Draft Paper

Learning from Yolanda (a.k.a. T/S Haiyan)

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INTRODUCTION

The UN World Disaster Report 2012[1] ranked the Philippines as third most disaster-prone country in the world (Beck, et al., 2012). Annually, about twenty typhoons strike the country. In the Philippines, sea levels, sea temperature and weather patterns are expected to be disproportionately altered by the effects of climate change. Other geographic features combined with widespread poverty put the country and its 98 million people at extreme risk from climate change. Located on the Ring of Fire and in a main alleyway for typhoons, the Philippines will never be disaster-proof; but, experts say it can cut the risk.

Tropical Storm (T/S) Yolanda tested the Philippines's ability to cut the risk of disaster. At 4:40 a.m. of November 8, 2014, typhoon Yolanda made its first landfall over Guian, Eastern Samar; it was a category 5 typhoon. With peak winds of 315 kilometers (195 miles) an hour, the storm howled and made its 2nd landfall over Tolosa, Leyte at 7:00 a.m. Unrelenting, its 3rd landfall was over Daanbantayan, Cebu at around 9:40 a.m. An hour later, it struck Bantayan Island, Cebu. By 12:00 noon, it felled Concepcion, Iloilo. It maintained its strength all through the afternoon as it approached the Calamian Group of Islands. Then, at 8:00 p.m., the storm made its 6th and final landfall over Busuanga, Palawan before slightly weakening and moving towards the West Philippine Sea.

A total of five provinces were fatally struck by its six successive landfalls before it finally left the Philippine Area of Responsibility the following day at 3:30 p.m. (National Disaster Risk Reduction and Management Council, 2013). Consequently, crucial lifelines like, electric power supply was cut off in seven regions nationwide. Telecommunication lines were also severed. With the breakdown of power and communications system, no one knew the extent of destruction. Cut off from the rest of the archipelago, the five provinces directly hit had no access to first aid medication and relief operations at the most critical hours. The impasse continued for several days. People who initially survived the storm but needed urgent medical attention eventually succumbed to death; all other survivors became increasingly desperate.

[1] The World Disaster Report 2012, a collaboration among the United Nations University's Institute for Environment and Human Security (UNU-EHS), the German Alliance for Development Works (Alliance) and the US-based environmental group, The Nature Conservancy, rated the disaster risk of 173 countries using "globally available data" on their individual exposure and susceptibility to disasters, as well as their coping and adaptive capacities in the event of natural calamities, rated the Philippines as third most disaster-prone country in the world.

Typhoon Yolanda was a very strong tropical storm and it dramatically revealed the Philippines's vulnerability to disaster. Disaster management experts described T/S Yolanda as a super typhoon with a class of its own. "Even the best-prepared nation would have a hard time bracing itself against the effects of such a storm," Kathryn Hawley, a disaster management expert from Asia Foundation told Rappler's Marites Vitug (Ranada, 2013). The magnitude of its destruction was immense. On December 13, the UNOCHA reported that significant humanitarian needs still remained despite signs of recovery in some areas. Over three million people continued to be displaced from their homes with nearly 102,000 living in evacuation centers (UNOCHA, 2013). Six weeks after the storm, the civil defense director announced that the number of casualties, placed by the government at 6,057 dead and 1,779 missing, was almost certain to rise (Frances-Presse, 2013). By then, authorities were reportedly still collecting bodies at an average of 8 to 10 additional cadavers daily. The director also expressed doubt that many of the missing would be found alive since so much time had elapsed since the killer typhoon flattened and flooded whole towns mainly in the central islands of Samar and Leyte, particularly, Tacloban City.
Human life is priceless. And with thousands of human lives lost, rebuilding communities becomes even more daunting.[2] Plus, the financial cost of rehabilitation is staggering. President Aquino said the country would need 8.59 billion dollars for rehabilitation efforts alone for damage due to typhoon Yolanda (Dacanay, 2013).

RATIONALE

With so many lives lost, countless persons scarred by psycho-emotional trauma, and the staggering cost of disaster response and rehabilitation, lessons ought to be drawn from typhoon Yolanda's wrath. What can be learned? How can hazard risks be mitigated and managed? This paper is an attempt to learn from the Yolanda disaster through a review of what happened before, during, and after the super storm struck the Philippines. Insights drawn from this reflection process hopefully can contribute to building a culture of preparedness against hazards and resilience from disasters. Specifically, it is hoped that recommendations can be offered to Xavier University so that it may, as an academic institution of higher learning, continue to help promote sustainable development in the Philippines through the reduction and management of risks associated with hazards.

METHODOLOGY

News clippings, interviews, researches and other archival materials were studied to make meaning of the impact of the typhoon. The Comprehensive Disaster Management Framework for comprehensive disaster risk management was principally used as basis for reflecting on the events that transpired. The basic components of the framework reviewed were mitigation and preparedness for pre-event; and, response and rehabilitation for the post-disaster phase.

Additionally, data from the Hyogo Framework Agreement was reviewed to determine the Philippines' progress in efforts towards disaster risk reduction and management. In 2005, the Philippines adopted the Hyogo Framework for Action (HFA) (United Nations International Strategy for Disaster Reduction,

[2] Post-disaster recovery takes time and can be very costly. In December of both 2011 and 2012, two typhoons named Sendong and Pablo struck the Philippines's southern island of Mindanao. Each typhoon killed more than 1,000 people. Areas hit by these typhoons were still in the recovery phase when t/s Yolanda struck. Moreover, three weeks prior to typhoon Yolanda's landfall, on October 15, 2013, an intensity 7.2 earthquake shook the central Philippines, particularly Bohol and Cebu islands. It was the deadliest earthquake in the Philippines in 23 years. According to official reports by the National Risk Reduction Management Council (NDRRMC), 222 were reported dead, 8 were missing, and 976 people were injured as a result of the earthquake. More than 73,000 structures were damaged, of which more than 14,500 were totally destroyed including heritage buildings such as centuries old churches (Wikipedia, 2013).

2011). The Philippines evaluated itself as has having made significant progress in each of the HFA priority areas; the range of its self-ratings were from 3/5 (institutional commitment attained) to 4/5 (substantial achievement attained on the priority area). The Philippines's self-ratings on the HFA Monitor were validated in the aftermath of T/S Yolanda.

DISCUSSION

In 2005, the Philippines adopted the Hyogo Framework for Action (HFA) to guide its efforts in the area of disaster risk reduction and management (DRRM). On March 27, 2011, the Philippines updated its national progress report on the implementation of the HFA. The Office of Civil Defense's National Disaster Risk Reduction and Management Council supplied self-ratings that signified substantial progress in reducing and managing hazard-related risks. These self-ratings were validated in the aftermath of T/S Yolanda's destruction.

HFA Priority 1: Prioritizing DRRM

The first priority area of the HFA asserts the need to ensure that disaster risk reduction and management is both a national and local priority. The indicators of this priority include the following measures: establishment of policy and legal frameworks for DRR; allocation of adequate resources for implementing DRR plans; participation by the community itself and decentralization of authority; and the existence of a functioning national multi-sectoral platform for DRR. Using a scale of 1 to 5, with 1 representing minor progress and 5 for comprehensive achievement, the Philippines gave itself a self-rating of "4/5", indicative of "substantial achievement attained but with recognized limitations in capacities and resources".[3]

DRRM's Policy and Legal Frameworks

The Philippines already has risk reduction laws that the United Nations calls among the best in the world—at least on paper. In 2009, the Climate Change Act (CCA) or, Republic Act 9729 was legislated. Then, in 2010, Republic Act (RA) 10121 created the National Disaster Risk Reduction and Management Council (NDRRMC). Section 22 of said law specified that disaster risk reduction, prevention and preparedness should be the primary mandate of the NDRRMC. The CCA complements and supports the Implementing Rules and Regulations of the DRRM Act. Given these legal frameworks, the responsibilities and authority for implementing DRR measures were decentralized to local governments. The establishment of the twin laws on DRR and CCA empowered local governments and their respective communities to enforce measures to prevent disasters. These laws affirmed the importance of pre-disaster activities to substantially reduce the devastating effects of typhoons and other calamities.

DRRM Resource Requirements

In terms of financial budget, the DRRM Act allocated a specific budget for DRR. It stipulated that 70 percent of disaster spending shall be used on long-term steps pertinent to pre-disaster preparations. Only 30 percent shall be used for quick response and emergency aid. It was a radical shift from the previous practice that put emphasis on military-led relief operations after disasters hit (Harlan, 2013). The ISDR reported that the Philippines allocated five billion pesos (approximately $111 million) for National Disaster Risk Reduction and Management Fund for 2009-2011. But, in 2011, the government retracted from its funding commitment.

[3] Forty four percent of UN member states joined the Philippines in this self-rating. Australia, Bangladesh, Cook Islands, Indonesia, Malaysia, New Zealand, Pakistan, Samoa, Sri Lanka and Vietnam.

On November 19, 2013, the online news portal of TV5 recalled that "President Aquino vetoed a provision in the 2011 budget that allocates money for disaster preparation under the 5 billion peso calamity fund." Aquino decided that the 5 billion peso calamity fund should be mainly used by the NDRRMC for "actual calamities" and not for the preparation of relocation sites/facilities, and training of personnel engaged in direct disaster. Sadly, the President's veto of the DRR budget impeded both disaster mitigation and preparedness initiatives; it rendered the country more vulnerable to hazards and had to spend more for relief and recovery operations in the aftermath of recent typhoons and calamities.

In 2012, the President reversed his attitude towards disaster preparedness. More funds were allotted for disaster risk reduction and mitigation than for relief and rescue operations. Malacañang allocated P7.5 Billion for calamity fund and P14.2 billion for disaster education and management. But, such commendable change in outlook did not seem to have positively impacted the mindset of local government officials. For example, Tacloban's local officials were reportedly unprepared for T/S Yolanda. Tacloban city councilor Cristina Gonzales-Romuladez's narration of how their family was trapped and almost died due to the storm surge in their beach-front property alluded to the unpreparedness of Tacloban's local executives (Paula Hancocks,Anna Corren,Andrew Stevens,Ivan Watson, CNN, 2013). Incidentally, the city councilor was the city mayor's wife. Such unpreparedness suggested that local executives lacked appreciation of hazards data and tools such as inundation maps which had already been provided them by risk assessment teams like the AusAid's Project READY (refer further to subsequent discussion on HFA 2 regarding risk assessment). Consequently, one also doubts the strength of the evacuation plan, if there was any at all, which the mayor had for his own family and for his constituencies. Ultimately, one wonders how much budget—in terms of money, time and capacity building—was set aside by the local government for pre-disaster planning and quick response measures.

On December 20, 2014, President Aquino signed into law the P2.265 trillion national budget for 2014 (Gutierrez, 2013). In the same report, Gutierrez quoted President Aquino: "We will not allow the mistakes of the past to be repeated…we will equip the government with the wherewithal to respond to any situation confronting our country." It was also reported that the approved annual budget included a P100-billion lump sum rehabilitation fund for calamity-hit areas. Of the 100 billion peso lump sum rehabilitation fund, P80 billion was allocated for the government's rehabilitation plans. The remaining 20 billion was to be divided among various local government units and agencies. Apart from the lump sum rehabilitation fund, it was reported that P16.9-billion quick response fund was to be distributed across different line agencies. Given the budget breakdown and the President's avowal to learn from "mistakes of the past," one wonders however, why no budget line item specifically for disaster risk reduction and management was clearly specified; preparedness against disaster does not appear to be a priority.

Community Participation in DRRM

In terms of decentralization, civil society was found playing an increasingly active role in DRR. NGOs, Civil Society Organizations, private corporations and private individuals however, dealt largely with relief operations. A pattern of confusion and the absence of quick response during the first critical hours were experienced in the aftermath of three recent typhoons (Sendong, Pablo, and Yolanda) that hit communities like Cagayan de Oro, Iligan, Cateel, Tacloban, etc. The prolonged disorder or impasse after a hazard event suggested the lack of local government leadership and the absence of a functional Incident Command System (ICS) on the ground. Thankfully, civil society assumed leadership in organizing relief and recovery operations.

Thought leaders Dean Tony La Vina and Kristoffer Berse were all praises for citizens' organizations in disaster response as well as in planning for reconstruction and rehabilitation (La Vina & Berse, 2013). Commended were various citizens' organizations such as Balay Mindanaw, the Ateneo de Manila DREAM Team and churches of all denominations and faiths. Ordinary Filipino citizens as well as citizens from all over the world responded with record amount of donations to support relief operations. Various local government units, foreign governments and international organizations like the UN Habitat, World Food Program, Plan International, Caritas "descended to the affected areas bringing needed expertise, equipment, and funds" (La Vina & Berse, 2013, p. 1).

Multi-sectoral Platforms for DRR

Business firms, notably PLDT-SMART Foundation, UnionBank, May Bank, and even small corporations committed their corporate social responsibility cause to DRR particularly in the aftermath of T/S in Cagayan de Oro. The academe like the Department of Education, Xavier University, Ateneo de Manila University, etc. cooperated vigorously with other civic organizations for relief operations and rehabilitation efforts during the T/S Sendong disaster. These were signs that the establishment of functioning national (or at best, regional) multi-sectoral platforms for DRR were taking shape. The same was reportedly the case in the aftermath of T/S Yolanda. The Department of Science and Technology led Project Nationwide Operational Assessment of Hazards (NOAH) and the Australian Agency for International Development (AusAid) Project on Hazard Mapping and Assessment for Effective Community Based Disaster Management were examples of collaboration among sectors of society that prepared for hazards. But much more can be done in terms of institutionalizing DRR at national and local levels and in engaging both NGOs and civil society groups in crafting and implementing community-based DRR plans and activities.

In sum, the Philippines's self-rating ("4/5" or, "substantial achievement attained but with recognized limitations in capacities and resources") was fairly representative of the progress it had made on DRR. Legislation allowed for the establishment of DRR as a national and local priority. Budget for DRR had significantly improved over the years despite the Chief Executive's tendency to vacillate about prioritizing disaster preparedness over response and relief. Community participation was found commendable albeit limited largely to response and relief operations. Multi-sectoral platforms were found evolving; this encouraged civil society's greater engagement in DRR beyond relief operations.

<u>HFA Priority 2: Risk Identification, Monitoring and Early Warning Systems</u>

The second priority area of the HFA prioritizes the identification, assessment, and monitoring of disaster risks and the enhancement of early warning systems. Its indicators include the following: availability of national and local risk assessments; creation of systems to monitor, archive and disseminate data on hazards and vulnerabilities; establishment of early warning systems for all major hazards; and the careful consideration of regional cooperation and risk reduction. Again, the Philippines rated itself "4/5" in this area to indicate that it had attained substantial achievement albeit with "recognized limitations in capacities and resources."[4]

Risk Assessment

The Philippines had taken up specific initiatives on risk assessment. The Australian Agency for International Development (AusAid) through the United Nations Development Program, funded project

[4] Similarly, Australia, Bangladesh, China, India, Indonesia, Japan, Malaysia, New Zealand, PDR Lao and Sri Lanka gave themselves the same self-rating as the Philippines did.

"READY" (also known as "Hazard Mapping and Assessment for Effective Community Based Disaster Risk Management"). The project provided hazard identification and risk assessments on 27 high risk provinces of the country (United Nations International Strategy for Disaster Reduction, 2011). It was a three year collaboration of the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA), the Philippine Institute of Volcanology and Seismology (Philvolcs), National Mapping and Resource Information Authority (NAMRIA) and the Mines and Geoscience Bureau (MGB) that furnished local executives with inundation maps in 2011.

In its website, PHILVOLCS reported that project READY had three components: 1) Multi-hazard and risk assessment, 2) community-based disaster risk mitigation through development of community-based early warning system (CBEWS) and conduct of information, education and communication (IEC) campaigns and 3) mainstreaming disaster risk reduction into local development. Thus, storm surges, severe flooding, and inundation maps were supposedly not new concepts for local executives and residents of Leyte. Note that back in 2011, two years prior to T/S Yolanda's landfall, Project READY already warned local officials about the possibility of severe flooding in Leyte's coastal communities due to storm surges reaching as high as 12 meters (39.37 feet). If scientific data and recommendations provided by the study had been clearly understood and considered by the city's decision makers, then the risk of disaster brought about by T/S Yolanda could have been mitigated (Flores H. , 2013).

Another project to evaluate Tacloban's vulnerability to disaster was led by the World Wide Fund for Nature (WWF); it specifically studied the impacts of climate change on the city. From 2011 to 2013, WWF's project entitled "Business Risk Assessment and the Management of Climate Impacts" assessed Tacloban and 11 other Philippine cities (Cagayan de Oro included) for disaster (Ranada, 2013). The project gathered historical data of 20 years to forecast disaster scenarios in 30 to 50 years. The project provided Tacloban with a document to help local government leaders, city planners, and the business sector create strategies to ensure the city's survival and to strengthen its economy in the face of disaster.

The WWF project assessed Tacloban on three main variables: its climate or environmental exposure, social economic sensitivity, and adaptive capacity.[5] One day in September, 2013, the group of environmentalists and residents of Tacloban conducted a scenario building exercise (Ranada, 2013). Environmental exposure, climate, temperature and rainfall were considered. It was foreseen that a super typhoon would wreak havoc in Tacloban in the year 2020. The group never expected the storm to come seven years early; T/S Yolanda came way before the stakeholders could prepare all the solutions to reduce the risk of disaster. But it certainly cannot be claimed that Tacloban leaders and residents were never warned beforehand about their vulnerability to hazards like storms and storm surge.

Hazards Information and Early Warning Systems

The Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAG-ASA) made significant progress in putting up a system to monitor and disseminate data on key hazards and vulnerabilities. But T/S Yolanda disaster suggested that people, particularly local leaders and those in rural areas, have yet to be properly educated about hazards, risks and vulnerabilities. Information dissemination, its clarification, and call to swift action especially at the local levels, could be done better.

[5] Social economic sensitivity looks at demographics, tourism, export, water, energy, land values, agriculture and fisheries. Adaptive capacity is measured by crime solution efficiency, local government performance, family savings and city savings.

The guidance, education, and stronger participation of local communities (given their distinctive local knowledge) in designing the early warning systems still need to be addressed. The experience that was T/S Yolanda exposed the need to ascertain warning messages for clarity, understandability, and timeliness.

Two days before typhoon Yolanda made landfall, officials rolled through Tacloban city with bullhorns, urging residents to get to higher ground or seek refuge in evacuation centers. Warnings were also broadcast on state television (Pitman, 2013). A day before T/S Yolanda made landfall, President Aquino appeared on national television to appeal for everyone's cooperation and coordination with disaster risk reduction and management authorities; residents of Ormoc, Ginayangan Ragay Gulf in Albay and Lamon Bay in Atimonan were warned about storm surges that may reach up to five to six meters high. Everyone was advised to monitor the websites of the PAGASA. The President also assured the public about the government's readiness to face super typhoon Yolanda (Sabillo, 2013).

The early warning systems were given once the storm path had been ascertained. In that sense, early warnings were quite timely. The use of broadcast media and bullhorns were commendable. But the implications of the warning messages were not fully understood. Residents of Tacloban prepared for the storm's wind and rain by stocking on food and by staying indoors; but they had no idea what a storm surge meant and they had no preparation against it. The following accounts attest to this.

> Linda Maie, stayed in her one-bedroom house more than half a kilometer inland: she had heard the warnings but said her Tacloban neighborhood "has never even flooded in my 61 years." Her family stocked up on canned food, water and candles and covered their TV, laptops and appliances in plastic bags. But when (they) awoke at 5 a.m., Friday to howling winds and heavy rain, it was clear that Haiyan was not a typical storm" (Pitman, 2013).
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> "Everybody knew a big storm was coming," said Mark Burke, an American native of Washington State who lives in Tacloban with his three small children. "But I had no idea it was going to be this hell…nobody imagined what was about to happen" Burke and his kids hid in a bedroom until a wall of mud came through the doors. The master bed was floating. "Then we all got on the piano, and it started floating through the hallway," he said, "the water kept rising, and we eventually climbed up into the attic and stayed there for a day and a half" (Pitman, 2013).

Television, internet, social media, radio, print, and bullhorns were the most common media used for early warning preparedness against Yolanda's hazard. But, were at-risk communities made aware of the severity of the hazard? How were these vulnerable groups empowered to act in a timely manner? One wonders what efforts were made to reach communities with limited infrastructure and communications systems. How did local officials deal with the disruption of services like electric power and telecommunications in providing early warning to communities-at-risk?

Regional Cooperation

The sharing of satellite images and data from international weather stations (e.g. Joint Typhoon Warning Center; Japan Meteorological Agency, etc.) indicated the presence of regional or international cooperation. The Philippines' Department of Science and Technology (DOST) Project Nationwide Operational Assessment of Hazards (NOAH) provided a good portal serving such information exchange. The sharing of information proved very helpful also in advocating for human solidarity in the aftermath of T/S Yolanda when the overwhelming support and cooperation of the international community was most palpable. The prediction, information management and sharing in disaster management ought to be continually fostered.

In sum, the Philippines's self-evaluation ("4/5" or, "substantial achievement attained but with recognized limitations in capacities and resources") did not appear reflective of its progress on HFA

Priority 2. Risks assessments were milestones in addressing hazards and evaluating existing levels of exposure. Project READY had intangible benefits in terms of increased awareness and preparedness of vulnerable communities. Unfortunately, data provided through hazards mapping were not put into good use by local executives particularly in terms of local government policy formulation. Evidently, Tacloban's local government leaders did not plan carefully for disaster risk management using available scientific data. For one, numerous people failed to understand, and take appropriate action on, the early warning messages issued.

HFA Priority 3: Building a Culture of Safety and Resilience

The HFA's third priority area concerns the development of disaster information management systems, research, innovation, and education to build a culture of safety and resilience at all levels. Indicators include availability and accessibility of relevant information on disasters to all stakeholders; the inclusion of DRR and recovery concepts and practices in school curricula, education materials and relevant trainings. Other indicators pertain to the development and use of research methods and tools for multi-risk assessments and cost-benefit analysis; and country-wide public awareness strategy to stimulate a culture of disaster resilience. In this priority area, the Philippines rated itself "3/5" which signified the attainment of "institutional commitment but, achievements are neither comprehensive nor substantial."[6]

Availability and Accessibility of Information

Quick access to information about hazards, risks, and disasters remains to be a huge challenge in the Philippines. PAG-ASA has a website or portal that collates and disseminates information on hazards. The NDRMC, DSWD, Manila Observatory, Rappler.com, etc. are examples of other portals that provide relevant updates on vulnerabilities to hazards and disasters. Updated information on weather forecast and bulletins are also available through social network sites such as Twitter. However, bringing the information to communities-at-risk with no internet connectivity, especially those in rural areas, is a serious concern. Limited internet connectivity and the likely chance of electric power failure during a calamity ought to be considered too. T/S Yolanda taught us that the availability, accessibility, and understandability of information to all stakeholders remain to be issues of concern.

Research Methods and Tools

Research and raising public awareness to stimulate a culture of disaster resilience are significant means to positively transform public consciousness and build a culture of preparedness and resilience. Government agencies like PAGASA, DOST, and Philvolcs can coordinate with private universities to either promote research on disaster risk reduction or to help communicate research findings to stakeholders. There was no data to ascertain if higher education institutions in Tacloban had done DRRM-related research prior to T/S Yolanda. How were universities and colleges in Tacloban involved in the conduct of either Project READY or WWF's "Business Risk Assessment and Management of Climate Impacts? Government-led researches and its methods and tools on community hazard, multi-risk assessment, vulnerability and capacity could have been better coordinated with civil society organizations so that more communities could have been helped.

School Curricula

The Department of Education has a project on "Prioritizing the Mainstreaming of Disaster Risk Reduction Management in the School System and Implementation of Projects" as mandated by Department Order

[6] Thirteen other countries in the Asia Pacific region—Bangladesh, Bhutan, Cook Islands, Fiji, Indonesia, Maldives, Nepal, Pakistan, PDR Lao, Samoa, Solomon Islands, and Vietnam—share the same self-perception as the Philippines.

No. 55, series of 2007. The curricula of public elementary and secondary schools supposedly incorporate DRR. Were mock evacuation drills systematically conducted in schools? Were school teachers and students part of efforts to mainstream DRR? One wonders whether these practices were actually observed in Tacloban prior to T/S Yolanda. The absence of a sense of urgency among residents shortly before the super storm made landfall, the community's ignorance about storm surge, and the ensuing chaos and confusion after the storm had passed all indicated a limitation in implementing the desired school curriculum. Was DRRM simply a planned, but not implemented, curriculum of schools?

Trainings

This phase refers to efforts for capacity building of local officials, deputized coordinators, auxiliaries, and volunteers. The conduct of trainings on DRR appeared to be uneven nationwide. No accounts were read about disaster risk management training in Tacloban. But the names of two persons kept appearing when searching for initiatives in education and training on community based disaster risk management. One was Albay Governor Joey Salceda. (His account is presented in the section on HFA 5, Disaster Preparedness.) The other was Camotes Island Former Mayor Al Arquillano who, for years systematically trained local leaders and residents on disaster preparedness through mock drills and other evacuation exercises.

Before T/S Yolanda made landfall, Arquillano promptly evacuated 1,000 families to prevent a catastrophe for the residents of Tulang Diyot, San Francisco, in Camotes, an island east of Cebu Province and west of Leyte. The United Nations Office for Disaster Risk Reduction (UN International Strategy for Disaster Reduction) recognized San Francisco, Camotes Island as role model of prompt evacuation. "Years of work to strengthen community preparedness and reduce disaster risk saved the entire population" according to the local leader. "Because we've done so much work on disaster risk everyone fully understood the need to move to safety," Arquillano added (Umbao, 2013)**.**

Advocacy

Advocacy pertains to the raising of people's consciousness through mass media, information dissemination and conduct of disaster management forum. Programmed and ongoing efforts, instead of sporadic initiatives, are crucial in raising awareness to effect change in people's attitudes towards hazards and risks. For example, the regular observance of disaster consciousness month can influence change in people's sense of preparedness for hazards.

A day before T/S Yolanda's landfall, the President appeared on national television to appeal for everyone's cooperation with disaster risk reduction and management authorities. The President's appeal was followed through by text blast sent by the Philippine Information Agency; information was instantly sent to local officials down to the barangay level and key officials of various government offices. (Gazmin tells Eastern Visayas LGUs, response agencies to do 'final check' on preparations for 'Yolanda' , 2013). But these two examples were emergency information dissemination activities and not advocacy initiatives. The researcher has yet to find information about the government's implemented advocacy program—those that are pre-emptive and ongoing in nature—pertinent to disaster preparedness.

In sum, the Philippines's self-rating ("3/5" or, "institutional commitment attained, but achievements are neither comprehensive nor substantial") appeared to be a fair estimate of its progress on HFA Priority 3. Availability and accessibility of information remained to be challenges particularly in remote areas nonetheless, remarkable progress had been made in the identification, tracking, and sharing of information about hazards. Mandating the integration of DRR in school curriculum was a milestone but a

gap appeared to exist between planned and implemented curriculum. Trainings on DRR appeared to be isolated rather than common practice nationwide. Advocacy schemes to raise country wide public awareness on DRR was a practice not commonly heard of.

HFA Priority 4: Reducing Risk Factors

The fourth priority area of the HFA aims for the reduction of underlying risk factors. Linking climate change policy and DRR are initiatives under this area. Poverty and social development concerns, rapid urbanization, weak enforcement mechanisms, and constraints in capacities and resources are pressing issues of this priority area. The integration of DRR in environment related policies and plans, land use, natural resource management, and adaptation to climate change is an indicator. Another indicator pertains to the reduction of vulnerability of populations most at risk through the implementation of social development policies and plans. Likewise, the implementation of economic policies and plans to reduce the vulnerability of economic activities is an indicator. The following are its other indicators: incorporation of DRR elements, including the enforcement of building codes, in the planning and management of human settlements; inclusion of DRR measures in the post-disaster recovery and rehabilitation processes; establishment of procedures to assess disaster risks of major development projects, especially infrastructure. The Philippines had a self-rating of "3/5" indicating that "institutional commitment (has been) attained, but achievements are neither comprehensive nor substantial."[7]

Integration of DRR in Environment Policies and Plans

The HFA's fourth priority area establishes DRR as an integral objective of environment related policies and plans, including land use, natural resources management and adaptation to climate change. The passage of both RA 10121 (DRRM Act) and the Climate Change Act (RA 9729) into law signified progress at combating the challenges of climate change as well as environment protection. Hazard risk assessments like Project READY and the WWF project, "Business Risk Assessment and the Management of Climate Impacts" provided essential data for contingency planning to reduce risks and mitigate disaster. But in the aftermath of T/S Yolanda, one doubts that Tacloban's local executives made contingency plans at all. Moreover, the local government's enforcement of regulations on land use, issuance of environment clearance certificate, adherence to building codes, etc. appeared doubtful.

Social Development Policies

The implementation of social development policies and plans to reduce the vulnerability of populations most at risk is another area of concern. One wonders how concepts like population size, densities, and poverty had been considered Tacloban's development plan. Furthermore, this researcher has yet to encounter data or news materials indicating that mechanisms such as insurance coverage for life, livelihoods and property (agriculture and livestock) are part of disaster risk reduction efforts in Tacloban (or any Philippine locale).

Economic Productivity

The formulation of productivity policies and plans to reduce the vulnerability of economic activities is another concern. Examples are initiatives like crop diversification for agriculture and drought proofing for fisheries. Contingency planning for critical infrastructure and essential services such as water, electricity, transport and financial services are other examples to consider. No news articles about planning for all this were found pertinent to Tacloban.

[7] It is joined by 11 other countries, namely, Bangladesh, Bhutan, Cook Islands, Fiji, India, Maldives, Pakistan, PDR Lao, Sri Lanka, Thailand, and Vietnam in this self-rating category.

Planning Human Settlements and Building Codes

DRR elements, including the enforcement of building codes need to be integrated in the planning and management of human settlements. How did urban planning (or the lack of it) affect Tacloban's vulnerability to disaster? Many important buildings in Tacloban were built right by the sea. The city hall, elementary schools, colleges and hospitals could have been used as evacuation centers. But because they were built close to the shore, they were among the structures first inundated by the storm surge (Ranada, 2013). A quick review of four aspects—location, land subsidence, population and local governance—suggests that the manner by which zoning and land use were enforced in Tacloban city increased its risk to disaster.

Location: Geo-hazard maps of Tacloban already showed how exposed the city was to danger. Tacloban is bound on the east and south by water leading to Leyte Gulf and the Pacific Ocean. In the north and west, it is bound by mountains. Thus, the city was trapped. In the face of the 15-foot high storm surge that submerged its coastal communities, Taclobanons could not evacuate further than the mountains (Ranada, 2013). The same wall blocking their path was a danger spot in itself. Mountains often mean landslides, especially when the winds and rain were as strong as Yolanda's.

Land subsidence: Further making Tacloban vulnerable to flooding caused by storm surge is the fact that much of it is below sea level. In many places, there were also cases of land subsidence in which "sea water enters the soil, slowly eating away the coastal areas," said Monci Hinay who led the Tacloban assessment team (Ranada, 2013). Land subsidence also happens when humans draw water from the soil for drinking, bathing, and other uses. The extraction of water creates spaces between soil particles. When the roof over these spaces cannot support all the intact soil above it, it collapses thereby lowering the level of soil on the surface. Subsidence lowers the land surface a couple of centimeters every year. The lower the land goes, the more likely it will be inundated when sea levels or flooding occurs. Eventually, the land will become so low that flooding will happen even during high tide.

Population and urbanization

During the 2007 population census, Tacloban City had an actual total population count of 217,199. With an average annual population growth rate of 2.73 percent, it was projected that for the year 2008, Tacloban' City's population would be 223,130 and based on this projected population, Tacloban City had a population density of 1,106 persons per square kilometer or 11 persons per hectare (City Population Office, 2013).

A bigger population often equates to more urbanization as more people require more housing, livelihood opportunities, infrastructure and facilities. But it also means more risk. It causes "concentrated risk" (Ranada, 2013). The more people will go to an area, the denser an area is, the more vulnerable to the effects of typhoons. For example, informal settlers crowd near places of livelihood downtown in order to save on transportation costs. High population may also mean the pace of urbanization was harder to manage and control. Consequently, downtown Tacloban had a haphazard disaster-prone urban lay-out.

Local governance

Much of the responsibility for lowering disaster risk falls to local governments. Local officials in the Philippines not only decide how to spend the money but also oversee building codes and land use planning. Unfortunately, communities had been allowed to establish settlements on high risk areas or no-build zones. These were difficult lessons learned in the aftermath of T/S Sendong (Washi) that struck

Cagayan de Oro and Iligan cities in Mindanao. It appeared that to some extent, Tacloban's local government allowed a similar pattern of "concentrated risk" on supposedly no-build zones.[8]

In sum, the Philippines's self-evaluation (3/5 or, "institutional commitment attained, but achievement are neither comprehensive nor substantial") appeared to be fairly reflective of its progress pertinent to HFA Priority 4. The passage of both RA 10121 (DRRM Act) and the Climate Change Act (RA 9729) into law indicated significant progress at combating the challenges of climate change as well as environment protection. But social development policies and economic productive policies and plans to reduce the vulnerability of communities most at risk need to be implemented. Planning and management of human settlements left much to be desired as well. Thus, capacity building and monitoring of local government leaders as regards DRRM appeared to be an urgent and important concern.

HFA Priority 5: Disaster Preparedness and Effective Response

Disaster preparedness and the preparation of contingency plans for effective response at all levels is the focus of the fifth priority area. Indicators include the existence of strong policy, technical and institutional capacities mechanisms for disaster risk management; crafting of disaster preparedness plans and contingency plans; presence of financial reserves and contingency mechanisms to support effective response and recovery; setting up of procedures for exchanging relevant information during hazard events and post-disaster event reviews. In the Philippines, both Departments of Education and Health pledged to make 100,000 education and health facilities in the country safe from disasters as part of the "One Million Safe Schools and Hospitals Program." The Philippines rated itself "4/5" to indicate attainment of "substantial achievement but with recognized limitations in capacities and resources."[9]

Capacities and Mechanisms for DRRM

Project READY recommended that local governments use the storm surge hazard map as reference for disaster mitigation and preparedness plans and for land use planning. Experts also recommended the construction of rigid seawalls and breakers with piled foundation for protection against storm surges. The project also suggested the planting and preservation of mangroves along the shoreline as these help in dissipating big waves and storm surges. In the aftermath of T/S Yolanda disaster, some questions arise. How was information from the hazard mapping project disseminated to decision makers, the general public and the communities-at-risk? And, to what extent did Tacloban's local government executives act upon the project's recommendations to mitigate disaster? What legislative provisions in the area of disaster risk management and disaster risk reduction were created in response to scientific data provided by Project READY?

[8] Lessons from Sendong: "A January 2013 report from the Internal Displacement Monitoring Center looked at the impact of Tropical Storm Washi (Sendong), which struck the east coast of the southern island of Mindanao in December 2011 and killed more than 1,500. The storm hit hardest in Iligan and Cagayan de Oro, nearby cities where more than 300,000 people had their homes destroyed or damaged. In both cities, the governments "chose not to carry out their official responsibilities regarding disaster preparedness," the report said. The cities ignored warnings from the Philippine Mines and Geoscience Bureau that many residents were living in hazard prone areas—particularly bar islets that could easily be flooded and had been designated as "no-build zones." "Some had built homes in that area under a poor-housing scheme of the Cagayan de Oro mayor, who allowed people to settle in unsafe areas for 1 philippine peso, or about 2 cents. More than 1,000 took up the offer, the report said, and ended up being among those most affected by the storm Washi" (Harlan, 2013).

[9] Eleven other countries namely, Australia, Bangladesh, Fiji, India, Japan, Malaysia, Mongolia, New Zealand, Pakistan, Thailand and Vietnam share the same self-rating as the Philippines.

Planning

This phase pertains to the formulation of disaster management plans, contingency plans, and standard operating procedures (SOPs) to realize the plans. The creation of an Incident Command System (ICS) is integral to the planning phase. And so is the creation of mutual aid arrangements. More research has yet to be done as regards the planning processes undertaken by both the national and local government in preparation for T/S Yolanda. But a November 13, 2013 editorial from Philippine Inquirer strongly expressed disappointment over the absence of a clearly identified commander-in-chief in charge of coordinating the rescue and relief operations (Philippine Daily Inquirer Editorial, 2013). The article alluded to the lack of organization and coordination of resources and efforts which one would expect of a fully functional ICS. It could even be indicative of the absence of disaster preparedness plans, contingency plans, and basic protocols in the event of disasters "from deploying immediate search and rescue operations, to overcoming communication and transportation jams, to properly locating evacuation shelters" (La Vina & Berse, 2013). And research has yet to show if Tacloban had conducted training drills and evacuation rehearsals at all to test and develop its disaster response programs.

Resources

Resources pertain to life-saving means, the five "M's", that need to be ready in anticipation of any hazard event. These are: manpower, materials, methods, machines and money. There was news gathered about the national government's efforts to prepare resources in anticipation of T/S Yolanda. There were news articles too about Governor Salceda's pre-emptive measures. But nothing was found about Tacloban's preparation of resources prior to T/S Yolanda's landfall.

Albay Governor Joey Salceda had manpower and food ready before T/S Yolanda struck. In an interview by ANC, he said that three days before the storm happened, he already had 37 trucks under his command from the army. He added that even when the storm was still outside the country, he requested 15,000 bags of rice from the DSWD as a pre-emptive evacuation measure (ANC, 2013).

In anticipation of T/S Yolanda's landfall, the Department of Social Welfare and Development (DSWD) prepositioned 4,800 family food packs with at least 700 packs each for the six provinces of the region. The Philippine Air Force (PAF) had 36 aircrafts on standby to transport goods in areas that would be difficult to access. The 8th Infantry Division deployed 1,021 troops to flood and landslide prone areas. The Philippine National Police (PNP) in Eastern Visayas prepositioned its more than 700 search and rescue trained personnel in various provinces of the region (PNA, 2013).

Post-Event Activities

Post-event activities correspond to efforts pertinent to either "response" or "rehabilitation." Response included early warning; the "golden hour" principle; the incident command system and the use of cluster approach. On the other hand, the rehabilitation phase referred to both the short-term (recovery) and long-term (rebuilding) efforts.

Quick Response

This phase pertain to actions undertaken immediately following an emergency. Such measures are directed towards saving life, protecting property, and dealing with the immediate damage caused by the disaster. For example, early warnings were issued before T/S Yolanda made landfall. But, as previously discussed, clarity and understandability of the warning message were serious concerns. The span or scope of reach of the warnings issued was another concern particularly for communities in remote areas. When electric power lines and telecommunications were destroyed, information sharing and the mobilization of quick response became even more difficult, if not altogether impossible.

Golden Hour

Tacloban significantly lost the "golden hour" or "first 100 hours" opportunity. As a consequence of the absence of electric power, telecommunications, proper and sufficient evacuation centers, and a ground commander in charge of an Incident Command System, the city lost its golden opportunity when readily life-threatening injuries could have been reversed and more lives could have been saved (Page, 2014). When T/S Sendong struck Cagayan de Oro, it was fortunate that Xavier University's Tabang Sendong operations was able to immediately mobilize three emergency trauma teams comprised of medical doctors, nurses, sanitation personnel and trauma counselors less than 12 hours since the incident happened. The trauma team visited different evacuation centers and dressed wounds, dispensed medicines, provided grief counseling and constructed latrines. These interventions proved helpful in saving more lives and limbs and prevented the outbreak of disease particularly in congested evacuation centers.

Cluster Approach

The Cluster Approach on humanitarian response was another guiding principle in line with the UN Humanitarian Reform Agenda. It sought to improve the effectiveness of humanitarian response by ensuring greater predictability, accountability and partnership. The approach was implemented and institutionalized in the Philippine Disaster Management System as contained in the National Disaster Coordinating Council (NDCC) Circular dated May 10, 2007 entitled "Institutionalization of the Cluster Approach in the Philippine Disaster Management System, Designation of Cluster Leads and their Terms of Reference at the National, Regional and Provincial Level." The approach was also institutionalized by the Department of Education through DepEd Order No. 74, s. 2007. Protection, Shelter, Water and Sanitation, Emergency Education, Livelihoods and Early Recovery were some of the clusters operational in Tacloban; UNOCHA monitoring reports indicated that the cluster approach was used extensively in Tacloban (UN OCHA, 2014).

Recovery and Rehabilitation

Four months since T/S Yolanda struck down Tacloban, bodies were still being found and the government's confirmed death toll of 6,201 had not been updated for a month (Flores, 2014). There were also allegations of overpricing and substandard work on bunkhouses (Mundo, 2014). Many people continued to live in their ruined homes which won't stand up to a storm. Permanent housing and restoration of livelihood remained the greatest concerns.

The work of rehabilitating disaster-stricken communities goes beyond supplying relief goods and ensuring the restoration of shelter and basic utilities for affected communities. Money to finance rebuilding is a challenge. The government doesn't have the means necessary for it. "The national government resources are stretched as is," said Lucille Sering, secretary of the Philippine Climate Change Commission, "and even before we could recover from one disaster, here is another one" (Harlan, 2013). The Climate Change Commission secretary pointed out if international aid would not be able to cover for the needs arising from T/S Yolanda then, government would resort to borrowing or would have to cut the budget of its other programs.

Restoring economic activity and development is urgent and important for rebuilding Tacloban. Families need to be empowered so they can once again make a living for themselves and become active participants in their communities' economic growth. On March 5, 2014, President Aquino approved the release of 1.71 Billion pesos to help fishermen who lost their livelihood to super typhoon Yolanda. Budget Secretary Florencio Abad gave a fitting remark on the President's decision, "In the aftermath of

every calamity, affected communities need to reckon not just with the devastation of their homes and the loss of lives, but also with the damage to their major sources of income. Part of the administration's reconstruction and rehabilitation efforts for Yolanda survivors is the restoration of their communities' means of livelihood" (Panares, 2014).

In sum, the Philippines's self-evaluation (4/5, or "substantial achievement but with recognized limitations in capacities and resources") did not appear reflective of its progress on HFA Priority 5. The absence or lack of well-crafted disaster preparedness and contingency plans was observed to be a major weakness. The articulation and execution of protocols and SOPs during hazard events and post-disaster event reviews need to be in place as well. The Philippine President's tendency to vacillate between prioritizing disaster preparedness and relief operations sends mixed or confusing signals to stakeholders; furthermore, it affects the presence of financial reserves and contingency mechanisms to avert disasters and support effective response and recovery. Thus, the National Disaster Risk Reduction Management Council has yet to assiduously pursue and fulfill its primary mandate to focus on disaster risk reduction, prevention and preparedness (Section 22 of Republic Act 10121).

Xavier University DRRM Program

Xavier University (XU), an 80 year old educational institution in Cagayan de Oro consistently gave assistance in times of calamities mainly through relief operations. Over the past decade, the university's disaster-related activities evolved into more pro-active approaches. In 2002, the University's Civil Engineering department did a study on fire hazard mapping of a community within the city. Then in 2008, the XU Engineering Resource Center (XU ERC) developed methodologies for disaster risk assessment and mapping of various hazards in Barangay Carmen, Cagayan de Oro City (Xavier University DRRM, 2013).

The XU Disaster Risk Reduction and Management (DRRM) Program, led by the XU DRRM team, was formally institutionalized in 2013 to facilitate the convergence of the expertise of the different academic units of XU. The program was envisioned to capacitate stakeholders in mainstreaming DRRM towards building more resilient communities. The five components of the XU DRRM concerned research, capacity building, capacity building, advocacy, response, and rehabilitation.

Researches pertinent to community based hazard characterization and mapping as well as environmental and health studies had been conducted (Xavier University Disaster Risk Reduction and Management Program, 2013). Capacity building through the training of local government leaders and other stakeholders had been held in cooperation with the XU Regional Center of Expertise on Education for Sustainable Development (RCE-ESD). Faculty and students of XU were also engaged through information campaign about results of research and other knowledge products. Response and rehabilitation initiatives were also done mainly through the organization of networks of organizations for relief operations, distribution of relief goods, the deployment of medical trauma teams and counselors for trauma debriefing and the creation of five-hectare resettlement site for the survivors of T/S Sendong.

RECOMMENDATIONS & CONCLUSION

It is recommended that the XU DRRM team gather the different units of the University to plan for what each unit can contribute to the DRRM efforts of XU. The framework of the discussion can consider the following areas: economic action, environment action, social action, political and legislative action, physical action, and technical action. The following points presented below are being offered for the consideration of Xavier University.

1. **Economic Action**—Much can be learned from the case of Tacloban's coconut farmers and the destruction of their coconut trees. Replacement trees will not bear fruit for another six to eight years. Alternative crops and livelihoods need to have been identified and implements prepared before disaster strikes. Thus, it is recommended that the College of Agriculture research on possible alternative livelihoods particularly for disaster prone areas in Region X. Diversified livelihoods can help build a community's resilience. For example, the viability of raising ducks to replace chicken raising farms may be considered.

   Poor farmers and fishermen have little recourse when disaster occurs. Only a fraction of Filipinos has insurance or any claim to property ownership. It is recommended that the School of Business and Management and College of Law look into the possibility of proposing a program for insuring farmers, fishermen, and small scale entrepreneurs through multi-purpose cooperatives to help communities recover more quickly from any disaster.

   It would be best for The School of Business and Management to be guided by the findings of the WWF Report, "Business Risk Assessment and the Management of Climate Impacts." Data and strategies to ensure the city's survival and to strengthen its economy are already provided and may just need to be reviewed given most recent developments. Capacity building sessions for Tacloban and Cagayan de Oro (as well as 10 other Philippine cities) can be initially based on the WWF report.

2. **Environment Action**—Strong ecosystems and management of natural resources support livelihoods and provide environmental protection against hazards. The College of Agriculture and the College of Engineering can join forces in determining environmental actions suited to particular localities using their respective GIS technology. Note that Project READY has multi hazard maps available for 27 high risk provinces in the Philippines. Thus, it is not necessary to establish new ways of creating hazard maps. The available technology can be replicated.

   Understanding the scientific data on the possible impact of hazards and educating decision makers and stakeholders on the implications of the study are areas where XU can assist. And, should it wish to serve other provinces and municipalities, the XU Colleges of Engineering and Agriculture can coordinate with the DOST so that the process and technology of Project READY may be replicated. Moreover, both colleges can design sustainable solutions such as planting shelter breaks, reforestation, mangrove development, etc. to minimize the impact of typhoon surge and other similar hazards. Crop diversification can also be considered in the effort to address both erosion and sustainable livelihood.

   Similarly, the College of Arts and Sciences (CAS) particularly its Biology, Physics, and Socio-Anthropology departments can consider working on environment actions along its engagement with the Macalajar Bay Development. Rain water gauge stations can be increased. More local

communities can get involved in the data collection process and information sharing. Research on local community knowledge pertinent to early warnings (and conservation of ecology) would be helpful too particularly in the effort to come up with a community-based disaster risk reduction and management program.

3. **Social Action**. Building a culture of preparedness and resilience from disaster takes time. Education and advocacy efforts are crucial in transforming culture. Xavier University's School of Education, College of Nursing, College of Medicine, College of Law and Psychology Department (of CAS) and College of Engineering can consider training stakeholders to promote a culture of safety and resilience. Trainings on hazard maps, flood modeling solutions and other tools on hazards and vulnerabilities can be led by the XU College of Engineering.

   Trainings on gender perspectives and rights based approach to DRRM can be designed to ensure the protection of the rights of women, children with special abilities, youth, the elderly and persons with disabilities. Social inclusion in the decision making process of choosing alternatives related to the recovery and rehabilitation of communities can be enhanced through such trainings. Particular groups (women, children, PWDs, youth, elderly), communities at high risk areas, and the general public would also need to be educated on DRRM. All of these trainings can work towards building a community-based DRRM and can be designed and facilitated by the XU RCE-ESD.

   The succession of disaster events has shown that the quality of response by local government units in the aftermath of typhoons (Cagayan de Oro and Iligian during T/S Sendong in 2011, Cateel during T/S Pablo in 2012, and Tacloban during T/S Yolanda in 2013) suggest the need for capacity development in the area of DRR and climate change especially at the sub-national levels. There appears to be a need to capacitate leaders on the institutional and technical implementation of the laws on DRRM and CCA. Local leaders did not seem to understand nor fully appreciate the hazard maps made available by both Project READY and WWF. For example, in Cagayan de Oro City, the non-implementation of ordinances on land use, housing or settlements, building standards, etc. aggravated the risk of disaster when T/S Sendong struck. Similarly, in Tacloban, the local government did not show competence in carrying out their official responsibilities regarding disaster preparedness in spite of hazard maps and specific recommendations made available beforehand. Thus, local government officials should be given priority for DRRM trainings and capacity building efforts. The Graduate School's Governance and Leadership Institute in cooperation with other units like the School of Education and XU ERC can provide such trainings and workshops on DRRM.

   Volunteer groups can be harnessed within the school set-up itself. Student volunteers can become trainers for capacitating vulnerable groups such as children and women. And within XU itself, the creation of an XU Incident Command System, led by the Chief of Campus Security, can become the venue for training leaders (both students and University personnel) on the conduct of evacuation drills and other activities related to disaster response. The XU-ICS can be the venue for establishing and codifying protocols and practices pertinent to evacuation, relief, and rescue operations to promote a culture of preparedness within the University itself; these then can be replicated or adapted in other similar settings such as public schools, day care centers, etc.

Other volunteer groups within the student body can be fostered through linkage with civic organizations such as Fire Fighting teams; Flood Fighting teams; Rescue teams (earthquake, flood and fire). NSTP, ROTC, KKP and other existing student groups can be trained to help in providing safety nets for vulnerable groups like providing evacuation support during disaster. These student volunteers, guided by the Department of Development Communications, can be also tasked to take the lead in holding Disaster Reduction and Volunteer Week celebrations and in creating materials to create city-wide awareness on DRRM.

As in the case during the aftermath of T/S Sendong, a XU trauma team comprised of doctors, nurses, and guidance counselors (for critical incident stress debriefing) can be organized and institutionalized as quick responders during any hazard event. Such school-based trauma team can complement the Red Cross volunteers of the school. Student volunteers (particularly from the Colleges of Nursing and Medicine) can be trained as paramedics. Even campus ministers can form part of the team since prayer and faith in God were found to be effective ways of debriefing amidst (the Sendong) disaster.

4. **Political and legislative Action.** The College of Law and the Graduate School's Governance and Leadership Institute can help lobby for political and legislative action on DRRM. Poverty and inequality were underlying causes of vulnerability for most of those displaced by Yolanda. The poor created cramped settlements which further increased the risk in no-build zones. In Cagayan de Oro, enforcement of laws that prevent building structures on no-build zones and strict compliance with building codes would have helped reduce the devastation brought about by T/S Sendong. Thus, above-mentioned XU units can lead the advocacy for enforcement of DRRM and CCA laws and compliance with controls such as building codes and land use, etc. The College of Law can also help craft and lobby for a fair and reasonable process to help victims claim their rights after their documents such as land titles have been lost due to a hazard.

5. **Physical Action.** T/S Yolanda and other similar disasters taught us that the inadequacy of infrastructure and transport are obstacles to inclusive economic growth and a hindrance to disaster relief efforts. Xavier University College of Engineering can help in proposing design structures to mitigate risks such as flood controls, safer buildings and other infrastructures. Building stronger and safer structures using local materials can be its key advocacy. Building practices which reduce the risk of buildings falling down in the event of an earthquake can be a research agenda for its faculty and students. It may also consider designing water harvesting, waste water treatment (recycling), and portable water filtration systems to address the scarcity of clean or potable water after pipelines get damaged due to a hazard event. Devices for charging cellphones and flashlights can also be an area of innovation and research. Even the College of Medicine's current model of the eco-san toilet can be further developed to suit particular local contexts.

   Given their GIS technology, both Colleges of Engineering and Agriculture can help local government identify possible relocation sites of the city. Moreover, architectural and engineering designs of both semi-permanent homes and permanent homes used in Ecoville can be improved on and shared to the local government. The public sharing of Ecoville's data on its bill of materials, specifications, construction costs, suppliers, etc. may also be helpful in hastening the recovery phase of any disaster-struck community and in curbing corrupt practices especially during emergencies.

6. **Technical Action**. Early warning systems play an important role in disaster risk reduction by allowing people additional time to move to higher ground in the event of a tsunami or flood and/or move away from unsafe structures in the event of an earthquake. The College of Engineering (Electrical and Electronics) together with the College of Computer Studies can collaborate in designing early warning systems to save lives. Effective warning systems that consider the local knowledge of people in remote barrios with no internet connectivity and possibly no electrification would have to be designed.

   Food preservation and hygiene are issues confronted during emergencies. The College of Agriculture Food Technology department can research on food products (food that do not spoil easily and which can be prepared more readily) that are best suited during emergencies. The College of Medicine can continue to provide measures to promote sanitation (eco-san pit latrines) and hygiene (hand washing kits) particularly during emergency situations.

   Accountability and transparency are important concerns during crisis. Donors want to be assured their donations are properly channeled. Beneficiaries want to be assured that equitable distribution happens. The School of Business and Management and the College of Computer Studies can design inventory systems that would ensure transparency, accountability, and easy tracking of goods and services donated and delivered.

Conventional wisdom teaches that "an ounce of prevention is worth a pound of cure." A natural hazard such as a typhoon need not lead to a disaster where countless lives are lost and important facilities are altogether destroyed. The impact of a hazard ought to be anticipated and managed. To reduce the risk of a disaster, one takes measures way ahead in advance of a hazard. Preparedness is the key.

The recommended actions would hopefully help in the ongoing shift of emphasis from disaster response to one of creating a culture of preparedness and disaster resilience. It is particularly in the HFA's third priority area—the development of disaster information management systems, research, innovation, and education to build a culture of safety and resilience at all levels—where an academic institution such as Xavier University can contribute much towards the operationalization of the DRRM law which the national and local government units are primarily mandated to lead.

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