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Asian Disaster Preparedness Center

Community-based Disaster Management Viet Nam
Program for Hydro-meteorological Disaster Mitigation in Secondary Cities in Asia

Safer Cities 19

Case studies on mitigating disasters in Asia and the Pacific

Promoting Safer Housing Construction through CBDRM:
Community-designed Safe Housing in Post-Xangsane Da Nang City

Typhoon Xangsane entered Viet Nam on 27 September 2006, packing strong winds over 137 km/h and rain that cut power and caused widespread devastation and disruption. An estimated 300,000 people were evacuated from Viet Nam's central coastal provinces to safer locations. About 1.3 million people were reported as affected by the resulting flooding in the days after Xangsane hit Viet Nam. The typhoon's fierce winds and rain destroyed or damaged thousands of homes when it slammed into Viet Nam's central coast. A strong house is an important asset that provides some economic stability. This case study is about how to help poor families protect their homes when facing typhoons and floods.

Mrs. Le Thi Quyen is a cheerful-looking 63-year-old woman who lives with her daughter and three grandchildren in the Ngu Hanh Son district of Da Nang City. She usually stays at home and minds the children, while her daughter goes off to work. They were all home when typhoon Xangsane struck their house. This is her story of Xangsane.

"My daughter was holding the door in place, while I hid with the grandchildren under the bed. We were like four dogs under the bed!" she said while laughing. "It's harder than fighting an enemy." It must have been a terrible experience indeed, for their house was weak. It had walls made only of brick and had no pillars, and sported an iron sheet for a roof. During the typhoon, the roof of their house flew off, and most of the walls were cracked. The damage to the walls was such that it would not be able to support a new roof.

If another strong storm is coming, will she know what to do to protect her home? "I'm too old to do what is needed. I'll ask my neighbors to come and put sandbags on the roof, and tie it down with steel wire. Then I'll bring the family inside and close the door." At that moment, they were already storing food in preparation for the coming rainy season.

She learned these simple measures from her daughter who had attended the Training on Building Techniques Resistant to Typhoon and Flood. Certainly, these simple steps would help her and her family much better than hiding under the bed. Best of all is that the training helped her daughter make decisions on how her new house should be built.

Mrs. Quyen relayed her daughter's message that they built their new house carefully, from foundation to door, used six pillars for its frame, and even ensured that they had a good mix of concrete. Her daughter made sure that the walls had the correct thickness. "I'm happy with the new house; it's strong."

How can we make sure that she remembers the messages and actions that will keep her home safe? How can we spread her growing awareness to others like her? The answer is the approach that prepares the community for managing their disaster risks by themselves with capacity-building for safer housing construction integrated in its activities.

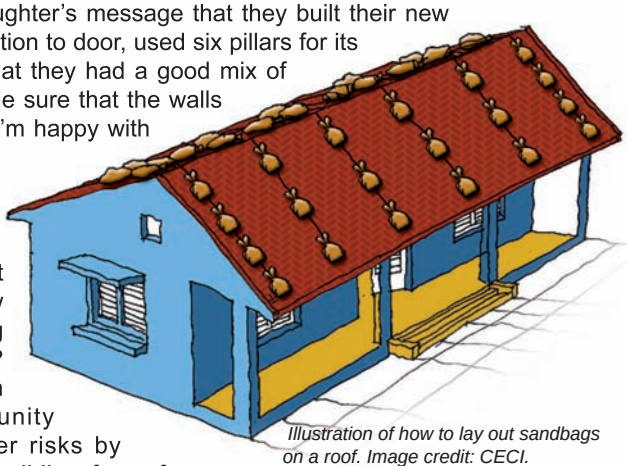


Illustration of how to lay out sandbags on a roof. Image credit: CECI.

Abstract

This case study of Da Nang City describes how building safer houses has to be supported by a comprehensive and integrated approach that includes creating a culture of safety through an appropriate institutional framework, community-based disaster risk management, and raising the capacity of home owners and builders.

What's inside

Summarised Table of Natural Disasters in Viet Nam from 1953 to 2007							Table 1
	# of events	killed	injured	homeless	affected	total affected	damage (in US$) (000's)
Drought	5	0	0	0	6,110,000	6,110,000	649,120
average per event		0	0	0	1,222,000	1,222,000	129,824
Epidemic	10	1,182	0	0	28,754	28,754	0
average per event		118	0	0	2,875	2,875	0
Flood	51	4,952	1,302	375,650	24,075,540	24,452,492	1,580,200
average per event		97	26	7,366	472,069	479,461	30,984
Wind storm	72	20,351	10,139	3,915,355	37,381,705	41,307,200	2,461,025
average per event		283	141	54,380	519,190	573,711	34,101

Source: CRED/EM-DAT; as of 26 October 2007.

Vietnam suffers from severely from floods, typhoons and tropical storms; it also experiences drought, storm surge, landslides, forest fires, and occasional earthquakes. The CRED database show that disasters from wind storms occur more frequently than from other types of hazards (Table 1). The CRED database also puts typhoon Xangsane as Number 1 disaster event in terms of damage, and the second worst was Typhoon Durian that followed two months later (Table 2).

Top 10 Natural Disasters - economic damage:		Table 2
Disaster type	Date	Damage US* (000's)
Wind storm	27 September 2006	624,000
Wind storm	30 November 2006	456,000
Drought	December 1997	407,000
Wind storm	24 July 1996	362,000
Flood	July 2000	250,000
Flood	25 October 1999	237,000
Wind storm	27 September 2005	219,250
Wind storm	2 November 1997	200,000
Drought	May 2002	200,000
Flood	4 September 1994	177,000

Source: CRED/EM-DAT; as of 26 October 2007.

Storm risk perception

The Government of Vietnam made separate, decisive flood policies for the northern, central and southern (Mekong) regions based on each area's geographical, climate and disaster features. Da Nang is found in the central region, which is narrow and topographically complicated, frequently affected by storms, and heavy rainfall that resulted in flooding. Each province in the Central Region is, in effect, a separate river basin. The principal hazards in the central region are typhoons, flash floods and drought. This region has historically used a river basin-wide approach to protect itself against water-related disasters. El Niño phases tend to bring fewer typhoons, less rainfall, and more droughts. La Niña phases tend to bring more tropical storms, sometimes in quick succession, causing torrential downpours followed by flooding.

The government identified some solutions to the hazards problems in the central coast. The principle to be followed is "avoidance and adaptation".[1] This is translated into several approaches covering disaster prevention, response and mitigation, such as the planning and construction of residential, tourism and industrial areas. The approaches tend to be structural interventions, such as dyke strengthening, pier construction, and the relocation of agricultural infrastructure. Public awareness solutions are related to early warning and building local capacity for emergency response. Against this policy on storm and flood preparedness is the reality that a large number of homes were damaged by the typhoon.

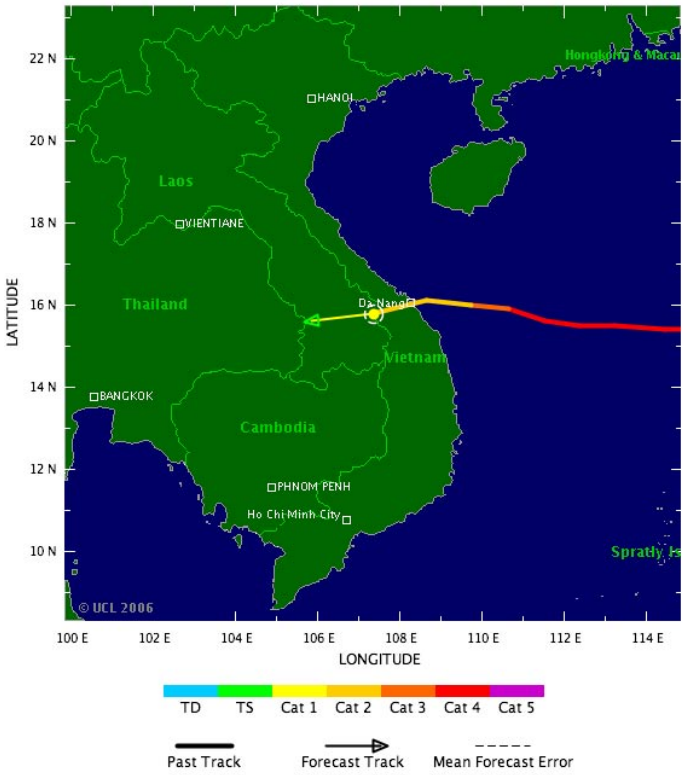
The fury of Xangsane

Da Nang city is frequently exposed to floods and storms. The storms are often tropical storms and depressions coming from the South China Sea, and from tropical and cold fronts. Severe storms with strong wind bring heavy rains that raise the river water level and cause flooding.

Xangsane was the strongest typhoon to hit Da Nang City in 40 years. The Frontline Steering Committee under the Deputy Prime Minister and the People's Committee of Da Nang managed the massive evacuation, reinforcing critical infrastructure and other buildings, stocking the evacuation sites with food and clean water, and providing health care and security.

Reports from the Central Committee for Flood and Storm Control (CCFSC) on incurred damages and losses indicate that 69 people died, two were missing, 435 were injured and more than 1,000 residents were hospitalized. Damaged infrastructure included roads, bridges and electricity posts, as well as to trees and the environment in general. Sunken and damaged boats numbered at 878. In all affected provinces approximately 19,736 houses had collapsed and 273,744 were damaged or flooded. Homes collapsed and roofs were ripped off in Da Nang and the nearby ancient town of Hoi An. Xangsane damaged roads, telecommunications and power networks, fisheries and crops along a roughly 1,000 km (600-mile) stretch. Total estimated loss is VND 10,375 billion (USD 650 million), according to official estimates.[2]

Da Nang had the worst damage in Viet Nam, estimated at VND 5 trillion (over USD 300 million). The amount of damage was worth almost 50% of Da Nang's GDP for 2005 of VND 12 trillion. Table 3 summarizes the damage in the housing sector in Da Nang. There is no formal and comprehensive study on the reasons for the damage, but in the opinion of Mr. Nguyen Huu Sy, the Vice-Chief of the Urban Planning and Construction Department of Da Nang, the houses that collapsed were weak, roofed with corrugated iron sheets or not



Storm track of Typhoon Xangsane (based on image from TSR).

designed for strong wind, while the houses that had no damage had concrete roofs or were reinforced against strong wind.

The main reason behind the weak construction he believed was that house owners were overconfident that Da Nang would not be exposed to such a strong typhoon as Xangsane. The second reason was that house owners would stretch their money available for construction, and would rather not build stronger houses because they cost more. Security is thus sacrificed in favor of a larger house.

Finally, there are reasons that affect the technical design of a house. Some house owners are not aware of safer construction techniques that incorporate typhoon and flood risks, and therefore want unsafe designs (e.g. absence of building foundations) or features (like awnings). The city cannot force people who want to build 1- or 2-storey houses to follow safer construction techniques; it can only encourage or advise them. Some of the local masons were not aware of safer construction techniques, and so built people's houses poorly.

What the statistics do not show is that most of the collapsed houses belonged to poor people, and that they tend to build small houses out of brick, with roofs of corrugated iron, and lacking foundations or a frame. Even with external financial assistance, people tended to build the same type of unsafe house.

Damaged house before it was rebuilt. Image credit: CECI.

This leads to the legal framework that puts responsibility for the safety of housing construction upon each individual house owner. Most poor house owners will only build one-storey houses, and under the law, each individual is ultimately responsible for the quality of his/her house so long as it falls within this size category. This means that the city can do little more than strongly promote safer construction, and that the desire for safer houses must be cultivated in the house owner. Within the context of reducing typhoon and flood risks, this is reached by a combination of activities that reinforce the idea that the ordinary house owner and h/her family can take steps for assuring their own safety.

Damage to houses due to Xangsane — **Table 3**

Type of Damage	Number of Houses
Total collapse	14,138
No roof, badly damaged	42,691
No roof, little damage	65,271
Submerged	2,672

Source: Report Ref. No.: 110/BC-UBND, PC of Da Nang, 14 October 2006

Construction Regulation Processes in Viet Nam

The framework used for specifying hazard-specific regulations is the Master Plan as mandated by the Law on Construction, Decree 16 of 26 November 2003. The priorities and strategies for urban planning and development are decided by the national government. These are in the Development Plan and the Master Plan decided in 2002. Under the new Master Plans, construction regulations must be reviewed every 5 years, to be suitable to current social and economic conditions. The first review is year 2007.

The government has concerns for Da Nang's areas exposed to floods, typhoons, and earthquake. The city planning includes requirements for reducing floods, typhoons, and/or earthquake risk in the building codes they release. For example, to assure safety against floods, any area near the sea or river has to have a ground floor that is safe against a 100-year flood (a large flood with a 100-year recurrence and 1% probability of occuring in any year). The city has also started to plant trees at the coast as protection from storm surge. The city is will also consider all environmental and climate change issues for its next adjustment of the building codes, according to Mr. Nguyen Van Chung, Deputy Director of the Construction Planning Institute, the local government agency with the task of developing urban plans and building codes.

The actual monitoring of construction activities is done by the Urban Planning and Construction Department of Da Nang and the urban planning and construction faculty of the districts. Construction has differing levels of regulation. A building permit is always required in the urban areas. Owner-driven construction is typical for small houses, defined as having a maximum floor area of 250 m^2 and a maximum height of two storeys; the purpose of the building permit

Da Nang Facts and Figures	
Total Area	1,257.3 km²
Average annual rainfall (2006)	2233.8 mm
Population (in 2006)	834,000
Population growth rate (in 2006)	1.18%
Population density (in 2006)	663 people/km²
Number of households (in 2007)	21,786
GDP per capita (in 2006)	USD 1,050
Monthly average income (2006)	VND 1,400,000

Source: 2007 Statistics, Da Nang City Statistics Department

is to regulate if the house is consistent with the city's Master Plan, and it conforms to architectural guidelines.

For buildings with area larger than 250 m² or more than 2 storeys, the purpose of the building permit is to check: (1) if the building was planned by a registered architect, (2) if it will be built by a registered construction firm, (3) if it conforms to safety guidelines and building codes, and (4) if it observes appropriate beauty, safety and architectural standards. The process is under Decree 16 of 2005 by the People's Committee of Viet Nam, and under Decision 19 of 2006 by the People's Committee of Da Nang. The owner must submit the building plans for inspection by the Urban Planning and Construction Management Department of Da Nang City and faculty at the district level. The inspection process takes 15 days to complete, and once issued, a building permit lasts for one year. The following are some of the steps taken once the application is received:

- Check if the land is owned by the applicant.
- Check if the proposed land use is correct for the area.
- Check if the proposed building is at a safe distance from the railway and highway.
- Check if the architectural guidelines for the street address are observed (standard height and number of floors).
- Check the number of bore holes of the geotechnical survey.
- Check if the appropriate building codes are observed, such as for the wind coefficient and earthquake coefficient.
- Check if fire regulations are observed.
- If the application is to add a floor to 2-storey buildings or taller, they give advice to get a registered consulting firm to design the building.

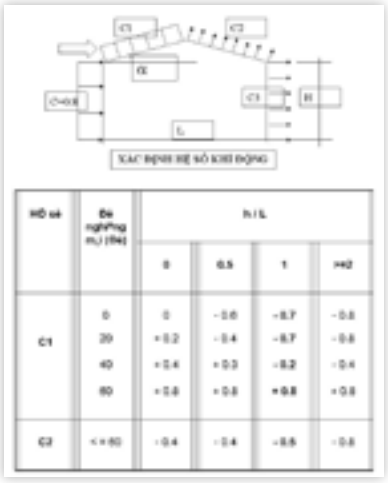
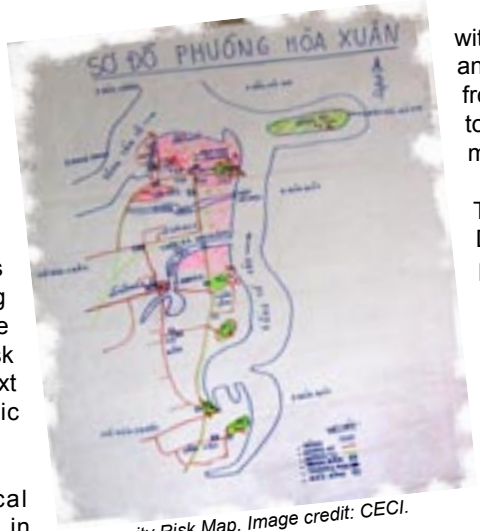


Table of wind coefficients. Source: Urban Planning and Construction Management Department, Da Nang City

Community-Based Disaster Risk Management

In post-Xangsane Vietnam, some assistance was available for poor households as funds for housing reconstruction. However, this form of assistance can mean that the money is a means by which the original risk is recreated if people build their houses in the same manner as the original weak house that had been blown away by the typhoon's winds. This case study shows how the selected communities of Da Nang City had the advantage of undergoing the process of Community-Based Disaster Risk Management (CBDRM) that forms a context and culture of safety for other economic recovery activities.



Community Risk Map. Image credit: CECI.

The Program for Hydro-Meteorological Disaster Mitigation in Secondary Cities in Asia (PROMISE) in Vietnam was working to reduce the vulnerability to typhoons and floods of communities in Cam Le district in Da Nang. The objective of the two-year project is to promote the adoption of specific hydro-meteorological disaster preparedness, mitigation measures, strategies, tools and methodologies by the communities and the city government. One methodology is CBDRM. In Da Nang, this was done by working through a local NGO, the Center for International Studies and Cooperation – Vietnam (CECI-Vietnam).

CBDRM is a process in which at-risk communities are actively engaged in the identification, analysis, treatment, monitoring and evaluation of disaster risks in order to reduce their vulnerabilities and enhance their capacities. CBDRM can enable the community with coping and survival strategies to respond to an emergency situation even before outside help from the government or NGOs arrive, and with tools to analyze their risks and apply appropriate mitigation.

The key feature of CBDRM is the Participatory Disaster Risk Assessment. It is a diagnostic process to identify the risks that the community faces and how people overcome those risks. The process involves guiding the community to do their own hazard assessment, vulnerability assessment and capacity assessment. First, the community is given a short training sessions on basic concepts (hazards, vulnerabilities, capacities, risks, disasters and disaster risk management) and on the community's role. Second, the community is asked to identify and characterize the hazards they face, their vulnerabilities, and their resources. Finally, the communities are asked to make action plans based on their assessments. With this process, people's perception of risk is considered, the data is immediately owned by the community, and they are able to describe in their own words which areas are exposed to what hazards, and they are able to identify their own resources that they can mobilize to reduce their risk.

The assessment made by the communities showed that they recognized their vulnerability was primarily to typhoons and floods among other natural hazards. Aside from the structural mitigation they felt was needed (such as cemented canals and sea walls), they also recognized the need for training the community on safer construction methods.

Capacity Building for Safer Housing Construction

Capacity building activities were held to promote safer houses. The activities carried the same advocacy message of promoting the use of safer construction techniques and were later helpful in mutually reinforcing the principles of safer housing construction.

The first was a workshop about "Construction Techniques Resistant to Natural Disasters" held with more than 40 local leaders and professionals whose work were related to urban planning and building construction, and specifically included the district and commune engineers whose tasks include supervise building construction in the city's districts.

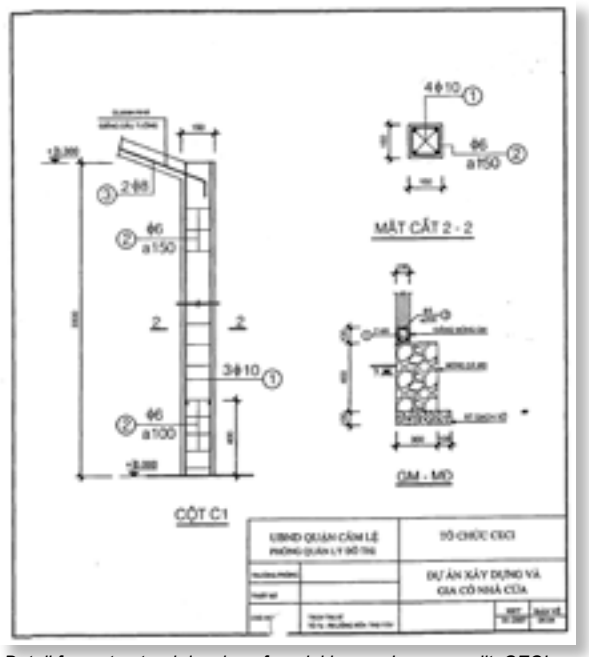
Presentations were made on the principles of and legal framework for using urban planning and construction regulation as strategies for mitigating disaster risk in Da Nang in response to changing disaster risks brought by climate change to achieve a common understanding of urban planning as a strategy for reducing disaster risk. A workshop session was held for the presentation of safe house models by different organizations who work in Da Nang, and then to engage the participants to collectively develop a model of a safe house that can be used in Da Nang.

Presentation of model house developed by builders during workshop. Image credit: ADPC

The second activity was a two-day training course on "Construction Techniques Resistant to Typhoon and Floods". The training participants consisted of 18 local builders and contractors who were going to be involved in Xangsane recovery projects in housing reconstruction. The training topics were as follows: *General Aspects of Typhoon and Flood Resistant Construction*, *Typical Building Construction Systems* exercise, *Field Visit* to survey the main damage to houses, *Reinforcement and Construction of Local Housing Models*, and *Developing a Model House* exercise. The models developed by the groups were presented on flipcharts and reviewed by the resource persons and the other participants. Almost all the designs proposed a house with metal sheet gable roof inclined along the wide wall, which is vulnerable to strong wind. However, this provides some shade and is a prevalent culturally-accepted local practice; drastic changes to it would be unacceptable to the community. Except for one design, the house designs proposed seemed too expensive, too large, and would have to be modified in order to build them feasibly. After some discussion among the participants and resource persons, a model was finalized and is described in Box 1.

The community's model of a safe house **Box 1**

- The floor area of the house should not exceed 4m x 8m.
- Follow the principles of typhoon and flood-resistant building construction.
- Use a steel roof frame with framing members along both directions. Consider using cross-braces for the roof frame if the roofing material is made of corrugated iron sheets or fiber-cement.
- The gable roof can be along the long direction, but should be built with an unsymmetrical shape. The side facing prevailing wind direction should be the shorter side with a pitch >30º.
- The mezzanine for flood refuge should be simple and constructed out of timber, not reinforced concrete, and a wooden ladder should be used for access. This is not a full-time living area, but only used in during an emergency situation. During normal times it can be used for storage or similar purpose.
- Put the toilet in a small separate structure outside and in the back of the house, not inside because many of the communes do not have running water supply. An indoor toilet would create a bad smell and make the indoor environment unpleasant.



Detail from structural drawing of model house. Image credit: CECI

Using Disaster Recovery Funds While Promoting Safer Construction

Post-Xangsane assistance to Da Nang came from several sources. One such project was the "Relief and Recovery from Typhoon Xangsane in Danang City and Thua Thien Hue Province" supported by the Canada Fund for Local Initiatives, and implemented by CECI-Vietnam. One of its components was on housing that assisted families whose houses were damaged or collapsed completely. The budget allocation for the housing component was VND 322,171,000 (USD 20,144) that supported the training of beneficiaries and builders in safer construction techniques, and the rebuilding of 23 houses and repair of 7 houses.

Families who were to receive assistance for rebuilding their houses had to send a member of the family to attend the training on "Construction Techniques Resistant to Typhoon and Floods". This is important so that when they are rebuilding their houses by themselves or with the assistance of local

builders (masons and carpenters), they can insist on using the safer house model.

Beneficiaries, both men and women, participated in the decision-making over the design and materials to ensure the house was suitable to their needs. This process respected local culture and tradition as well as beneficiaries' modification concerning their preferences, beliefs and culture (any extra cost for modification would be the family's responsibility). The training participants also proposed a set of guidelines to ensure new house constructions were more resistant to typhoon and flood hazards. District engineers completed the house design following safer house construction techniques.

Suppliers were selected not just on the basis of bids, but also by evaluating the available quantity and quality of construction materials. The delivery of the materials was to the construction sites to ensure that the fund was used for buying materials of adequate quality and not used by beneficiaries for other necessities.

A team made up of the city government's engineers, local builders and CECI-Vietnam supervised the construction to ensure that the recipient families followed the safer building practices. A monitoring sheet (check list) was developed and filled by the ward and CECI-Vietnam team during the construction.

Reminding the Lessons

Safer building designs cost more than unsafe designs, and therefore to follow the model would mean a much smaller house for the family. The beneficiaries usually received social pressure (from family, relatives, neighbors and friends) to build bigger house. Vietnamese families are also expected to (temporarily) house neighbors and relatives who are struck by similar misfortunes. Such pressure can sometimes override training lessons and public awareness messages. This situation came out during the housing reconstruction project, when beneficiaries initially planned their houses with the unsafe design they were accustomed to, and again during construction when well-meaning relatives and friends tried to convince them to stretch the available construction materials to build bigger houses without frames.

Monitoring team meeting with beneficiary. Image credit: CECI.

Completed model house. Image credit: CECI.

The city officials, specifically the Cam Le District Engineer and the six Ward Engineers of Cam Le, played critical roles in enforcing the use of the model. First, the District Engineer patiently worked with the design team of each house to make sure that the dwellings are designed for safety. Each team was composed of the beneficiary, the District Engineer, the Ward Engineer where the beneficiary lives, and a CECI-Vietnam representative. They went over the designs over and over until the District Engineer was satisfied that each design was of a safe flood- and typhoon-resistant design, and each beneficiary was satisfied that h/her family's needs were adequately met.

Second, monitoring teams made up of ward engineers, the local builders trained in flood- and typhoon-resistant construction techniques, and resource persons from CECI-Vietnam found that random visits to the reconstruction sites helped reinforce the message of constructing safer houses. During these visits, the beneficiaries would be reminded of the discussions during the training, of what they saw during the field visits to damaged houses, and of their conclusions of what had caused such damage. The monitoring team therefore played the role of advocate for safer housing and safer construction techniques. The project managed to get 100% of the beneficiaries to apply the lessons learned in the training.

After the houses were finished, posters of the principles for constructing houses resistant to typhoons and floods were developed with the city officials and the training participants. These posters, printed on sturdy laminated cardboard, were distributed to and displayed in the houses reconstructed using the design developed by the training participants and district engineers. Thus, the city had living models of the concept that people in their community could see and enter. The houses have survived storms since they were built or repaired with this methodology, while other houses built through other Xangsane recovery projects have already sustained damage. The beneficiaries are thus proud that their houses remain standing, and have become the main ambassadors for safer housing to their neighbors.

Construction Principles poster. Image credit: CECI.

The posters were also distributed to and displayed in the local government offices (people's committee) at ward and district level. Taken together, the constant reminder of the principles was done at several points: during the construction of houses, by the presence of model houses within neighborhoods, with the house owner as the neighborhood's messenger of safe housing, and strategic location of the poster in the model houses and community centers.

Voices of the People

We already met Mrs. Le Thi Quyen earlier in our story about constructing safer houses. Here are the snapshots of three more residents of Da Nang interviewed on June 12, 2007. They all came from Cam Le district, and either personally attended the training on "Construction Techniques Resistant to Typhoon and Floods" or sent another family member who supervised the rebuilding of their new house. They were asked to relate what they remembered of the training, and how useful could the training be for others.

They are typical Xangsane survivors whose own house or family's houses were damaged during the typhoon. The personal circumstances are described to frame the choices each made over whether to build a smaller but safer house. Mrs. Quyen, Mrs. Gia, Mr. Linh, and Mr. Nhut are the typical people who would lose their houses to a strong storm. Their limited education or poverty were not obstacles to appreciating the value of using safer construction techniques.

Mrs. Gia (left) sitting with the monitoring team in her reconstructed house. Photo credit: ADPC

Mrs. Trinh Thi Gia

Mrs. Trinh Thi Gia is a 65-year-old grandmother living with 5 grandchildren and daughter-in-law; her son had died some time ago. There was a time when her daughter-in-law abandoned the children, but returned after Mrs. Gia got her new house from the project. Thus, the disaster had a very big personal impact on her. During Typhoon Xangsane, the back wall of her house collapsed and part of the roof came off. She was eligible for financial assistance for getting new windows, doors, walls and roof, so she and her brother attended the training.

"I have no money. I can ask the PC (People's Committee) for some help, but this cannot be all the time. I found open land, and do vegetable farming there. I also look for shells in the river, and prepare food I will need for the storm."

"If another storm is coming, I will place sandbags on the roof, and shut the doors and windows. The training helped me, and now I have a safe house. Other people should have this training."

"If the storm is supposed to last 2 to 3 days, I will get help to put sandbags on the roof, use steel wire to anchor the cross beams to the ground, and bar the doors and windows."

Mr. Kieu Quoc Khanh Linh

Mr. Linh is 32 years old and works as a laborer when he can find employment. He lives in the new house with his wife aged 30, and two daughters aged 11 and 9. His wife augments their income by collecting recyclable materials from the trash. At the time of the interview for this study, he and his wife were both home sick. His eldest child just started going to school last year; due to her excellent academic performance, she won a scholarship and was allowed to skip first grade. The family lives with his mother who owned the house that was destroyed as well as the rebuilt house.

Mr. Linh standing at the doorway of their new house with his daughters. Photo credit: ADPC

"Nowadays, when other people see our house, they ask me why we didn't expand it to accommodate a toilet and more people. Because they didn't attend the training, they don't understand that safe construction with reinforced columns costs more than using only brick. I prefer a small but safe house."

"Before a storm, reinforce the roof with zinc wires that tie the roof to the wall and place sandbags on it."

"My younger brother received VND 2 million to repair his house. I advised him to use the money for bracing for the front and side walls, and to cut off the protruding awning."

Mr. Tran Nhut

Mr. Nhut is a field worker and a laborer. He attended the training in behalf of his sister who was a chosen beneficiary of the reconstruction project; subsequently, he supervised the construction of the new house. His sister tends to the family's rice fields, and his brother-in-law is a field worker and laborer like himself. He and his other family members live in the adjacent houses, and all share the two crops of rice they get every year from their small paddy that has an area of almost 1500 m^2.

"I remember the principle of reinforcing the pillars, keep the distance between pillars at not more than 4 meters, that the front wall of the house should be 20 cm thick, the side walls should be 15 cm thick, brace the wall and the roof, and use a steel cross bar so that it's strong."

Mr. Nhut in his sister's safe house that he helped build. Photo credit: ADPC

"Later, the rest of our family will follow this house, and will rebuild their houses at the same time to economize."

"If a big storm comes, the whole family and maybe the neighbors will come here to hide. Other neighbors feel their houses are not as strong as this one."

Lessons Learned

- *Promote a culture of safety above all.* The desire for safety must be embedded in as many aspects of community life as possible. It is not enough to rely on a legal and institutional framework to assure that safer construction principles will be followed by the individual home owner. Involving the home owner in CBDRM processes will deepen the understanding of how choices of safety over other social or economic considerations will be best for the welfare of h/her family and community.
- *Promote first-hand understanding of safer construction.* A training workshop on safer construction principles and techniques can help open the eyes of the community resident to the pitfalls of unsafe construction, learn first-hand and explain safety principles with their own words. A workshop on developing an ideal house was successful in showing how to apply the principles of safer construction.
- *Reinforce the lessons with close monitoring.* There is no substitute for close regulation of the construction process. The teams for regulating construction can be enlarged with the masons and carpenters who undergo the training in principles and techniques for safer construction.

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[2] "Rapid Joint Assessment of Response Needs due to the Typhoon Xangsane in Central Viet Nam," joint assessment report by representatives from Viet Nam Government Departments, UN agencies, international organizations and non-governmental organizations (NGO), local authorities and local communities; online at: http://www.ccfsc.org.vn/DMU_En.

Further Reading

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About the Project

PROMISE-Vietnam is a two-year project whose goal is the reduced vulnerability of urban communities in the Philippines through enhanced preparedness and mitigation of hydro-meteorological disasters. The activities planned for PROMISE-Vietnam include:

- Risk-based urban land use planning
- Training / Workshop on typhoon-resistant construction
- CBDRM Training and Training of Trainers
- Hazard mapping Vulnerability and Risk Assessment
- Community Based Disaster Preparedness Planning
- Community-Based Emergency Response Training

Project Partner

The Centre for International Studies and Cooperation (CECI) – Vietnam, the lead partner in the project, combats poverty and exclusion by strengthening the development capacity of disadvantaged communities, supporting initiatives for peace, human rights and equity, mobilizing resources and promoting the exchange of know-how.

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Other Relevant Safer Cities Studies

Safer Cities 4: *The School Earthquake Safety Program in Kathmandu Valley: Building safer communities through schools*

Safer Cities 5: *Community-based Disaster Risk Reduction in Central Sri Lanka: Mitigating landslide and rock-fall damage in urban Nawalapitiya*

Safer Cities 12: *Demonstration Housing Construction for Landslide and Flood Prone Areas: A case study from Ratnapura, Sri Lanka*

***Safer Cities** is a series of case studies that illustrate how people, communities, cities, governments and businesses have been able to make cities safer before disasters strike. The series presents strategies and approaches to urban disaster mitigation derived from analyses of real-life experiences, good practices and lessons learned in Asia and the Pacific. This user-friendly resource is designed to provide decision-makers, planners, city and community leaders and trainers with an array of proven ideas, tools, policy options and strategies for urban disaster mitigation. The key principles emphasized throughout Safer Cities are broad-based participation, partnerships, sustainability and replication of success stories.*

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PROMISE

During the implementation of the Asian Urban Disaster Mitigation Program (AUDMP), ADPC recognized the importance of interventions in urban areas and accordingly identified Urban Disaster Risk Management as one of its five core thematic areas of work, experiences from which have also guided the selection of the target secondary cities. ADPC has developed 'Strategy 2020 for Urban Disaster Risk Mitigation in Asia' which aims to reach 200 cities by the year 2020.

The need to minimize the destructive impacts of these hydro-meteorological events on the vulnerable communities, particularly the urban communities and the economic infrastructure through enhanced preparedness and mitigation is therefore the main thrust of the present intervention in implementation of the Program for Hydro-Meteorological Disaster Mitigation in Secondary Cities in Asia (PROMISE).

ADPC considers PROMISE program as an opportunity to associate with many communities living in Asian cities vulnerable to hydro-meteorological hazards with the aim of reducing the impacts of such events and demonstrate innovative applications for community preparedness and mitigation.

This case study documents efforts under a specific program objective:

- *Increased stakeholder involvement and further enhancement of strategies, tools and methodologies related to community preparedness and mitigation of hydro-meteorological disasters in urban communities.*
- *Effective local disaster risk management by local authorities is first related to many development activities. These measures are preventive in nature, and attempt to reduce people's vulnerability to disasters. They are also diverse, complex, and interactive, and are not always recognized by local and national authorities who are accustomed to responding to emergencies and reducing exposure to the hazards that bring about disasters.*

USAID FROM THE AMERICAN PEOPLE

The Asian Disaster Preparedness Center (ADPC) is a regional resource center dedicated to safer communities and sustainable development through disaster risk reduction in Asia and the Pacific. Established in 1986 in Bangkok, Thailand, ADPC is recognized as an important focal point for promoting disaster awareness and developing capabilities to foster institutionalized disaster management and mitigation policies.

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