



UN-GGIM:Americas
REGIONAL COMMITTEE OF UNITED NATIONS
ON GLOBAL GEOSPATIAL INFORMATION
MANAGEMENT FOR THE AMERICAS

9° SESSION

UN-GGIM: Americas

Geoinformation management in response to disasters in Ecuador, case study: the actions of the IGM in the Earthquake 06/2016

Gestión de geoinformación en atención a los desastres en Ecuador, caso de análisis: el accionar del IGM en el Terremoto 06/2016

Dra. Rosa Cuesta M.
rosa.cuesta@geograficomilitar.gob.ec

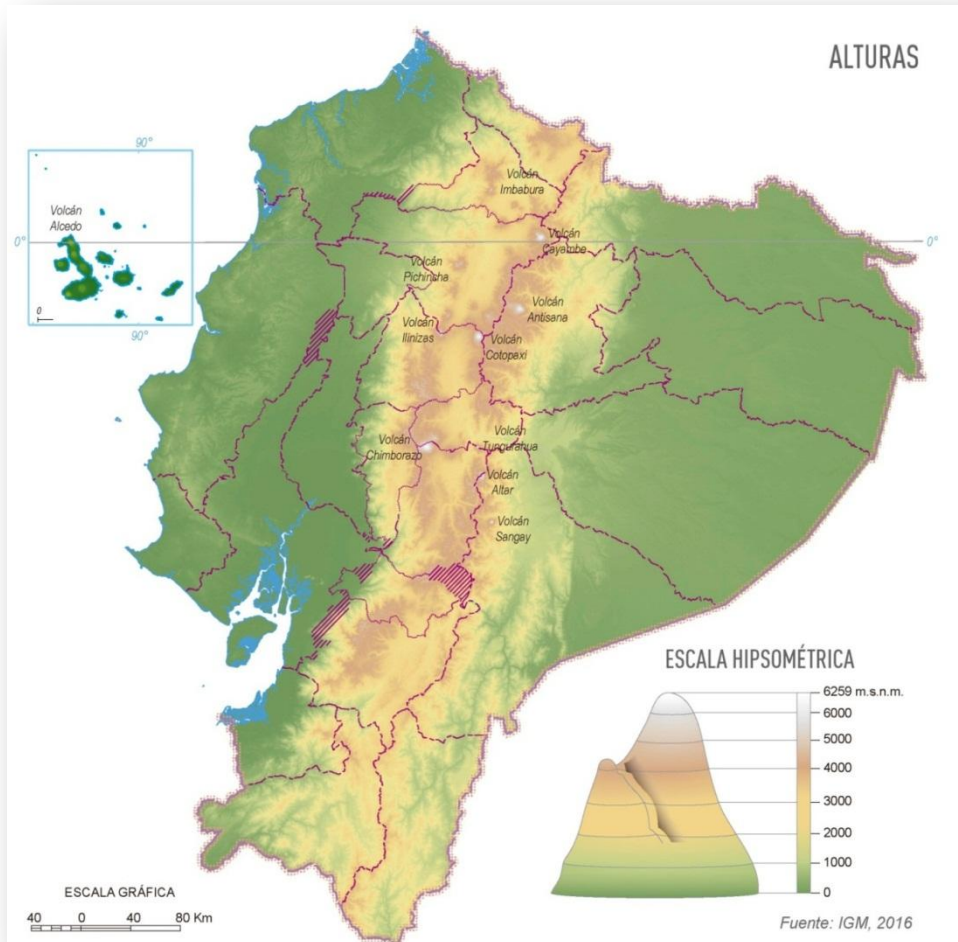
Session Marco Estratégico de Información y Servicio Geoespaciales para Desastres



**INSTITUTO
GEOGRÁFICO
MILITAR**

November 28, 29 and 30
Santiago de Chile, ECLAC

NATIONAL CONTEXT



Area : 257.217,07 km²

Population : 18'000.000

Ecuador has exposed spaces:

- Earthquakes
- Volcanic eruptions
- Floods
- Landslides
- Fires
- Droughts and desertification

EARTHQUAKES: ECUADOR- PEDERNALES (2016)

- **Earthquake** registered on Saturday, April 16 at 6:58 p.m. (local time), of magnitude 7.8 (Mw moment magnitude), whose hypocenter was located in front of Pedernales (Manabí), Source: IG-EPN
- **Executive Decree 1001:** State of exception for sixty days in the provinces of: Esmeraldas, Manabí, Santa Elena, Santo Domingo de los Tsáchilas, Los Ríos and Guayas, due to the adverse effects of this natural disaster. April 17, 2016.
- **Executive Decree 1002:** Extend Executive Decree 1001, in the sense that the mobilization is for the entire national territory. April 18, 2016.

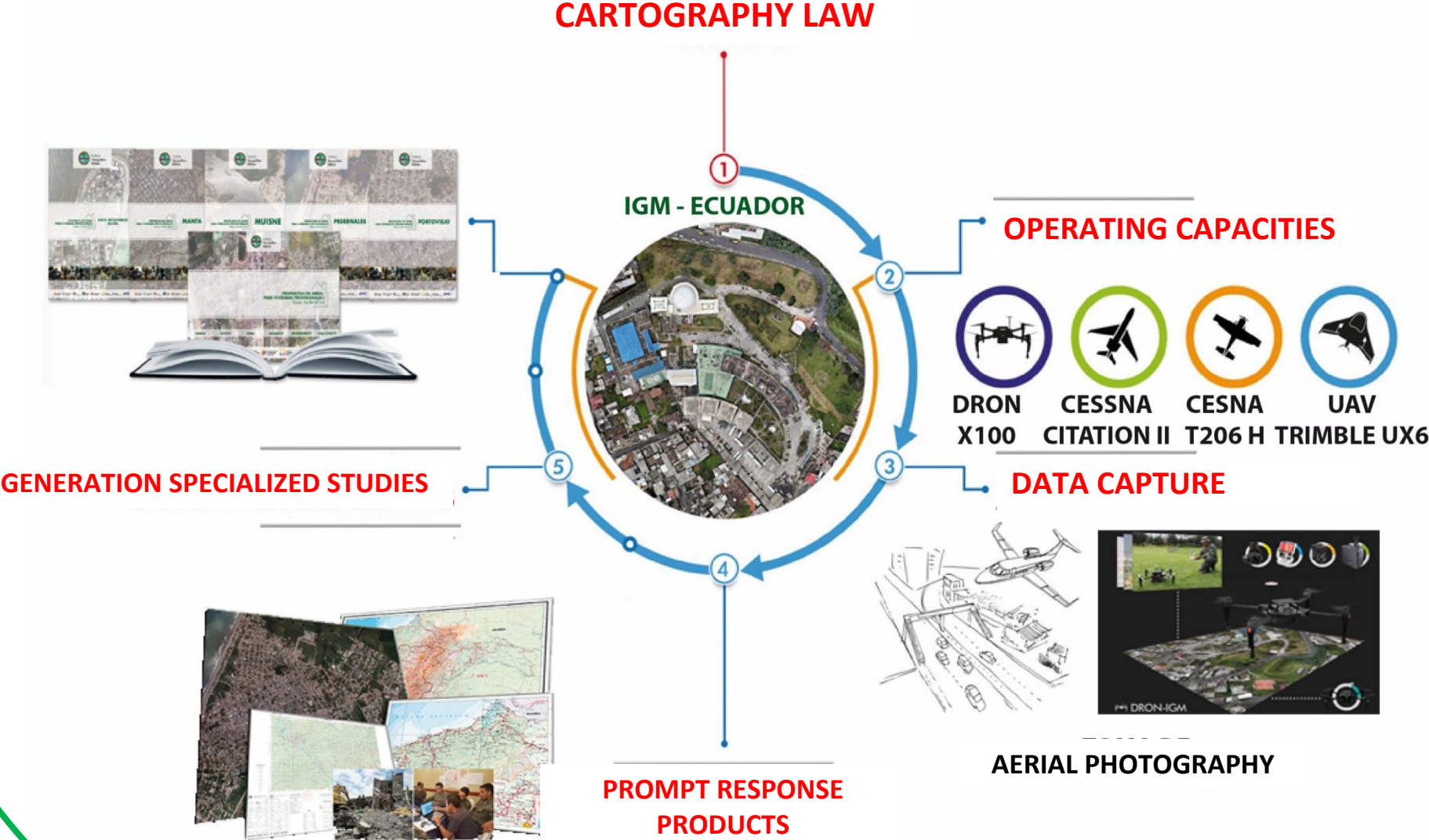


The Military Geographic Institute, manages, approves and controls all the activities aimed at: **elaboration of the official cartography and the archive of geographic and cartographic data of the country and studies of geomatic application**; prepares valued species and security documents as the only authorized body; and carries out research and dissemination of geospatial sciences, contributing to the defense of sovereignty and territorial integrity, support for national development and in support of the actions of other State institutions.

INSTITUTIONAL MISSION



SPACE INFORMATION MANAGEMENT IN DISASTER RESPONSE



EXAMPLE OF RESULTS



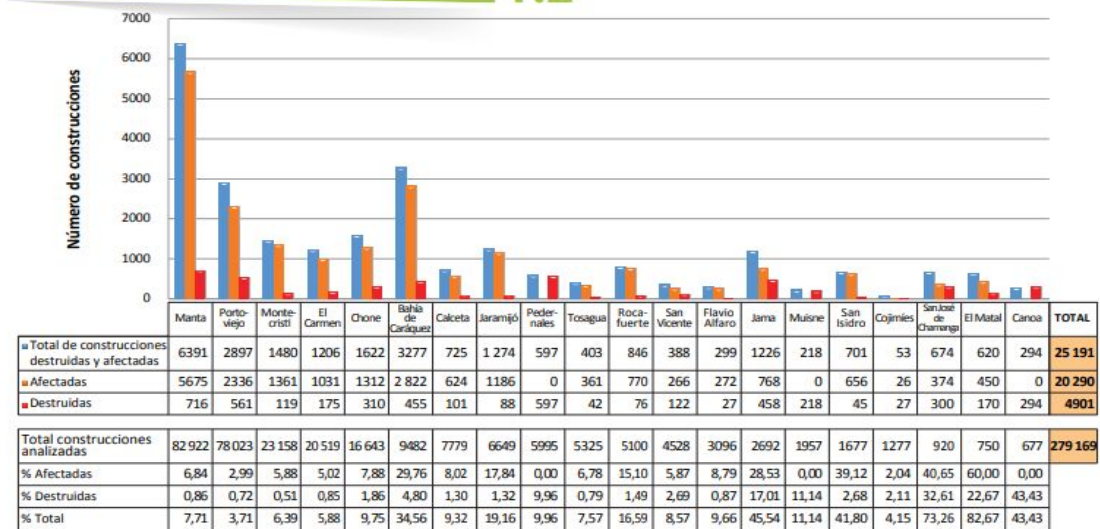
**AFTER AND BEFORE
THE EVENT**

EXAMPLE OF RESULTS

GENERACIÓN DE CARTOGRAFÍA Y ESTUDIOS GEOGRÁFICOS DE PRONTA RESPUESTA

1
1.2

Estimación provisional de edificaciones destruidas y afectadas



Número de construcciones afectadas y destruidas por localidad.
16/04/16

El gráfico de barras muestra el número de construcciones totales, destruidas y afectadas que han sido fotoidentificadas comparando fotografía aérea existente con fotografía aérea nueva, tomada después del terremoto ocurrido el sábado 16 de abril. Los valores corresponden a las construcciones en cada una de las localidades.

Ejemplo:

En Jama se analizó un total de 2962 construcciones, de ese valor, 1226 han sido destruidas y afectadas. Un total de 768 se consideran afectadas y 458 destruidas

DESTROYED BUILDINGS BY LOCATION



CONSTRUCCIONES AFECTADAS
20 290



CONSTRUCCIONES DESTRUIDAS
4901



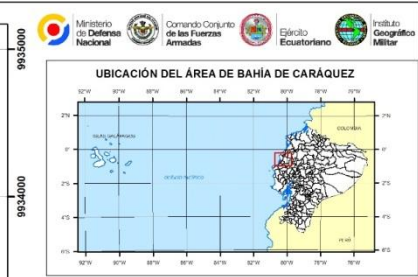
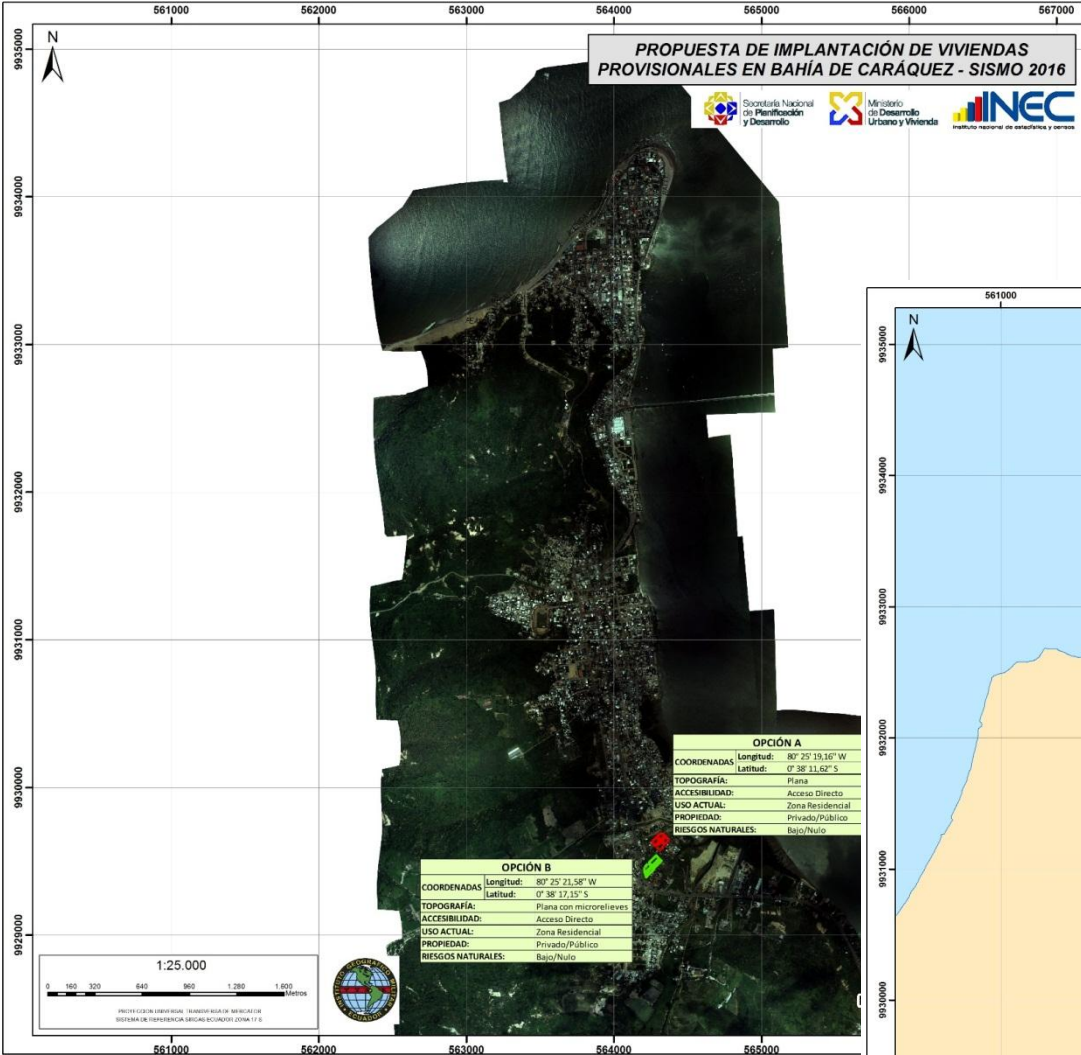
TOTAL AFECTADAS
25 191

30 380

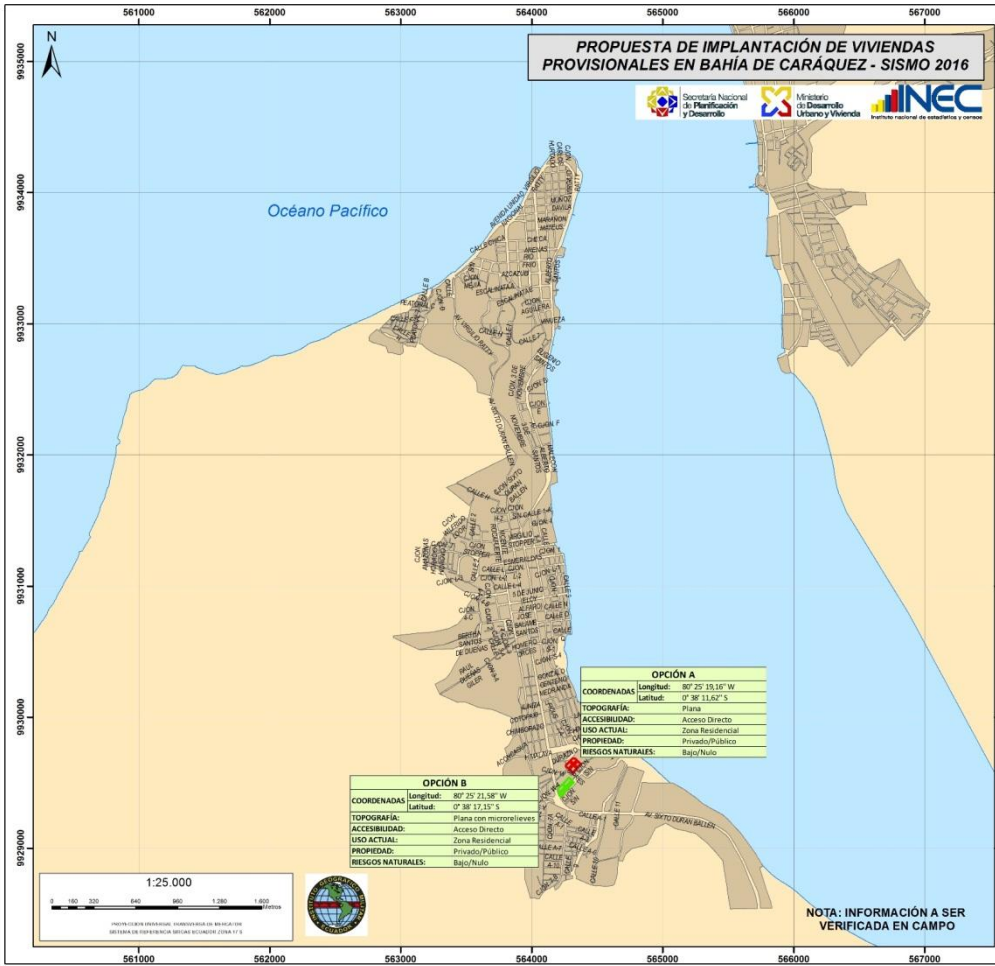
4801

32 181

EXAMPLE OF RESULTS



TEMPORARY HOUSING STUDY



UBICACIÓN DEL ÁREA DE BAHÍA DE CARÁQUEZ

Logos: Ministerio de Defensa Nacional, Comando Conjunto de las Fuerzas Armadas, Ejército Ecuatoriano, Instituto Geográfico Militar

INSUMOS

- Mosaico fotográfico georeferenciado, IGM, 18 de abril de 2016
- Área amanzanada, INEC, 2014
- Mapa de Multiamenazas del Ecuador, IEE, 2016
- Mapa de Pendientes, IEE, 2016
- Mapa de Uso del Suelo, MAGAP - MAE, 2015
- Plan de Desarrollo y OT del Cantón Sucre, 2012
- Mapa del Sistema Nacional de Áreas Protegidas, MAE, 2014
- Servicio Web Geográfico WMS, Mapa Base Ecuador IGM, 2016

LEYENDA TEMÁTICA

OPCIONES PARA LA IMPLANTACIÓN DE VIVIENDAS PROVISIONALES

- OPCIÓN A
- OPCIÓN B

PROTOTIPO DE IMPLANTACIÓN DE ALBERGUES

PARÁMETROS DE DISEÑO BÁSICO

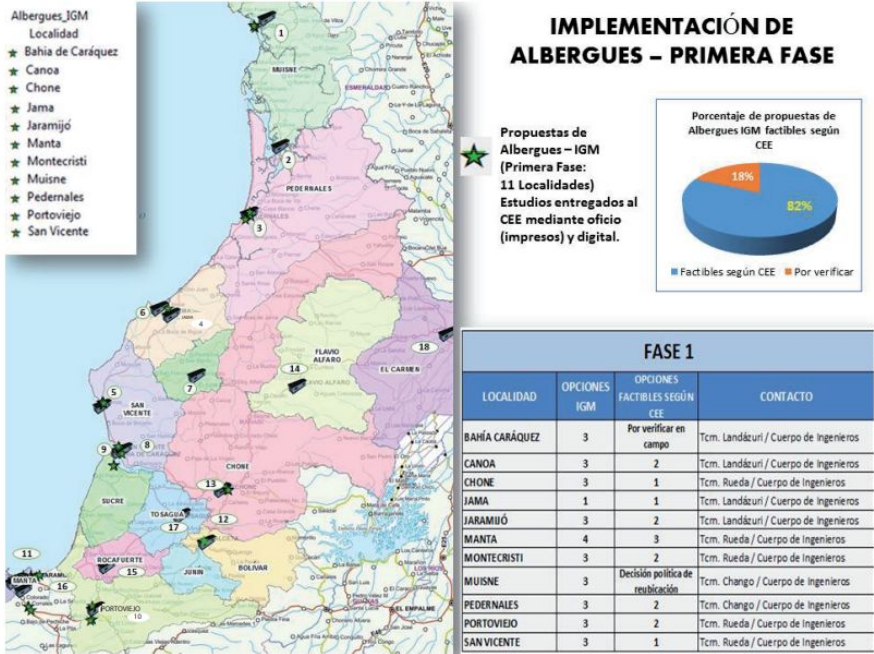
CONSIDERACIONES	Área m²	Porcentaje	TOTAL m²
Número de habitantes en viviendas provisionales			
Área mínima para vivienda por persona	16	1	7 648
Área para seguridad (UPC), salud	200	1	200
Equipamiento comunal (cocinas, comedor, cocina)	500	1	500
10% del área para recreación	7 648	10%	764.8
25% del área para vitalidad interna	8 432.8	25%	2 108.2
TOTAL ÁREA REQUERIDA (m²)			11 241
TOTAL ÁREA REQUERIDA (he)			1.241

* Fuente: MDS, Albergues y refugios, 25 de abril de 2016.

EXAMPLE OF RESULTS



IMPLEMENTATION OF TEMPORARY HOUSING STUDY



ECONOMIC VALUATION

- Download of more than 700 products on the website (Orthophotos before and after the event, basic cartography, early response cartography, georeferenced photomosaics, etc.)
- Publication of more than 600 layers of information through WMS, WFS, WMTS and/or TMS services to provide direct and interoperable access from multiple sources of information.
- During the months of emergency, 35,000 data were downloaded, exceeding the annual average for the entire Geoportal.
- Direct cooperation processes were established with volunteers generating Orthophotos with drones, for the generation of specific information.
- The collaborative work between OpenStreetMap, the Humanitarian OpenStreetMap Team (HOT) and several volunteers created projects to update the maps in the most affected places.
- All of this generated savings for it of approximately \$550,000 USD in direct generation of geoinformation and also generated an economic benefit to the state of approximately \$12,460,000 USD.

LEARNED LESSONS

In terms of geospatial information management, the following lessons learned could be deduced:

- The institutional strength of State agencies lies in the ability to articulate their competencies and manage geospatial information, in a scalable way from the National Operational Committees to the Locals in response to Emergencies.
- It is necessary to have an operational instruction, which allows to activate the actions and make available to the authorities and other State agencies all their technological and human capacities of the specialized Institutions.
- The interoperability of geographic information was essential to give timely attention to the requirements of the Institutions in charge of post-event care. (Reconstruction, damage assessment, help bonuses etc.

JOINT WORK PROPOSALS

- From Ecuador and in coordination with Brazil (leading the Disaster Group) it is proposed to keep everyone's memory alive, making available to the general public a ***"Data HUB of good practices in disaster response with geospatial information"*** with the purpose of create awareness in the population.
- In addition, with the support of all the countries of the region, we expected to generate a guide document, which will allow the determination of minimum layers of geographic information, in order to give prompt attention to the different natural threats.

Thanks for your attention



**INSTITUTO
GEOGRÁFICO
MILITAR**

