	150
Contributors	155

Editorial Introduction

Graham Tipple and Jean D’Aragon

This issue of *Regional Development Dialogue (RDD)* arises out of, and builds upon, the United Nations Centre for Regional Development (UNCRD) International Workshop on Disaster Risk Reduction and Resilience Building of Urban Communities in Nagoya, Japan, in December 2012.

As Jean D’Aragon’s article indicates, there are many characteristics of urban areas which make them either more vulnerable or more resilient to disasters than rural areas. Higher investment can allow more sophisticated structural modifications for earthquakes and other physical measures to increase resilience to various kinds of disaster. The very concentration of investments, activities, people and movement within cities, however, means that the consequences of disasters can be more severe in the scale of damage done and livelihoods disrupted for a given area affected. Furthermore, as much urbanisation occurs in countries with only a few hundred dollars of gross domestic product (GDP) per head, hundreds of millions of people settle outside of the formal systems. The land they occupy and the lack of services provided can increase their vulnerability many-fold over those in formal housing and with formal employment. It was particularly important, therefore, that there should be a workshop and this issue of *RDD* to focus specifically on urban issues in Disaster Risk Reduction and Resilience as UNCRD adds a specifically urban concern to its operations.

UNCRD established its Disaster Management Planning Programme, in 1985, as one of its main thematic areas of work supporting efforts towards sustainable regional development in developing countries. Part of its work in disaster risk reduction (DRR), enhancing communities’ resilience and reduce their vulnerability to natural and human-induced hazards and disasters, has recently begun to focus on urban areas specifically. As more than half the world’s population is now urban and disasters often have more destructive effects in urban areas, this direction is timely and the workshop was one of its first activities.

Participants came from Ghana, Kenya, and Mozambique in Africa, from Bangladesh, Fiji, Nepal, Papua New Guinea, and the Philippines in Asia Pacific, and from Argentina and Colombia in Latin America. Others from Ecuador, Senegal, and Uganda were invited but could not attend.

In holding such a meeting in Japan, UNCRD was able to build in training for the professionals from several countries who are responsible for DRR measures in governments or nongovernmental organizations (NGOs). Two sites were chosen for study visits. The first, the *Waju no Sato* traditional polder system in the Kiso Three River Basin, a low-lying estuarine area which has, for centuries, protected a way of life there coping with periodic inundation both from the three rivers and from cyclonic surges or typhoons. The second was to Tohoku Region, part of the site of the worst disaster to hit Japan in recorded history, the Great East Japan Earthquake and Tsunami (GEJET) of 11 March 2011, in which a magnitude nine earthquake was followed by a tsunami of catastrophic magnitude.

The Great East Japan Earthquake and Tsunami (GEJET) Confirms the Need for an Integrated Approach to Disaster Risk Reduction

Initially, the workshop participants, who were all from countries where the means are limited, were somehow sceptical about the transferability and applicability in their home country of the lessons drawn from the GEJET that hit such a rich and technologically advanced nation like Japan, where a long-standing traditional practice has evolved into widely recognized cutting-edge disaster risk management expertise and technologies. Obviously, most developing countries can hardly match the level of investments made by Japan structural protection measures against tsunamis. Yet, there are many universally-applicable lessons to be drawn from the GEJET starting with — perhaps the most obvious but also disregarded lesson — the fact that independently of the level of our prevention, mitigation and preparedness efforts we need to always be prepared for the unexpected, regardless of the level of investment in protective infrastructure. In that regard, the GEJET stressed the importance of a holistic and integrated approach to disaster management. Without any doubt, efforts in research and innovation can contribute to improve the resilience of the structural disaster defence systems so they not only withstand better but also longer before eventually collapsing under tremendous impact events despite their low probability, be they expected only once in five hundred years (or more).¹ However, as recalled in D'Araron's article, irrespective of the level of development of a country or of its capacity to invest in structural measures those need to be balanced with a combination of non-structural measures.

There had been major investment in multiple layers of barriers including sea walls five, ten or even fifteen metres high, tidal gates at rivers, and the siting of embankmented trunk roads along the sea front all along the coast facing the major subduction zone responsible for the 2011 event. Through the narratives from different local guides and informal discussions with local residents during the study visit in the Tohoku region the workshop participants could grasp what sounded like a widespread feeling amongst the population that these defences, built to resist almost routine tsunamis, may have inspired false confidence in the face of a once in 500 years' catastrophe and may have increased the loss of life. Moreover, a recent history of erratic tsunami warnings, where the size of the waves had been overestimated a few times, may also have contributed in shaping people's nonchalant attitude towards the successive tsunami warnings on 11 March 2011 when, unfortunately, the size of the waves has, this time, been greatly underestimated. Such was the population's apparent confidence in their defences that many continued routine life even after the public address systems had been broadcasting the successively revised (3 m, 6 m, and 10 m) major tsunami warnings the Japanese Meteorological

Agency (JMA) had issued within three minutes of the earthquake and up to more than half an hour later, when Miyagi and Fukushima prefectures were already under the blackout or when Iwate Prefecture had already been devastated by the tsunami waves.² Videos posted on the internet distressingly show drivers using roads as normal with the tsunami only one block away and approaching at high speed. All of them would be violently inundated within seconds. Furthermore, barriers prevented a good view of what was happening out at sea.

Many more universally-applicable lessons could be learned from the experience of such an “unexpected” event. It has, for instance, raised the need for re-evaluating our existing evacuation plans and designated refuges wherever we are. In northeast Japan, those were designed for tsunamis of 7-10 m high, referred to as Level 1 events having a return period of a few decades to 150 years. Thus, it was not completely surprising to witness how those became suddenly obsolete and inappropriate when the Tohoku region was hit by a Level 2 event (used for tsunamis over 10 m and up to 20-30 m high with a return period of 500 years or longer),³ resulting in many deaths,⁴ particularly among the elderly people, a group who made about 30 per cent of the population of the three affected prefectures but where more than sixty per cent of the casualties were found.⁵ The international experts group meetings and discussions that followed the GEJET also provided an opportunity for the international community to reflect on emerging issues such as the concentration of core social infrastructure (e.g., schools, hospitals) and advanced industries in disaster-prone areas (where land is affordable) and the importance of promoting and taking multi-layered measures (redundancy) for critical infrastructure, including transportation and communication networks.⁶

Although Japan’s central government has a leading responsibility in disaster risk mitigation throughout the country local governments have also a major role to play in the disaster risk management (DRM) systems of the country. Similarly, the national and local authorities recognize the contribution of the communities in DRM systems. This recognition is well established legally through laws and regulations. In the past, communities have proven to be very effective first responders. Of the 35,000 people or so rescued following the Great Hanshin Earthquake that struck Kobe-Osaka in January 1995 28,000 people have been rescued by their neighbours, ordinary citizens with no particular rescue expertise or tools.⁷ When the tsunami of March 2011 hit the Tohoku region, communities played a major role — and sometimes while disconnected with the rest of the country — relied solely on their own ingenuity and knowledge to survive and help each other surviving the disaster.⁸ As the *Hyogo Framework for Action*⁹ stresses, and as responses to recent disasters have encouraged, governments are moving away from reacting to disasters to a more pro-active approach which encourages all actors to be involved

Community Involvement

Community involvement is seen as essential to successful DRR and Disaster Resilience Management (DRM) programmes. Experience in both the Philippines and Argentina show that community-led ventures are more likely to succeed than those using top-down decision-making processes. Ma. Regie E. Ruego’s article in this issue shows how the Homeless People’s Federation Philippines, Inc. (HPFPI), the local Slum Dwellers International (SDI) affiliate, have acquired such valuable experience in mobilising communities through their group savings process that they are now an equal player to the local

authority when DRR measures are needed. Following Typhoon Frank (Fengshen) in 2008, HPFPI was able to take action in providing emergency relief and in the relocation and transitional housing exercise for affected people in Iloilo.

A more conditional endorsement of community participation arises from Ana Hardoy and Jorgelina Hardoy's description of the process of urban upgrading undertaken in a suburb of Buenos Aires from which lessons were incorporated in work preparing to manage climate change in the Rio de la Plata region. Their article shows that, while the process of community participation is reasonably straightforward in its description and intent, actually implementing it in a routine way and at municipal scale is much less simple. Just as communities are unused to collaborating with local government, so local authority personnel are unlikely to take easily to giving up their powers of decision-making to nonprofessional community members. In addition, timescales and expectations of what is success are unlikely to mesh between the parties. On reflection, Hardoy and Hardoy affirm that community participation is an important criterion for success, especially where community-gathered information is used to frame policy, but it is important not to raise expectations to unreasonable levels and to encourage all parties to be flexible throughout the project. They note that building social capital within communities should be treated as a criterion for project success.

Risk mapping is an important tool in DRR and several experiences of communities being involved in their formulation can be found. In Argentine and Philippines, Hardoy and Hardoy's and Ruego's articles in this issue tell of the strength of community knowledge and their expertise in risks in and around the neighbourhoods they occupy. As self-enumeration is part of the package which SDI affiliates use in lobbying for their interests, both *Instituto Internacional de Medio Ambiente y Desarrollo, América Latina* (IIED-AL) and HPFPI promote knowledge gathering and sharing by the communities themselves.

John Norton's experience in Burkina Faso, in his article in this issue, shows that, where the community is involved in the decision-making, in this case about training for woodless construction techniques, take-up for the task is more effective. In Viet Nam, Norton shows how demonstrating resilient technologies in buildings used by the community can prompt community members to retrofit their dwellings with similar features or build new in the same way. That programme proved the efficacy of straightforward, simple messages, especially passed into community knowledge through children.

The article by Rosa A. Flores Fernandez and Jean D'Aragon, on the other hand, looks at the different spatial configurations generated by the way slum dwellers establish themselves over disaster-prone landscapes, and explains how this impacts on the vulnerability of the informal settlements. Besides the morphological and geotechnical characteristics, the site orientation and exposure to climatic conditions of the settlements, the article looks at the location of the slums in relation to the "formal" city (within the formal urban perimeter or on the outskirts), whether the territory is appropriated and turned into an informal settlement in a spontaneous or planned manner, individually or collectively, peacefully or violently, to explain how this will create specific spatial configurations which, in turn, will prevent, limit or exacerbate the vulnerability of those informal communities established on fragile lands.

Health Management

Urban development also raises health issues to which Jostacio M. Lapitan and Arturo M. Pesigan's article in this issue responds with the concept of Urban Health Emergency Management (UHEM). UHEM brings together the management of emergencies and disasters based on preparedness, response, and recovery with health emergency management which looks at implications of and actions on the governance, financing, workforce, service delivery, technologies of health and dissemination of information on health. As the result of a World Health Organization (WHO) consultation on strategic directions for UHEM, the article inevitably takes a wide and optimistic view of the role of health in mitigating disasters. It focuses on what should be done to improve health in urban areas, especially in the context of rapid and often unplanned urban growth. This is especially critical since the type of governance which generates unplanned urban growth, often on vulnerable sites (steep slopes, flood plains, sea-shores) is the one to cope with improving health management in disaster-prone areas.

The article calls for greatly improved data on the locus between poverty and health, on its urban characteristics, of linkages between the rural and urban settings, and including disaggregated data on what diseases are suffered by whom. While disasters management personnel would all probably give their eye-teeth for such resources, the recognition of such data in an international consultation offers links between health professionals and city governance to improve the understanding of soft interventions in DRM. Though not the authors' intentions, readers should be wary of condemning unplanned settlement and, thus, having a mind to clear it and start afresh. Such attitudes embed both unhelpful attitudes and unreasonable expectations in urban planning. It is refreshing, nevertheless, to be able to include a health-focused article into a collection on urban disaster issues.

Housing Development for Disaster Mitigation

As much of urban development is housing, and most of that is provided by informal sector contractors, it is essential that DRM efforts address the potential offered by local builders.

Graham Tipple's article in this issue makes a strong link between the strength of the local construction sector operating in the informal sector and the resilience of neighbourhoods and households to disasters. As low-technology, local building processes create large amounts of employment and income locally, they are uniquely placed to improve local economies and make them more resilient to shocks. For small investments in front-end finance and improving efficiency, governments could improve the livelihoods profile in poor neighbourhoods in appreciable amounts.

Norton's paper in this collection, on Development Workshop's (DW) construction training and practice in disaster-prone areas, tells of the relatively low cost of training in Mali for builders and potters, working in a sustainable manner, and the retro-fitting of strengthening measures in housing and schools in Viet Nam. The point is well made that construction that is of good quality and uses appropriate materials, is important both in defending against hazards and in protecting the environment. This does not mean, however, that an improvement in the building regulations in force will help. It was evident from the 24 April 2013, collapse of a building housing garment factories in Dhaka, Bangladesh,¹⁰ that building regulations can be in place without always affecting poor construction or building on unsuitable sites. Quite the opposite of tightening

regulations may be appropriate, especially for simple housing structures and where the regulations insist on 'modern' materials such as Portland cement. Good construction may mean simple fixings and collaboration with, and improvement of the performance of, the local informal sector. The quality of materials may include how sustainable they are. As Norton points out, it is important not to use materials in routine construction whose exploitation leads to loss of livelihood, such as is occurring in the destruction of the Sahel's trees.

Financing

Appropriate financing is also important at the level of retro-fitting disaster resilience in Viet Nam (Norton) where relatively small amounts are required and a bank has become involved. In resettlement schemes, the resources of households being moved tend to be smaller than the cost of a minimum dwelling acceptable to the authorities. In the Philippines, Ruego describes how HPFPI was able to engage with the Community-Led Infrastructure Funding Facility (CLIFF). In projects which acknowledge the importance of communities' involvement at preparatory stages, some money is required up-front (Hardoy and Hardoy). This calls for more flexibility than is usually built into project terms of reference and funding protocols. In addition, local authorities may not have unallocated monies available to fund the necessary developments up-front. The tight rein they are kept on by central governments is part of the problem; flexibility is desirable in project work with communities.

Resettlement and Transitional Housing

Resettlement is quite a frequent reaction to disasters but imposes its own issues on those involved. Residents in Iloilo have been resettled following typhoon Frank. In Japan, workshop delegates visited temporary resettlement sites and heard of the difficulty of carrying out the policy to prevent anyone returning to their old home site. Even countries with the resources of Japan have difficulty carrying out resettlement policies in reasonable time and at a bearable cost. The difficulty of compulsorily acquiring land and the enormity of engineering challenges building on hilly land, elevated above even the 2011 tsunami, have delayed resettlement of the survivors in permanent homes.

The workshop participants visited two areas of transitional housing which still accommodated the tsunami survivors two years after the event. Dwellings were very small compared with their former homes but they were making the best of very difficult circumstances which were lasting much longer than everyone hoped.

In this issue, Oliver B. Frith and Liu Kewei describe experimental use of modular bamboo construction in transitional housing following the 2008 Wenchuan Earthquake in China. Their technical article introduces the fabrication of modular bamboo panels and how they were deployed in housing as an alternative to the more usual prefabricated steel units. They have a significant sustainability advantage in the much-reduced embodied energy in them compared to the steel units. At 18 m² in area, designed for households of five people, the units are very small and occupants had the same space issues with the bamboo units as with their steel equivalents. Bamboo performed slightly better, however, on sound insulation (both from the neighbours and in rain storms) and gave better thermal insulation in both heat and cold. There were issues of dampness and marks appeared on the outside walls from the water absorbed but they allowed water to drain away better than their steel equivalents. This was more important than just for

keeping dry; the steel units became slippery in the wet and accidents had occurred. There appear to be no insurmountable problems in using them in the future but their greater cost than the steel units must be overcome if they are to become preferred.

Urban and Peri-urban Agriculture and Forestry (UPAF)

Cities have had agriculture embedded in them since time immemorial. Many current urban residents, however, have little opportunity to contribute to their food security and cities have become more vulnerable to fluctuations in food supply. Marielle Dubbeling's article in this issue focuses on the work of the Resource Centre on Urban Agriculture and Food Security (RUAF) Foundation in promoting Urban and Peri-urban Agriculture and Forestry (UPAF) as a means, *inter alia*, of reducing vulnerability. She points out the many advantages of inserting agricultural areas into cities, including productively using land that should be protected against urban development (steep slopes, flood plains, etc.) and improving local diets while reducing the carbon footprint of food supply. She cites Freetown as a city in which RUAF is working to stabilize steep slopes and Kathmandu as the site of a programme of rooftop gardening. A particular success story can be seen in Trinidad Beni in Colombia where the revival of the traditional *Camellones* system of farming has not only reduced food vulnerability but also generated tourism in the canals within the system.

Dubelling's article poses an interesting issue to do with cross-disciplinary collaboration and prioritisation of interests. In Freetown, for example, the low-lying land proposed for agriculture are so well located between sea and business districts that they are occupied by low-income unplanned housing. The idea of moving the residents to higher ground is firmly held by policymakers even though its likelihood is vanishingly small in one of the poorest countries in the world. The mind-set, however, blights the areas from being serviced or improved even though they house about 400,000 people.¹¹ Here, therefore, ambitions in one discipline create problems in another. It is hoped that this multi-disciplinary collection will inspire inter-disciplinary discussions and priority-setting in DRM for urban areas.

NOTES

- ¹ Global Facility for Disaster Risk Reduction (GFDRR), *The Great East Japan Earthquake: Learning From Megadisasters — Knowledge Notes, Executive Summary* (Washington DC: International Bank for Reconstruction and Development (IBRD)/World Bank).
- ² Satoko Okia and Kazuya Nakayachi, "Paradoxical Effects of the Record-high Tsunamis Caused by the 2011 Tohoku Earthquake on Public Judgments of Danger," *International Journal of Disaster Risk Reduction* 2 (December 2012):37-45. (Available at <http://www.sciencedirect.com/science/article/pii/S221242091200012X>; retrieved on 9 May 2013).
- ³ Author's notes from Katsuya Hirano's presentation titled "Dilemma between Protection and Sustainability in Reconstruction Planning" made to the UNCRD-led workshop participants during a seminar organized by the International Research Institute of Disaster Science (IRIDeS), Tohoku University on 13 December 2012.
- ⁴ It was a shattering experience to listen to the story of a local guide accompanying the group during the field visit in northeast Japan. The fisherman told us that when he came back from the sea after the tsunami (as it is a common practice among the fishermen to go to open sea with their fishing boat and gear, to save their livelihood assets), he found out that not only his house has been destroyed but he also had lost his wife and two grandchildren who had initially evacuated on supposedly safe ground but were then taken by surprise by the huge tsunami waves and died while trying to move higher up.

- ⁵ Cabinet Office, Government of Japan, *Disaster Prevention and Reconstruction from a Gender Equal Society Perspective: Lessons from the Great East Japan Earthquake* (From the White Paper on Gender Equality 2012 — Summary) (2012).
- ⁶ Ministry of Foreign Affairs (MOFA), Government of Japan, *The World Ministerial Conference on Disaster Reduction in Tohoku — Joint Endeavors for Solutions: Wisdom of the World to the Disaster — Affected Areas, Lessons of the Disaster-Affected Areas to the World, Chair's Summary* (Tohoku: MOFA, 2012) (Also available at http://www.mofa.go.jp/policy/environment/warm/cop/wmcd_r_2012/chairs_summary.html).
- ⁷ City of Kobe, “Comprehensive Strategy for Recovery from the Great Hanshin-Awaji Earthquake” (Kobe: City of Kobe) (Also available at <http://city.kobe.lg.jp/hanshinawaji/revival/promote/img/English.pdf>).
- ⁸ GFDRR, *The Great East Japan Earthquake: Learning From Megadisasters*.
- ⁹ United Nations Secretariat for International Strategy for Disaster Reduction (UNISDR), *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters* (Geneva: United Nations Office for Disaster Reduction, 2005).
- ¹⁰ Which occurred during the writing of this editorial introduction.
- ¹¹ The Guest Editor carried out a scoping mission for upgrading slum areas in Freetown in 2012.