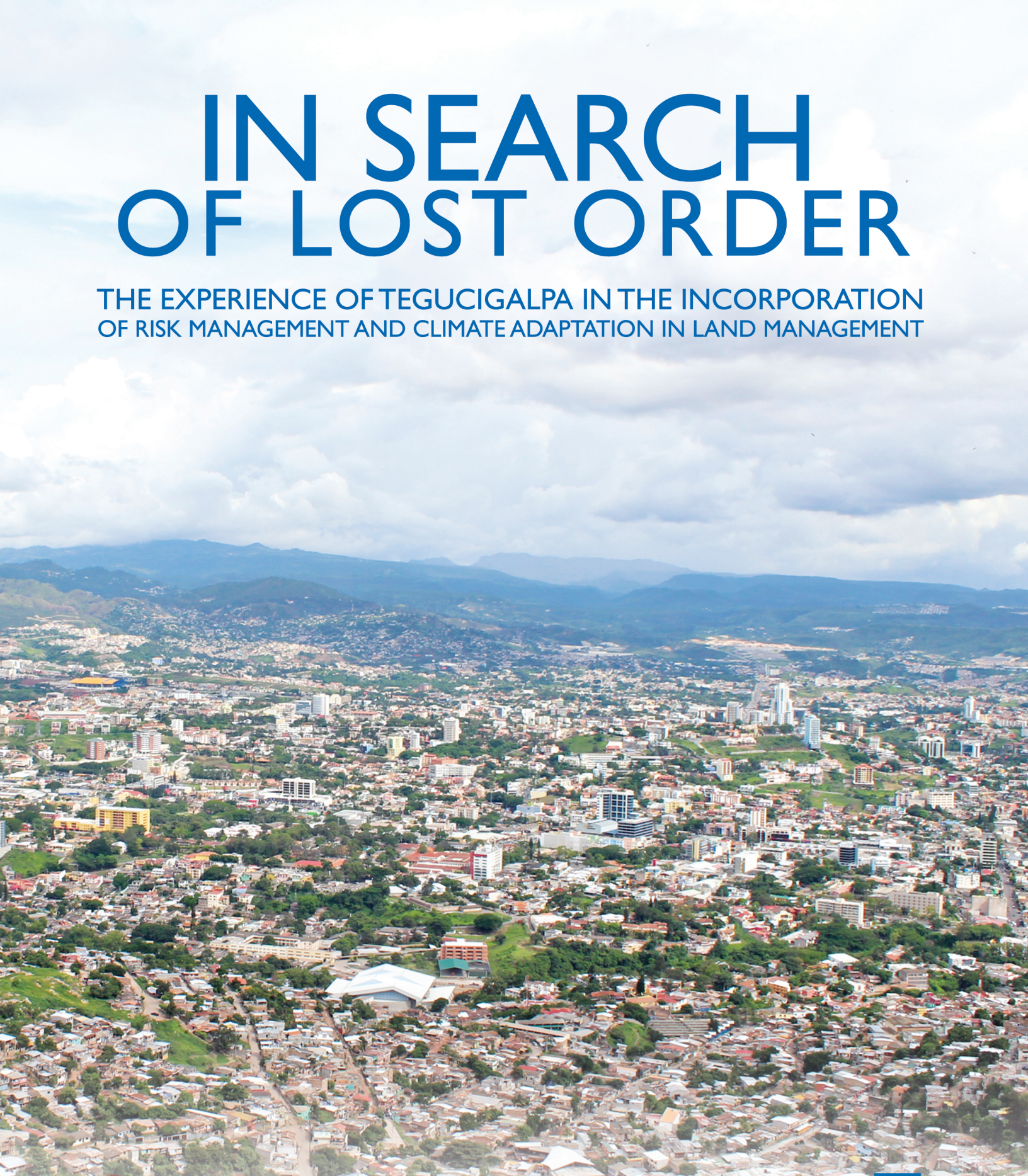
IN SEARCH OF LOST ORDER

THE EXPERIENCE OF TEGUCIGALPA IN THE INCORPORATION OF RISK MANAGEMENT AND CLIMATE ADAPTATION IN LAND MANAGEMENT



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PNUD
Al servicio de las personas y las naciones

This document was prepared under the supervision of the Environment and Risk Management Unit of UNDP Honduras.

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Acronyms and Abbreviations

CCA	Climate Change Adaptation
CDMA	Central District Municipality
BCPR	Bureau for Crisis Prevention and Recovery, UNDP
CCAHI	Centro de Coordinación de Ayuda Humanitaria Internacional (International Humanitarian Assistance Coordination Center)
CAH	Colegio de Arquitectos de Honduras (Architects Association of Honduras)
CIUR	Centro de Información Urbano Regional (Regional Urban Information Center)
CH	Humanitarian Coordinator
CODED	Comité de Emergencia Departamental (Departmental Emergency Committee)
CODEL	Comité de Emergencia Local (Local Emergency Committee)
CODEM	Comité de Emergencia Municipal (Municipal Emergency Committee)
COEN	Centro de Operación y Emergencias Nacional
COPECO	Comisión Permanente de Contingencias (Permanent Commission for Contingencies)
COSUDE	Swiss Agency for Development and Cooperation
CR	Coordinador Residente (Resident Coordinator)
ECHO	European Commission's Humanitarian Aid and Civil Protection department
UNISDR	United Nations International Strategy for Disaster Reduction)
DGIP	Dirección General de Inversión Pública de Honduras (Directorate General of Public Investment in Honduras)
DIPECHO	EU Disaster-Preparedness Programme
ESFING	Strategy for Financial Strengthening for Risk Management and post- crisis Disaster Recovery in Honduras
FHIS	Fondo Hondureño de Inversión Social (Social Investment Fund in Honduras)
GIR	Gestión Integral de Riesgos (Comprehensive Risk Management)
IASC	Interagency Standing Committee of the United Nations
IDH	Human Development Index
MAC	Mapeo de actores clave (Mapping of Key Players)
MDG	Millenium Development Goals
NGO	Non-Governmental Organization
PDM	Plan Municipal de Desarrollo (Municipal Development Plan)
PDM-OT	Planes de Desarrollo Municipal con enfoque de Ordenamiento Territorial (Municipal Development Plans with a focus on Land Use)
PEDM	Plan Estratégico de Desarrollo Municipal (trategic Plan of Municipal Development)
UNDP	United Nations Development Programme
DRR	Disaster Risk Reduction
DRR-AC	Disaster Risk Reduction – Climate Adaptation
ER	Early Recovery
SAG	Secretaría de Agricultura y Ganadería (Ministry of Agriculture and Livestock)
SINAGER	Sistema Nacional de Gestión de Riesgos (National Risk Management)
SEFIN	Secretaría de Finanzas (Ministry of Finance)
SERNA	Secretaría de Recursos Naturales y Ambiente (Ministry of Natural Resources and Environment)
SEPLAN	Secretaría de Planificación y Cooperación Externa (Ministry of Planning and External Cooperation)
SNIP	Sistema Nacional de Inversión Pública (National Public Investment System)
UNS	United Nations System
SOPTRAVI	Secretaría de Obras Públicas, Transporte y Vivienda de Honduras (Department of Public Works, Transportation and Housing of Honduras)
UNAH	Universidad Nacional Autónoma de Honduras (National Autonomous University of Honduras)
UIT	Unidad de Información Territorial (Land Information Unit)

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Presentation

Tegucigalpa has been a city hit hard by disasters. Set in a natural environment which for its geological features has been highly susceptible, and is repeatedly impacted by landslides and floods. In addition to natural growth, it has experienced a major urban expansion as a result of population displacement from the rest of the country to the capital, especially from the early 1960s, which took place without the city or the country implementing the institutional development that would have enabled them to plan and organize this unusual occupation level.

The effect of extreme weather events, especially storms and hurricanes in Tegucigalpa, have hit its inhabitants hard and made the hillsides, stable in the past, unsafe in the present. Today, it presents a picture of a major capital city, facing higher risks of disasters, especially from landslides, floods and earthquakes.

In recent years, the continued severity in risk conditions over the city has imposed an impetus for change in the institutional capacity to do something more substantive against vulnerabilities. The administration of the city, accompanied by the UNDP/SDC program has been promoting institutional change in disaster risk management in the city. It comes down to seeking governance over a territory and occupation of the city, which means taking on board the terms and determinants geographically imposed on the inhabitants of Tegucigalpa, and in particular its conditions of threat to prevent the population from being exposed to more dangerous conditions.

The experience of Tegucigalpa, is the product of both its own efforts and those of the change that national public policies have achieved in recent years. This change is part of a national process in a consistent evolution of standards for integrated risk management and climate adaptation, better suited to the existing problems and in particular that are strengthening the exercise of authorities, e.g. in the shape of Prevention Officials, technical concepts and improved conceptualization. The same applies to local regulations through ordinances for risk assessment.

The document that follows is a summary of developments in Tegucigalpa on risk management in the process that has been facilitated by the UNDP/SDC programme through projects Promoting Adaptation to Climate Change in Highly Vulnerable Municipalities and Communities in Honduras, UNDP-SDC and Capacity Building in Integrated Risk Management in Honduras, which were conducted between 2011 and 2013.

This Systematization of Experience has been presented as have the dynamics of disaster risks in Tegucigalpa, and institutional development to address risk management as a major macro-process, from five sub-processes that make it possible.

We hope that this account of challenges and transformations enable various stakeholders to reflect on the complex and diverse problems of the city of Tegucigalpa.

JOSE MANUEL HERMIDA

Resident Representative UNDP Honduras.

Esq. Crescencio

1. A City in Search of Lost Order

Esq. Crescencio Barahona Torres, a 71-year-old man who lives with his wife, two daughters and three grandchildren in Yaguacire outside Tegucigalpa. His life story reflects the dynamics of the construction risk in the city and the difficulties faced by many households to overcome risk conditions. This is his story:

1.1. The battle

"I am from the town of Cedros that is in the municipality of Francisco Morazán - I am not from the village but from a hamlet a bit further out but not too far. It's a tiny village. In my house, there were six of us, but I'm the only one who's been to elementary school. Before, there was this thing... women were only educated at the elementary level because if they learned more, they'd use it to write letters to boyfriends....

From there, I'd travel 8-10 km each day between the school and the village.

I came to Tegus in 1959. I was 17 at most. How could I forget? I started herding cattle 4 days away because that was how I got paid and that was how I moved because I didn't have a penny. A cousin helped me so that I could study and get ahead but my Dad didn't want me to and preferred to see me work.

1.2. Land use

When we came here, we moved to El Reparto, and rented, and later to La Guillén. El Reparto and la Guillén are neighboring villages. We moved to El Reparto in '77.... It's an old and large neighborhood.... El Reparto dates from the 50s.

In El Reparto, there was some land nearby and there was an invasión and that's where we went. This was in '79-'80... the invasion in La Guillén was in '79.

The area began to fill in '79, we arrived in '81 and built a house in '83, there were 7 of us. There were 650 inhabited houses. At first the houses were made of wood and sticks after a while, we built them with bricks.... it was on land of 8x15. I had two pieces of land because it turns out that there was a lady who was to be my neighbor but she did not paid, so they took it from her and was put on sale, and as I had more family, I bought it.

1.3. Climate variability in a vulnerable environment

We lived in La Guillén from 1983 and left in 2010. Mitch had already passed. The area was stony and these areas are usually more resistant but it ended up collapsing.

Mitch was horrible. Seeing neighbors houses falling down was horrible. There was a lady who lived in our house for more than a month.

People were saying that it was on the coast. Three days before we were looking for food and clothing to send, but within the week we were the ones going through the same thing. Mitch hit part of la Guillén and weakened the terrain. In La Guillén we had a grocery store attached to the house. Until Agatha, the store was fine. After Mitch, we sold less because many of our clients had to leave.

What is a disaster to us benefits the rich because before Mitch, the land was very cheap. Just after though, prices went through the roof. I went t olive in a colony, la Villeda Morales, I liked the place, I came to a house that was occupied and the owner told me that before Mitch, the land cost 6,000 lempiras and in 2009, 11 years after Mitch they were asking for 200,000 lempiras and what happens? Some profit from the necessity instead of saying that these people are "like

that", the contrary is true.

1.4. The pain and social cost

After Mitch, they had to take me three times to the emergency room for depression. In the middle of the night, they took me because I was thinking I was there and didn't know how I came to be here. There was a part of the house that was scary, the wall broke in two and separated.

In 2010 I borrowed 70,000 lempiras to build, I got 65,000 lempiras payable in 5 years and I must pay 120,000 lempiras. I have a daughter who is a teacher and she applied for the loan through INPREMA (Instituto de previsión de magisterio – National Pension Institute for Teachers).

There are single mothers and it's more difficult for them because they have no help. In our environment, if you don't have qualifications, you earn very little or just the minimum. Minimum wage doesn't even come to 6,000 lempiras (200 USD) and you can't survive with that, even less so if you have kids in school.

My wife has never gone back and she says she's not going to la Guillén. I have. I went a few months ago because it had been 8 months and that was terrible. There are holes and there is no past where the house was because there are immense holes. The walls fell down and there is nothing."

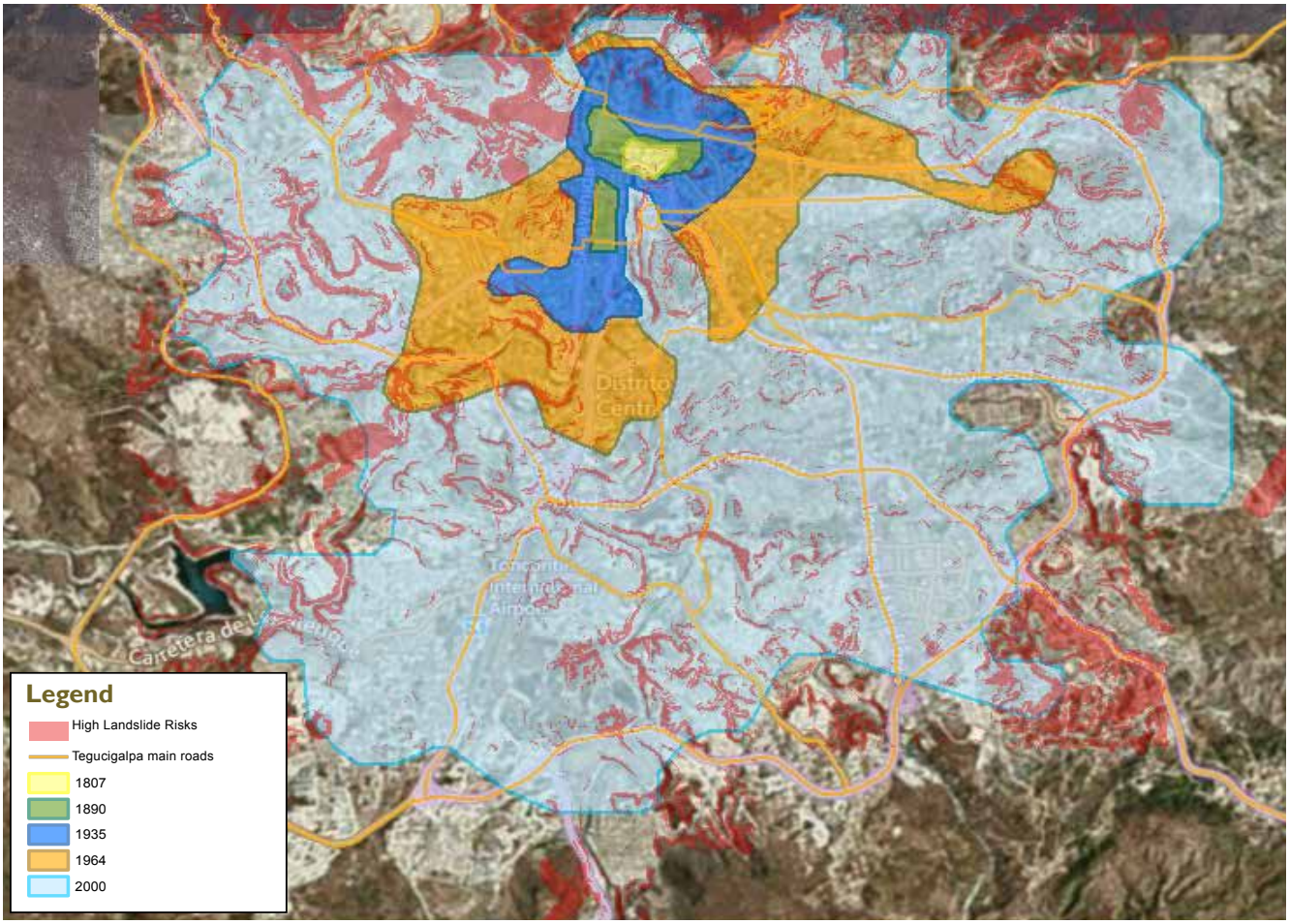
Tegucigalpa

2. Tegucigalpa: Urban growth and risks

The urban population of the Capital District is 1,826,534 inhabitants in an area of approximately 150km. It has one of the highest rates of urbanization in the region area (4.4), especially through rural migration that has led to the country's urban population comprising over 50% of the total. Some studies estimate that by 2030 Tegucigalpa's population will double and if the current land occupancy rate is maintained, it will need at least 10,000 ha more of urban land.[1]

In Tegucigalpa, as in the majority of cities in metropolitan areas, growth on the periphery is higher than in the central area. The inhabitants and main settlers in the periphery constitute the core poor population, and they live in these areas as a survival strategy. This explains other characteristics found in the peripheral areas of the region: relatively low quality of life, absence of or inadequate physical, communication and transport infrastructure, environmental and territorial vulnerability, higher living costs and higher transaction costs.

Map 1. Map of growth in CD and high landslide risk zones



Source: UNDP, CDMA

1 Shlomo Ángel, Princeton University 2004

Infrastructure is primarily found in the center, though some of it has collapsed because of age or lack of maintenance. In the peripheries, informal, unregulated neighborhoods have sprouted without basic services and with serious deficiencies in the housing quality. In addition to problems of infrastructure, there are those concerning health, education, transport and safety.

The impacts of climate risks include major drought and water shortage problems in the summer, and mudslides and floods in the winter, due to excess water.

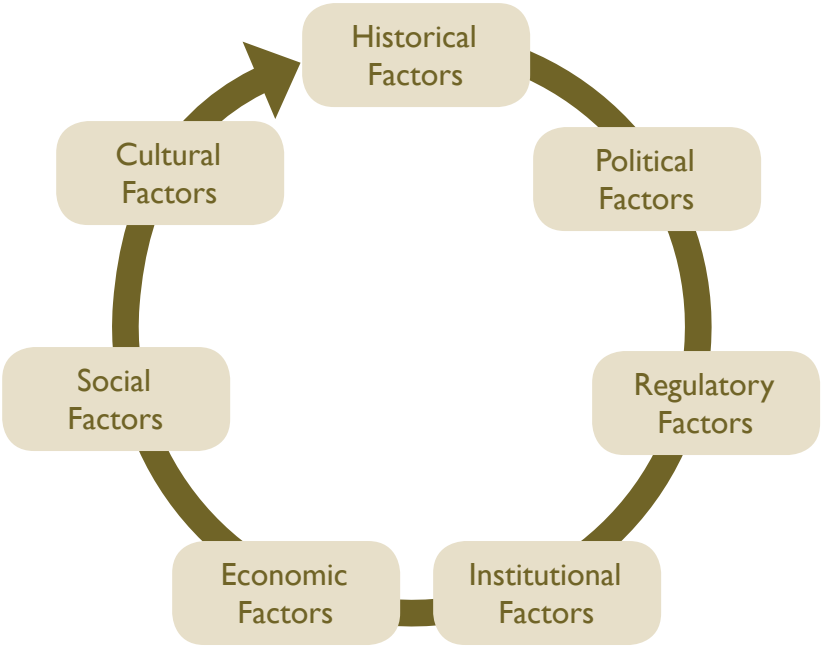
Tegucigalpa's typical risks can be summarized as follows:

1. A high river pollution risk,
2. Encroachment of land on river banks,
3. Inadequate solid waste disposal system,
4. Soil erosion that reduces natural river flow causing floods in the lower basin.
5. The city of Tegucigalpa is located on sedimentary and igneous rocks, highly susceptible to collapse in the presence of water.
6. Absence of urban water channeling, inadequate management of surface water and no sewage system in some sectors. This mismanagement of water generates saturation on the slopes (with loose matter susceptible to collapse).
7. There are here are approximately 54 critical areas where hazardous conditions are exacerbated by the steep terrain, or improperly-made cuts to the land.

Among the areas identified as high-risk for landslides and/or where such phenomena are already occurring are Residencial Paris, Lomas del Dorado-Los Pinos, El Tablón, Paseo de Las Campanas, Humboldt Colony, Miraflores, Villa Nueva, Los Pinos, Nueva Suyapa, Flores de Oriente, El Infiernito and El Rincón Colony.

Factors that have contributed to the risks in Tegucigalpa are [2]:

Figure 1. Factors contributing to the risk



Source: UNDP Honduras. Orrego, Juan Carlos (2013), UNDP-SDC Project Systematization.

2 Analysis carried out via workshops with personnel from various CD Municipality departments.

Historical Factors. Two major historical factors conditioned the construction risk in Tegucigalpa.

- Tegucigalpa began as a mining town and was never meant to be the capital of the republic. The relocation of the capital to Tegucigalpa in 1856 led to institutional development in an environment without the appropriate conditions.
- The rapid population growth, and high migration from the countryside to the city in a country still functioning on a centralized model, with a concentration of public investment.

Political and Regulatory Factors – decision making.

- The 1975 Development Plan (METROPLAN) and subsequent plans called for building restrictions, but did not factor in variables, threats and risks. Risk assessments were recently performed but this process must be linked to planning and land use legislation. Until 2010, within the UNDP framework, the "Arriba Capital!" plan was developed with a clear focus on risk management planning.
- Lack of monitoring of environmental impact assessments.
- Lack of regulations on relocations. In addition to constraints in construction controls, there have been regulatory and financial constraints for relocations. The relocations of families in high-risk areas or areas affected by disasters did not factor in threats, vulnerability and risks.
- Informal and unregulated growth. Only minimal control over communal lands and undefined regulations on tenure.

Institutional Factors.

- Structures without permanent staff or changes.
- Difficulties in developing technical information on threat and risk assessment and the identification, coordination and implementation of actions to prevent improper handling of cuts in hillsides, inadequate management, rainwater saturation and illegal occupation.
- Lack of access to information. No spreading of information on threats, no established systems of information, data or updates.

Social and Economic Factors.

- Poverty, high cost of buildable land in Tegucigalpa and the lack of social housing projects contributed to the fact that most of the Tegucigalpa hillsides were populated "informally". In fact when a disaster occurs in an area, it is not abandoned or uninhabited, but is re-occupied by lower income communities that previously existed, so both high-risk areas and marginal zones have developed simultaneously.

Cultural Factor

- Lack of education and awareness campaigns for the population for example, garbage disposal into sewers, canals and streams, also associated with the absence of a garbage collection system covering the entire city, including informal areas that are sometimes used as garbage dumpsites.
- Disasters viewed as punishment. Predominance (at both within the population and the media) of a disaster being viewed as something that is caused by external causes. Stakeholders are not recognized as part of the social construction of risk, so there is no shared feeling of responsibility in decision-making.

Housing affected by landslides in El Berrinche

3. Risk management practices in Tegucigalpa

In 1998 (the year Hurricane Mitch hit), the issue of risk and disaster management was barely known, or not even considered. After the impact caused by the hurricane, city officials recognized the need to incorporate the issue of disaster management. Consequently, a number of projects supported by the international community, were initiated in order to respond to this need.[3]

In response to Mitch, various actors and donors contributed within the country to bring attention to humanitarian issues and restore functions. An articulated intervention and coordination process was not established at the time. This lack of coordination led to gaps in key issues such as the reactivation of the productive apparatus and the strengthening of long-term processes, especially those related to social transformation and institutional capacities for risk reduction.

In some cases, the post-Mitch reconstruction process did not allow recovery actions and risks were reconstructed because of the lack of enforcement of building control standards, occupation in unsafe areas or reoccupation in affected areas.

Following Mitch, landslides and floods were generated that destroyed towns, farmland and much of the country's infrastructure such as roads, bridges, etc. In areas of El Berrinche and El Reparto, more than 1,000 people died. The landslide of El Berrinche caused the blockage of the Río Choluteca, which led to major flooding in the city.[4]

Overhead view of the EL Berrinche landslide. Note the blockage of the Río Choluteca on the left.

3 Application of GIS for hazard and risk assessment: Tegucigalpa, Honduras. UNESCO – RAPCA. pg 1 http://www.itc.nl/external/unescorapca/Casos%20de%20estudios%20SIG/09%20Analisis%20de%20riesgo%20Tegucigalpa/ Caso%20de%20estudio%20Tegucigalpa.PDF

4 Application of GIS for hazard and risk assessment: Tegucigalpa, Honduras. UNESCO – RAPCA. pgs 1, 4.

Other major landslides occurred in the Colonias Miramesí and Nueva Esperanza, also affecting large populations and leaving areas unstable, which, after Mitch, in times of heavy rains, continue to cause damage in these and other colonies of the city. This is the case of the Santa Rosa located 0.5 km southeast of the El Reparto slope, where in September 1999 a slow-moving landslide was triggered. About 200m South of the El Berrinche landslide another collapse of moderate magnitude took place in la Colonia Campo Cielo.

Upon the activation of risk conditions in Tegucigalpa, the mass migration of people added to the capital, as can be seen in the expansion of the city between 1998 and 2010, much of it in areas of high and medium threat. (See Map 1).

The post-Mitch experience in Tegucigalpa is an example of risk reconstruction processes after disasters. Today could be considered one of the cities in Latin America posing one of the largest disaster risk dynamics, especially for its steep and unstable slopes and the threat of landslides, floods and earthquakes. Its growth as a city has been disorganized and lacking in planning. Environmental determinants have been ignored, fact, which is reflected in the vulnerable conditions present throughout the city.

Institutionally, the early years focused on emergency response and preparedness with no technical or human resources to know the technical conditions of risk or to avoid or correct conditions of prevalent risk in the city or support the process of planning the development of the city with risk reduction criteria.

Debris in La Guillén

4. The UNDP/SDC program and its contributions to Tegucigalpa

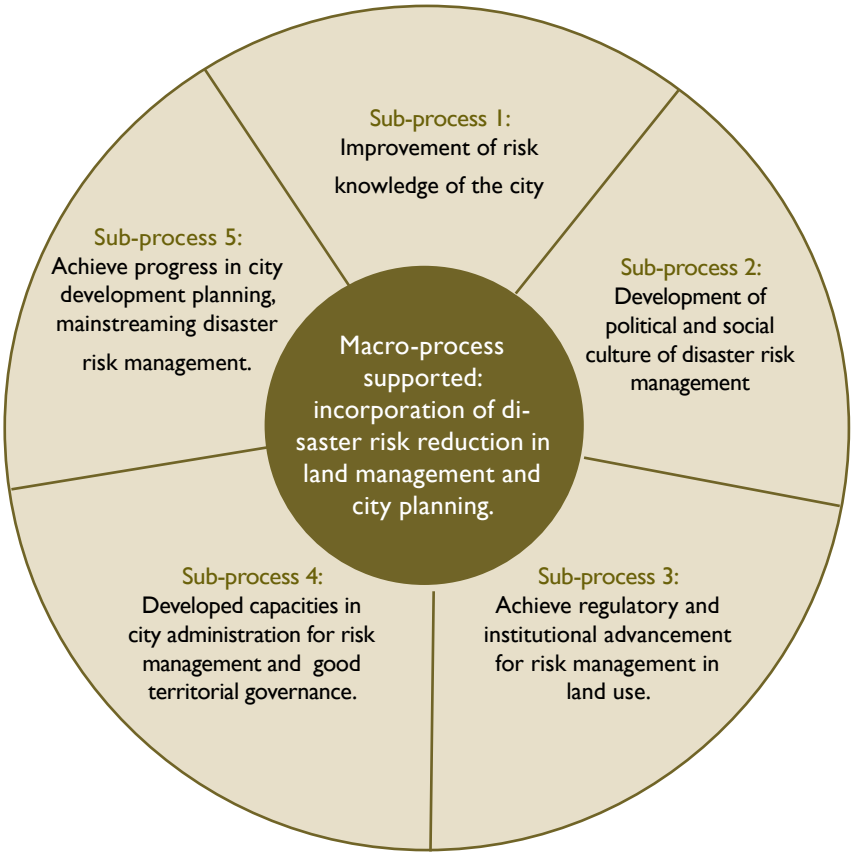
The occurrence of emergency situations in 2010 because of floods and landslides and visits by the Mayor and the authorities of the Central District administration to the many critical sites, highlighted the need for diagnostics of the severity of certain risk conditions, in order to prioritize the actions of the Municipal Emergency Committee (CODEM) and administration as a whole.

This need meant that the administration of the Central District should have technical capacities to perform highly detailed risk area diagnostics. At this time, UNDP Project - SDC offered support to the Mayor and the Administration in the development of capabilities and technical advice on risk conditions, the identification of priority management actions to contain every critical situations whilst strengthening the administration in its capacity to produce technical risk concepts.

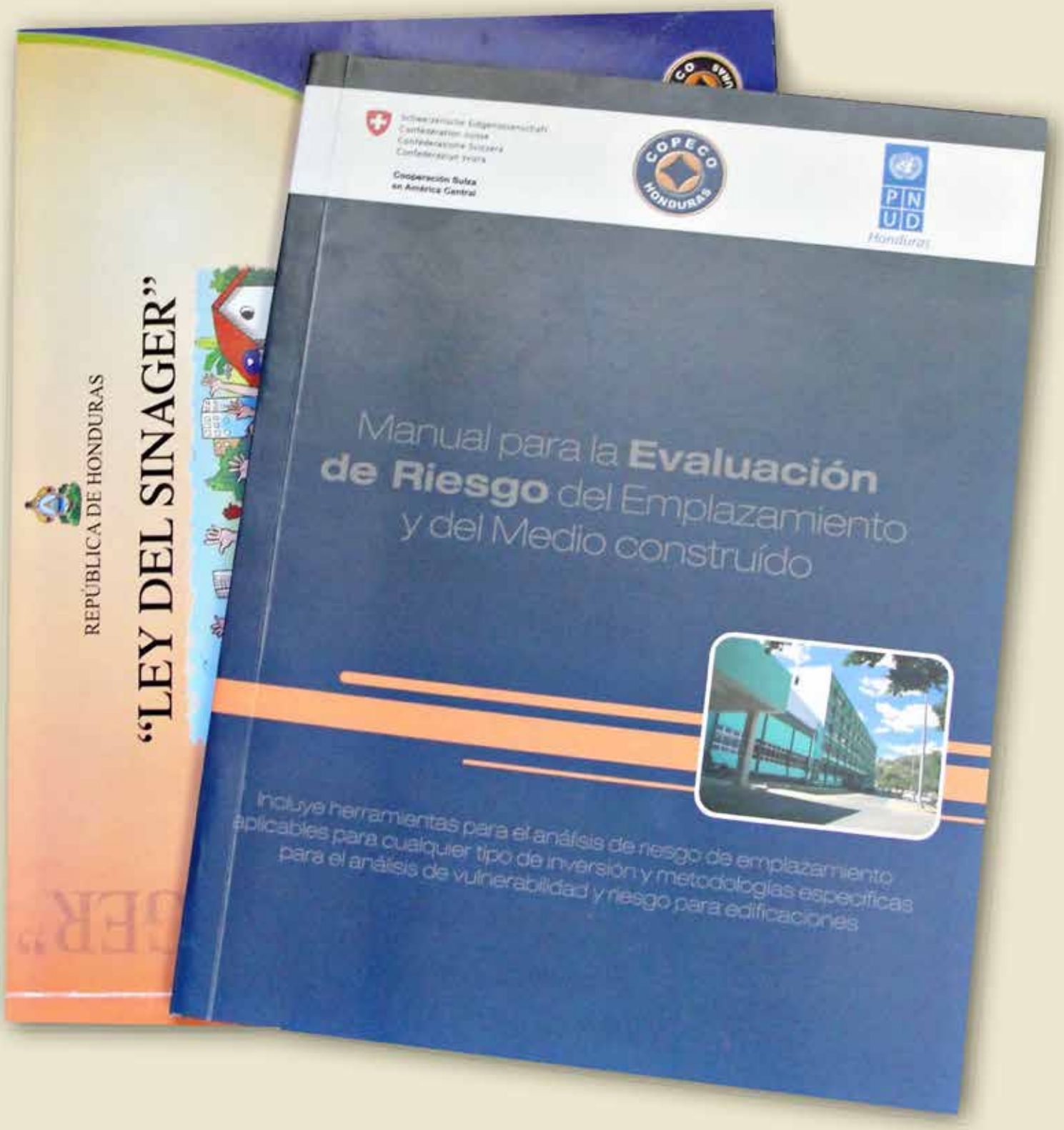
4.1. Intervention strategy:

The UNDP/SDC program was proposed as a strategy to strengthen the capacities of local government in Tegucigalpa for proper land management under these processes:

Figure 2. Strategy: Land management for disaster risk reduction.



Source: UNDP Honduras. Orrego, Juan Carlos (2013), UNDP-SDC Project Systematization.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de Riesgo del Emplazamiento
y del Medio construído
Incluye herramientas para el análisis de riesgo de emplazamiento
aplicables para cualquier tipo de inversión y metodologías específicas
para el análisis de vulnerabilidad y riesgo para edificaciones

5. Incorporation of disaster risk reduction in land management and city planning

5.1. Improved risk knowledge of the city

Knowledge of risks involved, for the CDMA, improving their technical skills and tools for the identification, evaluation, classification and mapping of threats by floods and landslides.

Mapping city threats.

The CDMA determined that to know risks and produce technical concepts, threat maps were needed. First of all, information about threats from landslides and floods was required, for which a collection of reports submitted since 1998 by the Japanese cooperation and a later report issued by UNAH, City Hall and the UNDP Early Recovery Implementation Policy Project was compiled.

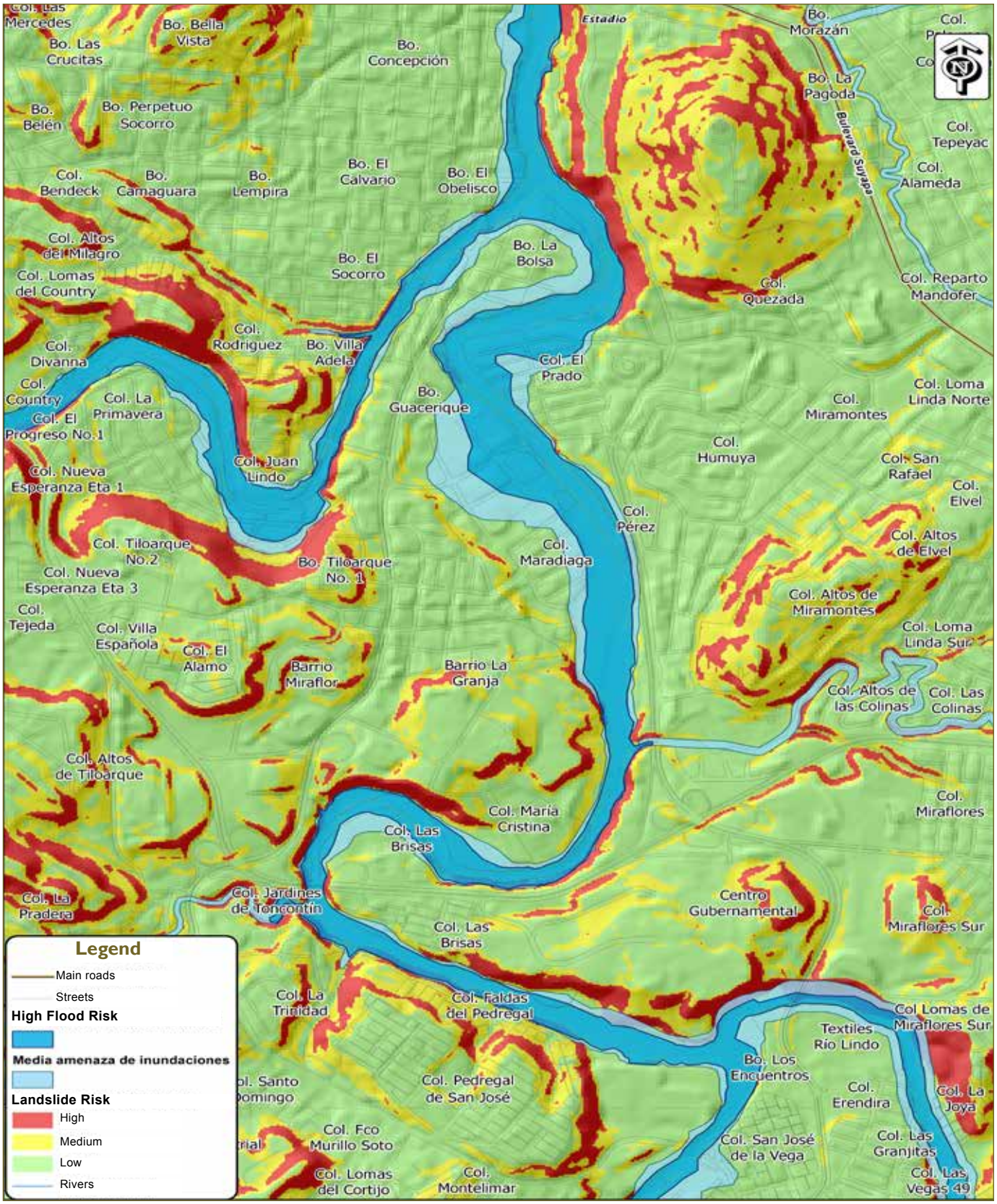
From this information the multi-threat map that collected information from critical points and susceptible areas of the city was developed. This map was used by the CDMA until 2013 when it was updated omitting susceptibility information in favor of threat information with a heuristic approach.

This update is based on information on regional and local geology, and mapping of landslides and critical areas. Also included in the risk analysis were methodologies for vulnerability assessment of the premises to be inspected as defined in manuals approved by COPECO (Permanent Commission for Contingencies).

Even though currently mapped, the CDMA is aware that this represents the critical sectors of the city as well as the projection of some sectors by their geometric configuration and type of material that may be affected in the future.

Therefore, in the final phase of the implementation of UNDP/SDC program relied upon Prevention Management in defining the technical information base and complementary studies to obtain a threat map with a deterministic or probabilistic approach (see Table 1), which takes into account the effect of external agents such as rain or earthquakes (which have not been taken into account to date for lack of information).

Map 2: Threat map showing landslides and floods patterns in 2013.



Source: UNDP, Environmental Unit, 2013.

Table 1. Types of methodologies used to plot flood and landslide zones and usefulness scale.

METHODOLOGY	DESCRIPTION	GENERAL SCALE	INTERMEDIATE SCALE	DETAIL SCALE
Historic occurrence	Zoning directly based on landslide inventories: type and characteristics, in relation to historical rains and earthquakes	3	3	2
Heuristic analysis	Qualitative and semi-quantitative analysis, combination of factors based on expert criteria and/or decision rules.	3	2	1
Statistical Analysis	Indirect mathematical methods that use statistical analysis of some factors to plot threat zones. They can be univariate or multivariate.	1	3	2
Deterministic	Equilibrium analytical methods Limit or stress/deformation relationship	1	2	3
Value scale:	1. Not useful	2. Limited usefulness	3. Very useful	

Source: Guía Técnica para la Interpretación y Aplicación del Análisis de Amenazas y Riesgos (Technical Guide for the Interpretation and Application of Threat and Risk Analysis). Primera Edición Lima Perú.

As stated previously, the map was the basis for the municipal ordinance, in which the conditions and restrictions for the areas of high, medium and low threat were established.

The evaluation of vulnerability.

The siting or location of homes, buildings and infrastructure is an important determinant of the risk conditions. One of the main obstacles Tegucigalpa had in assessing risk conditions was the lack of methodologies, tools and trained personnel which would have shown whether the location of a particular building provided the right safety conditions. To this end, the program was developed jointly with experts and COPECO technical tools to analyze location and vulnerability condition of the buildings.

These tools include the risk assessment Manual of the site and the built environment, which is led by staff accredited by COPECO as risk assessors and Prevention Officers, responsible for issuing risk and clearance certificates. Note that the risk certificate is a document where the level of risk for an investment or project to be carried out is evaluated, while the clearance certificate is a certificate issued on the risk level of an existing building.

The Manual is divided into 5 sections: a conceptual framework on risk management, matrices and tools to analyze threats of river flooding, marine, landslides and mudflows, tools to analyze building vulnerability with regard to threats in question, tools for quantitative and qualitative risk analysis of buildings, and support tools for relocation and for the overall risk analysis.

The Manual provides the process for assessing threats and vulnerabilities and the development of the field visits, the terms of reference for specific threat and vulnerability studies, Site Evaluation histograms, analysis of social aspects of relocation, quantitative risk analysis for buildings and preliminary analysis of risk and disaster scenarios.

The evaluation of geomorphology and watershed components, areas of threat or susceptibility in lakes, lagoons and floodplains, instability, water upstream of the work, land form, fragile areas, and downstream water impacts are evaluated. The geomorphology

and watershed component provides a basis to draw conclusions concerning the location of the place of work, which are crucial to extend the risk assessment or clearance certificate of the work.

5.2. Developing a political and social culture of disaster risk management

The CDMA has reported a greater appreciation of political and social actors in disaster risk management. The mayor has ensured the sustainability of management and supports their work plans, which not only limited to the provision of technical concepts.

The Office has become a consulted actor and is taken into account by various local offices that take on and understand the technical role and risk reduction as a concept that is being mainstreamed in that the different agencies, like the Basic Sanitation Service, SANAA, are included to expand networks. In addition, private actors, such as banks, and lending institutions and entities use the information handled by the Administration, in areas such as construction or remodeling of homes.

The possibility of access to updated information on threats and risks has come to be valued by public, private, cooperative actors, as it is becoming a requirement and also used as a basis for planning and development and territorial decisions.

The Aguilar family requests Prevention and Mitigation Evidence from the Prevention and Mitigation Office of Tegucigalpa

Claudia, Claudia, Marcel and Julio Roberto Aguilar have a split-level property in the Jardines de Casamata area, opposite the Department of Security. This is a family property built in 2005.

The Aguilar family has asked the Urban Renewal Office of the Mayor of Tegucigalpa for a building permit. Although in the past, authorizations for remodeling were not required but since October 15, 2012 the procedure has been formalized.

When the Aguilars were at the Town Hall, in Urban Renewal Office officials investigated, as it is an established procedure, the location of the property on the Threat Map and found that it was located in high-threat area. This meant that the matter had to be brought to the Prevention and Mitigation Office, to determine whether the risk was mitigated or not and under what conditions.

The Aguilars do not recall disasters in their sector however they are aware that their knowledge of the area and that of their relatives is too recent to draw any conclusions about the safety of the construction sector. They believe the administrative procedure makes sense.

5.3. Achieving a regulatory and institutional breakthrough for risk management in land use

The most significant advances in recent years are embodied in the establishment of a lead specialized technical group Prevention Officer, which has been leading actions for policy development, manuals and tools, training and contact with public and private actors on the subject, and the incorporation of prevention concepts in CDMA technical processes and procedures.

Establishment of the Prevention and Mitigation Office.

The Office was established because the CDMA need to know risk conditions of the city, which entailed a gradual capacity-building process. It was created as a technical office, reporting directly to the Mayor's office, which could produce risk reports and coordinate inter-agency actions. Subsequently, this Office acquired new functions in the provision of technical risk concepts which are now required for building permits. It currently has a team of 3 civil engineers, a team of surveyors and staff, resources and equipment, such as a plotter and 2 vehicles to transport equipment. The software was managed by the UNDP.

The Office, in addition to issuing technical concepts, provides support for the administration and facilitates the coordination of a number of risk management processes in the city. It coordinates with CODEM for concepts of risk knowledge for emergency responses, with the Community Management Department which aids populations on affected properties and concepts on family tracing, and it exchanges information with the Territorial Planning Department and Land Registry Office and the Institute of Government Property and coordinates with the Office of Construction Control for issuance of permits.

The Office has been an important source of information and promoting the issue with Banking institutions, professional associations, cooperatives and government institutions of various kinds, such as the Department of Sewerage and Sanitation, and procedures ranging from knowledge of risks to the viability of housing loans. The Office has been an important institutional actor for the governance of the CDMA, and has been providing support in preventive risk identification and management of highly vulnerable communities.

In addition, it has facilitated the identification of mitigation measures and risk mitigation that have been submitted to different aid workers for execution, such as the UNDP, the Japan International Cooperation Agency and the Central American Bank for Economic Integration (BCIE).

These programs and projects include the stabilization of the El Berrinche slope, El Reparto and the Bambú in addition to the Bosai project that educates its population in living with the risk, the construction of the relief channel of the El Sapo creek, "CODELES" training, attention to victims, as well as the execution of works for dredging and channeling. Two other projects are being conducted in the La Obrera and Lomas del Dorado colonies, which are in the initial phase of surveying, design and budgeting for execution.

Among the mitigation works the DIPECHO VII Project is also being implemented in 14 districts and colonies vulnerable to landslides and earthquakes, and strengthening institutions involved in prevention, in order to increase responsiveness and help reduce vulnerability in these communities.

The dynamics of risk in the city continue to rise, bad building practices are still prevalent, use of unskilled or little-skilled labor, and in few cases with adequate training engineers for the specific type of construction.

Policy development

Technical concepts acquired legal force through the 2011 adoption of an ordinance enforcing mandatory risk assessments (supported by the provisions of the SINAGER Act) as a precondition for building permits in the city. The ordinance in turn adopted the Risk Assessment Manual of the Permanent Commission for Contingencies (COPECO), and multi-threat map.

The municipal ordinance is a generally applicable rule within the municipal district on matters within the exclusive jurisdiction of the municipality, where all civil and military authorities are obliged to comply, and enforce them.

The Ordinance notes that property owners must obtain a risk certificate and a clearance certificate which must accompany the authorization for any request related to construction procedures that take place in the Management and Control of Construction Management Urban Mobility. This provision applies in the case of construction or existing structures that are within high- and medium- risk flood areas, medium- and high-risk landslide areas and high susceptibility to landslide, for residential and non-residential buildings measuring over 14 meters and a daily occupancy of more than 15 people, housing developments and advertising signs.

These risk and clearance certificates are issued by the Prevention Official based on technical reports prepared by the rating agencies. The reviewers carry out inspections to identify whether land or buildings comply with the basic requirements of security, accessibility, quality of life and system, based on standards and local, national and international regulations. All this with the aim of improving the quality of buildings, and in order to safeguard human integrity and property, public health, safety and general welfare of the population.

The Municipal Ordinance regulates 21 requirements or obligations, which, so that they are more easily understood, have been grouped into five themes:

Table 2. Regulatory requirements or obligations of the Municipal Ordinance

1. RESPONSIBILITIES OF THE CENTRAL GOVERNMENT
4. Certification of safety of buildings, Works and public spaces within the municipality is encouraged.
6. Adopts as reference tools COPECO's Risk Assessment Manual, which specifies how risk inspections and reports should be carried out and additional studies to be performed.
15. The Mayor's Office and Professional Associations suspend any professional certifications issued in violation of rules or regulations. They must also suspend any professional who does not meet the requirements of this ordinance.
19. In the area of Very High Threat, construction shall be prohibited due to the risks involved. In special cases, a fund is created to make investments assessments and determine if the risk is mitigated or not. In addition a habitable zone or Resettlement Plan must be defined.
20. The Official Zoning Map of Threats is approved, establishing areas of threat and susceptibility which regulate land use.
21. The present Municipal Ordinance is immediately enforceable and subject to mandatory compliance in the Municipal area.

2. EL PROFESSIONALS
8. Must meet certain requirements, such being an Architect or Engineer and passing the training programs.
13. There shall be neither an employment relationship nor salary payment for their actions by the Municipality.
16. They shall use the (Regional Urban Information Center) computer platform to enter information relating to the certificates issued.
3. LAND OWNERS
1. Presentation of a certificate prior to obtaining building permits shall be mandatory.
2. A clearance certificate shall accompany all building construction application paperwork.
3. Land owners shall six (6) months from the publication of this ordinance to conduct inspections of properties.
4. CLEARANCE AND RISK CERTIFICATES
5. These shall be delivered by certified professionals after a risk assessment has been performed.
9, 11. The certificate primarily stipulates: • Risk certificate. • Details of the professional carrying out the inspection, information on the structure. • Description of the structure indicating that it meets the risk assessment criteria for the clearance certificate that they meet the minimum requirements established by instruments designed for assessments. • When the risk assessment is major, a REPORT is issued wherein further studies and their duration may be requested. • The indication that the certification has been issued in accordance with national and local laws."
10. Clearance Certificates shall be extended for existing works once the accredited professional has inspected the building and found no risk- or vulnerability-related issues in violation of the law relating to the issue of risk and vulnerability.
12. To be considered valid, risk certificates should be approved by the Municipality within 15 days. A municipal official shall determine the conformity of the report or submit observations.
5. PROFESSIONAL ASSOCIATIONS AND OTHER AUTHORITIES
7. Professionals qualified to issue risk or clearance may be accredited pending approval of a training program by the Municipality and COPECO.
14. The Municipality shall fix fees for certification services by means of an agreement with the Association of Architects and Civil Engineers of Honduras.
17. The Special Committee for Construction Safety and Urbanization comprises six representatives from different institutions. These representatives should audit processes issuance of risk and clearance certificates.
18. The CIUR of the Architects Association shall keep a computer record of all inspections carried out and certificates issued.

The CDMA initiated the implementation of the ordinance in 2012, and encountering difficulties with the Commissions, the certification procedures of risk assessors, professional fee rates for the rate charged to the communities, the restrictions of multi-threat mapping, and CIUR platform, requested UNDP/SDC support program again to review and update both the ordinance and the multi-threat map.

Initially this ordinance involved the creation of an information platform called CIUR, administered by the Architects Association of Honduras, which is currently disbanded, so in a second phase of implementation and recording of risk assessments, it is the responsibility of the CDMA to have a platform for public consultation of the map and technical risk concepts.

Between 2012 and 2013 the CDMA and COPECO with technical support from the UNDP/SDC program initiated the technical and legal review of the map and the ordinance of Tegucigalpa, further ensuring within the context of the review and amendments to the SINAGER Act, that issues related to risk assessment, the organization that certifies assessors, tariffs, and registration platforms of the certified assessors. At present the amendments to the ordinance of Tegucigalpa are pending approval before the Committee on Disasters. The adjustments incorporated synthesized as follows:

The purpose, scope and a glossary of definitions including highlights is also included:

Risk Certificate: Technical Document through which certified professionals and / or the Prevention Office of the Tegucigalpa Municipality (or the acting body) issues an official statement of the property, project or new development, and identifies whether they are in high, medium and/or low-threat areas for landslides or flooding, based on the map and manual, and makes recommendations for the use of these areas.

Risks certificates are issued in accordance with the request of the public or private owner and the same local government in the framework of their duties, which may define the need for detailed studies of risk conditions in accordance with the threat conditions (medium or high). These certificates must be requested and issued prior to obtaining construction and operating permits. If conditioning factors for the execution of works or studies are established in the certificate, it shall be issued by the requesting person or entity and the CDMA will monitor and issue technical concepts on compliance.

Clearance Certificate: Technical Document through which certified professionals and / or the Prevention Office of the Tegucigalpa Municipality (or the acting body) issues an official statement of the property, project or development that is already built, in order to establish the conditions and restrictions. These certificates must be requested and issued prior to obtaining permits for expansion or additional work. If conditioning factors for the execution of works or studies are established in the certificate, it shall be issued by the requesting person or entity and the CDMA will monitor and issue technical concepts on compliance.

Conditioning factors: preventive measures to be implemented prior to the clearance of a property to be built. Similarly, conditioning factors are also those defined in the technical concepts to allow construction or development.

Restrictions: Restrictive measures that prevent a property from being cleared to be built, or restrictive measures for land located in high-risk areas that cannot be mitigated that are restricted for construction and occupation.

Similarly, the threat map for landslides is adopted and regulations for land use are established.

Table 3. Table of Regulations for Land Use

THREAT TYPE	DESCRIPTION	REGULATIONS ON LAND USE
HIGH RISK	Areas characterized by their level of instability, which is due to the fact that their consistent materials render them more vulnerable to landslides. Landslides characteristically occur in these areas on slopes at a gradient between 10 and 30 degrees and are triggered, in most cases, by the following: • Poor resistance characteristics of the outcropping material in the area. • High gradient slopes. • Prolonged and heavy rains. • Inadequate surface drainage system, facilitating the infiltration of rainwater. • Presence of broken sewer and water supply pipes, permanently allowing water to infiltrate the slope. • In some sectors there is no sewage system, which is why sewage is discharged directly into the slope thus increasing instability problems. • In general the most critical sectors are located in colonies that have seen an influx of populations with limited resources. Housing is particularly defective, and in addition, for the introduction of housing in high-gradient areas, residents create cuts that increase the instability of the land and affect homes located higher up the slope.	Use of land for urban development in high-threat areas for landslides is regulated and in accordance with the following recommendations: a. A detailed study of landslide phenomena risks and threats should be attached to planning and building license applications and should include the establishment of mitigation measures under Annex 3 "Terms of Reference for Special Studies in landslide areas" from the Risk Assessment Handbook, the location and the constructed environment. b. Construction of mitigation Works required in accordance with the results of the study. c. Compliance with standards and codes as specific to infrastructure, building and urban development construction, and design proposal for cutting slopes.

MEDIUM RISK	These are sectors with slopes with a gradient under 10 degrees. They are usually adjacent to high-risk areas (transition areas) and over the long-term, if the adjacent high-risk areas are not acted upon, these can also be affected. Housing in these areas are in fair condition, however misuse of the terrain and inadequate filtering of superficial and subterranean waters can, over the long term lead to problems of instability.	Land use for future developments that are located in medium-risk areas is conditioned by landslides identified in areas of known landslide risks, for which the following conditions are set: • A detailed study of landslide phenomena risks and threats should be attached to planning and building license applications and should include the layout of mitigation measures under Annex 3 "Terms of Reference for Special Studies in landslide areas" from the Risk Assessment Handbook, the location and the constructed environment. • Construction of mitigation Works required in accordance with the results of the study. Compliance with standards and codes as specific to infrastructure, building and urban development construction, and design proposal for cutting slopes.
LOW RISK	These are areas presenting a gradient of under 5 degrees. They do not present landslide problems. It is important to check that the property is not in near steep slopes, because if so, the effect of a possible slope collapse on the property must be evaluated.	There are no conditions or restrictions in land use. Even though there are no particular conditions, standards and codes as specific to infrastructure, building and urban development construction, and design proposal for cutting slopes must be observed.

Source: Propuesta enmiendas Ordenanza Tegucigalpa (proposed Tegucigalpa Ordinance amendments). 2013. AMDC

Note that by virtue of the principle of precaution, in those sectors presenting any uncertainties because of lack of information, the applicant, in requesting a risk certificate should prepare detailed threat studies following the guidelines set out in Annex 3 of the Risk Assessment of the Location and Constructed Medium Manual. Similarly, compliance with standards and codes for construction and urban development is mandatory.

Regarding Risk Certificates, as established in the Manual for Risk Assessment of the Location and Constructed Medium, property owners must obtain a certificate by a licensed professional and/or the Prevention Office of the Town Hall, which, depending the type, the construction is declared viable and recommendations for the use of these areas are issued. To clarify the application of the resolution, criteria for the issuance of certificates and a classification are fixed according to the type of document that is issued.

Table 4. Table with certificate types

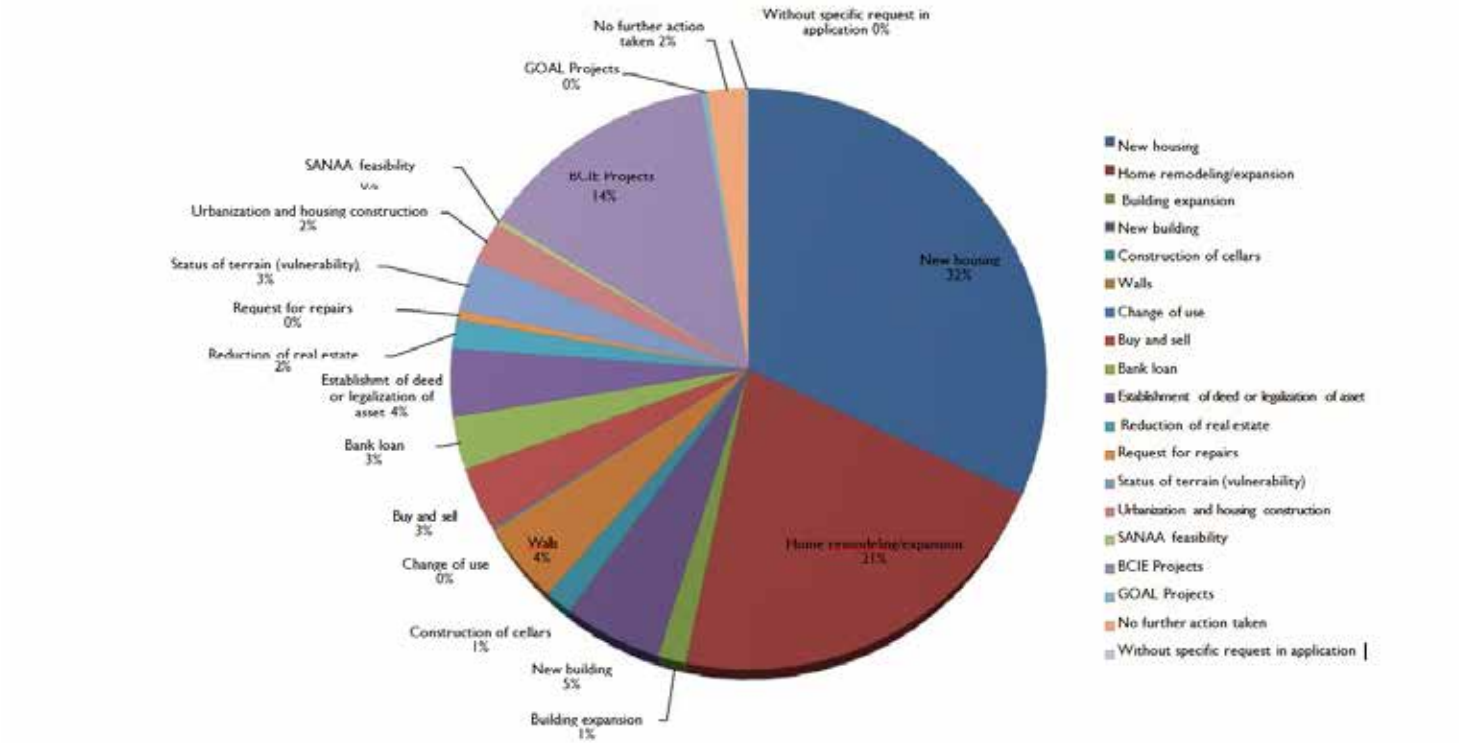
Type of Project	New building or Private infrastructure or Public service structure	Existing building or Infrastructure or Public Service Structure
Type of Certificate	Risk Certificate	Clearance Certificate
Emisor	Should be issued by an accredited professional and/or the Prevention Office of the Town Hall.	Should be issued by an accredited professional and/or the Prevention Office of the Town Hall.
Clase I. Valid for construction	Certificate stating that the property presents a low risk not entailing detailed threat and risk studies, including some recommendations for intervention in particular regarding compliance with specific standards and codes for building infrastructure, urban development and buildings, and the proposed design for cutting slopes.	Certificate stating that the property presents a low risk not entailing detailed threat and risk studies, including some recommendations for intervention in particular regarding compliance with specific standards and codes for building infrastructure, urban development and buildings, and the proposed design for cutting slopes.
Class II. Conditioned on the issuance of detailed studies.	Certificate stating that the property presents a medium or high risk requiring the issuance of detailed threat and risk studies defining mitigation methods prior to construction.	Certificate stating that the property presents a medium or high risk requiring the issuance of detailed threat and risk studies defining mitigation methods prior to clearance.
Class III. Valid for construction.	Reviewed by an accredited professional different from the one issuing the threat and risk study and/or Prevention Office of the Town Hall and said document and proposed mitigation works meet minimum requirements considered in this type of study. This certificate is issued to Class II constructions that comply with study and/or mitigation works conditions. Failure to comply with these conditions is punishable as offenses under the SINEGAR Act.	Reviewed by an accredited professional different from the one issuing the threat and risk study and/or Prevention Office of the Town Hall and said document and proposed mitigation works meet minimum requirements considered in this type of study. This certificate is issued to Class II constructions that comply with study and/or mitigation works conditions. Failure to comply with these conditions is punishable as offenses under the SINEGAR Act.
Follow-up	The relevant regional authorities should exercise control, penalties, and fines necessary in order to ensure compliance with the terms of such risk certificates. Additionally they must ensure that the construction of the mitigation works proposed in the studies and stability policies are implemented.	The relevant regional authorities should exercise control, penalties, and fines necessary in order to ensure compliance with the terms of such clearance certificates. Additionally they must ensure that the construction of the mitigation works proposed in the studies and stability policies are implemented.

Fuente: Propuesta enmiendas Ordenanza Tegucigalpa. 2013 AMDC

The main results obtained in the implementation of this ordinance in the prevention and mitigation office during the years 2011 and 2012 are:

TYPE OF REQUEST	JAN.	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
New housing	6	17	14	73	4	5	8	16	26	20	7		196
Home remodeling/expansion	12	23	17	12	18	11	5	5	6	10	8	3	130
Building expansion		1				4			2	2			9
New building	2	1	1	2	4	7		3			6	6	32
Cellar construction		1	1	2	1			1	2		4	1	9
Walls	1	1	5	2	1	3	2	2	2	1		3	27
Change of use		1									2		1
Buy and sell	3		1	1	1	2	6	2	3		3		21
Bank loan	1	2	2	1	2	4		3			2		18
Establishmt of a deed or legalization of asset	3	2	2		8	1	3				2	2	23
Reduction of real estate	2	2			2	1		1			1		10
Request for repairs	1									1	5		3
Status of the terrain (vulnerability)	1		1	2	6		2		1				18
Urbanization and construction of housing		1		2	3	1	2	2	2			1	14
SANAA feasibility			1		1								2
BCIE Projects	32	11			21	8	3					8	83
GOAL Projects						2							2
No further action taken	1			3	1		6	1	1				13
Without specific request in application	1												1
Total records	66	63	45	100	73	49	37	36	45	34	40	24	612

Figure 3. Records of risk areas issued in 2012



Source: AMDC, Prevention and Mitigation Office

5.4. Human capacity development in city administration for risk management and governance of the territory

The operation of the Office required logistic resources, management tools and training for the technicians so that they are able to fulfill their responsibilities in managing risks.

In the framework of the projects implemented by the UNDP and UNDP/SDC program for building and climate change adaptation identified 4 topics relevant to capacity building of technical and managerial personnel of both state entities at different levels, as identified non-governmental partners and counterparts from academia and the Colleges of Engineering and Architecture. These themes relate to development planning, technical tools for the roles of prevention officers and risk assessors, local governance and risk management, and more recently the official certification program for the Prevention Officers.

This comprehensiveness of content has allowed the CDMA have a team of technically trained professionals and sensitive to issues such as the recovery of means of livelihood and gender.

Development planning diploma course

The primary objective of this diploma course was to promote a comprehensive view of risk management processes with a focus on gender equality that would increase knowledge and encourage practices and attitudes that will transform the ways to intervene and promote growth and social improvement.

It was designed to generate and/or strengthen sectoral and local capacities through training processes of multipliers, from the use of practical tools by decision makers, national and municipal institution and development agency technicians. The course, more than a short-term training product, was conceived as a proposal for medium- and long-term oriented towards capacity building and strengthening of the SINAGER Act in Honduras.

The course featured topics relating to: (i) development, (ii) planning processes and actors, (iii) construction of diagnosis as part of the planning process: Baseline and gender analysis and risk reduction; (iv) construction of scenarios and trends and (v) development planning and reducing risks.

The course sought to bring their students to the institutions of which were part, on the basis of knowledge transfer processes and ensuring sustainable development. This proposal represents the pooling of knowledge and working tools to influence the building of a culture of risk management in the development process.

Diploma course in Technical Analysis and Tools for Risk Management

The Diploma was aimed at capacity building (instruments, tools, methodologies) to incorporate risk management in the planning of sectoral and municipal development, improved capabilities for emergency care, as well as content related to ordering and territorial planning system with a risk management approach.

Topics covered in the diploma were: (i) sensitization to risk management, (ii) seismic vulnerability, (iii) basic cartography and geographic information systems, (iv) geological hazards, (v) management of hydrographic basins; (vi) vulnerability and risk, associated potential impacts, (vi) planning and management tools, (vii) mitigation works, (viii) legal framework for risk management in Honduras, (ix) field trips, (x) reduction of structural vulnerability to earthquakes, (xi) seismic hazards.

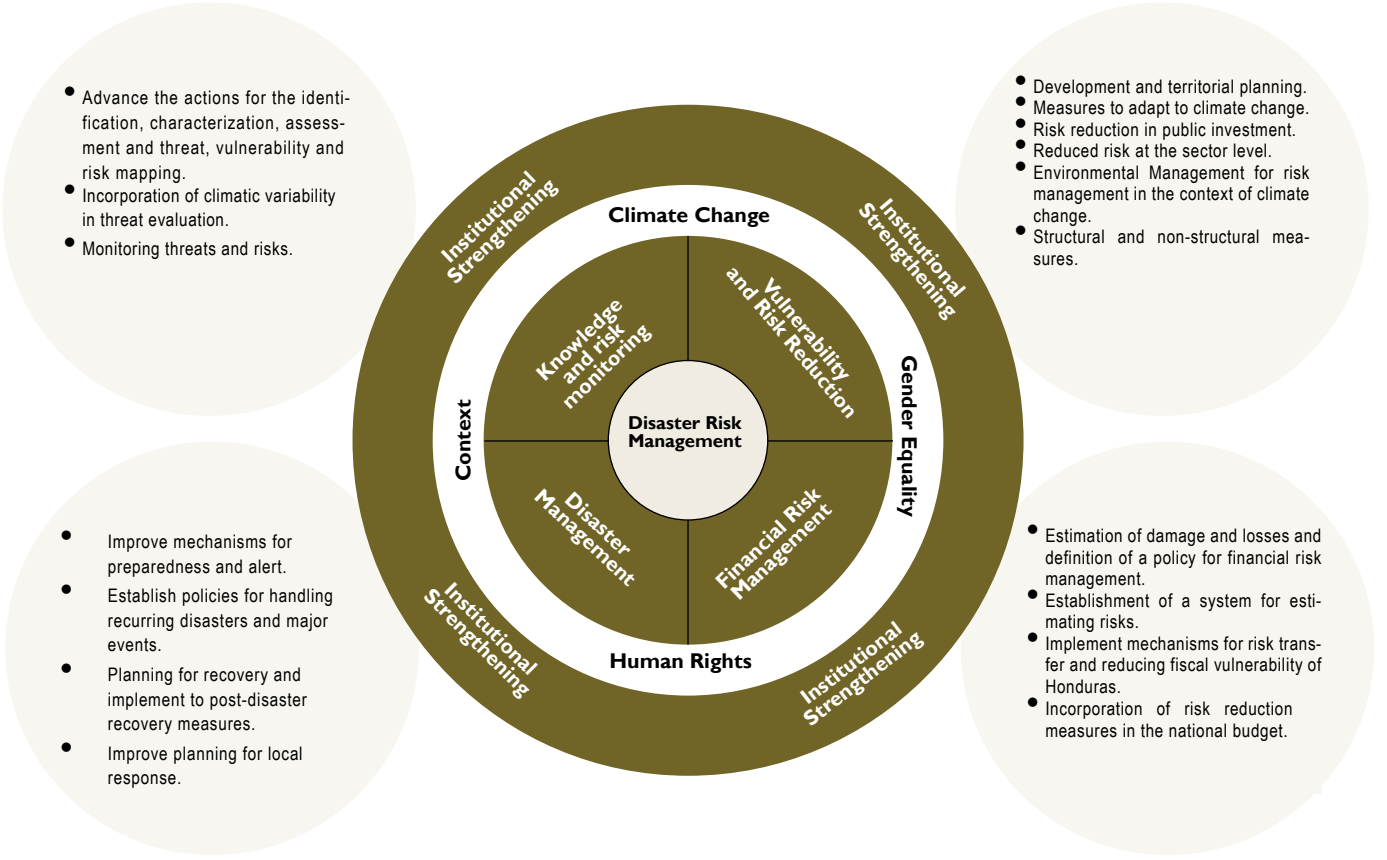
Diploma course in Risk Management for Prevention Officers

The primary objective of the diploma course was to train participants as Prevention Officers of an institution of the National Risk Management System (the SINAGER Act). This was done through the development of the legal, conceptual and procedural tools to analyze, evaluate and manage potential risks and become a valid interlocutor within their institution for risk management, both in relation to the senior management and intermediate levels, as at strategic and operational levels.

The focus of the course is risk management as a process that involves: (i) knowledge and risk monitoring, (ii) reducing vulnerabilities and risks, (iii) financial risk management, (iv) management disasters, (v) and a special chapter on the prevention officer. These include cross-cutting themes such as climate change, gender equality, including indigenous groups, human rights.

General training theme: aimed at all participants, where they learn about the conceptualization of risk management, the legal framework of the country and international knowledge and monitoring of knowledge, with the aim of creating bases and criteria.

Figure 4. Outline of Training Program



Source: UNDP Honduras Sandra Buitrago (2012). Risk Management Conceptual Framework

This method is applied at three levels of intervention; first ministries or institutions of different sectors of the state will be selected, at the second stage, officials in various regions and sub-regions of the country and local governments will be trained, and finally at the third stage, the social and private sectors, and the general public will be trained.

Figure 5. Stages involved in training Prevention Officers

Key results and observations in the development of the diploma:

- The design and structure of the diploma course based on risk management as a social and development process, updates the vision of DRM within sectors of the country. It is more easily assimilated because GR is conceived as a systematic logical process that is incorporated in governance. It facilitates understanding with the use of the same language, knowledge of national and international regulatory frameworks, basic knowledge risk, risk monitoring, risk financing mechanisms, project shielding, disaster management, and the role of prevention officer under the SINAGER Act.
- The methodology of presentation of experiences allows sector representatives to appreciate the practical application of the theory, learn about the projects that are developed and how they develop according to local contexts.
- The field trips allow increase participant learning and brings their attention to the reality of poverty, discrimination and the efforts being made to ensure comprehensive risk management based on technical knowledge.
- The incorporation of the National Institute for Women and the Secretariat of State in the Ministry of Indigenous and Afro-Honduran Populations (SEDINA-FROH) as part of the SINAGER Act is vital, as risk management cannot be established if populations are excluded.

Documentation has been developed for the structure of the diploma course sufficient for future replications and easy implementation of the modules.

5.5. Mainstreaming of risk management proposals for development planning of the city

The Plan document "Arriba Capital" is a proposal developed under the UNDP/SDC program by an interdisciplinary group formed by the Architects Association of Honduras (CAH) and the Ministry of Planning (SEPLAN), which seeks to serve as a liaison to municipal authorities for better control of a possible Municipal Development Plan focusing Territorial Planning (PDM-OT). In this regard in December 2009, the Municipality of the Central District signed an agreement with the Association of Architects of Honduras (CAH) to technically support the initiative by developing CAPITAL 450 of the Land Use Plan, based on diagnostic studies include territorial characterization, comprehensive diagnosis and foresight.

Its main objective is planning actions and strategies necessary to address the needs and requirements that come from the risk of recurrent disasters the town faces because of its high degree of vulnerability to natural threats, primarily hydro-meteorological; and to a lesser degree, to update the Land Use and Zoning (UPZ) of the city.

The specific objectives are to understand the dynamics of the territory and therefore the factors that define its current structure to guide its development, develop strategies for making decisions based on the trend and desirable future, generate a proposal stage of development and land use and assist the decision-making process regarding the occupation, use and transformation of the territory in the short, medium and long term.

On the issue of Zoning, technical assistance was carried out in two major products; one is the Development Plan and Zoning for the city urban area. The Arriba Capital Plan was used to serve as a link for the implementation of the Management Plan by the Municipal Authorities, responding to disasters in Tegucigalpa in the years just prior.

A survey and analysis of information to characterize the territory were established. Based on the characterization of the Territory of the Central District, developed by the College of Architects of Honduras, and the synthesis of projects submitted by the same institution, a technical analysis of the regional factors was performed.

1. Preparation, Promotion, Organization

Initial Step
Initiative/Item of the Proceedings
National/Regional/Departmental/
Community/Municipal
Legal Framework Guidelines

Preparation
Terms of Reference
Structure of Technical Team
Development of Work Plan
Inducement/Habilitation
Dissemination/Promotion

Management Structure
Municipal/Regional/
Departamental/National Guidelines
Institutional Coordination
Social Participation

Basic Zoning
Initial Basic Zoning

2. Territorial Categorization (Base Line)

Workshop 1
"Identification of criteria and problems.
Objetives and restrictions"

Establishment of information
Collect, evaluate and analyze. Process.

Tangible resources
Natural resources
Constructed resources

Intangible resources
Human resources
Social resources
Institutional resources

Evaluation of natural and anthropic risks
Threats, vulnerabilities, risks, recovery needs.

Characterization maps

3. Multidimensional Integral Diagnostics

Workshop 2
"Knowing our Territory"

Social Interiorization
Base line revision.
Characterization, integration and analysis, key factors

Technical Interiorization
Base line revision
Characterization, integration and analysis
Process

Future consumables
Key variables, analysis
Mapping of actors
Structural analysis

GIS-based modeling
Diagnostics synthesis

4. Territorial Projections (Scenarios)

Workshop 3
"The Future of our City"

Construction of territorial base
Understanding the model and key variables.
Analysis of actor Mapping

Hypothetical Trends
Formulation of General Hypotheses
Formulation of detailed hypotheses

Construction of scenarios
Construction of probable scenarios.
Description of probable scenarios.
Risk, recovery and climate change scenarios

Selection of Escenario Apuesta
Probable territorial development scenarios

Layout of scenarios
Community maps of outlook

5. Policies, project strategies

Workshop 4
"Going from theory to practice"

Objectives of Territorial Development
Objectives of Territorial Development

Strategy Formulation (OT)
Building a Territorial Development Strategy
from Scenarios put in place

Project Portfolio (PDM)
Development Programs and Subprograms
Project Portfolios/Project Profiles
Basic Project Profile
Municipal Investment Plan (MIP)
Annual Operating Plan

Sustainability Strategy
Development Programs and Subprograms
Proposals for risk reduction
Zoning Regulations for Land Use Planning

Territorial Zoning
Zoning, regulations and land use

6. Institutionalization of Plan

Public view → **Open Meeting**

Instrumentation
Discussion, Socialization and Validation
Public view, notification, national entity,
adoption of regulations, dissemination
campaign

Execution
Operationalization
Program execution
Municipal training and key actors
Monitoring and Evaluation
Term / Agreement

At Initial Step

Territorial Zoning
Final version / Popular 70 version

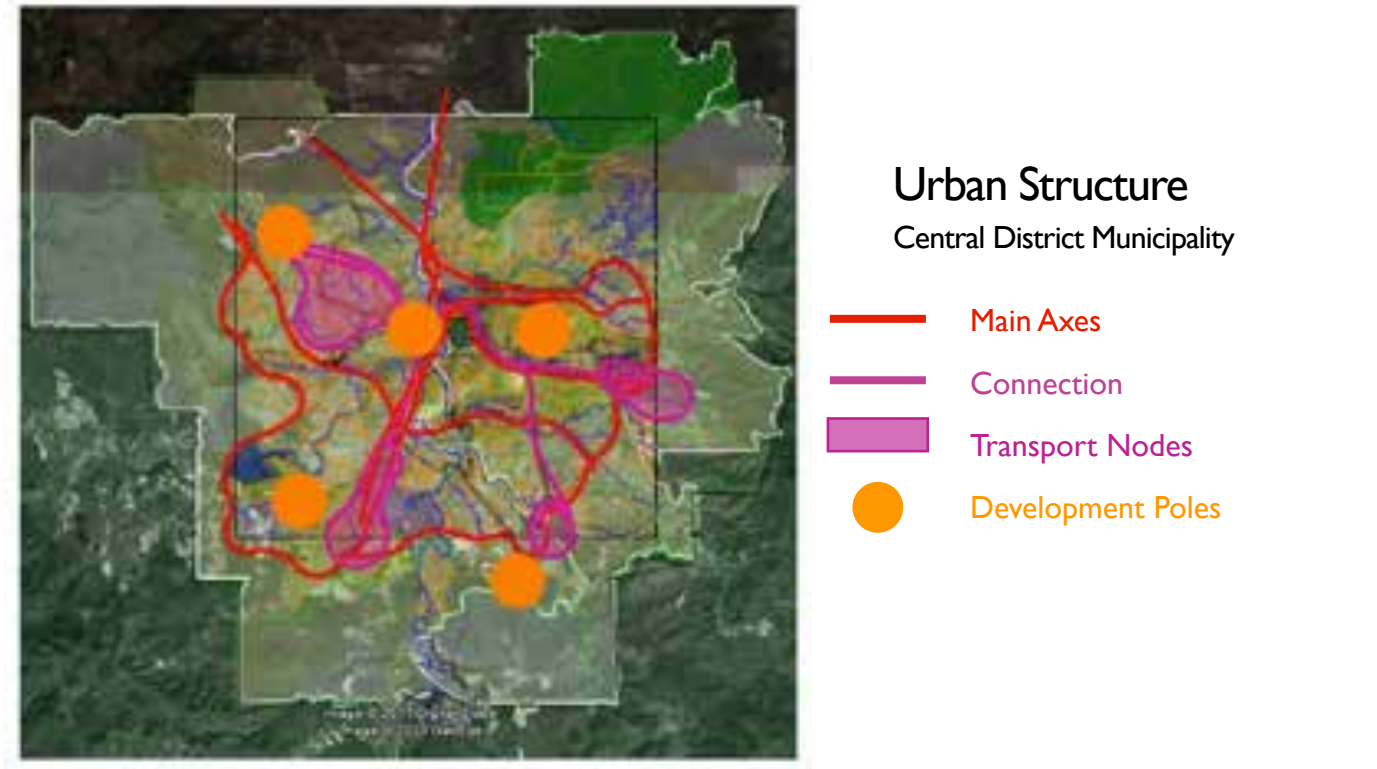
Structural analysis of developmental factors to identify a set of essential variables: i.e. those variables that are causes rather than consequences of the evolution of the studied system.

Methodology and participation in the Mapping of Key Actors

In March 2011, the research process which served as a platform for the Municipal Development Plan with a focus on Zoning, called the "Arriba Capital" Plan began, and one of the first research processes identified in the process of building the methodological model was the need to establish a Mapping of Key Actors, which involved the analysis of the status of human, social, organizational and institutional capital of the Central District (Ceballos, 2011).

One project that has resulted from the characterization and that, through the analysis of key factors of the territory, is the decentralization of urban control, and the creation of development zones, through which the importance of updating town zoning and the proposed division of urban area in units of Zonal Control Planning (UPZ) has come to the fore.

Map 3: Urban structure. Existing urban structure in the Central District Municipality.

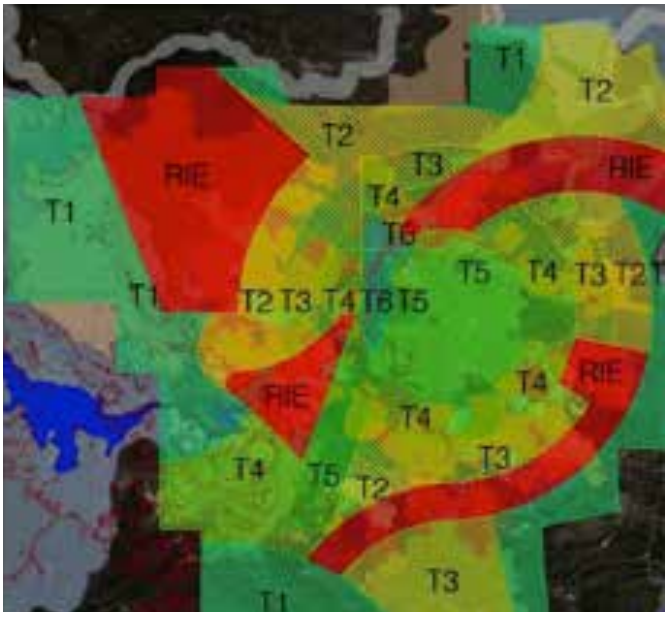


Source: Association of Architects of Honduras, Arriba Capital Plan

Conceptual Zoning.

Transect-based zoning proposed for the Central District; the zoning must be subdivided into Zone Planning Units, so that urban management is made as effective as possible.

Map 4: Conceptual Zoning



Zoning
Central District Municipality
Transect-based Zoning

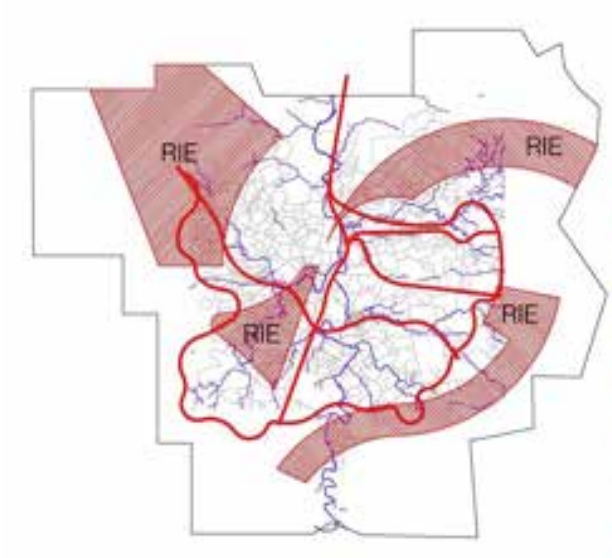
- RIE Risk Zones
- T1 Natural Zones
- T2 Rural Zones
- T3 Sub-Urban Zones
- T4 General Urban Zones
- T5 Central Urban Zones
- T6 Urban Nucleus

Source: Association of Architects of Honduras, Arriba Capital Plan

Risk Zones.

Risk zones shall be considered SPECIAL DISTRICTS and comprise areas with buildings, which, because of their function, location or configuration, cannot or should fall into one or more of the six policy areas above.

Map 5: Risk Zones



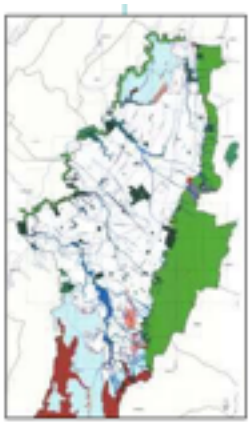
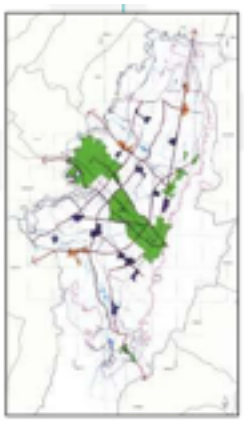
Zoning
Central District Municipality
Transect-based ZoningPlanificación

- RIE Risk Zones
- T1 Natural Zones
- T2 Rural Zones
- T3 Sub-Urban Zones
- T4 General Urban Zones
- T5 Central Urban Zones
- T6 Urban Nucleus

Risk Zones

Source: Association of Architects of Honduras, Arriba Capital Plan

Figure 6: General Elements of the Territorial Zoning Plan

Main Ecological Structure	Functional Structure	Socioeconomical and Spacial Structure
		
• Systems of protected areas • City parks • Bogota´s river management area • Ecological corridors	• System of mobility • System of urban facilities • System of built public space	• Center • Centralities • Demarcated trade and service areas • Residential areas

Source: Association of Architects of Honduras, Arriba Capital Plan

Based on the characteristics and zoning of the Central District Municipality with a focus on the socioeconomic, urban infrastructure and functional characteristics of the territory, the proposed transect-based zoning and on the basis of the cadastral map and sectors, the proposal to divide the area of Urban Control into homogeneous areas, according to their type has been put forth and which will constitute the Zone Planning Units.

According to the area, according to transect zoning, urban structure, risk management criteria and guidelines of the management plan, the urban planning and risk mitigation rules are defined according to each specific area. They have been divided into Regulatory sectors, subsectors of usage, and building feasibility subsectors. Regulatory information sheets will also be established along with legal support through ordinances, when necessary, and corresponding mapping in good faith, both by the taxpayer and the municipal engineer. [5]

5 Informe Final. Propuestas de Caracterización – Zonificación – Uso del Suelo – Normativa – Actualización Base Datos] En el marco de la elaboración del Plan de Desarrollo Municipal con enfoque de Ordenamiento Territorial para el Municipio del Distrito Central, Tegucigalpa – Comayagüela. Tegucigalpa. (Final Report. Characterization Proposals - Zoning - Land Use - Rules - Updated Database] As part of the preparation of the Municipal Development Plan with a focus on Territorial Planning for the Central District of Tegucigalpa - Comayagüela. Tegucigalpa)

Communities of Tegucigalpa.

6. The Main Learned Lessons in Creating the Risk Management Office

- In Tegucigalpa, the city administration has demonstrated the need to move away from attention-getting schemes and focus on emergencies. While response preparation is necessary, in the last decade internationally it has been shown that framing operational risk management structures leads to significant setbacks in reducing vulnerability and risk.
- The various cooperating bodies see Tegucigalpa as a municipal administration aimed at risk management. The tools developed and approved by the CDMA serve as support for decision-making both for reducing investment risk and investment for development. Without this approach, it would not be possible to generate confidence in cooperating bodies that the city is genuinely seeking solutions to historical problems of risks.
- A process of institutionalization of risk management leading to the process of solving specific problems. The (Prevention) Office was put forth as a necessity that involved the mayor relying on an institutional actor to produce technical concepts based on risk criteria of the city in order to meet the needs for care and support demanded by the city, the search for solutions and grant priorities.
- The crisis as an opportunity for change. The emergency crisis was the trigger factor of institutional change that led to the creation of the Management of Risk Prevention and Mitigation, bylaws and then went on to a larger field of risk management actions.
- The importance of knowledge in risk reduction. The knowledge of land-level risk is a growing need.
- Local and National Coordination. In municipal strengthening the change in national policy on DRR was the determining factor, which supported the creation of the Risk Management Officer, and provisions for the control of territory and building permits.

Communities of Tegucigalpa.

7. Sustainability

In Honduras, significant changes in public policy on risk reduction and post-disaster recovery are being implemented, reflected in the development of nationally-applicable standards and provisions. This change was the result of a dynamic led by national authorities and the network of social and institutional actors related to this subject. The UNDP and SDC program has provided a facilitator for support for a significant part of the political changes that Honduras presents today.

Additionally, the international environment has been an important factor that has enabled and promoted policy change and has led to the examination of the traditional way of dealing with disasters. This environment has been generated by the emergence and development of international scenarios for discussion and analysis of the issue of disasters, such as the Hyogo Framework for Action, the International Strategy for Disaster Risk Reduction and the Central American Policy for Disaster Risk Management.

Although Honduras is undergoing the process of change in their risk management policies, it cannot be said that all the necessary measures to resolve the accumulation of threats and generate all the capabilities required to address recovery processes have been taken. However, the initiation of change is an important development.

Changes in public and institutional policies in Honduras on risk reduction and post disaster recovery have begun to generate changes in the institutional and social culture in the country. These changes can be reflected in various ways, and some are already seen in the way the cities function.

Has the process in Tegucigalpa been sustainable?

The Risk Management Office of Tegucigalpa, despite being newly established, has been maintained over time, with a stable team of technicians, and gaining in significance. As has happened in cities like Bogota, it is already showing indications that these types of institutional areas are valued by the political authorities, when they prove their relevance in the daily operations of the city.

While technical instruments such as the ordinance and the threat map enable compliance with responsibilities of the Office under the SINAGER Act, continued observance of policies and guidelines outlined thus far is still necessary.

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