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CAP Implementation in México

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Mexico's Earthquake Early Warning System



- ✓ *México City 2014*
- ✓ *1 minute warning*
- ✓ <http://www.youtube.com/watch?v=x5wE7-NgvX8>

- ✓ *Los Angeles CA 2014*
- ✓ *Any Warning*
- ✓ <http://www.youtube.com/watch?v=KiB7ny52-xw>

Introduction



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- ❖ *How to built an Early Warning System (EWS) for communities that doesn't have internet, 3G, 4G services using CAP?, Does exist a Primary Key to do it?*
- ❖ *In México, How Earthquake Early Warning System may be the basis of diffusion system for National Warning System?*
- ❖ *How to organize components to implement in Mexico CAP protocol?*
- ❖ *What are the concepts to convince experts and authorities to create a National Warning System that use CAP?*
- ❖ *What are the results for CAP implementation in México?*

Background

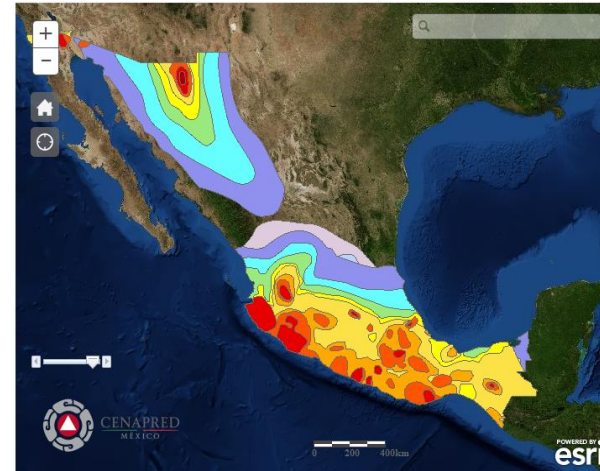


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- ❖ *112 million people.*
- ❖ *Extension near to 2 Million square meters.*
- ❖ *45.5% poor situation.*
- ❖ *4,525 (2%) Urban localities (192,214 México).*



- ❖ *High and very high seismic hazard (5 tectonic plates and 14 volcanoes).*
- ❖ *25 hurricanes are generated annually on average, torrential rains cause flooding and landslides.*
- ❖ *Drought, winter Systems, forest fires, red tides, and human activities related to industry, etc.*

1985 Earthquake

The earthquakes of modern times that have affected Mexico City have been mainly of July 28, 1957 and the September 19, 1985, the latter being the most deadly and destructive, both having in common their epicenter in the Guerrero coast.

The morning of September 19th a tragic wake left behind at least 8,000 dead, wounded, missing, homeless, public and private buildings and residential houses destroyed; property in danger of falling; interruption in water service, electricity and telephone; water and gas leaks; multiple breaks in the asphalt and gridlock in collective transport services.



Background

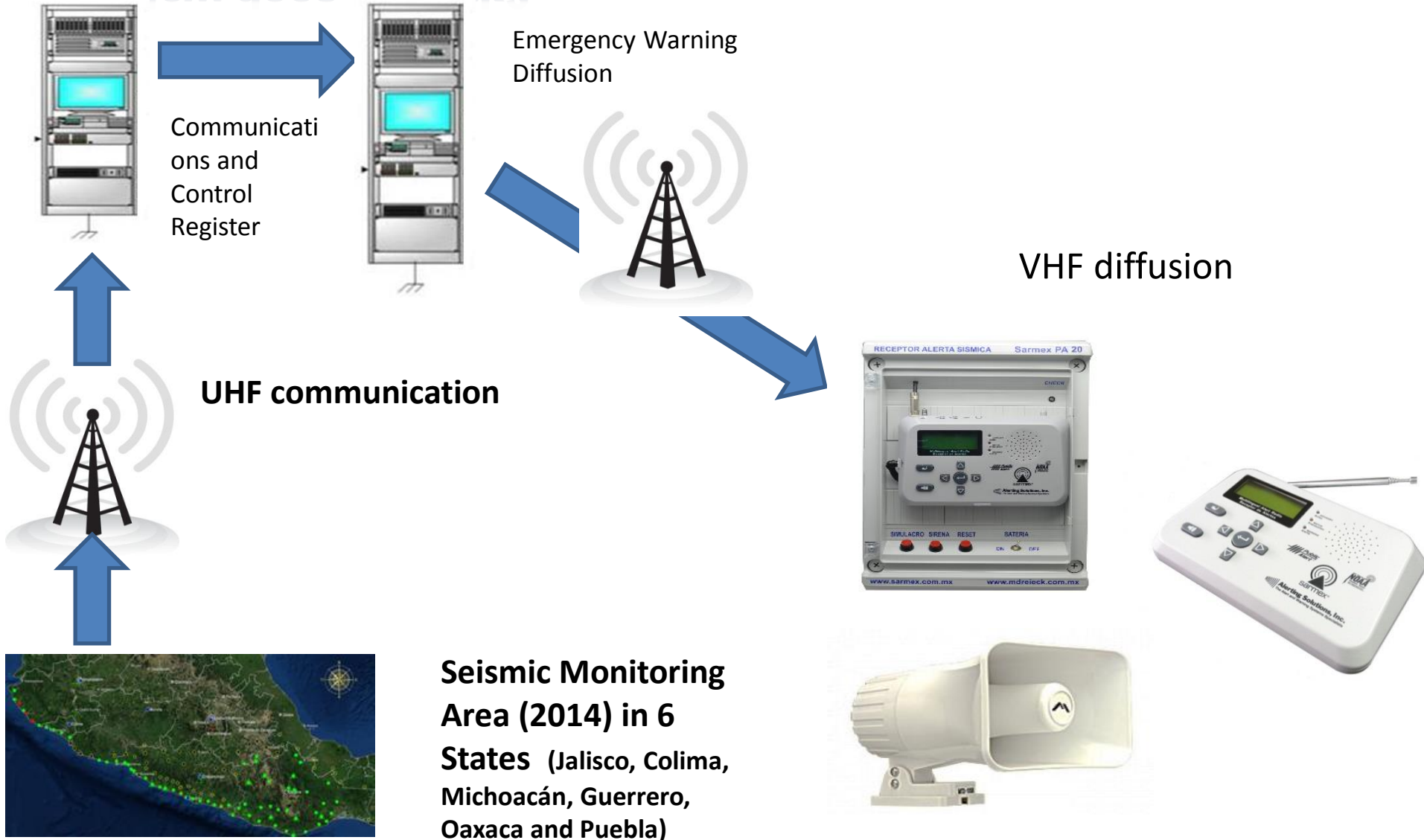


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¿How does it work?



Communications and Control Register

Emergency Warning Diffusion

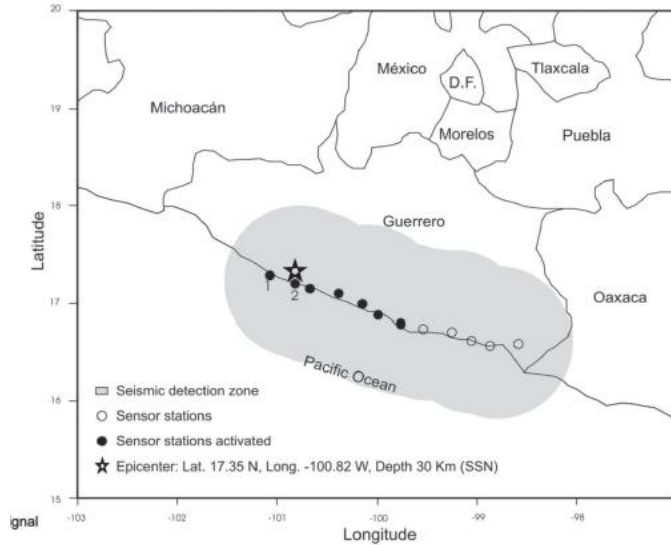
UHF communication

VHF diffusion

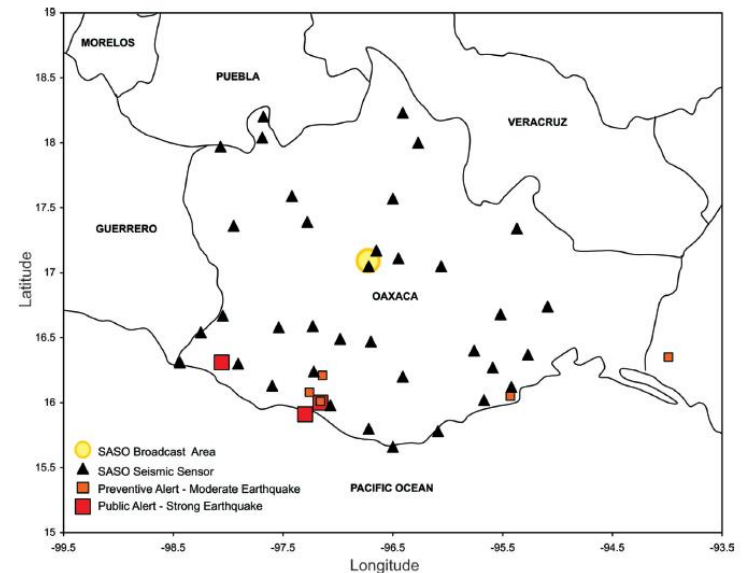
Seismic Monitoring Area (2014) in 6 States (Jalisco, Colima, Michoacán, Guerrero, Oaxaca and Puebla)

SASMEX stages

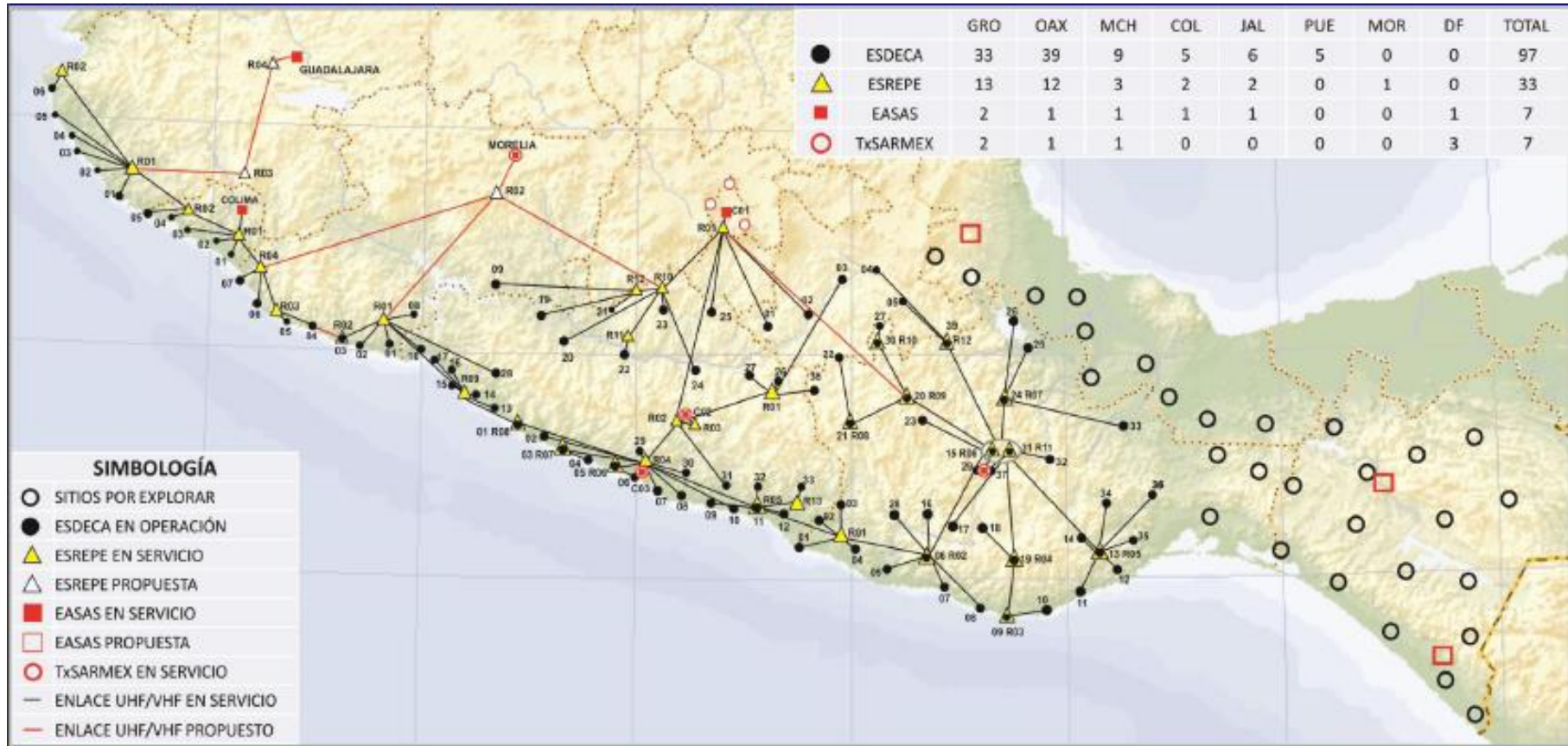
1. (1989) 1991 Mexico City Earthquake Warning System (SAS): Guerrero Coast with 12 sensor stations.



2. 2003 Oaxaca State Earthquake Warning System (SASO).



SASMEX stages



3. 2010, 97 field sensors: Jalisco, Colima, Michoacán and Puebla, plus Guerrero and Oaxaca sensors

Effectiveness of SASMEX: April 18, M 7.2 from Guerrero



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centro de instrumentación y registro sísmico, ac

Sistema de Alerta Sísmica Mexicano

Emisor Alterno Ciudad de México



Informe Reciente

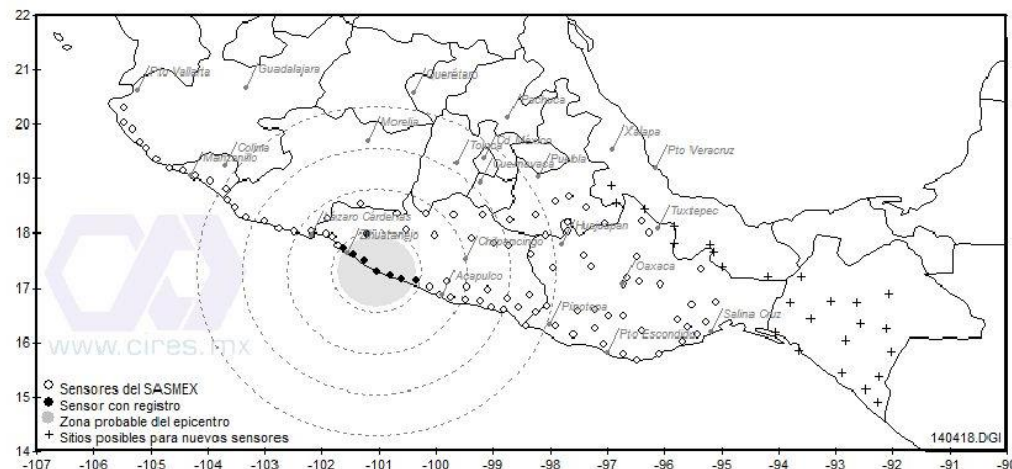
abril 18, 2014

El 18 DE ABRIL DE 2014 a las 09:27:32 el SASMEX registró un sismo que fue evaluado y confirmado con sensores próximos a su epicentro. Las ciudades donde se alertó automáticamente la amenaza de sus efectos y el tiempo aproximado de anticipación se indican en la tabla.

El mapa muestra la zona probable del epicentro y circunferencias de tiempo, cada 20 segundos, que permiten estimar el retardo del efecto sísmico advertido.

CIUDAD	Alerta	Hora Alerta	Distancia	Anticipación
Acapulco	Pública	09:27:38	131 Km	25 seg
Chilpancingo	Pública	09:27:37	166 Km	35 seg
Morelia	Pública	09:27:37	266 Km	58 seg
Ciudad de México	Pública	09:27:37	305 Km	68 seg
Colima	--	--	355 Km	--
Guadalajara	--	--	441 Km	--
Oaxaca	--	--	460 Km	--

Auto SASMEX, 18/abr/14 09:27:45



Early warning equipment's for communities: SARMEX



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December 2008, with support from the Autoridad del Centro Historico de la Ciudad de México, a digital code relay system such as that used by NOAA (EAS/SAME) was installed in Mexico City.

On 27 March 2009, SAS emitted a signal of preventive alert to warn of the risk of an M 5.3 earthquake occurring at the coast of Guerrero; it was the first time that transmitters (EAS/SAME/CAP) sends an earthquake warning to SARMEX receivers.

With improvements to protocol, electronics, software and the communications, SARMEX (Mexican Alert System Risk) receiver is created. With a vision to be adopting the CAP, transmitters were installed with a computer that records events according to CAP, intended to be disseminated in future to those corresponding authorities.

Early warning equipment's for communities: SARMEEX



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- ❖ *Base on Emergency Warning System (US)*
- ❖ *Improvement on protocols (fast response)*
- ❖ *Improvement in electronic, software and telecommunications (EAS/SAME/CAP Transmitters)*
- ❖ *Unique solution for Earthquake Warning Systems*

Early warning equipment's for communities: SARMEX



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No.	Eventos
1	Mensaje Administrativo
2	Precaución por Avalancha
3	Alerta por Avalancha
4	Alerta por Riesgo Biológico
5	Alerta, hervir el agua
6	Alerta por Ventisca
7	Emergencia por secuestro
8	Alerta Civil
9	Emergencia Civil
10	Precaución por Inundación Costera
11	Alerta por Inundación Costera
12	Alerta por Riesgo Químico
13	Alerta por Agua Contaminada
14	Precaución por Represa
15	Alerta por Rompimiento de Represa
16	Alerta por Enfermedad Contagiosa
17	Simulacro
18	Alerta por Tormenta de Polvo
19	Notificación Urgente
20	Fin de Notificación Urgente
21	Alerta Sísmica
22	Evacuación Inmediata
23	Evacuación
24	Alerta por Contaminación de Alimentos
25	Precaución por Inundación Fluvial



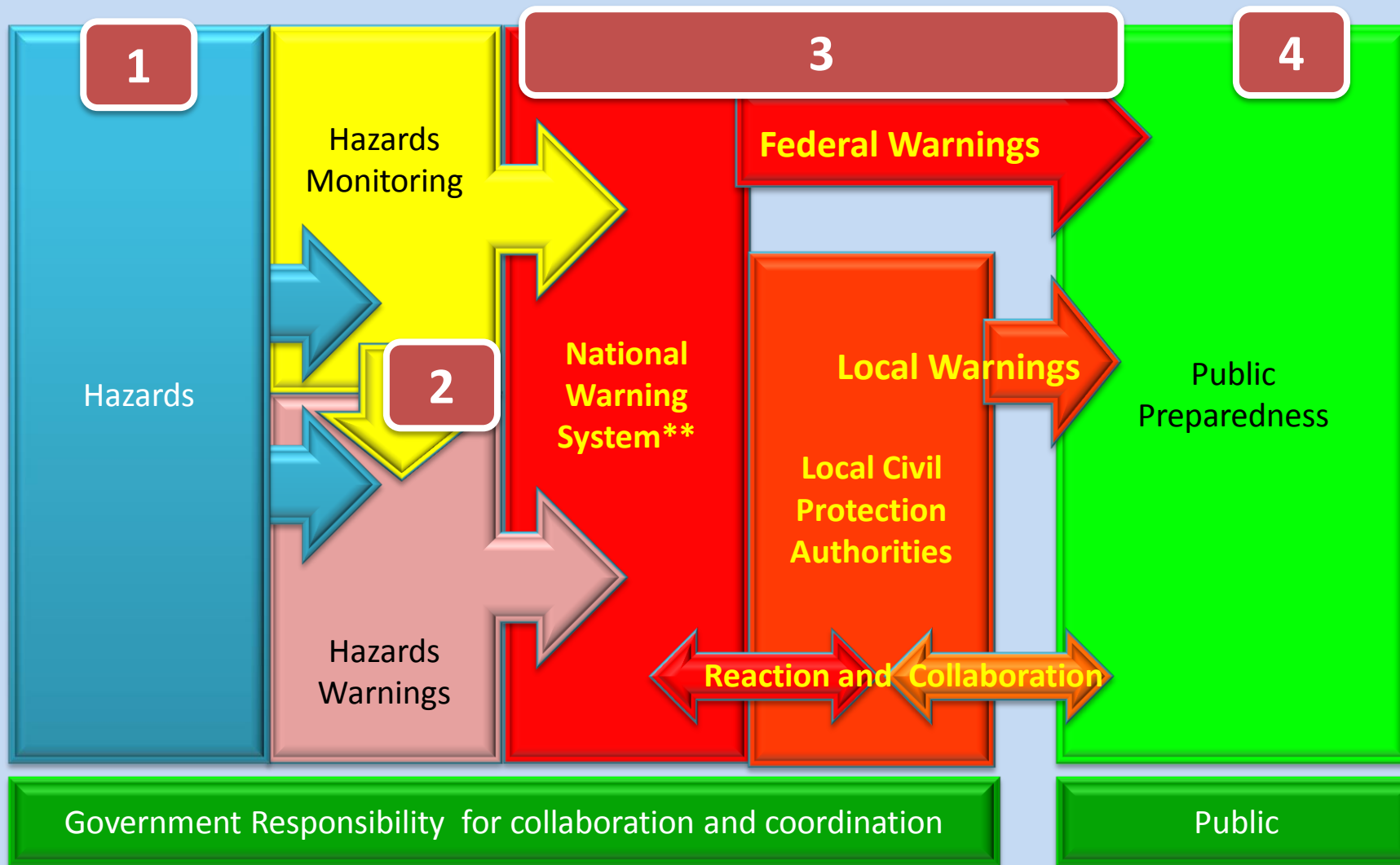
26	Reporte de Inundación Fluvial
27	Alerta por Inundación Fluvial
28	Precaución por Inundación Pluvial
29	Reporte de Inundación Pluvial
30	Alerta por Inundación Pluvial
31	Alerta por Inundación Pluvial
32	Alerta por Inundación Pluvial
33	Alerta por Inundación Pluvial
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69	Alerta por Inundación Pluvial
70	Alerta por Inundación Pluvial
71	Alerta por Inundación Pluvial
72	Alerta Volcánica
73	Alerta por Inundación Pluvial
74	Alerta por Inundación Pluvial
75	Alerta por Inundación Pluvial
76	Alerta por Inundación Pluvial

The Platform for the Promotion of Early Warning of the International Strategy for Disaster Reduction (ISDR) suggests thus to divide EWS into the four components



Legal Framework



Strategy for CAP implementation in Mexico

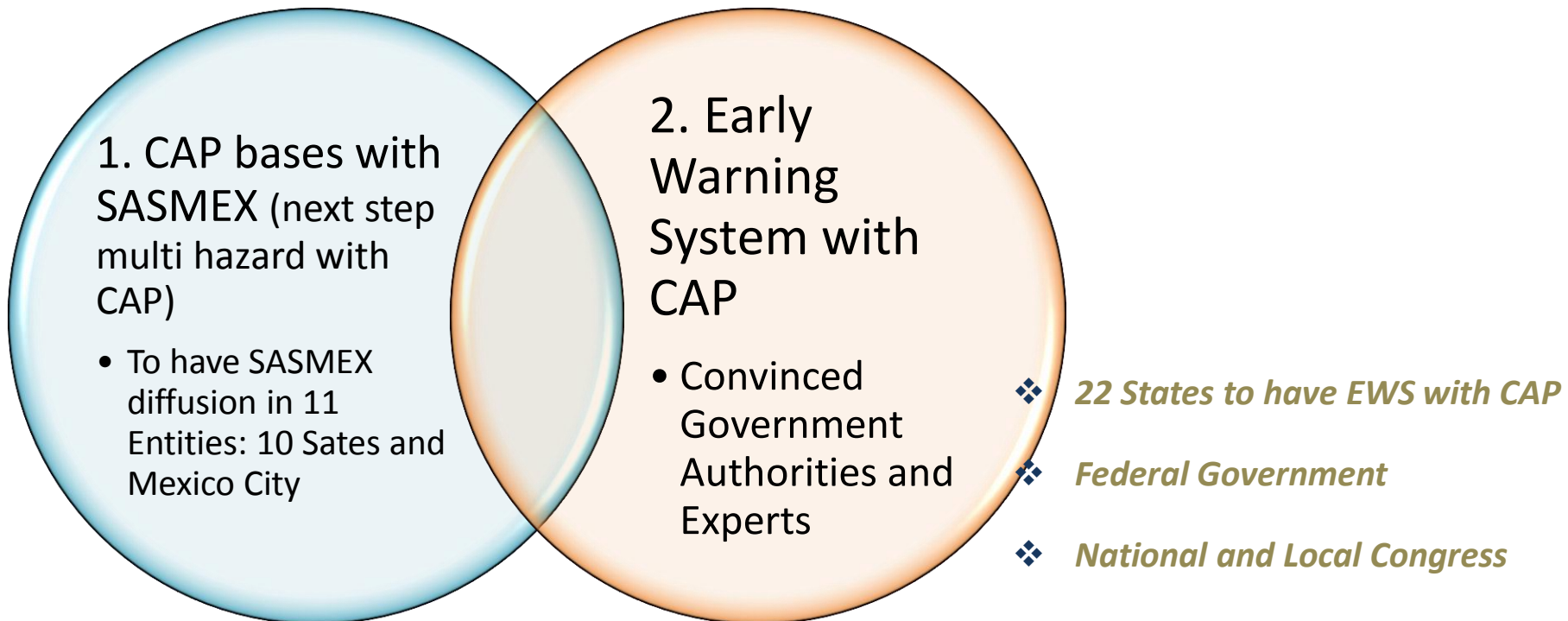


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Two strategic objectives:

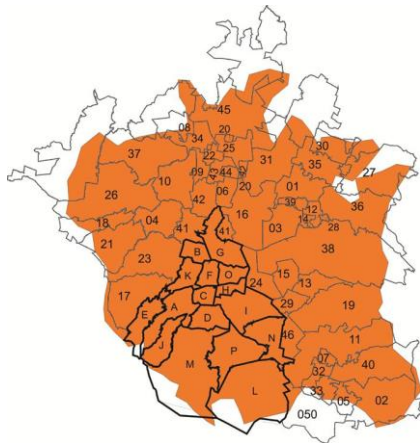


Results: CAP bases with SASMEX: EAS/SAME/CAP protocols for diffusion (next step multi hazard)

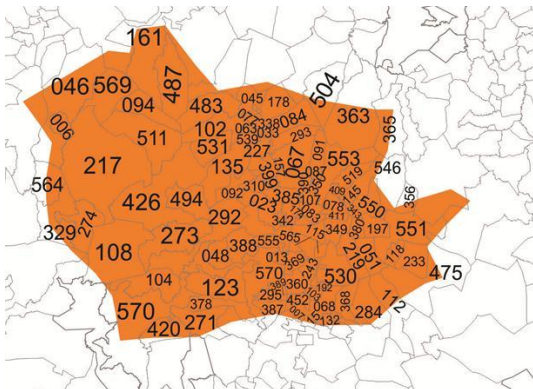
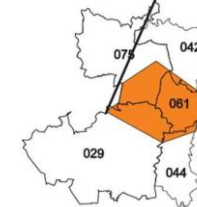


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SASMEX diffusion in 5 Entities: México City, Estado de México, Guerrero, Oaxaca, Michoacán and Puebla (December 2014 Puebla and Chiapas States, 27 Million People)



- México City: 62 Municipalities
- Ciudad de Oaxaca: 72 Municipalities
- Chilpancingo y Acapulco: 9 Municipalities
- Morelia City



Approx. 25 million people has the opportunity to receive EW

Working on 6 States:

Michoacán, Veracruz, Chiapas, Jalisco, Morelos, Colima



Results: Early Warning System with CAP



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Conclusions



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- ❖ *Create a Model that allows, in any kind of effort, introduce CAP: Legal Frame, EWS infrastructure, UN EWS elements, WS Diffusion, Experts Convinced*
- ❖ *What is our National EWS Model? And, Is included CAP in it?*
- ❖ *With this Model, we may to make strategically master plan, including parallel activities*
- ❖ *Tactically, include UN EWS elements that use CAP: Risk Knowledge, Monitoring and Warning Systems, Diffusion Systems, Preparedness*
- ❖ *What is the Primary Key to make our project at National Level?*
- ❖ *How CAP works with fast response like Earthquakes?*

References



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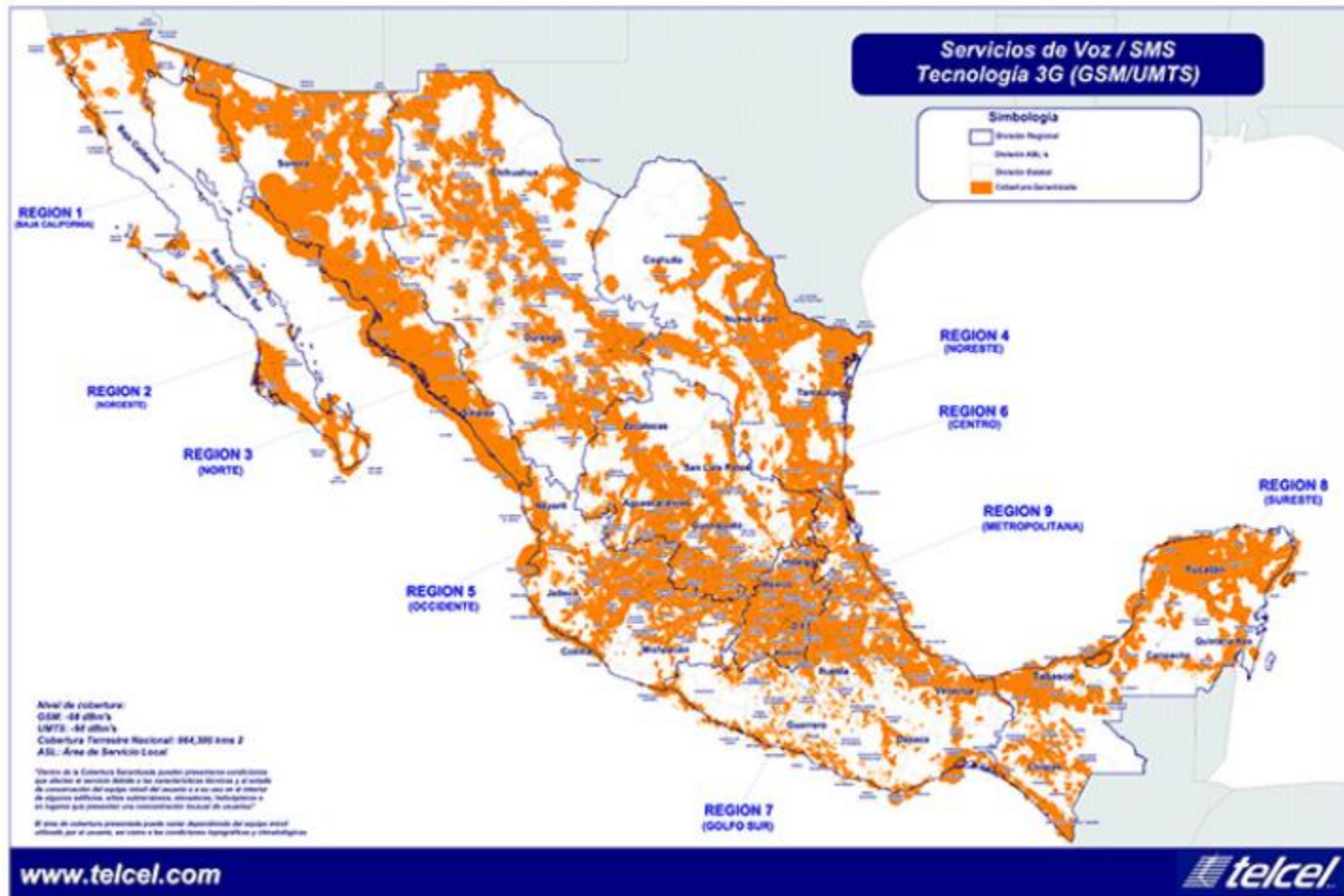
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Junio 2014





Aplicativo sísmico telefonía móvil GDF

Ciudadanía y
Autoridades

Alertamiento:
SARMEX;
radiodifusoras y
televisoras
participantes

Autoridades (Telefonía Móvil)

Alertamiento:
Números de
personas
estratégicas,
tácticas y
operativos (15
mil o menos?)

Notificación:
Ciudadanía y
Autoridades



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