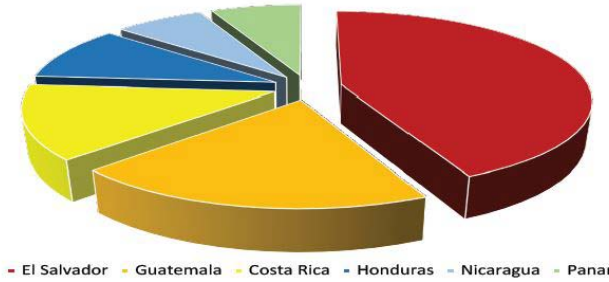
DRR in Central America:
Regional Experiences on Recovery

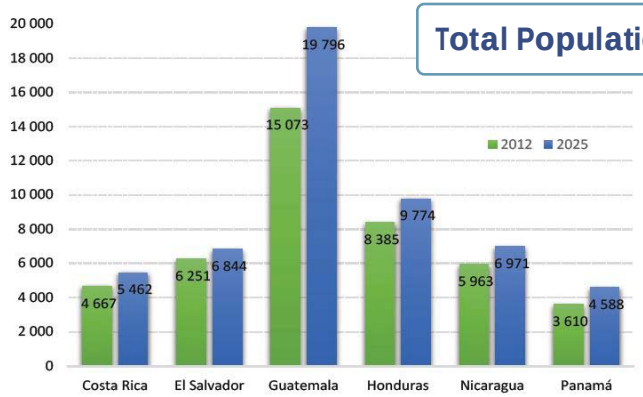
Coordination Center for the Prevention of Natural Disasters in Central America (CEPREDENAC)

International Recovery Forum
January 26th, 2016
Kobe, Hyogo, Japan

Population Density 2013



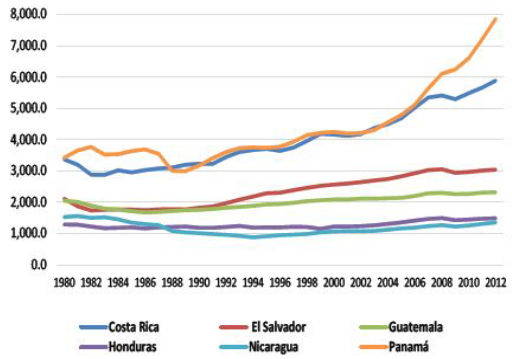
Total Population 2012 / 2025



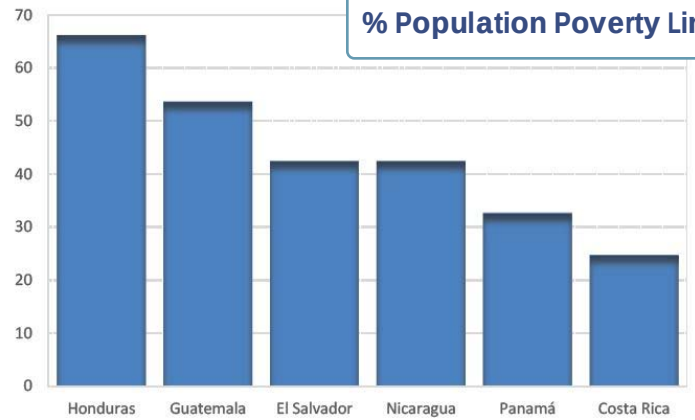
Fuente: Elaboración propia, con información de la CEPAL y CELADE, 2013

GDP (millions US$) 2012

GDP P C (millions US$) 2012



% Population Poverty Line 2012



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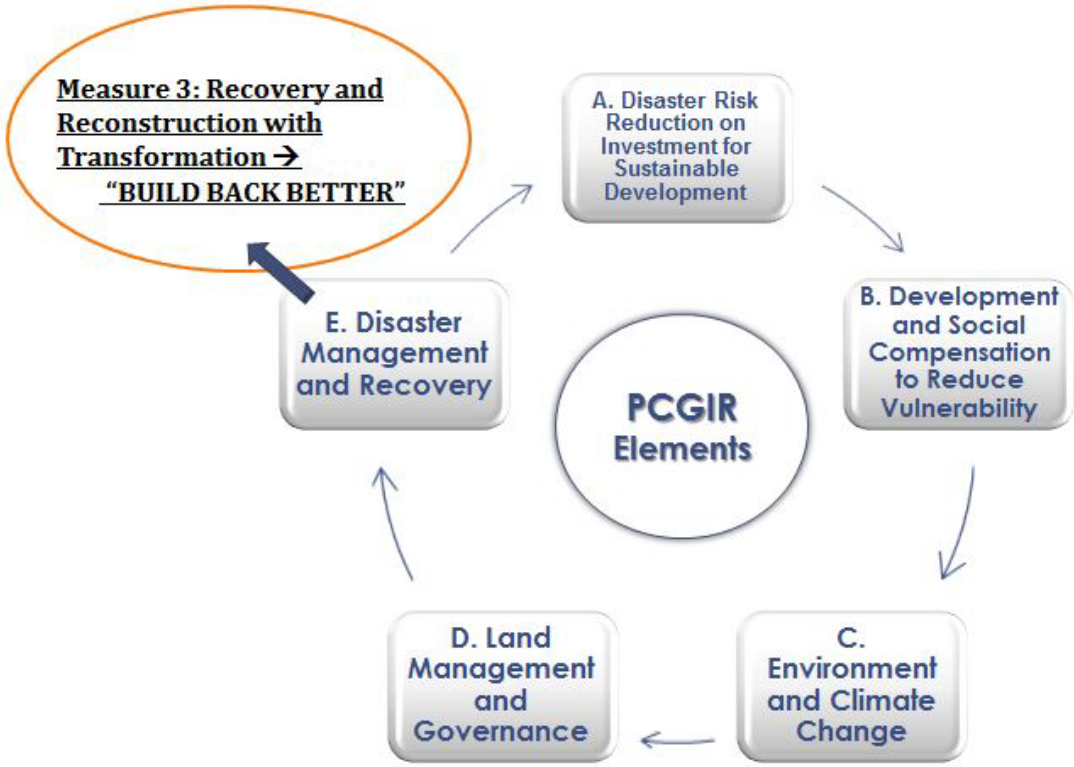
In charge of coordination of DRR in C.A. armonizing six national systems through the Central American Policy on Comprehensive Disaster Risk Management (PCGIR).

CEPREDENAC promotes multi-sector works with commong guidelines. During 2015, CEPREDENAC held six national and one regional workshops on the Sendai Framework on DRR 2015-2030, initiating dissemination to over 40 institutions/450 regional, national and local personnel.



Since 2012, Central America has worked in developing National Recovery Frameworks, based on experiences of recovery,, rehabilitation and reconstruction.

CEPREDENAC promotes more effective and inclusive DRR planning with multiple sectors (Economy, Planning and Land Use, Construction) and Local-Municipal Governments.

Multi-sectorial and technical commissions coordinate the recovery process after the occurrance of disasters. Specific protocols of action follow a “transformation towards development” approach.

1. Las Colinas Landslide
El Salvador 2001

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2. Cinchona Landslide
Costa Rica 2009

3. Cambray II Landslide
Guatemala 2015

1. Las Colinas Landslide
El Salvador 2001

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CONTEXT

- National event: Earthquake 7.6
- Local event: Landslide
- Victims: 604
- Household losses: 200

EARLY STAGES

- Ad-hoc multi-sector commission: response oriented
- Centralized response and coordination
- Search and Rescue; Relief and Assistance Actions

RECOVERY (4-18 months)

- Assessment stage: site off-limits; identification of affected families.
- Initial proposal: economic compensation on land loss; memorial monument on site.
- Municipality and Local association increase level of involvement.
- Ad-hoc coordination facilitates social, health and psychological support. No systematic previous mechanism.

(2-5 years)

- Municipality develops DRR management: EWS, coordination units, mapping tools.
- New assessment studies guide mitigation works on affected site.
- Lessons learned at technical and scientific level applied in metropolitan area.
- Re-open case on relocation of original Las Colinas residents.

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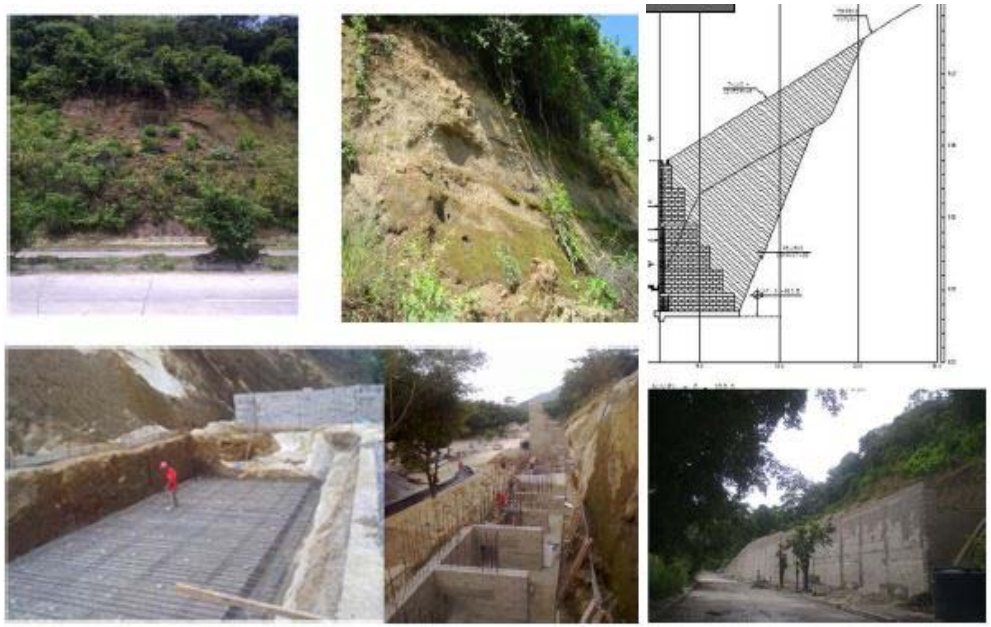
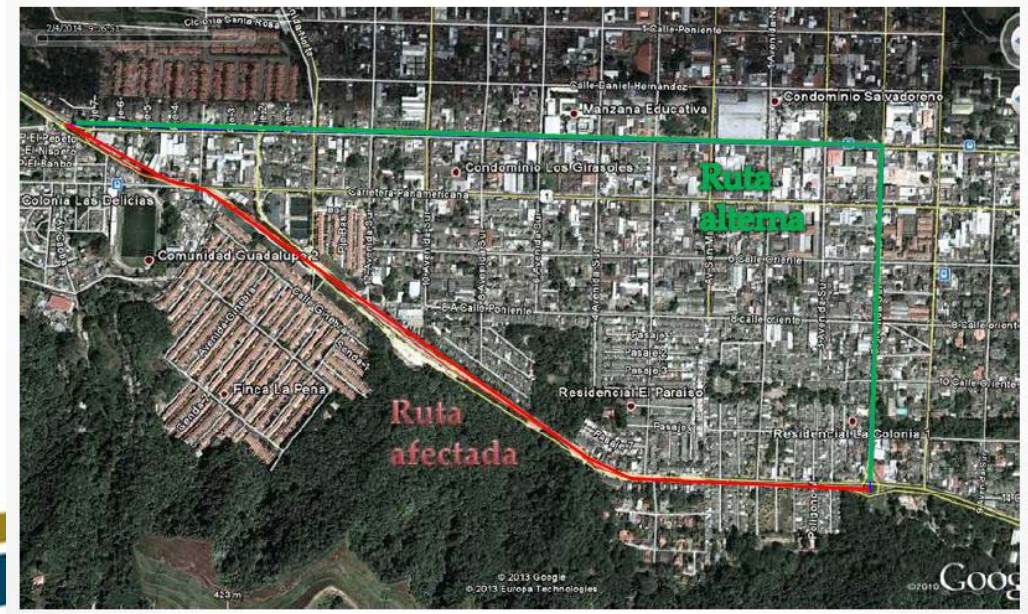
Municipality and DRR System develop mitigation works and prevention measures: shift from response to management





Investigación MICROTREMORES ZONA URBANA DE SANTA TECLA

Mapa de malla de medidas de microtremores Zona Centro- Norte.
Municipio Santa Tecla.
Escala 1:6.250
Elaborado por: Benancio Henríquez y Francisco Barahona

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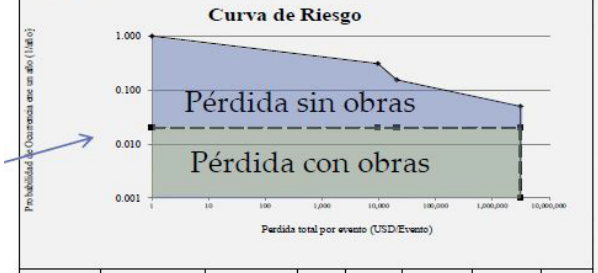
Research for land use and risk reduction; planning for development

Cost-Benefit Analysis with DRR measures

Risk Assessment Sheet 3: Risk Curve — **For Hillside Slope**

Site ID		0					
Department:	San Salvador	Municipality:	Delgado	Village/Neighborhood:	0		
Address/Road Name and Station		CA1E-18.5km					



	Disaster level			edge only	half function	whole function	1000 year return period
		Symbol		_E	_H	_W	
Without structural measures	Total loss of a event (USD/event)	TL	1	9,515	20,603	3,106,416	3,106,416
	Potential return period	RPDp	1.0	3.2	6.4	19.8	1000.0
	Exceedance probability of year for a disaster event (1/year)	EPYD	1.000	0.313	0.156	0.051	0.001
	Potential Annual Loss (USD/year)	ALp					327,846
With structural measures	Target return period (year)	TRP					50
	Total loss of a event (USD/event)	TL	1	9,515	20,603	3,106,416	3,106,416
	Potential return period	RPDp_wm	50.0	50.0	50.0	50.0	1000.0
	Exceedance probability of year for a disaster event (1/year)	EPYD	0.02	0.020	0.020	0.020	0.001
	Potential Annual Loss with structural measures (USD/year)	ALp_wm					62,128
Decrease in annual loss by structural measures							265,718

Risk Assessment Sheet 1: Potential Annual Loss — **For Hillside Slope**

Site ID							
Department:	San Salvador	Municipality:	Delgado	Village/Neighborhood:	0		
Address/Road Name and Station		CA1E-18.5km					
Probable event situation							

Item		Symbol	Computation Formula	Quantity
Probable length of damage along infrastructure for each disaster magnitude (km)	edge only	LN_E		0.010
	half function	LN_H		0.030
	whole function	LN_W		0.060
Volumen de Tránsito Vehicular (vehículos/día)	Automobile	TPDA_AU		8,351
	pick-up	TPDA_PU		4,963
	Microbus	TPDA_MB		261
	Autobus	TPDA_AB		883
	Carga C2: Camion 2 ejes	TPDA_C2		287
	Carga C3: Camion 3 ejes	TPDA_C3		273
	Carga T: Cabral 2-3 ejes, Rastra 2-3 ejes	TPDA_T		1,363
Total de Transito Vehicular (vehiculos/día)		TDPA		16,391
Promedio de costo de operación en tramo evaluado (USD/km/vehiculos)		AVOCA		0.43
Promedio de costo de operación en tramo de desvio(USD/km/vehiculos)		AVOCD		0.43
Velocidad promedio en tramo evaluado (km/hora)		AVVA		83.61
Velocidad promedio en tramo de desvio (km/hora)		AVVD		37.70
Valor del tiempo promedio por vehiculo (USD/hora/vehiculo)		ATVV		8.96
Promedio de pasajeros por vehiculo		ANPSV		4.04

seguridad temporales (USD)				
Numero de vehiculos dañados directamente		NVAE_F = LR_E/AVVA/24/TDPA		0.49
Valor de Vidas humanas ante pérdida completa (USD/event)		HL_F=	NVAE_E x ANPSOPV x 0.5 x URLL	226,159
Valor de Daño directo a vehiculos (USD/event)		VL_F=	NVAE_E x 0.5 x AVVA	1,648
Numero previsto de Dias de cierre		NCDp_F		30
Perdida en caso de Desvio (USD/evento)		LD =	TDPA x NCDp x ((AVOCD x LRD - AVOCA x LRA) + (LRD/AVVD - LRA/AVVA) x ATVV)	2,828,608
Pérdida de otra Obra pública por evento (USD/event)		LOPI		0
Pérdida de propiedad privada por evento (USD/evento)		LPP		0
Perdida total por desastre con perdida completa de transito (USD/event)		TL =	RC + HLL + VL + LT + LOPI + LPP	3,306,416
Periodo de retorno potencial por tipo de evento (años)	borde	RPDp_E =		3.2
	media	RPDp_H =	Hoja de evaluación de riesgo	6.4
	completa	RPDp_F =		19.8
Probabilidad de excedencia en un año (1/año)	borde	EPYD_E =	1/RPEDp_E	0.313
	media	EPYD_H=	1/RPEDp_H	0.156
	completa	EPYD_W=	1/RPEDp_W	0.051
Potential annual loss of a site (USD/year)		ALp=	Curva de riesgo	327,846

CURRENT SCENARIO

- Santa Tecla as Champion City on DRR.
- Permanent coordination structures and mechanisms for recovery.
- Consultation and technical input for establishing the NRF.
- Housing project for 150 affected families to follow completion of third major mitigation work.

Lessons during Timeline 2001-2016

- Ad-hoc response and emergent coordination structures delay recovery process.
- Lack of/ insufficient knowledge on legal and operative frameworks hinders coordination.
- DRR capacity generation is key to transform negative/slow results into lessons to promote development.

2. Cinchona Landslide
Costa Rica 2009

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CONTEXT

- National event: Earthquake 6.2
- Local event: Landslide
- Victims: 30
- Household losses: 93

EARLY STAGES

- Ad-hoc multi-sector commission: recovery oriented
- Inter-institutional coordination with local government and families
- Quick shift from response to recovery

RECOVERY (0-4 months)

- Assessment stage: site off-limits; identification of affected families.
- Initial proposal: relocation of 91 families, broad consultation.
- DRR authority leading the process with municipality and local association.
- Systematic process to ensure economy reactivation and basic services.

(5-20 months)

- Affected families and multi-sector technical commission establish new area for relocation.
- Site assessment and preparation with neighbor communities.
- Private sector and academia provide technical support.
- Design and construction of new Cinchona community and local production network.

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DRR System proposed and implemented a recovery process with a comprehensive approach from the beginning

20-25 months

- 91 families receive new houses in New Cinchona.
- Recovery process includes yearly assessment of resinsertion.

Lessons during Timeline 2009-2011

- Inclusive participation contributes to efficient process.
- Local participation provides valuable input regarding cultural and social aspects.
- Multi-sector involvement and committment demonstrated through technical and economic support ensures development continuity.

3. Cambray II Landslide Guatemala 2015

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CONTEXT

- Local event: Landslide
- Trigger Factors: Seasonal heavy rain / Precarious location
- Victims: 350
- Household losses: 73
- Affected population: 472

EARLY STAGES

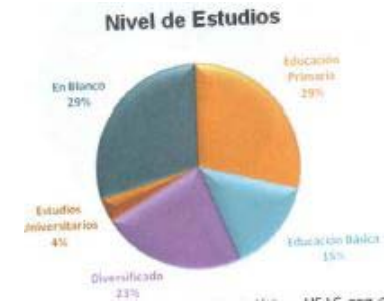
- Activation of multi-sector Recovery Commission and NRF
- Search and Rescue; Evacuation; Relief and Assistance Actions
- Inter-institutional coordination with local government and families

RECOVERY (0-1 months)

- Assessment stage: site off limits, adjacent evacuations, identification of affected families.
- Initial proposal: Relocation process, on-going shelters until economic support is provided.
- DRR authority leading the Recovery Commission with local involvement.
- Immediate activation of basic services provision.

(2-3 months)

- Recovery commission, including affected families, establish new area for relocation.
- Site assessment and preparation with neighbor communities.
- Phase 1 Planning: construction of 30 houses of new community.
- Legal situation on house ownership delays planning for following phases.



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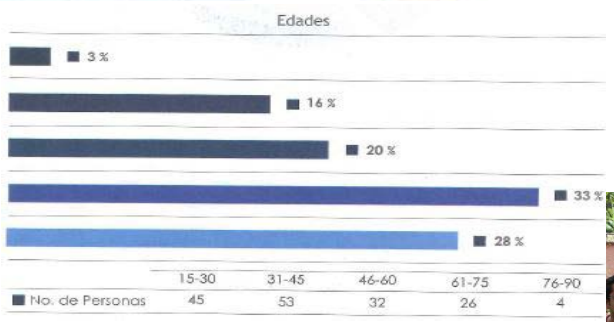
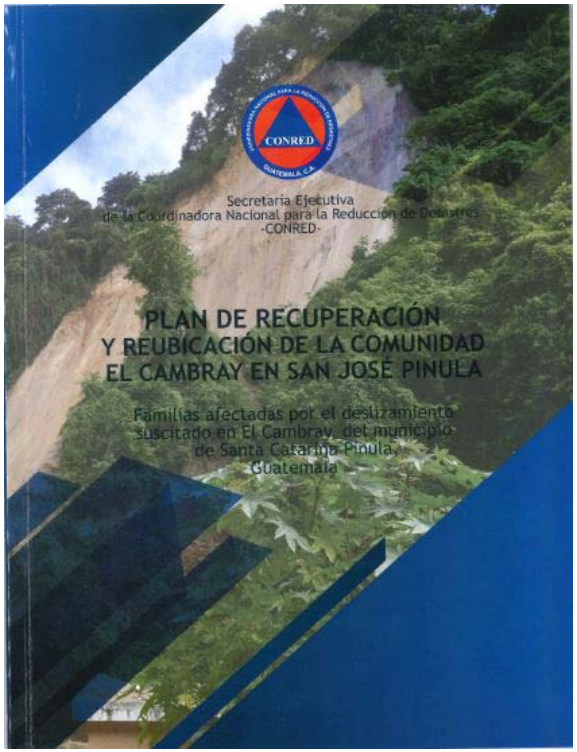
Activation of NRF and establishment of Recovery Plan: inclusive process building on experiences of previous recovery plans





Research for land use and risk reduction: Planning for Development

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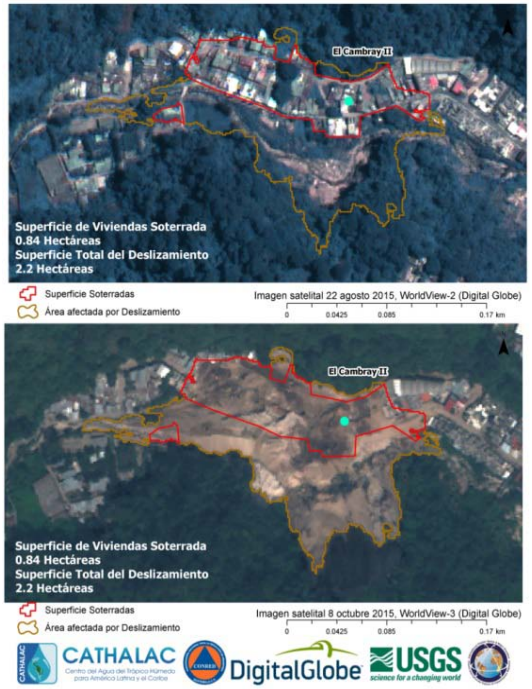
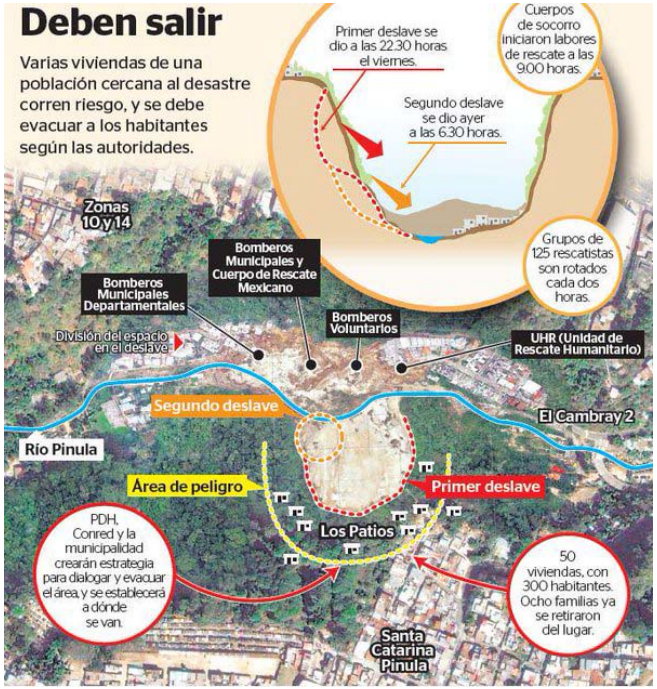
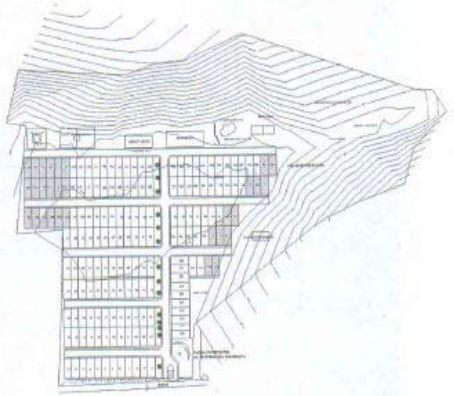
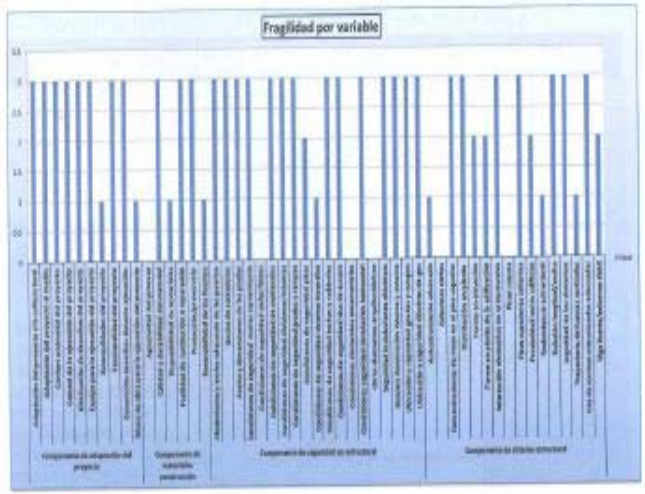








Current Situation

- 1st phase to be completed with 30 new houses.
- Donations and emergency funds: first availability.
- Public funds: committed but yet to be used.
- Recovery process to assess measures in regarding economic/labor related needs.

Lessons learned during Timeline 2015-2016

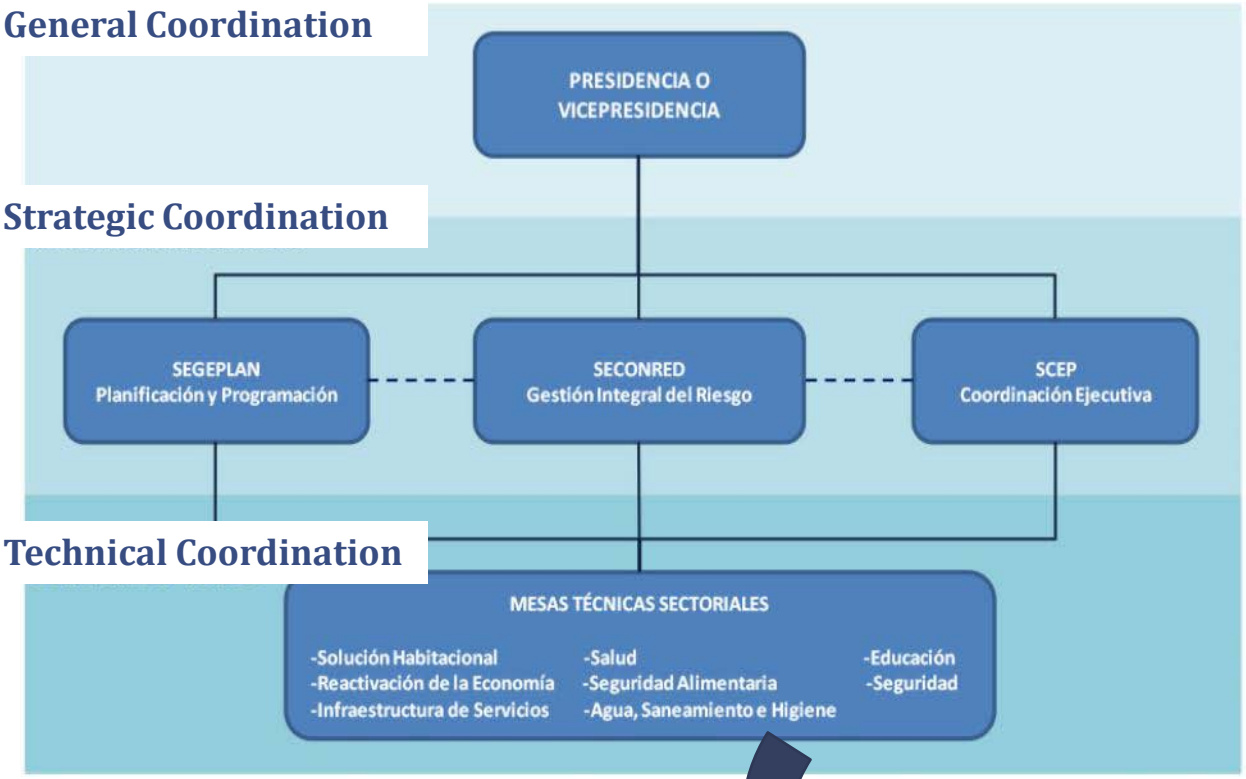
- Existence of NRF and Recovery Plans highly increases timely results.
- Training on recovery protocols increases level of participation of sectors and governments.
- DRR authority's assesments need to acquire stronger / binding influence on other development-related actores.
- Lack of fixed criteria to access recovery funds hinders fluent process.
- Alliance with private sector important as recovery actors.

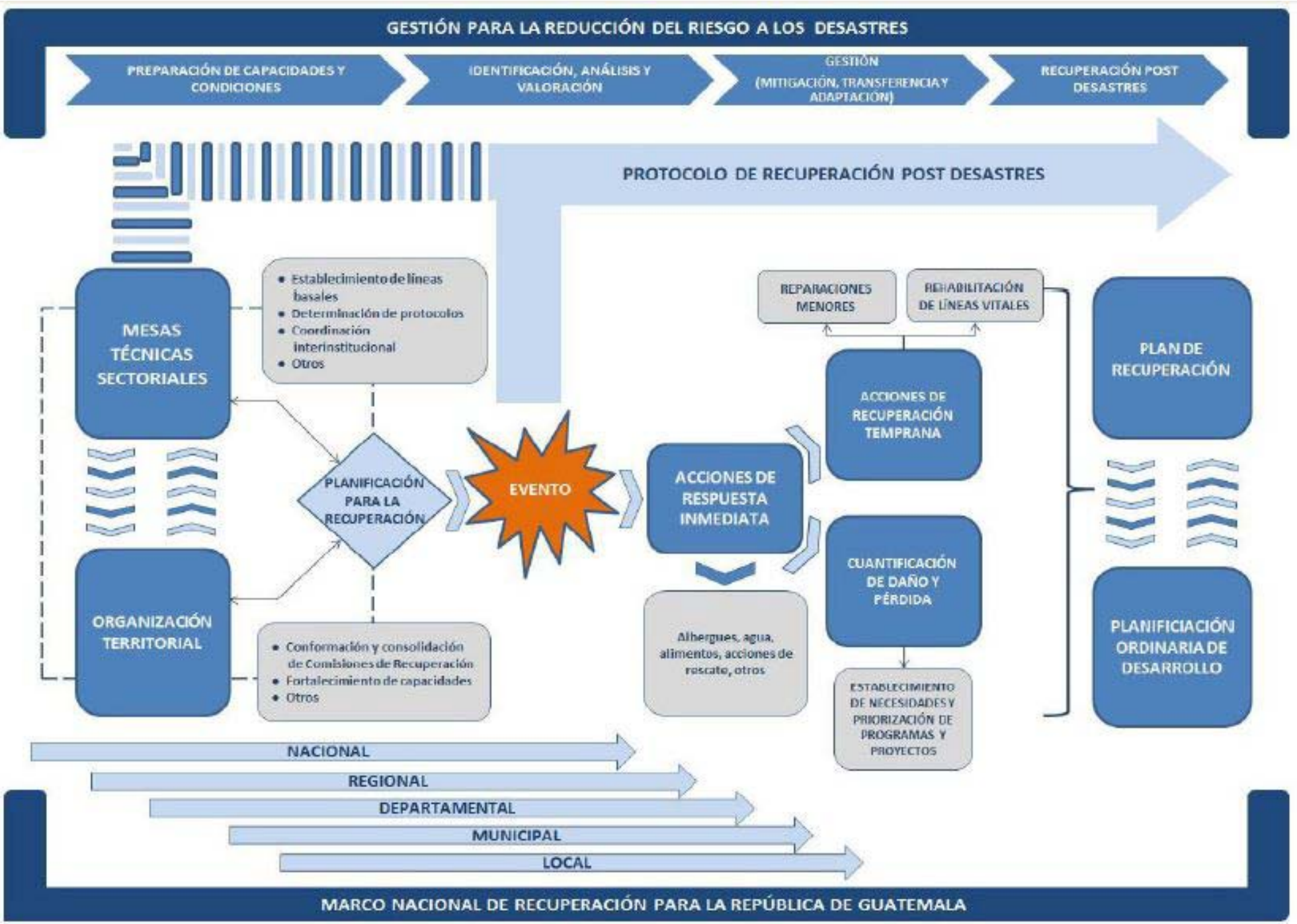
Multi-Sector Recovery Commission

General Coordination

Strategic Coordination

Technical Coordination




GESTIÓN PARA LA REDUCCIÓN DEL RIESGO A LOS DESASTRES
PREPARACIÓN DE CAPACIDADES Y CONDICIONES
IDENTIFICACIÓN, ANÁLISIS Y VALORACIÓN
GESTIÓN (MITIGACIÓN, TRANSFERENCIA Y ADAPTACIÓN)
RECUPERACIÓN POST DESASTRES
PROTOCOLO DE RECUPERACIÓN POST DESASTRES
MESAS TÉCNICAS SECTORIALES
Establecimiento de líneas basales
Determinación de protocolos
Coordinación interinstitucional
Otros
ORGANIZACIÓN TERRITORIAL
Conformación y consolidación de Comisiones de Recuperación
Fortalecimiento de capacidades
Otros
PLANIFICACIÓN PARA LA RECUPERACIÓN
EVENTO
ACCIONES DE RESPUESTA INMEDIATA
Albergues, agua, alimentos, acciones de rescate, otros
REPARACIONES MENORES
REHABILITACIÓN DE LÍNEAS VITALES
ACCIONES DE RECUPERACIÓN TEMPRANA
CUANTIFICACIÓN DE DAÑO Y PÉRDIDA
ESTABLECIMIENTO DE NECESIDADES Y PRIORIZACIÓN DE PROGRAMAS Y PROYECTOS
PLAN DE RECUPERACIÓN
PLANIFICACIÓN ORDINARIA DE DESARROLLO
NACIONAL
REGIONAL
DEPARTAMENTAL
MUNICIPAL
LOCAL
MARCO NACIONAL DE RECUPERACIÓN PARA LA REPÚBLICA DE GUATEMALA

CONCLUSIONS

- **Multi-sector mechanisms and institutionalized action protocols increase the efficiency of the recovery process.**
- **Recovery time will reduce if legal aspects on land/housing/production assets are well defined previous to a disaster occurrence.**
- **Development continuity requires equally-responsible partners in DRR: economy (public and private), land use and planning, academia, local governments.**
- **Improved recovery in urban areas: previous joint work with Land Use & Planning.**
- **Improved recovery in rural areas: previous joint work with production sectors.**
- **DRR and other sectors must commit funds specifically to comprehensive recovery to avoid HIGH RISK of funding only RESPONSE.**
- **Research (technical aspects & cost-benefit analysis) increases multi-sector support and belief in "DRR ensures development continuity".**
- **Common DRR guidelines promoted by CEPREDENAC/implemented by National Authorities allow for identifying and building up on good practices.**