IOM TYPHOON HAIYAN (YOLANDA) RESPONSE

DAMAGE ASSESSMENT OF DESIGNATED EVACUATION CENTRES IN TYPHOON-AFFECTED AREAS

EASTERN SAMAR, PHILIPPINES

APRIL 2014

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1. INTRODUCTION AND SUMMARY OF KEY FINDINGS

Typhoon Yolanda (International Codename: Haiyan) made its first landfall on 8 November 2013 in the Philippines in Guiuan, Eastern Samar, with the eye of the storm passing directly over the municipality. Peak winds reached 380 km per hour (235 mph) with sustained wind speeds of 315 km per hour (195 mph). The town suffered heavy damage to property, 110 people were killed and 3,625 were injured.

In the province of Eastern Samar, as is common in most areas frequently affected by tropical cyclones, populations living in high risk areas evacuate to safe shelters (commonly public buildings such as schools and churches) in advance of the arrival of the storm. The Philippines is no exception. However, Yolanda wrought catastrophic damage not only to habitat but to buildings previously used as evacuation centres (ECs)[1] as well. This report aims to analyze the usability of pre-Yolanda ECs and to make recommendations to improve preparedness and reduce the risks of future disasters.

Former health centre of barangay Paya (Giporlos Municipality), a designated evacuation centre entirely damaged by Yolanda Typhoon (March 2014).

In ten of the worst affected municipalities in Eastern Samar and Samar,[2] only **53 of 634 (8%) pre-Yolanda evacuation centres would be usable in case of typhoon today. Four hundred fifteen ECs (66%) are unusable due to substantial damage and require repair. The remainder (166, or 26%) were destroyed and would need to be completely rebuilt.**

The peak of the typhoon season begins in the summer months. **Absent urgent intervention to improve evacuation infrastructure, many of those affected by Yolanda will not only find themselves without adequate housing but without alternative accommodation in case of typhoon in 2014.** Further, with the effects of climate change, typhoons appear to be more intense and more frequent. This renders the situation all the more urgent.

In the context of the efforts of the Government of the Philippines to respond to the damage caused by Yolanda, as well as those aiming to increase the level of preparedness of, and reduce the risks faced by, the

[1] In 2010, the Philippine Government enacted the Republic Act (RA) 10121 – entitled "An Act Strengthening The Philippine Disaster Risk Reduction And Management System, Providing For The National Disaster Risk Reduction And Management Framework And Institutionalizing The National Disaster Risk Reduction And Management Plan" in order to strengthen disaster risk reduction and disaster management systems in the country.
One part of the Act mandates Local Government Units (LGUs) to identify or build potential evacuation centres (ECs) in the event of any disaster including typhoons, earthquakes, volcanic eruptions, floods, etc. As such, LGUs have identified and established evacuation centres in their respective areas of operations.

[2] The current version of this report covers eight of the worst affected municipalities on Samar Island (Guiuan, Mercedes, Salcedo, Quinapondan, Giporlos, General MacArthur, Hernani and Marabut). Data collection for two other municipalities (Lawaan and Balangiga) was ongoing at the time of the circulation of this version and will be included in a later update.

population in general, steps must be taken to prioritize the most vulnerable populations (relative to damage caused by Yolanda, pre-existing vulnerabilities, natural hazards and other factors) and begin immediately construction or rehabilitation of safe evacuation centres in which these populations can seek refuge in case of typhoon. These activities are an element of a comprehensive disaster risk reduction and management strategy, and should take place in the context of post-Yolanda rehabilitation.

2. GEOGRAPHIC SCOPE AND METHODOLOGY

Situated in the Eastern Visayas Region (Region VIII), Eastern Samar Province is comprised of 22 municipalities and one city (597 barangays), with a total population of 428,877 according to the 2010 census. It has a total land area of 466,047 km^2, with population density of 92 people per km^2. However, only the southern portion of Eastern Samar was badly affected by Yolanda, with the worst damage occuring in some coastal areas which were affected by storm surge and other areas which experienced the highest sustained winds of any landfalling tropical cyclone in recorded history.

As such, this report focuses only on the hardest hit municipalities, those where damage to infrastructure was heaviest, and for which the vulnerability of the population to potential future disasters is highest. **For the purposes of this assessment, all 634 evacuation centres located in ten of the most affected municipalities were visited, evaluated by IOM engineers, photographed and geo-referenced.** Data was encoded and analysis performed by IOM staff. *An example of the survey tool used is available in the annex section of this report.*

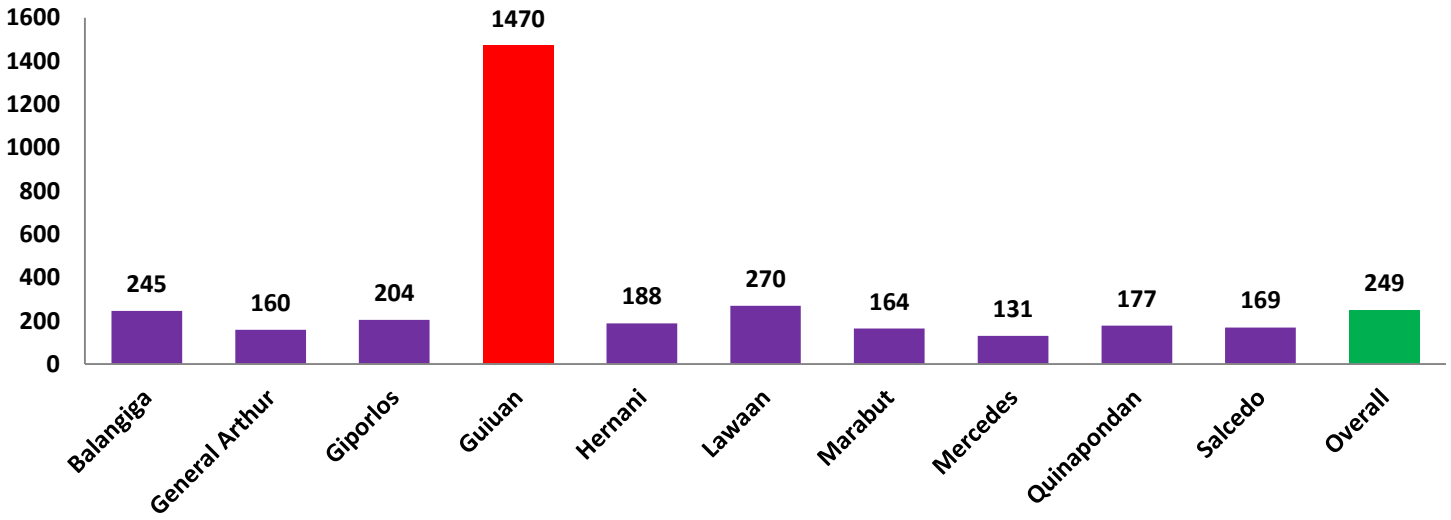
Municipality	Population	Total land area km^2	Number of barangays	Number of designated evacuation centres per municipality	Average number of person per designated evacuation centre
Balangiga	12,756	19,005 km^2	13	52	245
General MacArthur	12,124	11,729 km^2	30	76	160
Giporlos	12,040	9,751 km^2	18	59	204
Guiuan	47,037	17,549 km^2	60	32	1,470
Hernani	8,070	4,642 km^2	13	43	188
Lawaan	11,612	16,256 km^2	16	43	270
Marabut	15,115	14,355 km^2	24	92	164
Mercedes	5,369	2,332 km^2	16	41	131
Quinapondan	13,841	8,324 km^2	25	78	177
Salcedo	19,970	13,180 km^2	41	118	169
Overall	**157,934**	**117,123 km^2**	**256**	**634**	**258**

Designated Evacuation Centres in the Municipality of Guiuan

It is important to note that in the Municipality of Guiuan, the average number of persons per designated evacuation centre is particularly high (1470 people per evacuation centre). Several reasons may explain this result:

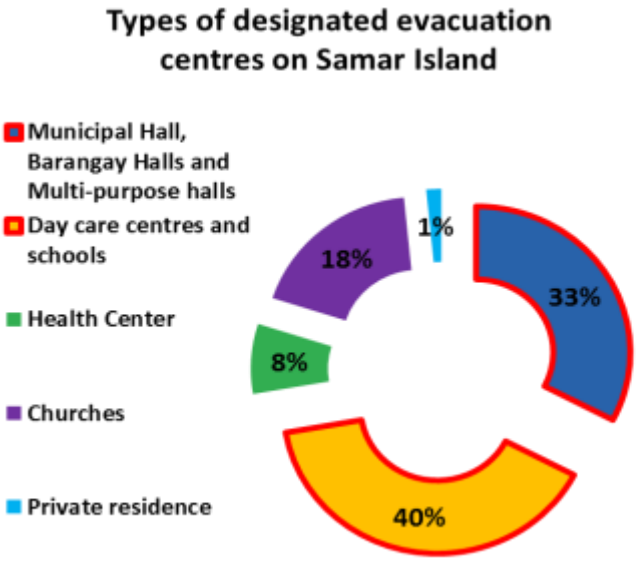
- ✓ *Local Government Unit (LGU) does not include churches as part of its official list of designated evacuation centres;*
- ✓ *Increasingly, a small proportion of 'private residences' are included on the list of designated evacuation centres – a factor that characterises disaster preparedness the municipality of Guiuan. An examination of the selection criteria that enables the LGU to include these private residences as official evacuation centres was considered beyond the scope of this initial study;*
- ✓ *Barangays situated on the outer islands of Guiuan were not included in this assessment, but will be visited at a later stage; and*
- ✓ *Finally, in Guiuan municipality, the damage assessment only included officially designated evacuation centres that were used during Yolanda in November (32 sites in total). No other municipalities, however, had such a list available; instead all public buildings in those municipalities were assessed.*

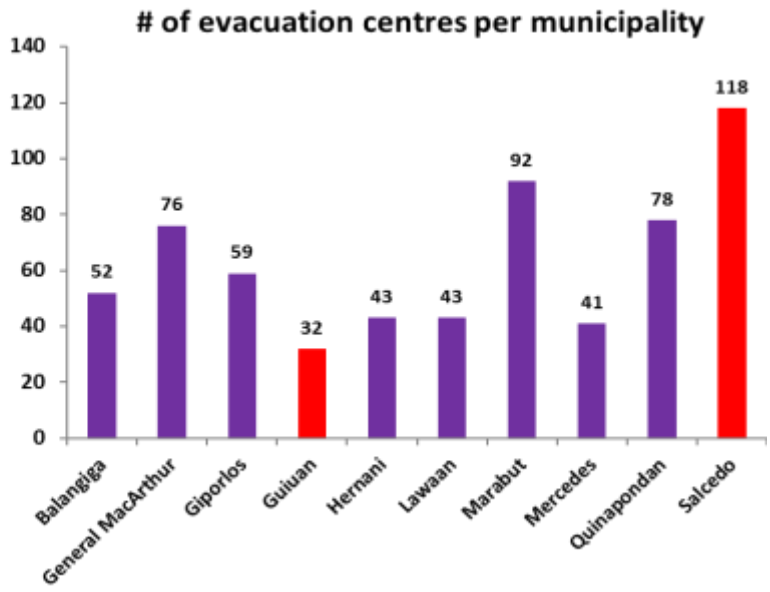
Average number of person per designated evacuation centre



3. DESIGNATED EVACUATION CENTRES IN EASTERN SAMAR (PRE-YOLANDA PERIOD)

The assessment found that 73% of evacuation centres were classified as social infrastructure including 40% that were categorized as day care centres and schools, and 33% as municipal halls/barangay halls/ multi-purpose halls. The Municipality of Salcedo was the municipality that registered the highest number of designated evacuation centres.





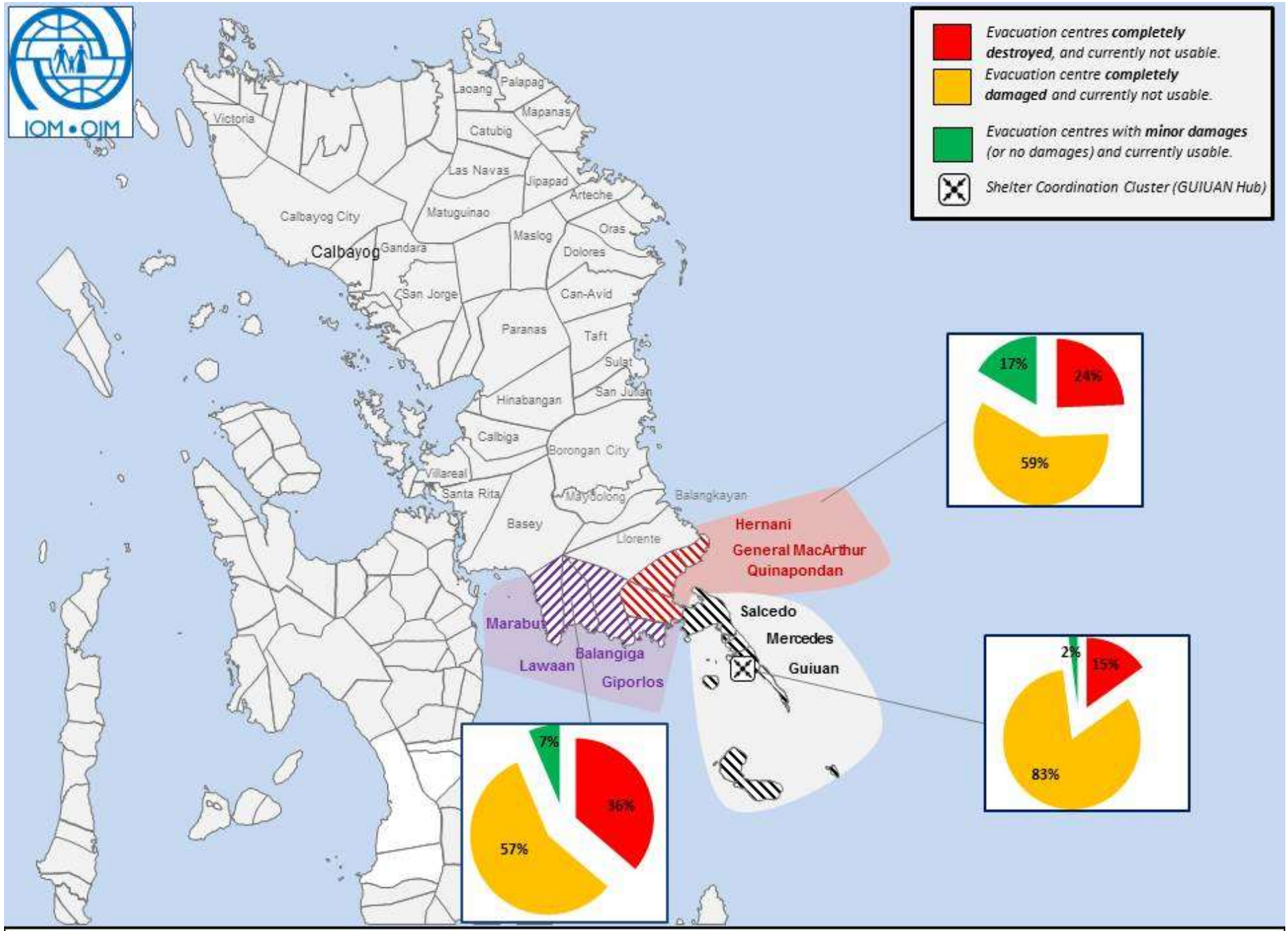
4. POST-TYPHOON DAMAGE ASSESSMENT: CURRENT STATUS OF DESIGNATED EVACUATION CENTRES

As might be expected, damage to ECs was catastrophic. The combination of substandard construction, extreme winds, storm surge and other factors, plus the fact that most of these structures were not designed to withstand such wind loads, caused the deaths of numerous individuals inside evacuation centres which collapsed. **In many cases, heavy winds ripped off roof structures and remaining trusses were twisted and bent. High wind loads and storm surge also caused reinforced concrete beams, girders and columns to fail, crack or collapse completely.**

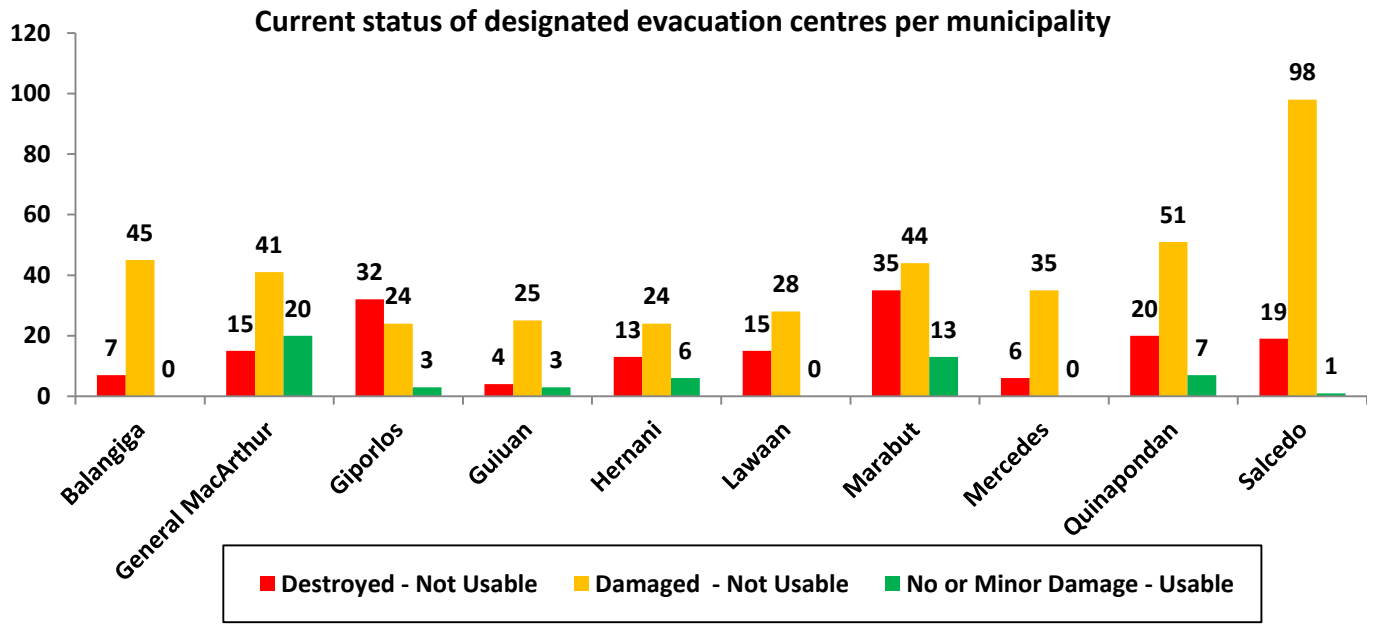
Current status of evacuation centres - post-Yolanda period				
Usability Index Code	**Description**	**Usable as an evacuation centre?**	**No. of buildings**	**Proportion**
1	**Entirely *destroyed***	**Unusable**	**166**	**26%**
2	**Heavily *damaged***	**Unusable**	**415**	**66%**
3	**Minor damage/*no damage***	**Usable**	**53**	**8%**

- ⇨ A growing source of concern in terms of disaster preparedness is directly related to **26% of designated evacuation centres as they were identified as completely destroyed or had suffered catastrophic structural damage, necessitating complete reconstruction**.
- ⇨ Furthermore, the majority of evacuation centres (66%) are also currently unusable due to the extent of the damage (ranging from moderate to severe) and the absence of thorough rehabilitation.
- ⇨ Finally, of the 634 designated evacuation centres (official sites) that were assessed, **only 8% (53 sites) are currently usable as they sustained only minor damage (or no damage) during the typhoon**.[3]

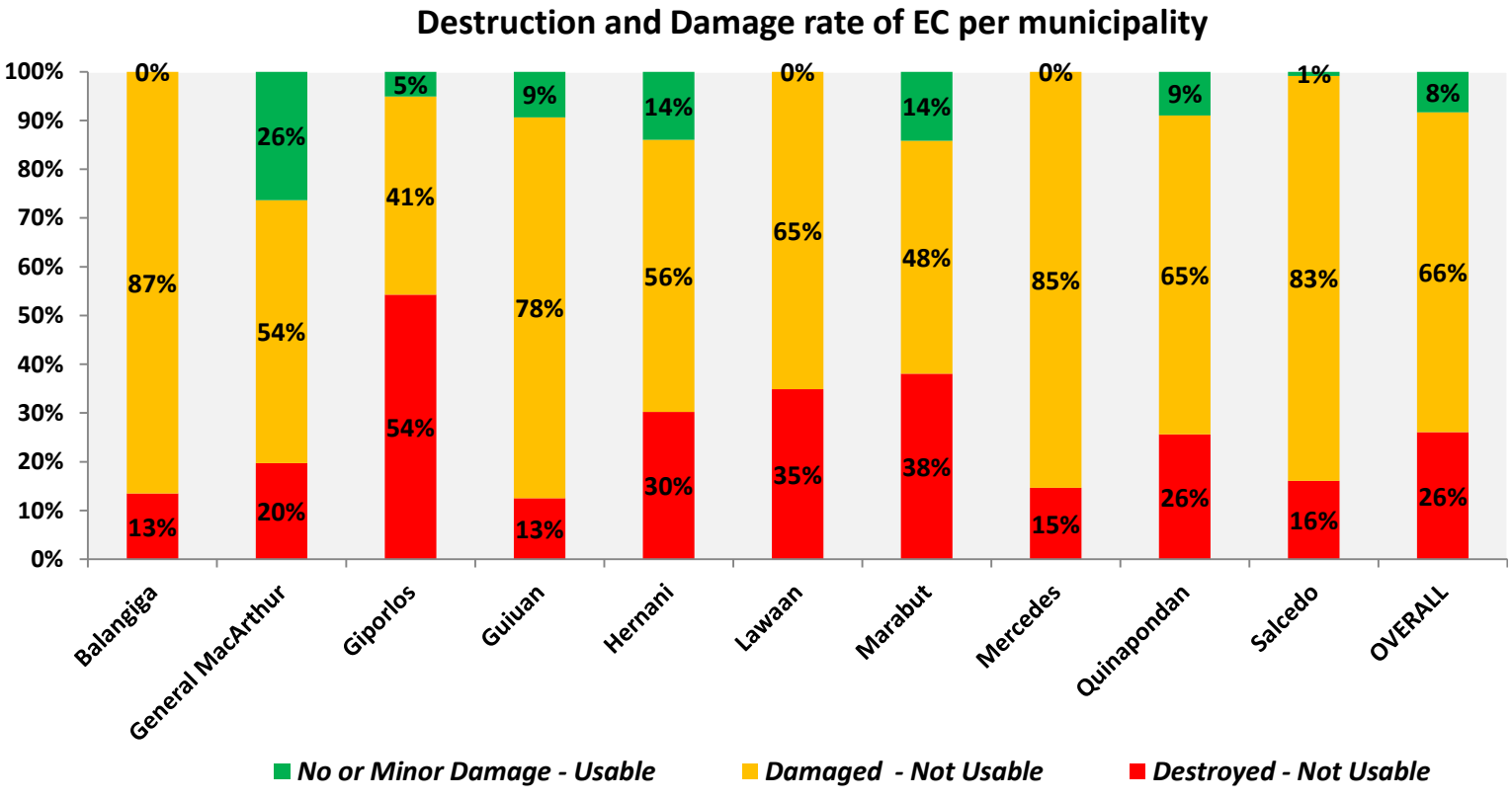
[3] It is important to note that the determination of minor or no damage (category 3) does not necessarily mean that they are structurally sound to withstand future high wind load events; rather, 'usable' in this sense indicates that the structural members and roofs are intact and that the building did not appear to be heavily damaged after visual inspection.



Current status of designated evacuation centres per coast line (April 2014)



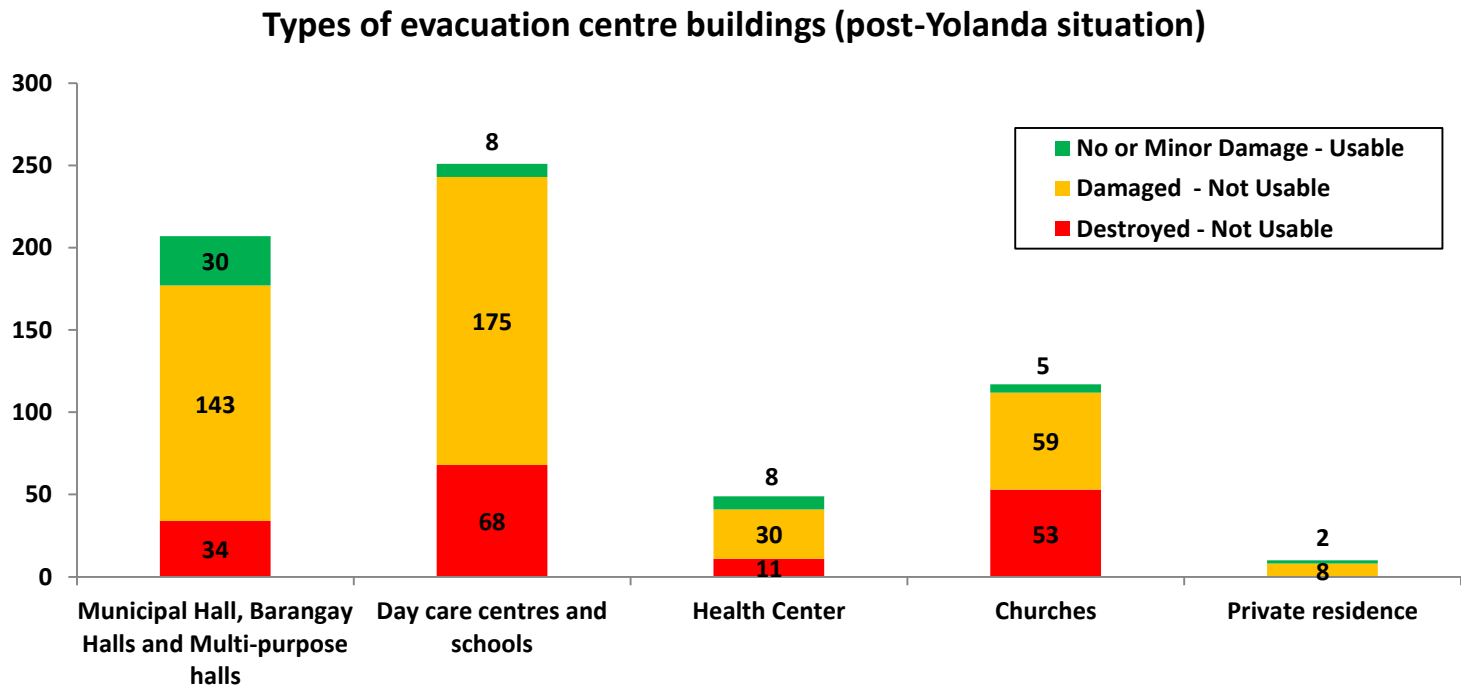
A closer looks at disaggregated data suggests that municipalities with settlements concentrated on the coastline and where storm surge was significant, experienced the highest level of destruction. **The Municipalities of Giporlos (54%), Marabut (38%), Lawaan and Hernani (30%) have a destruction rate for their evacuation centres superior to 30% (higher than the overall average).**

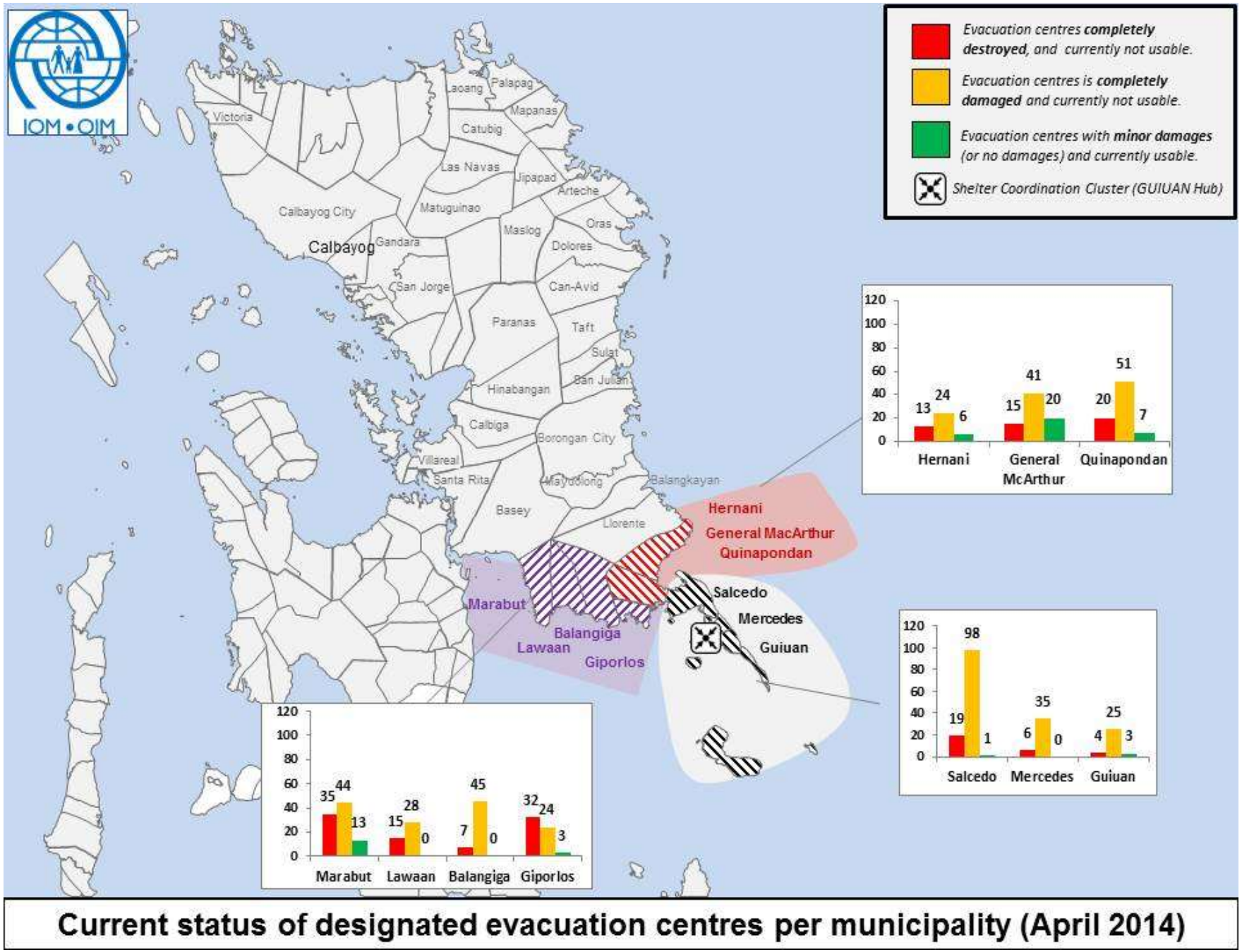


In terms of short to immediate reconstruction needs, the results highlight the fact that 66% of all evacuation centres are damaged or destroyed and thus unusable in case of typhoon. The majority of buildings that fall in this category are schools or day care centres (175 sites) and governmental infrastructure such as Municipal Halls or Barangay Halls (143 sites). **Rehabilitating, repairing or reinforcing social infrastructure that was heavily damaged needs to be prioritised as part of a wider disaster preparedness strategy in Eastern Samar**.

In terms of longer term reconstruction needs, survey results indicate that 26% of all evacuation centres were completely destroyed and will require much more time and resources to rebuild. Most of the buildings that have been assessed as 'destroyed' are either day care centres or schools (68 sites), and to a lesser extent, churches (53 sites).

Amambucale day care centre, barangay Amambucale Marabut Municipality (March 2014)





Current status of designated evacuation centres per municipality (April 2014)

5. Recommendations

Of the 634 ECs, the most oft-cited recommended repairs for ECs that were categorized as heavily damaged and unusable, are as follow:

1. Supply and installation of new trusses/ purlins/ CGI roofing sheets;
2. Retrofitting of some beams, girders and columns;
3. Repair or installation of new windows and doors, and repair of walls and repainting; and
4. Installation of new electrical wiring systems, in coordination with the local power company to ensure adherence to the National Building and Electrical Safety Codes of the Philippines.

To ensure that typhoon-affected populations can benefit from storm-resilient ECs during the upcoming typhoon season, there is an urgent need to rehabilitate, rebuild or reinforce all designated evacuation centres in Eastern Samar. It is important to ensure that such disaster preparedness efforts are "hazard sensitive" and "storm resilient", capable of withstanding the effects of stronger storms. Finally, the Government must continue its already-commendable efforts in preparing and training the population, and ensuring that populations have the tools and support needed to protect themselves in the event of a natural disaster.

In order to protect vulnerable populations for the 2014 Typhoon Season and beyond:

1. Construct or rehabilitate safer and stronger evacuation centres, in conformity with international and national engineering guidelines;
2. Prioritize such works on the basis of hazard and vulnerability analyses; maximize available evacuation space for the 2014 typhoon season;
3. Update evacuation centre inventories, taking into account other buildings not previously used as EC but still viable;
4. Support Government at all levels in continued training, sensitization and engagement of LGUs and communities to better prepare for potential hazards, improve awareness, preparedness and evacuation and contingency planning;
5. Support the updating and implementation of Comprehensive Land Use Plans (CLUPs) by the national or local government units; and
6. Support 'soft engineering' hazard mitigation works along coastlines, in watersheds and in other high-risk areas.

6. Annexes

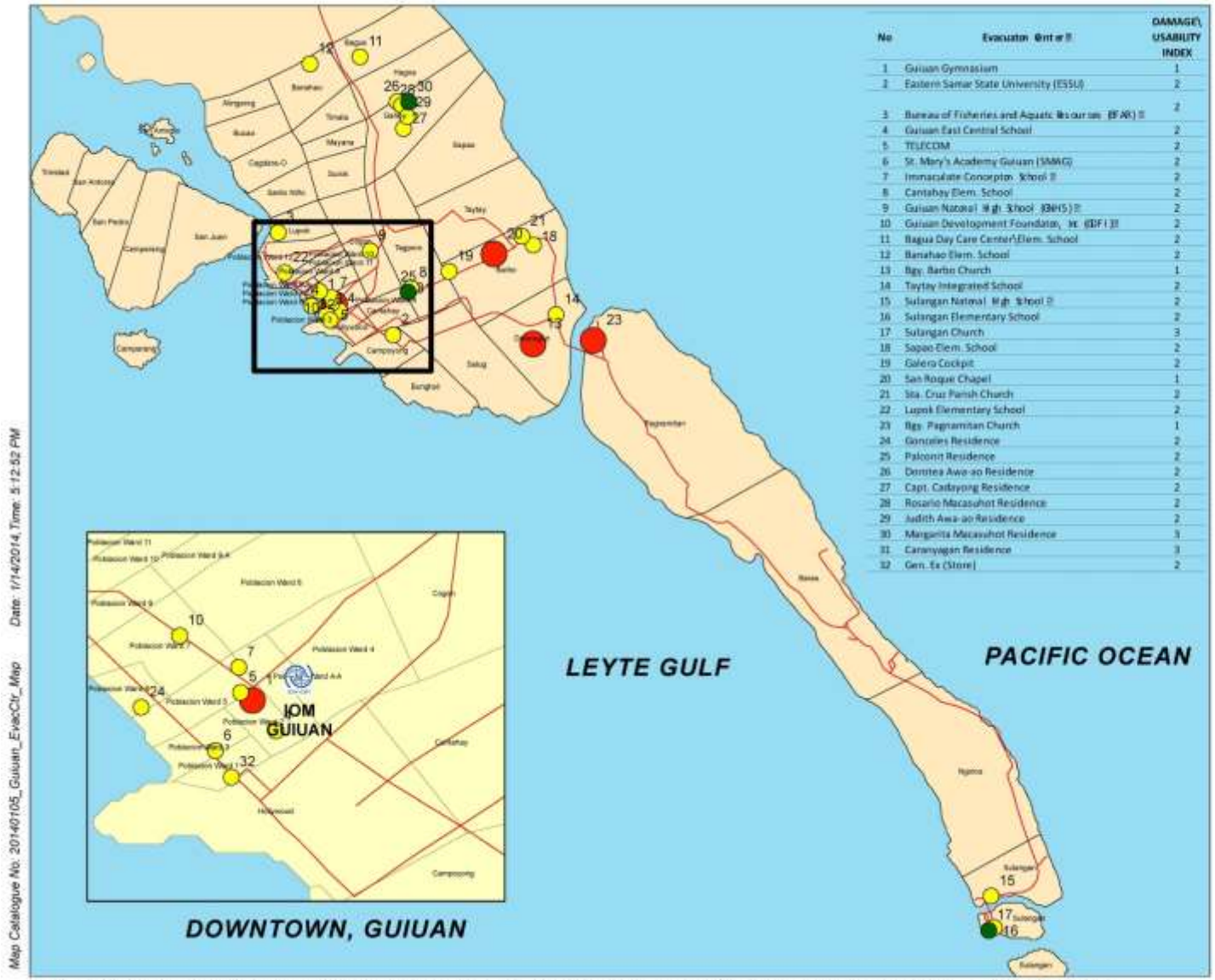
1. *Evacuation Centre Assessment Tool – IOM sample*
2. *Map of Designated Evacuation Centres (Pre-Typhoon Yolanda) in Hernani – IOM sample*
3. *Map of Designated Evacuation Centres (Pre-Typhoon Yolanda) in Guiuan – IOM sample*

ASSESSMENT OF DESIGNATED (PRE-TYPHOON YOLANDA) EVACUATION CENTRES IN EASTERN SAMAR

ASSESSMENT OF DESIGNATED (PRE-TYPHOON YOLANDA) EVACUATION CENTRES				
EVACUATION CENTRE CODE		GUI - 001	Usability Index	1
NAME OF EVACUATION CENTRE/EST. NO. OF CASUALTY		GUIUAN GYMNASIUM (IN FRONT OF THE GUIUAN TELECOM COMPOUND) ESTIMATED NO. OF CASUALTY IN THE EVACUATION CENTER = 6 PERSONS (DUE TO FALLING DEBRIS FROM THE GYM)		
LOCATION		POBLACION WARD 8, GUIUAN, EASTERN SAMAR		
COORDINATES	E	125.723729°		
	N	11.033231°		
CONTACT PERSON		[redacted] – [redacted]		
BRIEF DESCRIPTION		REINFORCED CONCRETE STRUCTURE WITH STEEL ROOF TRUSSES - DIVIDED INTO TWO PARTS, ONE PART IS 2 -STOREY (~24m x 30m) AND OTHER PART IS ONLY GROUND FLOOR (~45m X 30m)		
PHOTOS (FRONT VIEW)				
DAMAGE ASSESSMENT (POST-TY YOLANDA) • ROOF SHEETINGS\TRUSSES • BEAMS\GIRDERS • COLUMNS • WALLS • FOUNDATION • DOORS\WINDOWS		1. THE WHOLE ROOF STRUCTURE IS TOTALLY DAMAGED AND THE CGI SHEETS WERE BLOWN AWAY. 2. REMAINING TRUSSES AND PURLINS ARE TWISTED AND BENT. 3. GIRDERS, BEAMS AND COLUMNS WERE DAMAGED AND SOME HAVE FALLEN OR ABOUT TO. 4. THOUGH THE WALLS, IN GENERAL ARE STILL INTACT, SOME PARTS HAVE CRACKS OR HAVE FALLEN. 5. DOORS AND WINDOWS ARE DAMAGED.		
NECESSARY REPAIR\REMEDIAL WORKS		1. DEMOLISH THE DAMAGED STRUCTURAL MEMBERS AND REMOVE\DISPOSE THE DEBRIS. 2. CONSTRUCT A NEW STORM-RESILIENT BUILDING RATHER THAN REPAIRING THE REMAINING STRUCTURE.		
ESTIMATED COST (IN PESOS)		TBD		

GUIUAN GYMNASIUM (GUI - 001)

DESIGNATED EVACUATION CENTERS IN GUIUAN
(Pre - Typhoon Yolanda)



No	Evacuation Center	DAMAGE\ USABILITY INDEX
1	Guiuan Gymnasium	1
2	Eastern Samar State University (ESSU)	2
3	Bureau of Fisheries and Aquatic Resources (BFAR)	2
4	Guiuan East Central School	2
5	TELECOM	2
6	St. Mary's Academy Guiuan (SMAG)	2
7	Immaculate Concepton School	2
8	Cantahay Elem. School	2
9	Guiuan National High School (GNHS)	2
10	Guiuan Development Foundation, Inc. (GDFI)	2
11	Bagua Day Care Center\Elem. School	2
12	Banahao Elem. School	2
13	Bgy. Barbo Church	1
14	Taytay Integrated School	2
15	Sulangan National High School	2
16	Sulangan Elementary School	2
17	Sulangan Church	3
18	Sapao Elem. School	2
19	Galero Cockpit	2
20	San Roque Chapel	1
21	Sta. Cruz Parish Church	2
22	Lupok Elementary School	2
23	Bgy. Pagnamitan Church	1
24	Gonzales Residence	2
25	Palconit Residence	2
26	Dimitea Awa-ao Residence	2
27	Capt. Cadayong Residence	2
28	Rosario Macasuhot Residence	2
29	Judith Awa-ao Residence	2
30	Margarita Macasuhot Residence	3
31	Caranyagan Residence	3
32	Gen. Ea (Store)	2

N
W E
S

2 1 0 2
Kilometers

MAP OF GUIUAN EASTERN SAMAR

SUMMARY OF DAMAGED\USABLE EVACUATION CENTRES

No	Description	No. Of Buildings
1	Destroyed - Not Usable	4
2	Damaged - Not Usable	25
3	No\Minor Damage - Usable	3
	TOTAL	32

Legend

Damage\Usability Index

- 1 - DESTROYED - NOT USABLE
- 2 - DAMAGED - NOT USABLE
- 3 - NO/MINOR DAMAGE, USABLE
- roads
- Barangays_Guiuan

KEY MAP

Map Catalogue No: 20140105_Guiuan_EvacCtr_Map Date: 1/14/2014, Time: 5:12:52 PM

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DESIGNATED EVACUATION CENTERS IN HERNANI
(Pre-Typhoon Haiyan\Yolanda)

No	Barangay	Evacuation Center	Usability
1	Hernani	HERNANI MUNICIPAL HALL	2
2	BRGY.01(POB)	BARANGAY 01 HALL	2
3	BRGY.02(POB.)	BARANGAY 02 HALL	3
4	BRGY.03 (POB.)	BARANGAY 03 HALL	1
5	BRGY.04 (POB.)	BARANGAY 04 HALL	1
6	BRGY.CANCILIDES	BARANGAY CANCILIDES HALL	2
7	BRGY.PADANG	BARANGAY PADANG HALL	3
8	BRGY. NAGAJA	BARANGAY NAGAJA HALL	2
9	BRGY. SAN ISIDRO	BARANGAY SAN ISIDRO HALL	2
10	BRGY.CARMEN	BARANGAY CARMEN HALL	1
11	BRGY. BATANG	BARANGAY BATANG HALL	1
12	BRGY. GARAWON	BARANGAY GARAWON HALL	3
13	BRGY. SAN MIGUEL	BARANGAY SAN MIGUEL HALL	3
14	BRGY.02(POB.)	HERNANI CENTRAL ELEM. SCHOOL	2
15	BRGY.02(POB.)	DAYCARE CENTER	1
16	BRGY.CANCILIDES	CANCILIDES ELEM.SCHOOL	2
17	BRGY.CANCILIDES	CANCILIDES DAYCARE CENTER	2
18	BRGY.PADANG	PADANG ELEM.SCHOOL	2
19	BRGY.NAGAJA	NAGAJA DAYCARE CENTER	2
20	BRGY.04 (POB.)	DAYCARE CENTER	3
21	BRGY.01(POB)	DAYCARE CENTER	2
22	BRGY.04 (POB.)	PEDRO E. CANDIDO MEMORIAL NAT.SCH.	3
23	BRGY.SAN ISIDRO	DAYCARE CENTER	2
24	BRGY.SAN ISIDRO	SAN ISIDRO ELEM.SCHOOL	2
25	BRGY.CARMEN	CARMEN ELEM.SCHOOL	1
26	BRGY.BATANG	BATANG ELEM.SCHOOL	1
27	BRGY.BATANG	DAYCARE CENTER	1
28	BRGY.GARAWON	GARAWON ELEM. SCHOOL	2
29	BRGY. SAN MIGUEL	SAN MIGUEL ELEM. SCHOOL	2
30	BRGY.CANCILIDES	BRGY.HEALTH CENTER	2
31	BRGY.NAGAJA	BRGY.HEALTH CENTER	2
32	BRGY.SAN ISIDRO	BRGY.HEALTH CENTER	2
33	BRGY. GARAWON	BRGY.HEALTH CENTER	2
34	BRGY. SAN MIGUEL	BRGY.HEALTH CENTER	2
35	BRGY.02(POB.)	BIRHEN DELA ROSA	2
36	BRGY. CANCILIDES	CANCILIDES CHURCH	2
37	BRGY.PADANG	STA.CRUZ CHURCH	2
38	BRGY.NAGAJA	SAN ANTONIO DE PADUA	1
39	BRGY.SAN ISDRO	SAN ISIDRO LABRADOR CATHOLIC CH.	2
40	BRGY CARMEN	DEL CARMEN CHURCH	1
41	BRGY.BATANG	MEDALIA MILAGROSA	1
42	BRGY.GARAWON	SAN ANTONIO DE PADUA	1
43	BRGY. SAN MIGUEL	SAN MIGUEL ARCHANGEL CHURCH	1

SUMMARY OF DAMAGED\USABLE EVACUATION CENTRES

No	Description	No. Of Buildings	Percentage (%)
1	Destroyed - Not Usable	13	30%
2	Damaged - Not Usable	24	56%
3	No\Minor Damage - Usable	6	14%
	TOTAL	43	100%

Map of Hernani Eastern Samar

Legend

Damage\Usability Index

- 1 - DESTROYED - NOT USABLE
- 2 - DAMAGED - NOT USABLE
- 3 - NO \ MINOR DAMAGE- USABLE
- Roads
- Barangays - Hernani

KEY MAP

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