CENTRAL AMERICA
SUB-REGIONAL PROCESS

7th World Water Forum 2015

Global Water Partnership
Central America

This document was prepared as part of the preparatory process towards the VII World Water Forum to be held in Korea from 13 to 17 April 2015, to provide an overview of the situation currently managing water resources in Central America, major developments have been achieved and the challenges still remain. The content of this report is based on the priorities defined at the Americas and will be taken up in drafting the position paper of the Americas to be presented in Korea during the Forum.

The development process began with a regional consultation workshop where significant inputs that guided the development of its contents were generated. Also with a consultation workshop with directions of water from the Ministries of Environment of Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama, who supported define a set of key messages that should be considered as priority elements he had considered in the management of water resources in the region.

We thank all the organizations and individuals who actively participated in these meetings and hope that in addition to providing the preparatory process of the VII World Water Forum, this document will be useful to guide actions water resources in Central America.

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1. EXECUTIVE SUMMARY

The Central American region comprises the territories of Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama. Although these possess enough water resources to meet their needs, they still show deficits in access to water for domestic, food production and power generation purposes.

The geographic location of the Central American States also makes them highly vulnerable to impacts from hydro-climatic phenomena, now exacerbated by climate change, which threaten the region's chances for development and which require significantly improving local, national and regional resilience capacity to turn these threats into opportunities, as well as taking action to reduce social, economic and environmental impacts.

A large percentage of the region's water resource potential has yet to be developed. With the exception of Costa Rica, all Central American countries use less than 10% of the resources available. However, surface and ground waters have deteriorated as a result of the ineffectiveness of environmental control measures and the lack of a protection and conservation culture that comes from macroeconomic measures that do not yet value the contributions of natural resources, which limits the chances of achieving water security and sustainable development in the region.

The energy potential offers excellent opportunities for the energy matrix to stop depending on purchasing petroleum products; however, the development of this potential and water use by the mining industry has generated tension and conflict between States and in society, as civil society organizations with local and national presence oppose current public policies on using water for these purposes because they consider these exclude them from the economic benefits and yet impose restrictions and social and environmental burdens upon them.

Social movements - including those of indigenous peoples - are demanding a rethinking of public policies for national asset use, arguing the human rights to life, to health, to a healthy environment and to participation in development under equal conditions.

Climate change is integrated as a determinant in water management because it has managed to alter the hydrological regime and, therefore, the way water is distributed both spatially and temporally.

Neither the rainy nor the dry seasons are clearly defined. Only uncertainty is certain. Therefore, all States in the region have undertaken, to a greater or lesser degree, to identify how climate change impacts development.

Climate change adaptation plans are a great opportunity for countries in the region to work together and secure quality international cooperation, and to address the causes and conditions of this phenomenon, by promoting stakeholder participation in decision-making regarding territorial affairs and those of the Central Government so as to ensure measures in the social and public interest that go beyond the local level.

In terms of human development, States in the region are at high and medium levels with significant differences between and within the countries - progress, setbacks and stagnation. Panama, Costa Rica and Belize enjoy high human development levels, while Guatemala, Honduras and Nicaragua face the challenge of inequality and have yet to overcome high levels of poverty.

With their progress and challenges, States in the region have numerous successful experiences in the field of integrated water resources management to share with the rest of the world. They can also learn from other social conglomerates how to articulate water resource development to the achievement of goals and targets of a national nature, i.e. how to turn water security into the sector's overall objective.

Although States in the region have laws and institutions governing public assets, including water, the social situation calls for revising and updating the former and exercising leadership in the latter to overcome existing conflicts by applying multiple criteria in public policies - social equity, economic efficiency and environmental sustainability - and observing, as a general framework, public and social interests and legal security of usage rights with the aim of achieving an environment of social peace.

Agreeing on how to use shared water resources is of crucial importance for the region, given that water wealth, both surface waters and aquifers, is also distributed across political-administrative borders. The negotiation, signing and implementation of international agreements becomes another opportunity for development and regional integration.

Even if the region and the Central American States face serious development challenges, water's potential can contribute directly to achieving national social targets such as eradicating poverty and chronic malnutrition. It can also contribute to achieving economic goals, improving conditions for agricultural productivity by introducing efficient water use, promoting multiple uses for water and a shared energy development agenda, all of which could mean better chances for adapting to climate change, thus promoting integrated and sustainable economic development.

2. INTRODUCTION

The document describes the water situation in the Central American subregion and highlights the availability and rate of extraction of water, as well as the marked asymmetries in availability between and within the States.

It includes a number of key messages on issues that water managers in Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama consider essential for advancing toward water security in the region.

It outlines the region's vulnerability to the effects of climate change which requires the States and the regional community to redouble efforts to face the challenges of adaptation and mitigation and to enhance institutional resilience capacity at all levels.
It describes how several of the surface basins drain water from the international rivers and transboundary aquifers identified so far, which implies the State's varying degrees of dependence on water and stresses the need for signing bilateral or multilateral international agreements.

The report also describes the socioeconomic situation. Some countries have achieved higher levels of human development while others still face significant challenges in eradicating poverty and malnutrition. In also points out that, in general, the economy depends on agricultural product exports and remittances sent by nationals residing outside the region.

In terms of the duty to respect, protect and fulfill the human right to water and sanitation, it indicates the progress achieved and the weaknesses in specific measures to gradually fulfill the obligations corresponding to the State.

The report highlights the challenges the region faces in terms of water and sanitation; the close relationship between water and energy, parallel and growing demands, that are independent of each other; the situation of food security and its link to water; and how governance and financing still limit the sustainable development of water resources in the region.

It proposes seven strategies to address challenges and leverage the opportunities afforded by water in the Central American region. These are framed within water security as an end and implemented through integrated water resources management according to favorable good governance conditions.

Finally, it shares successful experiences in local water management achieved in all countries in the region.

3. KEY MESSAGES

A socialization meeting was held with water managers from the Central American countries, as part of the process to prepare this document, who identified the following key messages as essential elements in water management in the region:

- Central America considers that water security constitutes the reference framework for articulating water use and conservation to national development goals and targets, and that integrated water resources management applied according to the principles of social equity, economic efficiency and environmental sustainability is the means to achieving them.

- Countries in the region recognize the vital nature and the economic, social and environmental benefits of water and its impact on sustainable development; however, institutional capacity requires strengthening, including improving information systems and knowledge regarding water which are essential to effectively implement management tools for its sustainable use.

- The regional water potential can contribute directly to the achievement of social targets and economic development goals by improving sustainable service coverage and agricultural and industrial productivity and competitiveness and by promoting multiple water use, water resource protection and basin conservation, thus reducing territorial vulnerabilities and improving our resilience and adaptation to climate change.

- Given the global nature of climate change and its effects on rainfall regimes, and given that the natural distribution of water does not recognize borders and that in Central America there are several transboundary watercourses and aquifers that are of strategic importance to our countries, it is necessary to move towards their joint management by signing bilateral or multilateral cooperation and collaboration agreements that allow their coordinated management.

- The Central American Integration System (SICA) is the ideal platform to promote, propose, adopt, implement and follow-up regional water policy, in accordance with the environmental strategy approved in December 2014, and to ensure our contribution to defining a new sustainable development agenda and to the new global climate agreement.

- Water management and culture in Central America should assess and recover ancestral and local knowledge and practices, adopting appropriate and effective technologies to ensure the rational and equitable use of the resource within a context of climate change.

- Central America must allocate resources to sustainable water resources management, considering that such resources are the cornerstones for development given the essential nature of their contribution to strategic sectors such as health, agriculture and energy.

4. MAIN CHARACTERISTICS OF THE SUB-REGION

4.1 BIO-PHYSICAL CHARACTERISTICS

The Central American region is a natural bridge between North America and South America forming an isthmus 521,598 kilometers square. To the northwest it borders the Atlantic Ocean, with 2,740 Km of beach between Belize and Panama, and to the southeast it borders the Pacific Ocean, with 2,830 Km of beach between Guatemala and Panama. In addition, it is bisected by a mountain range reaching 4,000 meters above sea level and a volcanic chain that is part of the Pacific's Ring of Fire.

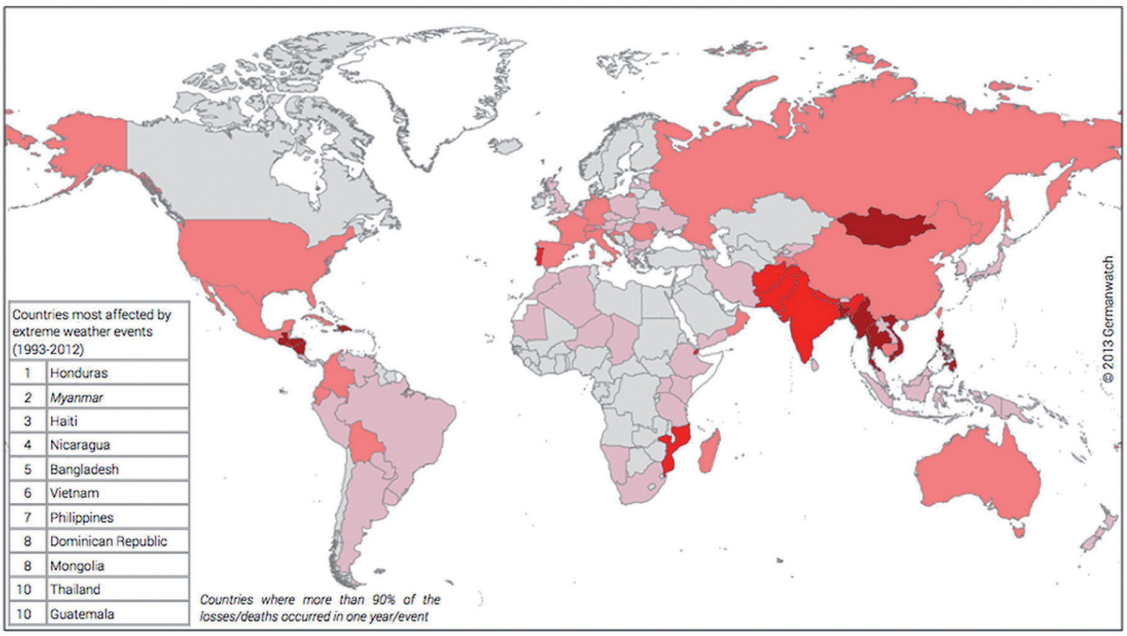
Central America's geographical location and geomorphological composition make it one of the most important megadiverse regions in the world with 11 freshwater ecoregions (TNC, 2007), which also puts it at risk of suffering the impact of extraordinary hydro-climatological phenomena exacerbated by climate variability and the effects of climate change.

In 2013, the global climate risk index (CRI) ranked Honduras and Guatemala first and tenth in the world - (See Map 1; Sönke Kreft and David Eckestein, 2014) - and given the magnitude of these events and the historical records, virtually the entire region is highly vulnerable to climate change. In the context of global environmental governance, reducing vulnerability and building social resilience capacity is vital for countries in the region.

The normal rainfall regime varies considerably depending on the altitude and location of the watersheds. Precipitation in the Atlantic is abundant, while precipitation is less in basins whose waters drain into the Pacific. See Map 2.

In Central America the availability of fresh water is considerable, the extraction rate is low, and the total availability by country is above the average designated by the World Meteorological Organization as in a situation of scarcity or water stress (FAO, 2014). (See Table 1).

Map 1 - 1993-2012 Climate Risk Index



Map 2 – Central America Water Network

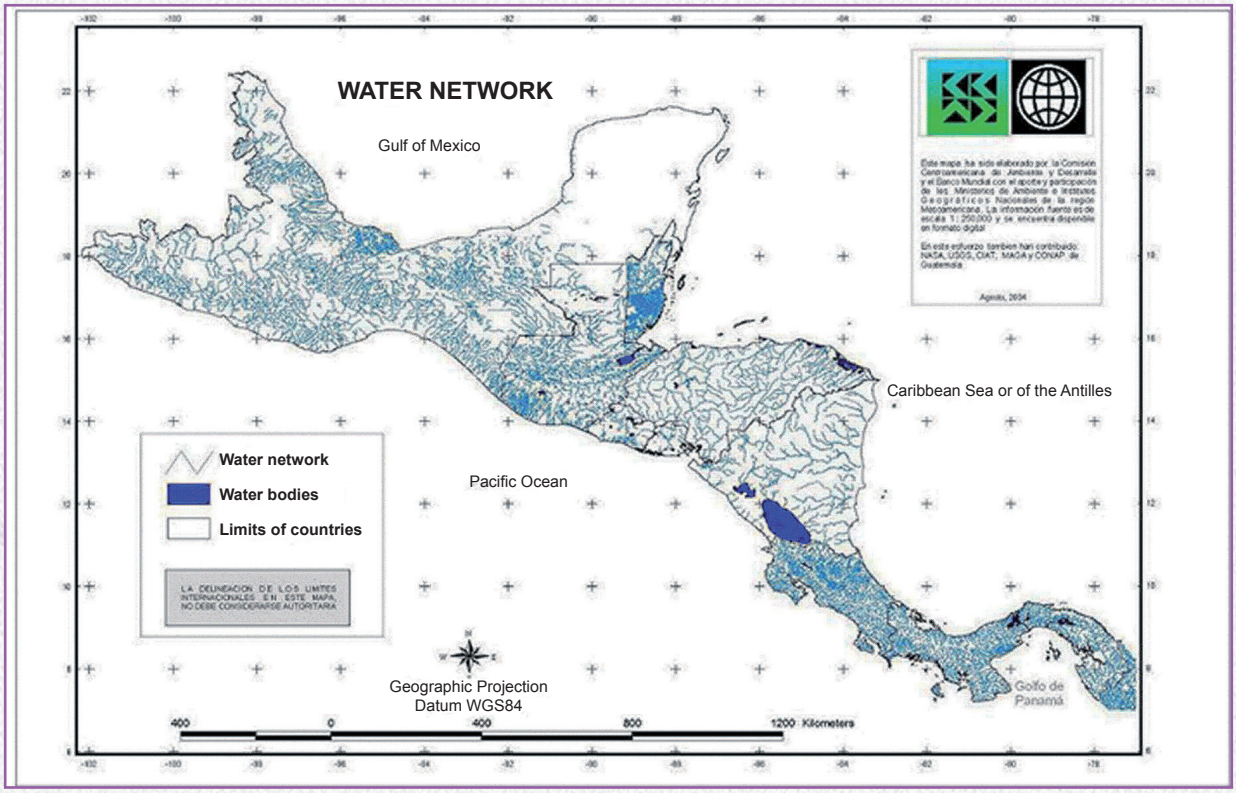


Table 1 - Central America – Water Resources by Country

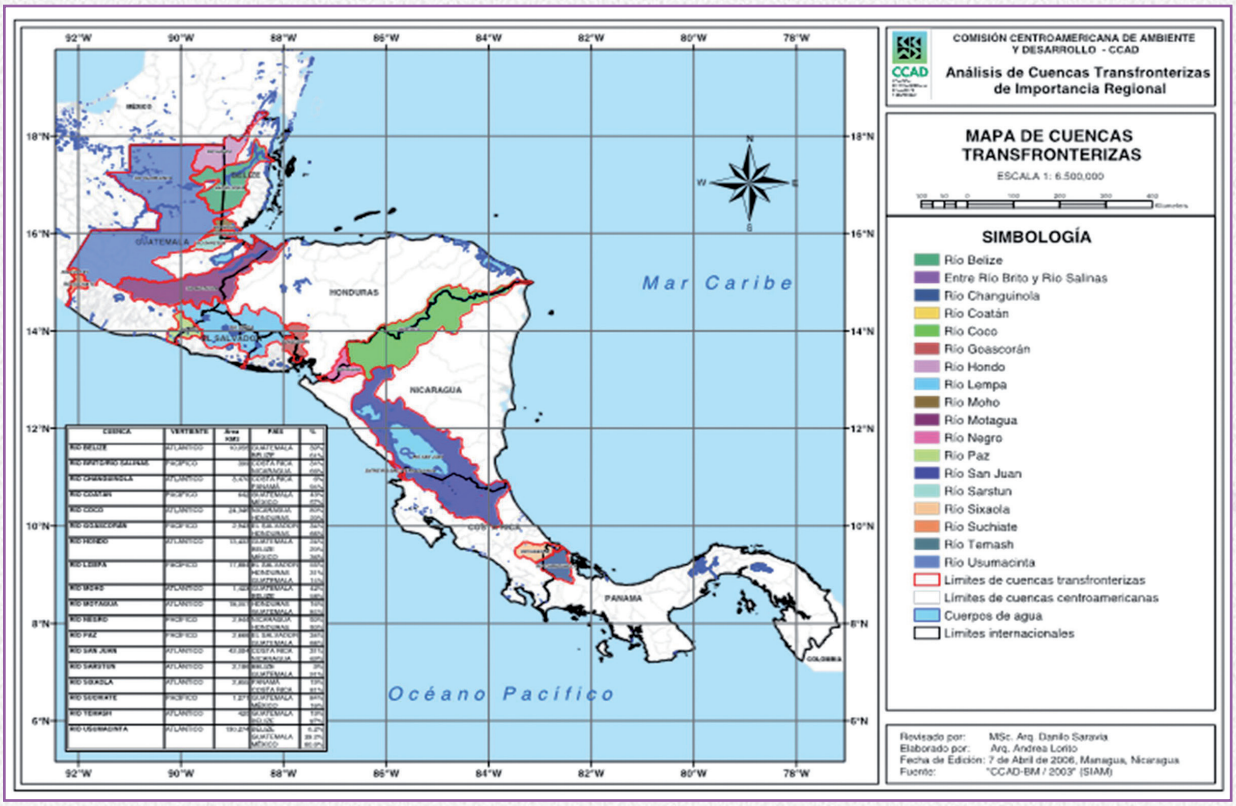
Country	Total internal water resources IRWR 1099 m^3year	Total external renewable resources 1099 m^3year	Total Water Resources 1099 m^3year	Dependency Rate %	Annual Freshwater Extraction	Total water resources per capita m^3/inhab/yr
Belize	15.25	6.474	21.73	29.790	0.8	65,452
Costa Rica	113.00	0	113.00	0	2.4	23,194
El Salvador	15.63	10.640	26.27	40.500	3.8	4,144
Guatemala	109.20	18.710	127.90	14.630	2.6	8,269
Honduras	90.66	1.504	92.16	1.632	1.2	11,381
Nicaragua	156.20	8.310	164.50	5.051	0.7	27,056
Panama	136.60	2.704	139.30	1.941	0.3	36,051

Source: FAO 2014 AQUASAT, http://www.fao.org/nr/water/aquastat/data/queries/show.html?idl35

Even though the average per capita water availability could reach 20,000 m^3/person in reality the difference between countries is very large, and it is necessary to significantly improve institutional capacity for regulation through both hard and soft works in order to ensure supply and to dissipate the energy of extraordinary events.

Of all surface basins, 23 drain waters from international watercourses (GWP 2011). They occupy around 40% of the territory - approximately 191,449 km^2, (see Map 3) - and according to a PHI-UNESCO-OAS study, 18 aquifer systems are transboundary, 16 of them shared with Guatemala (UNESCO-OAS-PHI, 2007).

Map 3 – International Watercourse Basins



According to AQUASAT data, the country with the highest dependence on water resources from other States is El Salvador, followed by Belize and Guatemala. Having States agree on how international watercourses are to be managed is a central theme for the region's development. An area of special interest known as Trifinio, which comprises Salvadoran, Guatemalan and Honduran territory, has developed a set of proposals and actions for the joint management of natural resources, including water, without even having an International Convention in this regard.

4.2 SOCIOECONOMIC CHARACTERISTICS OF CENTRAL AMERICA

The total population of Central America has reached 45.1 million people, 8 million more than in 2004, of which 58% reside in urban areas which is 4 percentage points more than in the year mentioned (GWP, 2011 and UNDP, 2013,). See Table 2.

In the region the concentration of people living in cities is close to two thirds of the total population, which puts pressure on water resources mainly groundwater. This involves diverting water and requires improving governance and institutional capacity for both meeting the increasing and concentrated urban demand and for managing the wastewater generated by the 4.5 million people living in Guatemala City, the more than 2.8 million living in San Salvador and the 2.6 million living in San José, Costa Rica. However, in terms of total population by country the urban population in Panama and Costa Rica is closer to 50%. Panama, Costa Rica and Belize enjoy high human development rates exceeding 0.700, which adjusted by the low equality criterion drops to 0.600; El Salvador, Guatemala, Honduras and Nicaragua have medium human development rates close to 0.600, which adjusted by the equality criterion drops to slightly above 0.400. See Table 3.

The status of human development in the region is correlated with the percentage of population at the poverty line, which in the case of Honduras is close to 60%, in Guatemala to 51%, and in Nicaragua to 47%[1]. This situation is directly linked with access to water for domestic purposes, food for subsistence production and the protection of natural assets in the basin, mainly because the Central American poor depend on subsistence agricultural systems and their only source of income/wealth are the assets provided by the natural environment.

Table 2 – Population and Distribution

Country	Population*			
	Total in Millions	Urban %	Rural %	Capital city, Metropolitan area, Population in M**
Panama	3.9	75,9 +	24,1	Ciudad de Panamá 1.4
Costa Rica	4.9	65,1 +	34,5	San José 2.6
Belice	0.3	44,5 -	55,5	Belmopán 0 .020
El Salvador	6.3	65,3	34,7	San Salvador 2.8
Guatemala	15.5	50,2 +	49,8	Guatemala 4.7
Honduras	8.1	52,7 +	47,3	Tegucigalpa 1.1
Nicaragua	6.1	57,8 +	42,2	Managua 1.0
Total	45.1			12.5

Source: *year 2012, UNDP, IDH 2013; **UEAR 2014, Wiquipedia.

1. Countries which according to ECLAC are not on track to reducing poverty and meeting MDG Goal #1

Table 3 – Central America: Human Development Conditions

Ranking	Country	HDI 2013	Life expectancy	Average years of schooling	Expected years of schooling	Country GNP*	GNP/ capita	HDI 2012	Change in Ranking
High Human Development									
65	Panamá	0.765	77.6	9.4	12.4	42.648.100.000	16,379	0.761	2
68	Costa Rica	0.763	79.9	8.4	13.5	49.621.089.476	13,012	0.761	-1
84	Belize	0.732	73.9	9.3	13.7	1.604.500.000	9,364	0.731	0
Medium Human Development									
115	El Salvador	0.662	72.6	6.5	12.1	24.259.100.000	7,240	0.660	0
125	Guatemala	0.628	72.1	5.6	10.7	53.796.711.129	6,866	0.626	0
129	Honduras	0.617	73.8	5.5	11.6	18.550.011.298	4,138	0.616	0
132	Nicaragua	0.614	74.8	5.8	10.5	11.255.642.565	4,286	0.611	0

Source: Human Development Report, http://hdr.undp.org/en/2014-report; * World Bank, 2013 http://datos.bancomundial.org/indicador/NY.GDP.MKTP.CD; sites visited on 31 10 2014

In terms of water status, the trend observed in the region is toward degradation mainly due to pollution, alterations to the physical structure of water sources and their overuse. This trend puts into question the effectiveness of institutional management mechanisms, including environmental impact assessment studies and licensing systems for use and discharge permits.

As part of the environmental pillar of sustainable development, water also needs to be viewed from an economic standpoint, as the onslaught of national and global macroeconomic policies impact water resources development.

The report on Sustainable Development in Latin America and the Caribbean (ECLAC, 2012) acknowledges there has been progress, stagnation and setbacks on the road to sustainable development in the region, and notes the gaps that include both social as well as economic and environmental factors, as shown in Table 4.

Just as biotic and abiotic elements are part of the environmental system, society and the economy are linked to the environment because it provides the resources, including water, with which to produce the most diverse number of goods and services.

Table 4 – Gaps in Sustainable development

Gaps					
Inequality	Productivity	International linkages	Taxation	Environmental sustainability	Investment
Despite progress, multiple inequalities (social) persist	Close external gap (with the technological frontier) and internal gap (between sectors and actors)	Risk of "reprimarization" of the export structure, with low AV and little investment in technology	Regressive tax systems; weak non-contributory pillar	Move towards sustainable production and consumption patterns	Investment, at 22.9% of GDP, is insufficient for development

Source: Taken verbatim from ECLAC, 2012, p. 97.

Measures to stop and curb water degradation are also part of the decisions of those managing the macroeconomy, and it is from there that control mechanisms must be defined because water is also useful for productivity and, therefore, its management is also linked to the tax system and public investment.

The general trends in the economies of States in the region are characterized by dependency on agro-exports, remittance services and the relaunching of government policies to exploit non-renewable natural resources, which are strongly opposed by social movements, mainly by indigenous peoples reclaiming the right to life, to health, to a healthy environment and to participation, and who consider that, among other things, the quantity and quality of water is under threat.

Challenges in the region relate to the link between water and the globalization of the economy, social exclusion and climate change. (ECLAC, 2012)

5. IMPLEMENTATION OF THE HUMAN RIGHT TO WATER

States in the region have made significant progress and launched actions to fulfill the human right to water and sanitation. The Declaration of the United Nations General Assembly on the human right to water and sanitation in 2010 (UNGA A/64/L.63/Rev.1) was preceded by the Millennium Development Goals (MDGs) global initiative in 2000, after which the States paid particular attention to the water and sanitation subsector.

5.1 LEGISLATIVE, REGULATORY AND POLITICAL FRAMEWORK

Substantial progress has been achieved in all countries in the region in terms of legislative, regulatory and political framework, including expressly incorporating human rights into the legal, jurisprudential and/or policy regime (Mora Portugués, 2014).

A regional-level institutional mechanism exists - the Central American and Dominican Republic Forum on Drinking Water and Sanitation (FOCARD-APS) - which leads the regional process with support from national authorities. The current priority is reflected in the Regional Sanitation Agenda (FOCARD, 2013).

At the national level, since 1986 Nicaragua has incorporated the "inalienable right of access to water and sanitation" into its Constitution; Honduras elevated it to constitutional rank through the reform introduced in 2013; and in Costa Rica has been recognized by repeated jurisprudence in 2000, 2002 and 2003. (Mora Portugués, 2014)

In addition to jurisprudence, Costa Rica recognizes the human right to water in the principles governing the national water resources policy of 2009 and so reiterates in the 2013 Water Agenda; Guatemala recognizes it in the 2013 National Policy for Drinking Water and Sanitation Sector; El Salvador recognizes it as a priority in the 2013 National Water Resources Strategy; and Panama does the same in its 2010 National Integrated Water Resources Management Plan.

The Costa Rican Government assigns the national responsibility for providing water and sanitation services to the Institute of Aqueducts and Sewers (AyA), an entity which with support from the Water Directorate attached to the Ministry of Environment and Energy (MINAE) - responsible for water management - and the participation of the Rural Aqueduct and Sewer System Management Associations (ASADAS) is making progress toward achieving universal coverage. Efficiency in water service delivery is regulated by the Regulatory Public Services Authority, in its capacity as the regulatory body.

El Salvador places the subsector under the purview of the National Aqueducts and Sewers Administration (ANDA) created in 1961. Its work plan observes principles such as non-privatization, focusing on subsidies, expanding sanitation systems coverage, articulated actions with municipalities and the decentralization of certain services. Through the Center for Consumer Defense, Salvadoran civil society in 2010 submitted the Citizen Bill for the Drinking Water and Sanitation Subsector, which to date has yet to be approved. It continues to exert public pressure.

In Guatemala, the Constitution, the Municipal Code, the Health Code and Environmental Protection and Improvement Law regulate aspects of water and sanitation service provision. The Constitution assigns the municipality the responsibility for providing them; the Municipal Code grants it the power to regulate them and to grant the rights to them; the Health Code ensures water and service quality; and the environmental law ensures water supply for domestic purposes. The 2008-2013 Government Policy supports the subsector's progress.

Honduras has a special legal system. Both the availability of water and the accessibility and affordability of the service are ensured by provisions within the General Water Law and the Framework Law for the Drinking Water and Sanitation Sector, which also provides the standards for controlling water quality. This is partly a product of the Strategic Plan for the Modernization of the Drinking Water and Sanitation Sector (PEMAPS) approved in 2004.

As part of the implementation of the Framework Law for the Drinking Water and Sanitation Sector, it establishes the regulatory entity whose responsibilities include monitoring providers, setting regulation and technical control conditions, tariff regulations, efficiency criteria, indicators, and representative models to assess the providers' management and ensure the rights of the users.

Nicaragua relies both on the General National Waters Law and on the General Law for Public Drinking Water and Sewerage Services, the enforcement of which falls to the National Institute of Aqueducts and Sewers (INAA), as the regulatory body. The Law for the Creation of the National Nicaraguan Aqueducts and Sewers Company (ENACAL) assigns it the responsibility for promoting and providing access to water and sanitation services. Both were created in 1998.

Nicaragua's 2010-2015 National Environmental and Climate Change Strategy provides for concrete measures to ensure water supply for domestic purposes and to control pollution. The Sectoral Drinking Water and Sanitation Strategy (2005-2015) includes planning and financing for the sector, as well as participation by the community, the private sector and users.

In Panama, a number of entities act to enforce respect, protection and fulfillment of the human right to water and sanitation. The Institute for National Aqueducts and Sanitation (IDAAN), created in 2001, is responsible for leading, promoting, coordinating, supervising, investigating and enforcing the standards laid down to provide these public services. It does so in its capacity as the governing body in accordance with provisions of the regulatory

body: the National Public Services Authority created in 1996. In addition, the National Council for Sustainable Development (CONADES) in its actions includes the Unified Sustainable Development Program for the Drinking Water and Sanitation Sector. These are also a part of the service management provided by Rural Water Boards.

5.2 FINANCING

In countries in the region, water and sanitation subsectors do not have one single or separate budget, receiving contributions from the central Government, municipal investments and loans.

Financing is a major obstacle to achieving universal coverage, improving service quality and to moving toward fulfilling the obligations concerning the human right to water and sanitation. FOCARD-APS has estimated that $7,706 million are needed to meet sanitation investment needs in the region. Costa Rica alone needs an estimated investment of US$ 2,590.00 million for 2011-2030 (Ferro and Lentini, 2013).

Operation and maintenance costs for public water and sanitation services in the region are supposed to be financed through tariffs. However, empirical evidence reveals difficulties in maintaining and expanding them, as well as in applying subsidies, without any financing policies framing them according to social equity criteria.

5.3 PARTICIPATION AND INCLUSION

In Central America, civil society participation in processes for access to water and sanitation services and to operate and maintain them precede the UN's Declaration on the human right to water and sanitation, emerging several decades before in view of Central and local Governments' failure to meet these basic needs. In the majority of cases, this participation has had positive results. (Carrasco, 2011; Gentes, 2010)

In all the countries in the region community social organizations play an important role as service providers, a scenario which also poses a governance challenge for the subsector that requires dialogue, support and coordination mechanisms at all levels.

Specifically, the Honduran legal regime for water and public water and sanitation services includes participation in management and governance of water, public services and basins, (Section 3, paragraph 4, Sections 7, 8, 19 and 22 of the General Water Law), both through Water Boards and in National Councils. Regulations for Water Management Boards were issued in 2006.

Nicaragua organized community participation for drinking water delivery in rural areas through its 2010 Special Law on Drinking Water and Sanitation Committees (CAPS), just as Costa Rica has regulated the performance of Communal Aqueduct and Sewer System Management Associations (ASADAS) since 2000. (Jorge Mora Portugués, 2014)

In Panama, the National Environmental Authority (ANAM) regulates the participation of Rural Water Boards in charge of operating and maintaining the infrastructure and providing the services. As for El Salvador and Guatemala, either on own initiative or as community development councils in the case of the latter, the population is organized to manage projects and to operate water and sanitation systems

5.4 MONITORING

In Guatemala, El Salvador and Honduras the systems that provide information regarding services and that assess and monitor their quality are generally precarious. Therefore, targets and goals can only be monitored

through general statistical information, such as that considered for measuring the achievement of MDG targets.

In the rest of the countries governing bodies or large service providers have subsector information systems that are able to reflect investment, service status, expansion plans and service quality: ENACAL in Nicaragua, AyA in Costa Rica, and IDAAN in Panama.

5.5 CHALLENGES

As it is a human right, all States in the region have to maintain the set of measures applied until now - obligation of non-regressivity - and to immediately adopt the measures required to achieve an essential level of access for the entire population. They also need to implement gradual, concrete and deliberate actions in order to achieve the full exercise of this right - progressive obligations - among which at least the following need to be considered: (Juan Bautista Justo, 2013; Carrasco, 2011; Lentini, 2010)

- Bridging the water and sanitation gap between urban and rural areas;
- Overcoming the financing gap to achieve universal sanitation coverage;
- Overcoming the financial gap for economic and financial sustainability through the establishment of tariffs based on efficiency, equity, simplicity and transparency;
- Strengthening national water and sanitation subsector institutions, distinguishing between urban and rural needs;
- Strengthening the organizing and training of service providers in rural areas;
- Managing conflicts over access to water sources; and
- Establishing mechanisms and indices to measure the quality of the services provided.

6. WATER CHALLENGES FACING THE REGION

6.1 WATER AND SANITATION FOR ALL[2]

According to official data, countries in the region have achieved significant progress in terms of fulfilling the targets proposed by MDGs, see Table 5. However, said data present a deceptive reality, as these do not reflect the precarious nature of the services, particularly the highly relevant challenges the subsector faces in terms of quality, cost and consistency in service provision.

Human settlements in the Central American Pacific in particular face water and sanitation service shortages during the summer; on the other hand, the water supplied to capital cities and metropolitan areas is affected by high pollution levels that limit its effective avail-

Table 5 – Central America: Water and Improved Sanitation Coverage

Country	% Access to Water-Improved Source'			% Access to Improved Sanitation		
	Urban	Rural	National	Urban	Rural	National
Costa Rica	100	91	96	95	92	94
El Salvador	94	81	90	79	53	70
Guatemala	99	89	94	88	72	80
Honduras	97	81	89	86	74	81
Nicaragua	98	68	85	63	37	52
Panama	97	86	94	77	54	71
Dominican republic	82	81	82	86	75	82

Source: ECLAC; taken from World Health Organization/UNICEF Joint Monitoring Program (JMP) for Water Supply and Sanitation, 2014

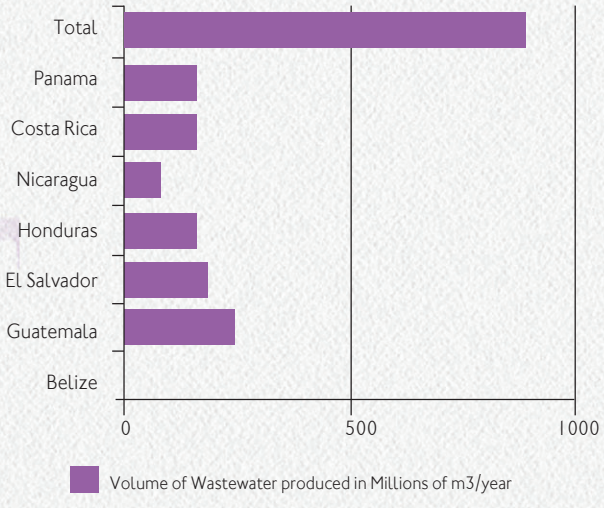
2. Reference sources: GLASS-PAHO / MAPAS-PAS-BM / FOCARD APS/ ECLAC/IDB / CABEI / SDC)

ability, particularly in expanding urban areas. This situation, however, is becoming increasingly commonplace in rural areas, causing cost increases due both to the treatment needed and to the need to transport it from more distant sources, affecting the quality of life of the population and becoming a source of social conflict.

The contamination observed in the water Central Americans drink refers both to sanitary quality and to the presence of metals. About 68.7% (712.48 million m³/year) of wastewater is discharged totally untreated into a receiving body. An investment of around US $7,706 million is required to manage excreta, which does not even include improvements, operation and maintenance of existing infrastructure (FOCARD-APS, 2013). See Graph 1.

One country that has shown substantial progress in this regard is Nicaragua with the expansion of its drinking water and sanitation services coverage, going from drinking water coverage of 74% in 1990 to 85% in 2011. (WHO-UNICEF Joint Monitoring Program) Progress has been modest in terms of sanitation because 48% of the population lacks adequate sanitation facilities, a situation which is worse in rural areas where up to 63% of the population lacks access to these services. (AGUASAN, 2014)

Graph 1 – Central America: Volume of Wastewater



Source: Own elaboration based on Regional Diagnosis - Excreta and Wastewater management in Central America and Dominican Republic. FOCARD-APS (2013)

During the 1990-2004 period, ENACAL and the New Social Investment Fund (FISE) invested close to $450 million in the sector, an annual average of US$ 30 million; 79% went to drinking water and 21% to sanitation[3]. During the 2008-2012 period, on average investment in the sector exceeded $44 million a year. Investment during the 2014-2018 is slated to be around US$ 332 million, demonstrating significant resource mobilization efforts in the last decade.

Nicaragua has set a very ambitious agenda for institutional restructuring in the subsector and capacity building to the provider, which is expected to facilitate the efficiency and effectiveness of the scheduled investments. Challenges are related to the prioritization of investments in sewerage in urban areas and the corresponding wastewater treatment.

In Costa Rica, the 2011-2014 National Development Plan indicates that less than a third of the population has sewerage[4]. Efforts to expand this network and to build the treatment plants are an AyA priority.

Investment in the sector in recent years averaged US$ 72 million per year, of which close to 68% has gone to the San José metropolitan area. Despite this level of investment, a 2014 ECLAC study reveals that in the short term Costa Rica requires some US$ 970 million for water and sanitation and some $770 million to expand and improve the services managed by municipalities and ASADAS. To this end, AyA is designing a joint funding mechanism. The subsector requires capacity-building and establishing a national system of indicators to assess its performance.

3. According to ECLAC data, of investment in urban areas, 86% went to drinking water and 16% to sanitation; in rural areas, 60% went to drinking water and 40% to sanitation.
4. Generally, septic tanks, and other alternative sanitation systems are used.

As a strategic objective, El Salvador's 2010-2014 Five Year Development Plan (PQD) proposed increasing drinking water coverage by 80% by the end of the period focusing efforts on the 100 poorest municipalities. Between 2004 and 2011 official data estimated an investment of close to $234 million: $29 million executed per year between both ANDA, which serves urban areas, and the Social Investment for Local Development Fund (FISDL) serving rural areas. Urban investment is twice that allocated to rural development. Recent studies estimate that the investment in sanitation required is around $800 million, which would mean much higher annual investment than the historical record has shown. (FOCARD, 2013)

As for the challenges for El Salvador, there is increasing concern regarding the absence of entities with clear governing and regulatory roles. This puts the subsector's development in a very precarious situation. This subsector has been characterized by irregular and intermittent service provision and low control of the quality thereof. Furthermore, there is an absence of sectoral strategic planning[5] and of an investment program prioritizing and aimed at raising coverage and quality targets - particularly in rural areas where systems are considered generally unsustainable - and the treatment of domestic wastewater, for which coverage remains low. Finally, it is necessary to move toward a formal system of indicators for due monitoring and evaluation of sectoral investments.

In Guatemala, only 15% of the water supplied by network systems is purified and only 25% of municipalities have some kind of purification system (Samper Rodríguez, 2008), resulting in high incidence of diarrheal diseases. Wastewater treatment coverage is very low and its sustainability is a central aspect in subsector management.

At the level of institutions, Guatemala's National Policy for the Water and Sanitation Subsector establishes bases for sectoral reform involving the creation of a regulatory body, strengthening the governing body, a regime for providers and defining the rights, duties and obligations of users which in addition make a distinction between urban and rural areas.

These positive signs reflect the sustained increase in investment in health infrastructure over the last five years, mainly with local resources. Despite these efforts it is estimated that the subsector requires an investment of close to $4.9 billion over the next 8 years (2014-2021), which represents the greatest challenge to the universalization of quality services (ECLAC, 2014). This means prioritizing interventions according to a national information system on the water and sanitation subsector which as yet does not exist.

Between 2002 and 2010 Honduras has invested an average of $28 million a year in the subsector. A large part of these resources were provided by international cooperation[6] and went to drinking water infrastructure, current spending and to a lesser extent to sanitation.

Reforms to subsector institutions in mid-2000 created the National Water and Sanitation Council (CONASA) to lead the sector, but to date it still lacks the budgetary resources and installed capacity to achieve effective coordination and to keep reliable statistics and an updated database, which are challenges to overcome on the road to universal coverage with quality services.

According to Panama's 2010-2014 Strategic Government Plan around $530 million were intended for the rehabilitation and expansion of water and sanitation services, in addition to the $450 million earmarked for the Sanita-

5. The current agenda includes moving forward with national planning for the water and sanitation sub-sector, a process about to begin.

6. According to ECLAC, it is estimated that of those resources, 70% came from external sources.

tion Program for the City and Bay of Panama. IDAAN was able to significantly increase the amount of investment without having detailed information on effective investment for the designated period.

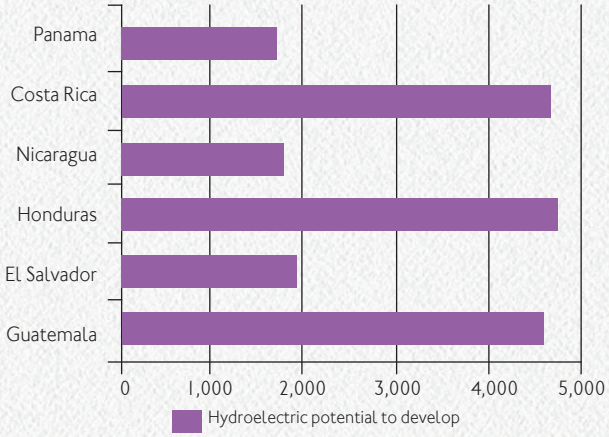
The challenges for the Panamanian water and sanitation sector have to do with the strengthening and consolidation of its institutions: the governing and regulatory entities and the inter-agency coordination mechanisms; addressing the sustainability of services to ensure quality and expansion and in particular overcoming the challenge of investing in sanitation and wastewater treatment; and focusing attention especially to rural areas with viable sanitation solutions for dispersed settlements and indigenous communities.

6.2 WATER AND ENERGY[7]

A little over half of the electricity consumed in Central America is produced by hydroelectric plants; the rest is produced by plants fueled by petroleum products and a small part is generated by wood combustion. According to OLADE's Energy-Economic Information System by 2007 57% of Central America's total net generation was hydroelectric, 1% geothermal and wind, and 2% cogeneration; the remaining 40% depended on thermoelectric plants.

According to ECLAC data from 2004 cited in the 2011 State of the Region, the estimated regional power generation potential is mostly from water sources: 18.271 MW. For instance, Costa Rica has a potential of 4,449 MW, followed by Honduras with 4,525 MW, and Guatemala with 4.360 MW. See Graph 2. In order to achieve energy independence, hydroelectric potential is revealed as key among renewable energies, in contrast to the geothermal which reaches 2,501 MW, or wind which reaches 2,200 MW.

Graph 2 – Central America: Hydroelectric Potential



Source: 2011 State of the Region, based on ECLAC data

However, studies of scenarios and projections of the impacts of climate change on the water regime in the region show that these threaten this potential and should be seriously considered. It requires hydrological planning and hydraulic works systems to regulate water flow and storage that ensures power plant requirements.

According to CCAD close to 261 hydroelectric projects are under development in Central America scheduled to start operations between 2012 and 2015; 194 represent 5,454 MW of installed capacity and 383 MW are expansion projects or improvements, see Table 6. This modality complements or replaces large projects.

It is an option for optimizing the use of regional resources and reducing environmental impacts while at the same time contributing towards an energy independent and environmentally clean energy matrix.

Developing the regional energy sector requires strengthening the mechanisms and clear, transparent and consistent game rules for decision making and conflict resolution, taking IWRM goals and targets into account.

7. Reference sources: INCAE, OLADE/ ECLAC

Table 6 – Central America: Summary of Hydroelectric Projects

Country	Number of projects	MW Potential	Expansion or improvements in existing plants
Costa Rica	3	977	
Panama	85	1,245	
El Salvador	25	1,180.39	80
Guatemala	52	313	2.7
Nicaragua	25	1,154.40	
Honduras 1/	18	584.16	300
Belize	33	584.25	
Total	194	5,454.00	382.7

Source: CCAD 2012.

UNESCO's 2014 World Report on Water and Energy is emphatic in pointing out the importance of the water-energy two-way relationship: (1) water used for the production and distribution of energy: hydropower, thermal generation, fossil fuels, bioenergy, transmission, among others; and (2) energy required to deliver water: pumping, distribution and treatment, among others.

In Latin America energy accounts for 30-40% of water supply costs (UNESCO, 2014). In El Salvador alone the consumption of ANDA, the public company that provides drinking water to 65% of the population, represents 5.1% of the total demand for electricity in El Salvador. (SIGET, 2014)

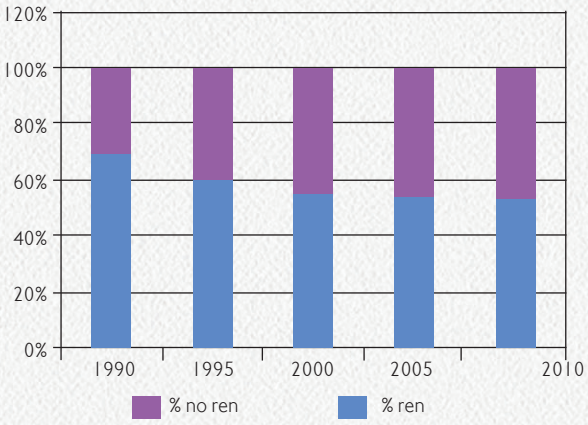
The water-energy nexus is clearly evident in Central America where at the same time the growing demand for energy and water must be met.

Graph 3 shows that more than 50% of power generation in the region depends on renewable sources; Graph 4 breaks down the contribution by type of natural source; and Table 7 indicates the effective potential of all natural resources.

The water and energy agenda in the region represents an opportunity for generating a work space geared towards the construction of low-carbon economies, with contributions in terms of greenhouse gas emissions mitigation, promotion of energy efficiency, and with possible generation of co-benefits related to the reduction of vulnerabilities associated with floods and droughts and loss and damage to water infrastructure, as stated in the 2012-2017 Regional Indicative Power Generation Expansion Plan.

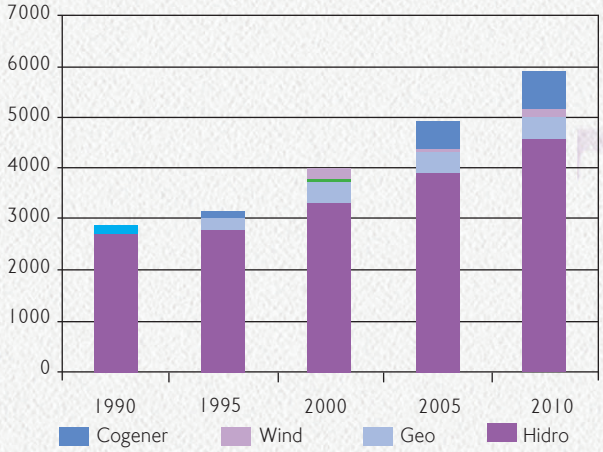
The water-energy nexus in the region should stand on decisions based on national and regional policies, technical information and

Graph 3 – Central America: Share of renewable sources in installed generation capacity



Source: Majano 2014, based on ECLAC data.

Graph 4 – Central America: Composition, installed generation capacity from renewable sources MW



Source: Majano 2014, based on ECLAC data.

Table 7 – Central America: Remaining effective potential of renewable resources

Country	Hydroelectric Energy	Geothermal	Wind	Bagasse	Geothermal, wind and bagasse in total
Belize	-	-	-	80.000	80.000
Costa Rica	20.386	1.621	1.127	293.000	3.041
El Salvador	6.544	2.605	2.798	273.000	5.676
Guatemala	15.010	3.630	2.174	1.075	6.830
Honduras	15.302	545.000	2.883	320.000	3.747
Nicaragua	7.187	5.377	6.014	147.000	11.538
Panamá	9.329	206.000	2.139	128.000	2.474
Central America	73.758	13.984	17.085	2.316	33.386

Source: Worldwatch Institute and INCAE, 2013, with data from ECLAC.

on consultation mechanisms used from the earliest stages of the process to plan energy options and for decision making and accountability regarding the execution of agreements for the implementation of the agreed energy solutions.

It is imperative for analysis, discussion and decision-making processes to consider the potential impact of climate change, the changes in production and consumption patterns, the availability of the resource, the increase in energy demand, and society's environmental and social assessments.

The region must find a balance within that context and support energy efficiency in water systems to reduce energy demand, while at the same time reducing the cost of access to and provision of water services in a win-win scenario.

6.3 ADAPTATION TO CLIMATE CHANGE AND RISK MANAGEMENT

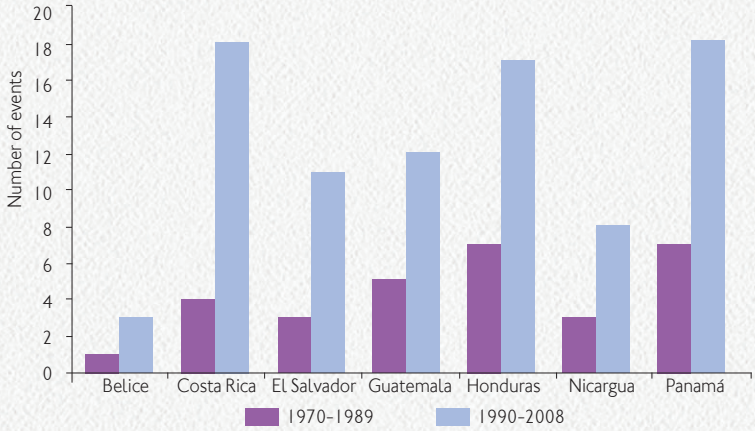
Central America is a water wealthy region; however, it has little capacity in terms of institutional and social resilience to deal with the impacts of climate variability and climate change.

This is reflected, on the one hand, in its inability to meet all demands and to develop existing potential and; on the other, in how pollution, degradation and the impacts of these phenomena are magnified in the region. This scenario changes with the appearance of historically unrecorded events with significant variations in increases or decreases in temperature, concentrated rainfall in terms of time and zones, floods, wind and drought. See Graphs 5 and 6.

These scenarios predict events of extreme drought and more frequent and intense storms. In the last 40 years in Central America and the Caribbean there have been some 6 episodes of drought - including El Niño Southern Oscillation (ENSO) events - and at least 10 hurricanes that have caused losses in human lives and in social and productive infrastructure.

Drought in Central America is defined differently than in other parts of the world. It is closely related to ENSO and the anomalous distribution of precipitation during the rainy season especially at its onset, the canicular period and when it starts up again (ECHO, ACH and FAO, 2012). In the last 60 years approximately 10 El Niño have been observed lasting between 12 and 36 months (CCAD, 2010). According to CCAD there is no certainty regarding future rainfall behavior, but it tends to be more erratic and extreme. Therefore, more prolonged droughts might be expected during El Niño periods, as well as heavy rains from hurricanes, tropical depressions and storms.

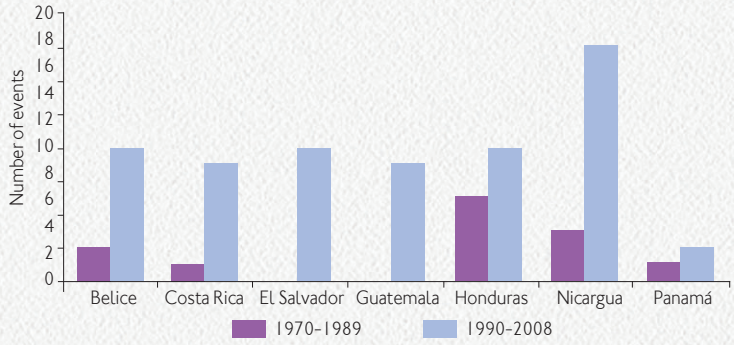
Graph 5 – Central America: Floods -1970-1989 and 1990-2008



Source: ECLAC, Economics of Climate Change, 2010

A study on climatic parameters in the last 40 years (1961-2003, Aguilar, et al 2005) concluded that rainfall distribution patterns have changed in Mesoamerica. There has been an increase in the number of dry days during the rainy seasons offset by days of extreme rainfall.

Graph 6 – Central America: Number of tropical storms and hurricanes 1970-1989 and 1990- 2008



Source: ECLAC, Economics of Climate Change, 2010

Changes in temperature and rainfall are also recorded in the region, as shown in Tables 8 and 9 which have been built from 3 scenario models.

The Regional Report on the State of Vulnerability and Disaster Risk in Central America of the Office of the United Nations for Disaster Risk Reduction (UNISDR) indicates that to 2011, the region has had a cumulative loss estimated at US$ 9,801,414,403. It also states that between 1970 and 2011 69.7% of these disasters have been caused by hydro-meteorological events, of which 55% were floods, 33% were storms and hurricanes, 10% were droughts, and only 2% were extreme temperatures.

Table 8 - Central America: Changes in Temperature and Precipitation

Season			
		Changes in Temp. °C	
	2020	2050	2080
Dry	+0.4 a +1.1	+1.0 a +3.0	+1.0 a +5.0
Wet	+0.5 a +1.7	+1.0 a +4.0	+1.3 a +6.6
	Changes in Precipitation (%)		
	2020	2050	2080
Dry	1.89	1.40	4.29
Wet	1.49	1.24	3.62

Source: ECLAC, Economics of Climate Change, 2010.

Table 9 – Central America: Anomalies in average temperature (oC)/according to the 3-model average

Years	2050		2100	
Country* Stage	A2	B2	A2	B2
Costa Rica	1.63	1.32	3.89	2.48
Belice	1.53	1.40	3.70	2.47
El Salvador	2.05	1.45	4.72	2.62
Guatemala	1.97	1.48	4.74	2.73
Honduras	1.83	1.42	4.20	2.53
Nicaragua	1.89	1.40	4.29	2.45
Panamá	1.49	1.24	3.62	2.21
Central America	1.77	1.39	4.17	2.50

Source: ECLAC, Economics of Climate Change, 2010

According to SICA, estimating economic losses due to extreme events in Central America began four decades ago; 11 extreme hydro-meteorological and climatic events that affected Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua generated losses in the order of $13,642 million at 2008 values.

In 1998 Hurricane Mitch killed more than 9,000 people and directly affected more than 3 million others, generating losses estimated at US$ 8,000 million. In October 2011 Storm 12-E generated losses of at least $2 billion to El Salvador, Guatemala and Honduras, with assessments relating to major events only

It is estimated, however, that only 9% of the events recorded in Costa Rica, El Salvador, Guatemala and Panama have been high-magnitude, but impacts from medium- and low-magnitude events are more frequent. In Costa Rica and El Salvador 75% of deaths and almost 60% of people affected can be attributed to these. This type of disaster spreads rapidly to other geographical areas and with greater recurrence, especially in the last 10 years (SICA-CCAD, 2013).

The region is especially prone to climate change impacts so in general the countries have prioritized adaptation as an action necessary to deal with this and to improve resilience capacity given their high natural and social vulnerability. In this regard, progress has been made in the development and adoption of political and strategic frameworks on the issue, but there are still important gaps for the effective implementation of these policies. The main gaps are associated with institutional and financial factors.

6.4 WATER FOR FOOD SECURITY

Agriculture is a strategic socioeconomic sector for sustainable development in the Central American region, both for its contribution to food security and for its importance as an income and job generator. However, the main challenge in the region, where half of the population is poor, is producing food for subsistence.

Food and nutritional security (FNS) numbers for the region are not encouraging. About 7.3 million Central Americans, equivalent to 16% of the total population, suffer from undernourishment (CABEI, 2014). FAO statistics on global malnutrition in children under five (low weight/age) indicate that in Guatemala 23% of these children are malnourished, 8% in Honduras, 6% in Nicaragua and El Salvador, 5% in Costa Rica and 4% in Panama. Numbers for moderate to severe chronic malnutrition in children under 5 are as follows: Guatemala 49%, Honduras 29%, Nicaragua 22%, El Salvador 19%, Panama 19%, and Costa Rica 6%.

Even though Central America has sufficient water resources, the development of the irrigation potential is not associated with food security which, coupled with the irregular spatial and temporal distribution of rainfall, lack of regulation works, basin degradation and water pollution, impedes producing food for all, affecting nearly 10 million subsistence farmers.

In Central America between 80-98% of agricultural products rely on rain. This is a sector area heavily hit by water insecurity which has been exacerbated by climate change (GWP, 2011).

Water availability varies from one zone to another and in the Central American dry corridor it increases crop damage, degrades the soil, causes hunger and increases the risk of malnutrition and food insecurity (See Map 4).

On the other hand, the intrusion of saline water into coastal groundwater supplies reduces the chances for food security especially where these are over-exploited, as is currently happening in El Salvador's Pacific coast and Honduras' Atlantic coast.

According to the Characterization Study of the Central American Dry Corridor - CA4 countries , in Guatemala, El Salvador, Honduras and Nicaragua it is possible to clearly identify three levels of drought impact: low, high, and severe. 140 municipalities are located within the severe level: 54 in Guatemala, 25 in El Salvador, 33 in Honduras and 28 in Nicaragua. (FAO, Action against Hunger and ECHO, 2012)

WFP's Analysis of Risk and Disaster Trends in CA4 countries has cross-referenced mapping of drought, flood and landslide risks and the most degraded areas showing the greatest vulnerability to such risks over the past five years. This provides a preliminary prioritization that identifies vulnerability patterns where, in most cases, the most vulnerable territories are located within the dry corridor. When these results are cross-referenced with five year food insecurity and chronic malnutrition trends, there is evidence of the correlation between vulnerability and hunger. Furthermore, when these are cross-referenced with population density information it is possible to identify where the people with the lowest capacity for resilience reside in each of the 4 countries.

Various regional studies highlight the direct relationship between water management and food insecurity, which is exacerbated and deeper in the dry corridor. According to the World Bank more than 1,000,000 homes in Central America live from subsistence farming, most of them within this area which comprises 30% of the surface of Central America. Here is where drought turns into malnutrition, hunger and an impediment to overcoming poverty.

In 2014 thousands of small Central American farmers were forced to dispose of essential assets in order to subsist due to the onslaught of one of the worst droughts in nearly half a

Map 4 - Central America: Dry Corridor

Source: P. Ramírez, 2007.

8.6 million people in Central America live in rural areas inside the "Dry Corridor or the Drought Corridor", exposed to natural disasters and periodic food shortages (WFP-UN, 2002). One might expect that in the next 20 years, at least 3 and 5 drought events will occur, as well as a number of tropical storms at least similar to those that have occurred in the past 20 years.

century which has put about 2 million people on the brink of famine. According to Oxfam and estimates by Governments and international organizations, this involves around 236,000 families in Guatemala, 120,000 in Honduras, 100,000 in Nicaragua and 96,000 in El Salvador. The most affected crop is beans, a staple food in the region. The impact is felt in national distribution markets and in the flow of intraregional trade which has increased the price by 100%.

Challenges in the region in this regard involve implementing a comprehensive agricultural risk management strategy associated with food security that includes, among other things, irrigation coupled with supplying food and income compensation to affected households. Integrating water management is central to supporting food security, using the irrigation potential and appropriate technology together with measures to protect the soil, forests and water recharge areas and to retain moisture and store water, aiming to double or triple yields with respect to traditional agriculture.

The challenge lies in how the region optimizes water use in order to both achieve food security for all and to supply high-yield agricultural crops.

6.5 ECOSYSTEM MANAGEMENT FOR HARMONIZING HUMAN BEINGS AND NATURE8

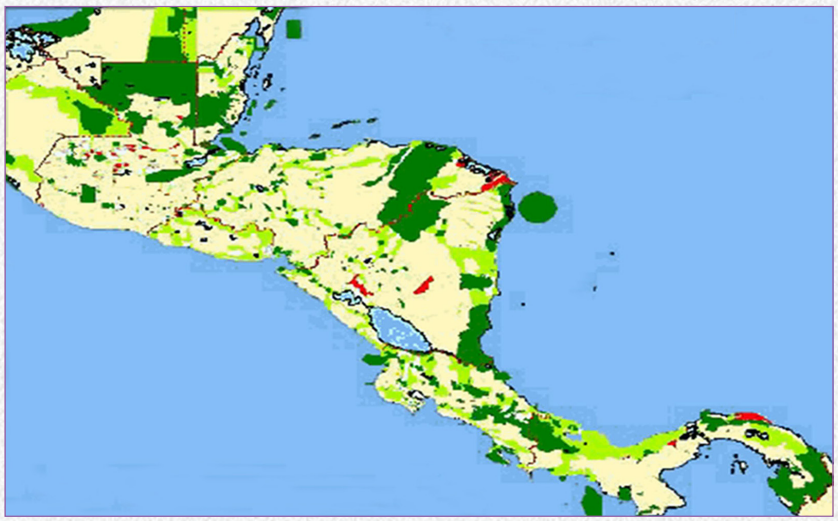
Biodiversity does not recognize borders. This is particularly true in the interconnected countries of the Mesoamerican Bridge which extends from Guatemala and Belize to the north and to Panama to the south, passing through El Salvador, Honduras, Nicaragua, and Costa Rica (WB, 2002). The region has great natural wealth; an asset for development historically managed little and highly threatened even in the 1990s when a regional protection system was consolidated: the Mesoamerican Biological Corridor (MBC). See Map 5 which also includes protected areas.

During the last decade the countries in the region made progress in the development of institutional frameworks for the environment and natural resources amid complex environmental and social settings and context.

At the same time, there were signs of greater engagement and proactiveness by the private sector, indigenous peoples and rural communities, who with support from international cooperation implemented initiatives to recover the natural heritage, highlighting the protected areas.

Historically the pressures on natural resources in the region have come from development dynamics based on an extractive model with

Map 5 - Central America: Mesoamerican Biological Corridor



Source: PROCARA / ADM 2002. Based on CBM 2001.

8. Sources consulted: WB, CCAD, UICN, WWF, State of the Region, UNDP, among others

polluting and predatory practices, a model in which financial aspects have prevailed to the detriment of social and environmental protection. (ECLAC, 2012)

It is believed that at least half of the Central American isthmus has been substantially altered by human activity and that the population will double in the next 20 to 30 years. As a result Central Americans will face an enormous challenge in trying to maintain representative natural heritage areas in the face of growing social needs.

To 2005, deforestation in the region was estimated at 350,000 hectares per year. Between 2005 and 2100 the trend-based scenario of changes in land use suggests that one third of forests and 80% of grasslands, savannas and shrubland will be lost due to expanding areas for crop and livestock use in approximately 50% of the territory (ECLAC, 2009). The loss of forest cover reduces the habitat of various land species[9] and affects the water cycle.

According to the World Bank, forests in the region represent between 14% and 58% of land ecosystems in at least seven countries in the region. El Salvador is the country with the least forest cover while Panama has the most, and the remaining countries have between 28% and 43%.

Despite their enormous importance as carbon sinks forest ecosystems are also vulnerable to climate change and climate variability, as precipitation levels can decrease and increase the likelihood of forest fires whose frequency and intensity depends on the hydrologic condition of the forest as well as on the availability of dry material.

The ecosystem services which have a significant impact on society are the hydrological, such as mangroves, wetlands and marine and coastal waters. Mangroves cover 1.4% of the region's territory (5,670 km2) and 71% are found in the Pacific watershed. (ECLAC, 2011)

Central America has made progress in terms of knowledge and actions to protect the forest cover for the purpose of regulating the hydrological cycle. The greatest challenge to reducing the vulnerability of these ecosystems - and of the environmental services they provide - to climate change and climate variability is expanding regional programs and strategies; promoting the implementation of innovative financial instruments for sustainable management; and applying an integrated water management approach where ecosystems participate in water allocation to benefit the environment.

6.6 GOVERNANCE AND FINANCING FOR SUSTAINABILITY

The quality of water governance is understood as the exercise of economic, political, and administrative authority to manage a country's affairs at all levels, with institutions through which people articulate their interests, exercise their rights, fulfill their obligations and resolve their differences (UNDP, 1993). It depends on the quality of the agreement adopted by each society, whose virtues and inequities will also be reflected in water governance.

9. Forest ecosystems are very important for the sustainable development of the countries in the region because of their importance as environmental goods and services providers, some of which include: timber, firewood, food, non-timber products, pharmaceutical products, seed, etc. Environmental services include: i) carbon sequestration or storage; (ii) regulation of hydrological processes; (iii) sediment reduction; (iv) habitat for biodiversity; and (v) reduction of risk from disasters due to extreme weather events.

Table 10 – Legal Regimes for Water

Water resource	Public drinking water and sanitation services	Water in basins
Water domain	Water user subsector	Reproduction of the water cycle
Usage Rights	Governing entity	Protection of soil and forest
Registries and cadastres	Regulatory entity	Protection of riparian forests
Conditions for transferring rights and water market	Providers, centralized, decentralized or mixed	Protection of riverbeds and banks
Water ecosystem protection and sustainability	Users, rights and duties	Protection of aquatic ecosystems
Institutional framework and participation	Urban systems and rural systems	
Financing		
Hydrological planning		
Conflict resolution		

Source: E. Colom 2003, 2010, 2012

According to the governance effectiveness indicator (part of the Kaufmann Governance Index)[10] in 2013 Costa Rica, Panama and El Salvador were ranked in the percentile above 60.00 (out of 100), while Guatemala, Honduras and Nicaragua in the percentile below 27.00. The asymmetries between States in terms of governance effectiveness are evident in the region and are undoubtedly reflected in that of water.

Water finances and governance the region are presented mainly in three legal regimes. The first concerns the water resource, traditionally embodied in a Waters Law; the second concerns public drinking water and sanitation services; and the third concerns water in basins, linked to conservation and risk management. This is summarized in Table 10 and developed in Annex 1.

6.7 FINANCING

Throughout the region the investment required to know, manage and govern the water sector requires a financing strategy, as it is one of the major constraints to orderly, deliberate and planned water resource development therein.

With the exception of Costa Rica and voluntary forms of payment for environmental services at local and community levels in Guatemala, El Salvador, Honduras and Panama, the development and implementation of economic instruments for water management remains a pending matter in the region despite the fact that current legislation includes such instruments.

Society and the States in the region are anxious to define a new culture regarding the value, price and cost of water - historically undervalued and underestimated - expressed through rates, usage standards, discharge permits and payment for environmental services, among others, so as to finance water management and the provision of quality services.

10. This index applies Voice & Accountability, Political Stability and Lack of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption criteria.

7. STRATEGIES TO ADDRESS WATER-RELATED PRIORITIES IN THE SUBREGION

The challenges of the Central American region relate to the nexus between water and globalization of the economy, social exclusion and climate change. States face challenges from the water sector due to the growing population and their concentration in cities; to the persistence of poverty; the economic crisis; the high deficits in sanitation services and consequent contamination of water sources; the effects of prolonged droughts and damage by short and intense rains; and the urgency to build capacity to adapt to climate change.

The States in the region still have enough water. Management priorities relate to meeting the demand and to developing the water potential, as well as to restoring natural conditions in order to favor better regulation of the water cycle and manage risks.

Strategies are inserted into the context of integrated water management where the basin has been adopted both as a planning unit as well as a space for managing risks and introducing adaptation to climate change measures that deliberately and concretely contribute to the fulfillment of national and regional development targets and goals. It is acknowledged that water contributes added value to human, economic and environmental development.

7.1 STRATEGY 1: UNIVERSAL COVERAGE WITH QUALITY DRINKING-WATER SERVICES

The main demands include water and sanitation. The first strategy consists in achieving universal coverage with quality drinking water services, and in the case of Guatemala, Honduras and Nicaragua the urgency of linking these initiatives with food security and poverty eradication programs.

7.2 STRATEGY 2: PRIORITIZING INVESTMENT IN SANITATION

In all countries in terms of this subsector, to prioritize investment in sanitation as a basic measure to control pollution and improve water quality, as well as to prioritize the expansion of urban systems given the increasing concentration of population in cities, taking basin protection and wastewater treatment into consideration. This is the second strategy.

To achieve this, the States and the regional community must continue building their planning capacity, increasing subsector investment and adopting deliberate and concrete measures to fulfill the obligation to protect and fulfill the access to water and sanitation as a human right, mainly in the case of Guatemala, Honduras and Nicaragua. El Salvador and Guatemala need to substantially update their current policies in order to institutionalize a system that clearly differentiates the roles of the governing entity and that of the regulatory and provider entities, providing institutionalized protection to services users.

7.3 STRATEGY 3: DEVELOPMENT OF THE ENERGY POTENTIAL

Opportunities for development in the region include the water potential for energy, agricultural, commercial and even environmental purposes.

The development of hydroelectric potential can contribute to reducing the regional energy matrix's dependence on oil, to the construction of low carbon economies, to attracting private investment and to opening spaces for a common agenda with significant co-benefits between water management and energy,

among others, because when it is not possible to move water through gravity, diverting, transporting or distributing it requires energy, a situation that in addition allows sharing infrastructure to reduce vulnerability to extreme hydro-climatic events and to the effects of climate change. States in the region cannot allow access to energy to become a limiting factor to providing public services, therefore there is a need for energy and water efficiency.

In a parallel manner the States in the region need to revise their national policies in order to define how hydroelectric development contributes to economic efficiency and social equity, which are aspects strongly criticized by social movements in most countries. They argue that this potential is located in isolated places and in territories with high levels of poverty and socially and economically abandoned by State policies. This situation is reinforced by the energy policy because it lacks an integrated approach and focuses on the energy subsector and the interests of the private sector without considering the natural and social environment.

The regional strategy is aimed at developing the hydro energy sector with support from private investment, provided that the States ensure, through clear rules, a way to incorporate social equity beyond the traditional benefits put forward by traditional public policies - universal access to affordable energy, a growing economy and opportunities for all – so as to define direct and specific local benefits, otherwise, social tension might reduce the chances to develop the subsector. This is the third strategy for the region.

7.4 STRATEGY 4: INTEGRATING WATER MANAGEMENT IN THE AGRICULTURAL SECTOR

The Central American economy still depends on the agricultural sector. For the small, higher-income segment of the population because they engage in cultivating extractive products which prove profitable in foreign markets, such as sugar cane and palm; and for others because producing basic grains for self-consumption is their sole source of wealth.

Rain is still the region's most important source of water for agriculture, and the way that the rainfall regime has changed due to the impacts of climate change and climate variability has affected production systems and accentuated the vicious circle of poverty which affects close to or above 50% of the total population of Guatemala, Honduras and Nicaragua. It has allowed chronic malnutrition to persist in nearly 16% of the total population in the region and just the impact of the 2014 drought alone has brought approximately 260,000 families to the brink of famine, mainly in the so-called Central American Dry Corridor.

Integrating water management into the countries' economic and social targets through the development of the irrigation potential becomes another regional strategy. In this case achieving food security while continuing to supply high-yield crops is the fourth water management strategy for the region.

7.5 STRATEGY 5: ENSURING THE SUSTAINABILITY OF AQUATIC ECOSYSTEMS

Given Central America's geographical position and location, aquatic ecosystems contribute favorably to it maintaining its status as a mega region diverse in flora and fauna. Furthermore, these ecosystems provide goods and services that are transformed into financial resources by the population, which is a reason why these must be taken into consideration in processes to assign use rights and when defining water protection measures.

The water resource development potential in Central America also rests on the aquatic ecosystems' capacity to reproduce and provide goods and services. Thus, this becomes the fourth priority of the regional water strategy:

managing sources according to their capacity to meet the various types of demand, whether social, economic or environmental.

The global environmental phenomenon shared by humanity is the climate change affecting all natural resources, and therefore requires improving global, continental, regional, national and local environmental governance, including that of water.

The effectiveness of climate change adaptation measures concerning water resources relies on the national institutional capacity that the States have to manage water, therefore, the fifth regional strategy is to strengthen this capacity in order to ensure meeting the demand, to anticipate and mitigate the impact of severe hydro-climatic events - due to either an excess (flooding) or a shortage (drought) - and to mitigate the effects of associated phenomena.

7.6 STRATEGY 6: IMPROVING WATER GOVERNANCE

Proper water governance can help to address regional challenges such as poverty; to overcome the lack of economic opportunities; and to stop environmental degradation by organizing strategic interventions that ensure supply for multiple purposes, prioritize access to water and sanitation as a human right, and that substantially improve the institutional resilience capacity. To do this, improving social participation conditions is essential. Introducing measures to transform the legal and institutional regime is central to El Salvador and Guatemala, and strengthening the one in place is central to the rest.

As water does not recognize borders, governance in each State also involves agreeing among themselves on how to administer the surface and underground water sources occupying the territory of two or more countries. That which is proposed for the national level also applies to surface waters or aquifers that are considered shared.

Water governance in Central America is the sixth water resources development strategy in the region. It requires policies, plans, budgets, and special and specific actions that are coordinated with each other and with those for forests, protected areas, soil and energy, to mention some areas of development.

All States in the region should capitalize on the broad citizen participation, which is a pillar of good governance. Policies need to harmonize economic, social and environmental interests between sectors and stakeholders, reflect their main demands, and define their levels of participation in decision making and the commitments that each one assumes, observing proportionality in terms of the benefits obtained.

The above mentioned strategies involve many sectors and many actors, including those who are not considered part of the water management scenario, such as macroeconomic decision-makers. The strategy of good governance can only be headed by the States and by political authorities in the regional community, as decisions require renewing or honoring political pacts.

If water is a resource useful to economic and social development, it is essential to invest in its management to make it accessible to demands and to control degradation and pollution, and especially to develop capacity in both risk management and adaptation to climate change.

Free access and the market, without assuming the externalities caused by extraction, use or diversion of water, have led to degradation and pollution which translates into specific limitations for development at all levels.

7.7 STRATEGY 7: INCORPORATING THE VALUE OF WATER INTO THE REGULATORY FRAMEWORK AND TOOLS TO MANAGE THIS RESOURCE

The strategy for placing a value on water in the subregion is fundamental. Those benefitting directly from water services, whether for domestic, agricultural, energy or other purposes, should finance via tariffs at least the cost to operate and maintain works and water resources, also considering covering the investment needed to protect the basins. Defining the cost, value and price of water is a macroeconomic issue and, therefore, also an issue of national policy for the subsidies established, arguing that these favor development because they do not consider the environmental factor.

Water sector investment needs require identifying innovative modalities for mobilizing resources such as water funds, trusts and revolving investment funds, which represent innovative mechanisms for providing partial and/or complementary financing to public and private water budgets. So far these modalities implemented have yielded positive results, although of limited scale.

7.8 GENERAL STRATEGY FRAMEWORK: WATER SECURITY AND IWRM

The region can base water's contribution on national and regional development only if it rests on a healthy economic and financial system: economic efficiency, social equity and environmental sustainability. The investment strategy is the seventh regional strategy.

To integrate these strategies water security is defined as the goal of water resources development in the sub-region, understood as the capacity to harness water's productive potential and limiting its destructive potential (Sadoff and Müller, 2010). It is an end because water security is linked to environmental, human and economic security.

The subregion reiterates integrated water management as a means for achieving water security, which is a complex and difficult approach but believed to be the opportunity for integrating actors and sectors, interests and rights, challenges and opportunities upstream and downstream, and uses with pollution control measures, as well as for linking basin natural resource management with supply and water risk management.

This vision requires reviewing the nexus between water and society in order to recognize water's vital, notable, and useful contributions to development, to prioritize public investment in water management, and to build resilience capacity to prevent the devastating impacts to society and to the economy which the region has suffered in recent decades due to climate variability and climate change. This vision also requires improving the conditions for good governance: clear rules, sound institutions and transparency where these already exist - Belize, Costa Rica, Honduras, Nicaragua and Panama - and urgently introduce them in El Salvador and Guatemala.

Achieving water security, applying IWRM and improving water governance in order to implement the seven strategies defined for the subregion requires, at a minimum, having the following scaffolding (Sadoff y Muller, 2010):

i) **Strengthened institutional systems with expert staff.** The subregion must strengthen the existing institutional framework for water in Belize, Honduras, Nicaragua, Costa Rica and Panama and must introduce specialized institutions in El Salvador and Guatemala, in order to ensure water's contribution to regional and national economic, social and environmental targets. Institutions require technical and professional multidisciplinary teams focused on how to contribute to IWRM from their areas of expertise so as to overcome sectoral views regarding use and unique water issues and achieve public investment that is strategic.

ii) **Information systems for hydrological planning, monitoring, evaluation and innovation.** Dealing with water, an element of the hydrological cycle whose behavior defines climate variability - now exacerbated by climate change - and an element vital to mankind and the environment and a natural resource useful to the economy, can only be managed according to a system of reliable information that makes it possible to establish planning processes to ensure meeting the demand and to manage natural risks, as agreed in the 2002 Johannesburg Summit Plan of Action. This is a task that is still pending in El Salvador and Guatemala. Other countries require serious efforts to consolidate water planning.

iii) **Funding for adaptive water resources management. Learning about, planning,** developing and protecting water resources requires the means to manage and coordinate actions between actors and sectors, such as collecting information, designing green infrastructure - for accurate reproduction of the water cycle by restoring the natural conditions of other basin natural resources - and building grey infrastructure - to store, transport and distribute water - to control floods and restore quality, among others. Designing, investment for, operating and maintaining these works is beyond individual capabilities and responsibilities.

Central America, a region naturally exposed to climate variability now exacerbated by the effects of climate change, requires investing in integrated water management processes because it is essentially a mechanism for adaptability given that, among others, the infrastructure for delivering services can offer additional benefits to the public, such as storage and/or flood control or even the possibility for multiple or sequential uses, which could also occur for the development of water resources shared between States.

The States in the region need to review how macroeconomics values water's contribution to economic growth and how the cost of making water accessible for the various demands can be assumed by applying principles of economic efficiency, social equity and environmental sustainability. In general, tariffs have only been determined for public services provided for domestic purposes which fail to cover operating and maintenance costs therefore limiting their expansion. As for irrigation, it operates based on water rights or use without any real financial burden with a few exceptions in districts originally organized by the State. Use for energy purposes is free in Guatemala and in Costa Rica it is subject to payments for environmental services and usage fees. All States face financial constraints that put at risk water's contribution to development, which makes it essential to apply economic and financial mechanisms that facilitate the implementation of sector policies, strategies and plans.

8. SUCCESSFUL LOCAL ACTIONS: BEST WATER MANAGEMENT PRACTICES IN CENTRAL AMERICA

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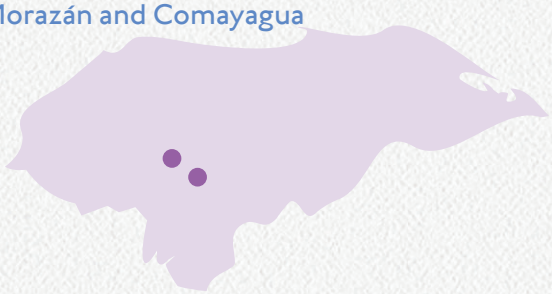
We present 6 successful cases - both public and local-level private and community-based experiences - for promoting sustainable water management in Central America. These are a small indication of the Central American society's strong interest and positive collective action that promotes specific solutions to the great challenges of integrated water resources management and that represent contributions to water development in the region.

The first case refers to the organizing and strengthening of the Goascorán River Basin Council in Honduras; the second case refers to Community-based Drinking Water and Sanitation Management with a Gender and Human Right to Water approach in rural communities of Nicaragua; the third case refers to Costa Rica, highlighting the water-energy-ecosystems nexus; the fourth case refers to sustainable and equitable promotion of the right to water, basic sanitation and food security, as well as organizational strengthening in a community in San Marcos, Guatemala; the fifth case in El Salvador highlights an effort to promote measures for early adaptation to climate variability and climate change in the region, which has devastating effects; and finally the case of Panama's restoration of the Zaratí River's sub-basin, based on joint work between communities, schools and local governments and how they open the door to regulating environmental degradation.

HONDURAS. OOrganizing and Strengthening of the Goascorán River Basin Council. Water Governance.

Departments of Valle, La Paz, Francisco Morazán and Comayagua



The source of the Goascorán River is in the Department of La Paz, Honduras and travels about 130 km, acting as a dividing line between Honduras and El Salvador during its last 18 km before flowing into the Gulf of Fonseca. The Goascorán River Bi-national Basin involves 29 municipalities on both sides of the border, of which almost 95% are located within the Central American Dry Corridor. This territory is exposed to severe climatic impacts and risks (droughts and floods) and its population to serious difficulties to preserve and improve livelihoods, a situation that has generated high rates of unemployment and mass emigration.

Within the framework of the process to strengthen transboundary governance in the Goascorán River Basin - dating back to 2004, boosted by the BRIDGE project financed by Swiss Cooperation and implemented by Fundación Vida/IUCN as of 2011, and under the leadership of a Bi-national Basin Management Group in accordance with the agreed roadmap - it was agreed to develop processes to consolidate governance in each country through dialogue platforms in order to advance towards the definition of transboundary cooperation agreements.

As a result of a series of information, socialization and consultation workshops in compliance with provisions in the General Waters Law, Honduras has been consolidating instruments for the registration and legalization of Micro Basin Councils (at all levels: Upper, Middle and Lower), Sub Basin Councils (Lower Goascorán and San Juan River) and the Goascorán River Basin Council.

Councils are made up of Central Government representatives from the Natural Resources and Environment Secretariat; Forest Conservation Institute; Ministry of Foreign Affairs; National Autonomous University of Honduras, 4 associations of communities (MAFRON, NASMAR, MAMSURPAZ and MAMLESIP) and municipal corporations; as well as of non-governmental organizations such as Community Boards, Water Boards, Development Agencies, Cooperatives, Environmental Organizations, Producer Associations and Rural Savings Banks.

This experience represents an effort towards consolidating decentralized basin management according to the vision and approach that Honduras has determined for water management at the territorial level. This Council, which at this time is in the process of being legalized on the Honduran side of the basin, is part of a broader process - the Bi-national Goascorán River Basin Management Group - which represents a Honduras-El Salvador bi-national initiative.

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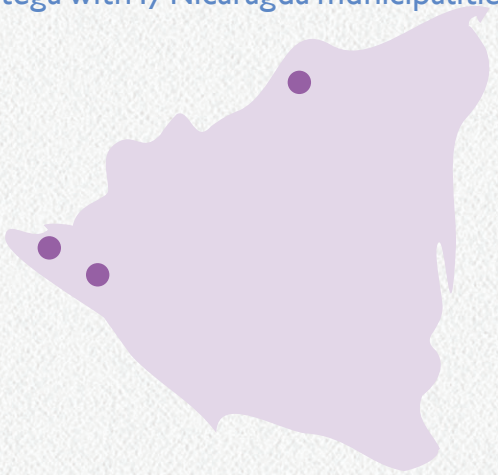
NICARAGUA. Community-based Drinking Water and Sanitation Management with a Gender and the Human Right to Water approach. Water and Sanitation.

Departments of León, Chinandega and Jinotega with 17 Nicaragua municipalities



Drinking Water and Sanitation Committees (CAPS) are organizations legally authorized to organize, manage, operate and maintain public water services in rural Nicaragua. The experience has been preceded by several training courses on Gender and Development sponsored by the AECID Technical Office in Nicaragua within the framework of its 2009-2012 Gender Plan of Action.

The first step was to make a gender diagnosis of community-based water and sanitation systems management to identify gaps and possible openings to promoting changes in the women's participation in both construction processes and in CAPS management dynamics. The following gaps were identified:

- Sexual Division of Labor: The tasks required to build, maintain and manage water systems and to make them sustainable follow gender guidelines: they exclude women from the more highly-valued tasks.
- Participation in spaces of power: women participate in community decision-making structures to a lesser extent than men.
- Cultural: it is socially accepted that supplying water to the home through precarious means is the women's task.

The gender gaps identified were addressed by NGOs defining concrete actions in 17 municipalities in the departments of León, Chinandega and Managua, among which is involving women and youth in supporting the CAPS' legalization process, promoting training to women within CAPS structures and following up on the implementation of the law.

This has been a successful experience in terms of knowledge management. It has increased the percentage of women in user assemblies and in CAPS Boards of Directors, in municipal network constituent assemblies and in their Boards of Directors, and in Departmental Networks. These decision areas reflect significant progress which is without a doubt the result of actions focused on improving the women's participation in water governance.

ONGAWA and LA CUCULMECA, both NGOs, work in Jinotega where 40% of the 49 members of the Departmental CAPS Network in 7 municipalities are women. This participation is reflected in the Boards of Directors of 7 municipal networks, where female participation is between 28% and 43%. This coincides with the female presence in the Boards of Directors of 200 CAPS (40%) and in user assemblies in Jinotega (35%) where leadership is increasingly being assumed by women.

Another great goal in this effort is linked to the promotion of the Human Right to Water and the promotion of women and youth participation in community structures, which has promoted: i) the acknowledgement of the Human Right to Water from the CAPS; ii) support for

the legalization of 250 CAPS; iii) 63 workshops to strengthen the CAPS; iv) creation of Municipal and Departmental Networks to improve committee associativity; v) implementation of drinking water and sanitation technologies; and vii) 181 improved water sources in 431 CAPS in 17 municipalities.

The key actors in the process have been the CAPS, the Nicaraguan implementing organizations Fundación LIDER, CIEETS, CUCULMECA, Fundación Nuevas Generaciones, with support of the Consortium of Spanish NGOs: Amigos de la Tierra, Fundación Ecología y Desarrollo, Ingeniería sin Fronteras Valencia, ONGAWA (formerly ISF-ApD); Alianza para la Solidaridad (formerly Solidaridad Internacional).

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PARAGUA: https://www.youtube.com/watch?v=HuCqJbl6oAo&list=UU_QQ2PZrEH4oJ-o_lZkUo8w

COSTA RICA. Parismina Fluvial Compensation Project Water, Energy and Ecosystems.

Guácimo and Siquirres in the Province of Limón. Reventazón Parismina Basin.

The Costa Rican Electricity Institute (ICE) has pledged to promote the management and conservation of the protected area around the banks of the Parismina and Dos Novillos Rivers, as well as to ensure that no obstacles are set up in the riverbed that might affect the natural distribution of aquatic species in order to offset the residual impacts caused by the harnessing of the Reventazón River for energy production purposes.

The environmental management of riparian areas is promoted by working with communities, social organizations, private landowners, and governmental and academic institutions in the area. A social diagnosis has been conducted using the capital methodology, developing a baseline of the quality of the aquatic habitat that includes indicators for water quality, riparian quality and natural riverbed characteristics. A continuous and participatory monitoring will be conducted using tools to measure the contribution of social and educational organizations. An environmental management plan with long-term goals is currently under development to start with central actions to protect the riverbed and banks as of next year.

The diagnosis of capital reveals that the river is an important element for inhabitants within the project's area of influence, who are willing to participate in conservation initiatives. 16 communities are linked to the river. Higher areas have a good to very good status of aquatic habitat while in middle and lower areas it is fair to poor. The affected aquatic species are present in the Parismina River and show a natural distribution up to the higher- middle basin.

The main challenges include improving conditions in the middle and lower basin, as well as maintaining and improving the upper basin with the participation of all actors, including the 16 communities linked to the river located on both banks.

Furthermore, the initiative has the backing of academia - the National University, EARTH University and CATIE as technical and scientific support organizations to measure and assess impacts - and obviously of the institutional sector - MINAE, MAG, INA, and ICE as coordinator of the effort.

This experience shows the water-energy-ecosystems nexus from a sustainable water management approach where the Costa Rican hydroelectric company is working to offset residual impacts from the construction of the Reventazon hydroelectric dam through the restoration and conservation of the Parisimina River in order to ensure an ecosystem that is the ecological equivalent of a free flow. This effort includes an ambitious strategy of active involvement of key actors in the basin, whether public, productive and social.

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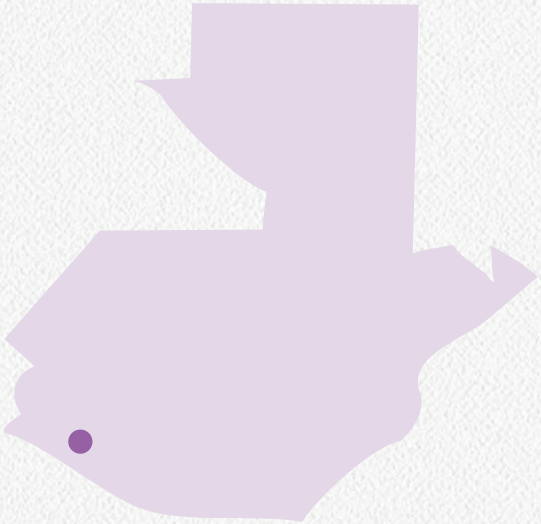
GUATEMALA. "Sustainable and equitable promotion of the right to water, basic sanitation and food security, and municipal and community organizational strengthening in the Department of San Marcos" (TANMA Program). 2010-2013.

Water and Sanitation and Food Security.



The experience includes 7 communities and is based on the comprehensive methodology of the People's Pro-Water Association for holistic solutions to rural water and sanitation, with support to food security. The Fundación Paz y Solidaridad from Navarra, Spain provides the financial support.

The principle of People's Water is that "water is a means, not an end", which means that the ultimate goal is not only to provide water and sanitation to communities but to build their capacity to overcome their poverty and the Central Government's neglect.[11]

Strengthened community organizing is conceived as a path to advocacy on municipal public policy, based on rights and on organized participation focused on precise objectives, as well as to integrating new generations as a source of fresh community leadership.

In terms of infrastructure, the experience includes basic sanitation for 7 communities, drinking water systems for 5 and a mini-irrigation system for 1 community. The comprehensive intervention model for water, sanitation and mini-irrigation projects is based on four components: (i) infrastructure for drinking water or mini-irrigation; (ii) sanitation + hygiene; (iii) protection of water recharge areas; and (iv) community, municipal and inter-municipal organizational strengthening.

The results achieved to ensure drinking water for 348 families in 5 communities are very positive. We built and installed 5 quality gravity-based drinking water supply systems in the communities of 20 de Febrero, Bendición de Dios, Tijhuichi, Ángel and Villa Hermosa.

The project has improved agricultural production, as well as access to and availability and consumption of food for 24 smallholder families in Chininshac, municipality of Tacana, San Marcos, by building a mini-irrigation system that is now fully operational. This has reduced vulnerability to food insecurity. Families with plots up to 5 cuerdas are now able to get 4 harvests instead of two, freeing them from having to go to "other side" (Mexico) as temporary workers. The project has been running smoothly for three years now so instead of having to sell their work force they sell their surplus harvest, in addition to being able to consume fresh vegetables year-round.

"I have six children...the older children used to suffer from fevers and diarrhea. The youngest are getting sick less often. We now have more time for the children because we don't have to go work to the other side...now with irrigation there is more work in the community." Beneficiary in the community of Chininshac.

11. Social indicators (extreme poverty, malnutrition and deficit in coverage of basic social services, such as water and sanitation, in rural and indigenous populations) are well above departmental indicators, practically twice the national ones. As for extreme poverty (living on US$ 1/day or less) two municipalities have almost 50% of their population living under these conditions.

Another result from this intervention has been the improved coverage and quality of sanitation and hygiene practices in 7 communities. The traditional landscape of basic rural sanitation has been altered in project communities by "grafting" a sump to a "pit", or household reservoir for the water flow from the stream, and then to a latrine with a polyethylene bowl and vent tube.

The project has worked toward organizational and technical strengthening using a gender and rights approach in 7 communities in order to operate and maintain water and sanitation infrastructure and to improve hygiene habits and environmental care. Thus, 7 Community Development Councils (COCODES) have acquired, strengthened and applied skills and 7 community teams have been trained as forest guides, strongly promoting young leadership to strengthen organizing and advocacy in local development processes.

Community organizational strengthening focused on but was not limited to just the COCODEs, which were created in accordance with the law as links in a chain of participation from the community to the municipality (COMUDE), then to the Department (CODEDE), through to the region and finally to the National Development Council. In addition, local health counselors, plumbers, and agricultural and marketing guides were organized for the mini-irrigation project. Child and youth groups were also formed.

The role of COCODEs focused on organizing and mobilizing actor participation in the execution of the works to install the services (ensuring unskilled construction labor), keeping tabs on the warehouse and mediating the relationship between People's Water and the community, a role they performed well.

The intervention also managed to expand wooded areas in 7 communities so as to protect water recharge areas, under the guidance of the forest guides, and locations affected or vulnerable to climate change.

Finally, the project formed the inter-municipal institution to build capacity in Water Management and Irrigation made up of properly organized and trained representatives from the 7 communities. This result is essential given the urgency to contain and reverse the phenomena fracturing both territory and organizing, weakening the mobilizing force of social organizing.

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EL SALVADOR. Basin Management Project and its contribution to reducing canicular effects. Water, Climate and Food Security.

Hydrographic region Bay of Jiquilisco, Usulután.

Since January 2013 the Ministry of Environment and Natural Resources (MARN) has been implementing the Micro-Basin Management project in the seven basins located within the hydrographic region of the Bay of Jiquilisco in order to contribute to sustainable natural resources management, with special emphasis on reducing soil loss from erosion and increasing water infiltration and tree cover. To achieve these goals, a number of technical actions have been developed aimed at protecting around 900 acres of fragile land in middle and upper basin areas by implementing a series of conservation technologies.

These technologies have a direct impact on mitigating the effects that climate change is having on agriculture. The project's area of influence, the Bay of Jiquilisco hydrographic region located in central Usulután, is recurrently affected by an extended heat wave during the rainy season which seriously affects agriculture[12] mainly basic grains cultivation - the cornerstone of the inhabitants' food security.

2014 was no exception. The heat wave lasted 25 consecutive days - June 25 to July 19 - bringing high temperatures that caused significant crop loss.

In order to counteract the adverse effects of the heat wave, MARN, through its Micro-Basin Management project, implements a series of targeted conservation technologies to increase soil water content and maintain moisture levels. 720 producers from rural areas in the municipalities of Usulután, Tecapán, Ozatlán, San Francisco Javier, California, Jiquilisco and San Agustín have played a leading role in this effort, protecting more than 900 hectares of hillside land devoted mainly to basic grains cultivation. The main technologies implemented are as follows:

- Managing and not burning crop stubble in order to reduce solar radiation effects, maintain moisture and retard soil drying.
- Trench-type infiltration ditches, which accumulate water and increase soil moisture levels.
- Live barriers of vetiver grass and bromeliads, which serve to protect irrigation ditches from sediment from eroded soil.
- Infiltration trenches in silvo-pastoral systems, which serve to capture rain water to increase or maintain soil moisture.
- Planting of fruit trees in individual terraces, which capture water for each plant individually.
- Implementation of agroforestry systems to increase forest mass in the hydrographic region.

Despite 25 days without rain, the technologies implemented allowed accumulating water from the rains prior to the heat wave and using it during the dry period, thus reducing the water deficit and ensuring a corn harvest which, while not the one expected, at least meets the producers' expectations.

12. The significance of this heat wave is that this meteorological phenomenon usually coincides with the flowering, fertilization and formation of the grain, a sensitive stage in which a lack of rain and water in the soil significantly affects crops. The lack of rain during this time of the year and the absence of cloud cover allow greater solar radiation, raise temperatures, heat the air, and the dry soil leads to plant dehydration. The crop that suffers the most damage from the heat wave is maize. After suffering the effects of this phenomenon, its leaves curl, growth stops, and if the wilting continues, it dies.

"The first rains managed to infiltrate and this prevented the corn from suffering much... carrying out this kind of work in the plots is important and helps a lot; the stubble that remained helped maintain the soil's moisture; the yield did not decrease because the irrigation trenches managed to collect water from the first rains that fell in the area and this prevented the yield from decreasing too much". Teresa de Jesús López de Soriano, a producer commenting on the benefits of these technologies to her 1.5-hectare plot

Based on testimonials from these producers benefitting from the project and on inspections to the areas, we can conclude that the activities promoted in plots during heat wave conditions - hillside irrigation trenches, live barriers, fruit trees, individual terraces, forest trees, stubble and fire management - have significantly contributed to counteracting and mitigating the effects of drought in the Bay of Jiquilisco's hydrographic region, thanks to which benefitting producers will have ensured their basic grain harvests.

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PANAMA. Restoration and Integrated Management of the Zaratí River Sub-Basin.

Water and Ecosystems.

Province of Coclé, District of Penonomé.

The Zaratí River Sub-basin is vitally important to the Coclé region, as it is one of the main sources of water for human consumption and for agricultural and livestock activities and agro-industry.

Downstream from the sub-basin we find a farming region known as "Llanos de Cocle" consisting of large plains devoted to rice production, livestock activities and sugar cane cultivation. It receives water from the Zaratí River, a Rio Grande tributary which reflects the impacts of environmental management and problems in the Zaratí sub-basin.

Despite its importance to the economy and to regional social development the Zaratí River is subjected to a gradual and cumulative process of pollution and alteration to the hydrologic regime of the basin, with its sequence of extreme flooding during the rainy season and acute droughts during the dry season. Each year the process of gradual degradation to the sub-basin generates problems involving erosion and sediment entrainment during the dry season and flooding during the rainy season. An integrated sub-basin management project was launched to reverse these effects.

Residents began mobilizing in view of the uncontrolled and irresponsible deforestation that was impacting the waters' source and, anticipating its imminent disappearance, requested the intervention of municipal and national authorities in order to preserve the forests surrounding said natural water source.

This mobilization bore fruit. Legal protection was granted to the recharge areas of these sources that supply the water systems of the communities located in the upper areas of the Zaratí sub-basin. With support from the municipality, local NGOs and the National Environmental Authority (ANAM), two Water Reserves were created by Municipal Agreement 003 of March 31, 2005, published in the Official Gazette 25,297 on May 12, 2005: the Cerro Turega Water Reserve, with 602 Ha. and the Cerro Cucuazal Water Reserve with 294 Ha.

In support of the actions taken at the local level, ANAM is driving the project for the restoration and integrated management of the Zaratí sub-basin which responds to the need to protect the river.

The creation of the water reserves and the opening of the new water treatment plant in the city of Penonomé intensified activities and relationships between local leaders around the issue of Zaratí basin conservation. This led to forming a task force comprised of ANAM, Penonomé's Mayor's Office, the Martinez Brothers Group, S.A. (MARHESA) and Angel Maria Herrera High School.

The project promotes the adoption of cleaner production practices that ensure water quality, and the results achieved include reforestation with native species and fruit trees of 60,000 Ha including catchment areas, private farms and gallery forests .

Residents of the upper, middle and lower sub-basin have been trained in agroforestry practices, nursery management, compost production, marketing and project development, gender and environment, production of preserves using local resources, preparation of flour products, nursery bamboo production,

manufacture of bamboo furniture, cultivation of Guadua angustifolia and manufacture of Guadua furniture, among others.

In addition, workshops have been held on environmental awareness, leadership, motivation, community organizing, environmental laws, cleaner production, business administration and environmental business and investment, among others. Tours and meetings have been held with producers in various successful projects, including bio-digester use and compost production.

An important outcome has been forming the Zaratí Multi-Service Agroforestry Cooperative (COOMUZA), which is made up of residents from the communities of Sofre, Caimito, Guabal and Oajaca - part of the sub-basin - whose main goal is production using environmentally friendly techniques and to market environmentally healthy products. This serves to unify small agricultural and artisanal communities through an enterprise whose products are intended to go beyond local and/or national borders.

The factors that facilitated the results achieved include the communities' interest in protecting the basin; the cohesion of local artisans around the activity of production and conservation of raw materials and production and marketing of their handicrafts; and the institutional interest in the sub-basin's conservation in view of the new water treatment plant in the city of Penonomé.

This action initially led by communities and ANAM currently receives support from institutions such as the Panamanian Autonomous Cooperatives Institute (IPACOOP), the Ministry of Social Development (MIDES), the Ministry of Agricultural Development (MIDA), the Ministry of Economics and Finance (MEF), the Medium and Small Enterprise Authority (AMPYME), the Technological University of Panama (UTP), the University of Panama (UP) and the Ministry of Education (MEDUCA).

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9. CONCLUSIONS, LESSONS LEARNED AND FUTURE OUTLOOK

9.1 CONCLUSIONS

1. Due to its geographical position the Central American region has ample water availability, however, this potential involves significant natural hazards arising from climate variability and climate change manifested through longer droughts and short but intense rains caused by events such as hurricanes, tropical depressions and El Niño Southern Oscillation.

2. The pattern of economic development is based on the extraction and use of natural resources, which has fostered environmental degradation and social inequality now exacerbated by the effects of climate change especially in Guatemala, Honduras and Nicaragua, whose HDIs are significantly lower than those of Belize, Costa Rica and Panama.

3. Recent public policy has introduced innovative reforms to the water sector in Nicaragua, Honduras and Belize. Costa Rica has made progress in the implementation of a water rights system since its 1942 law and has contributed significantly to promoting basin protection policies. Panama has developed special policies to manage the Canal basin, while El Salvador and Guatemala urgently need to update water-related public policy.

4. As a fundamental principle of international law, cooperation is the ideal means for linking negotiation processes, signing of agreements and implementation of joint actions between States for joint development of international watercourses and of transboundary aquifers in the region, which is a pending task for all States.

5. The region has achieved progress in terms of water service coverage but sanitation remains the most important task at hand, as most domestic, industrial and agro-industrial wastewater is discharged into the environment totally untreated.

6. In order to fulfill their duty to protect the human right to water and sanitation, States in the region must maintain current policies and define a specific plan so the entire population can progressively achieve access to these rights. The observed trend of high concentration of population in cities poses another enormous challenge to States in the region in terms of an integrated management of urban waters that allows meeting a growing demand for water and disposing of wastewater concentrated at certain points with the capacity for causing further degradation.

7. Central America is a pioneer in the promotion and implementation of measures for the conservation of natural resources associated with water, such as forests and protected areas. It has been a Mesoamerican Biological Corridor that promotes the protection of animal and plant species and, based on Costa Rica's experience, has promoted the payment for environmental services as a mechanism for efficient water use and as an incentive for basin conservation.

8. Water management in the region is not directly linked to national development goals, which explains why despite having a sufficient supply it still faces deficits in drinking water coverage; why the agricultural use of the resource is not associated with food security and the malnutrition and poverty still faced by Guatemala, Honduras and Nicaragua; why the development of hydro-energy potential has been a source of social conflict; and finally, why institutional capacity has not been strengthened or why not enough public funds have been allocated to address climate change when the greatest impacts to society, the economy and the environment these last decades have been caused by hydro-climatic events.

9. The case studies show successful local experiences in promotion of sustainable water management led by public and private and community actors promoting concrete solutions to the great challenges of integrated water resources management, becoming examples for the global community.

10. The case of Honduras is exemplary in its organizing of the Goascorán River Basin Council; Nicaragua's case describes community-based water and sanitation management from a gender and human rights approach; the third case, Costa Rica, highlights the water-energy-ecosystems nexus; Guatemala's case the sustainable and equitable promotion of the right to water and sanitation, combined with irrigation for food security and community strengthening; the case of El Salvador shows an effort to promote measures for early climate change and variability adaptation; and the case of Panama shows how agreements between actors and public, private and social sectors fosters actions to restore the Zaratí River sub-basin.

11. The balance between the economic, environmental and social goals of water resource development in the region still leans toward economic growth at the expense of social protection and environmental sustainability policies which, in addition to generating and increasing inequities and fostering social instability, threaten the natural resource base that enables economic growth, limiting the possibility of achieving sustainable development that seeks to balance social aspects with economic and environmental aspects. This paradigm was adopted by the UN Assembly, of which all States in the area are a part, at the World Conference on Sustainable Development in 1992 which was ratified in Johannesburg in 2002 and reiterated in the Future We Want Declaration in 2012.

9.2 LESSONS LEARNED

Balanced development of Central American societies is not ensured by having enough water but rather by how the social pact addresses the use of the natural resources providing goods and services, including water. Thus, Belize, Costa Rica and Panama have reached a human development that is considered high, while El Salvador, Guatemala, Honduras and Nicaragua exhibit a medium development which becomes a low one when adjusted by the inequality rate. The consequences of these positions are also reflected in water management and governance.

For water - an element of the hydrological cycle governed by climate and exacerbated by the effects of climate change – to be able to contribute to development, now more than ever it is necessary to have a solid institutional framework based on strategic information, water planning, infrastructure, and human and financial resources backed by specialized public policies, laws and institutions. This situation is reflected in the positive way in which Costa Rica and Panama govern their water, in the innovative institutional proposals introduced during the last decade by Belize, Honduras, and Nicaragua; and on the other hand, in the limitations that the lack of clear rules means for El Salvador and Guatemala.

Achieving conditions conducive to water security requires defining long-term goals - given that water is a natural asset with social, economic and environmental properties - deliberately and specifically articulated to national and regional targets and goals. As other natural resources, water and the environment provide society with the goods and services they need to subsist, produce and enjoy life, therefore, the measures to define its use and protection need to be considered by macroeconomic policy-makers in harmony with social and environmental needs.

Integrated water resource management appears to be the best choice for improving the state of affairs in the region, although it is necessary to acknowledge the complexity of its implementation, which can only be achieved through coordinated actions between actors and multiple sectors based on common objectives embodied in tools for water resources development.

Central America's water potential offers countries and the regional community ample opportunities for development that can contribute to eradicating poverty and malnutrition, to improving production opportunities - especially for subsistence farmers - and to recovering the aquatic ecosystems' capacity to provide goods and services.

Challenges in the region relate to the nexus between water and a globalized economy, social exclusion and climate change. The key lies in acting regionally and negotiating globally.

9.3 FUTURE OUTLOOK

The impacts of climate variability and climate change have affected and will continue to impact society, the economy and the environments of the countries in the Central American region. It is essential to improve State and regional institutional resilience capacity in order to turn this threat into an opportunity.

Maintaining the levels of economic growth and overcoming conditions of social exclusion and environmental degradation requires rethinking how regional societies relate to this valuable-on-three-fronts resource. It requires including macroeconomic measures in order to not only ensure meeting economic demands but also to control their negative impacts on aquatic ecosystems and society, as well as to ensure progress in these sectors.

Each Government in the region must assume its own responsibility by improving their legal and institutional regime for water, providing human and financial resources to the sector to foster water security, taking over water management within their territories and establishing win - win cooperation relations with neighboring States, the region and the world.

In that sense, water security is considered the cornerstone of water management and climate change adaptation strategies in the region. In practice this means focusing on equitable, efficient and sustainable water management achieved by implementing IWRM, which requires having an institutional framework for water. Otherwise, there will be no effective way of introducing from the water sector preventive measures for adapting to climate change.

SICA's (Central American Integration System) leadership, through its technical secretariats, the Environmental and Development Commission (CCAD), the Regional Water Resources Committee (CRRH), and other institutions responsible for facilitating the implementation of regional policy, is essential given the extent of the territory affected by climate phenomena and the impacts that these cause on society and the economy in the region.

The region's links to global climate change governance is essential to improving the chances of tackling and overcoming current water resource management challenges based on the principle of common yet differentiated responsibilities, as the region's contribution to greenhouse gases is not even remotely proportional to its natural exposure to extraordinary hydro-climatic events exacerbated by greenhouse gases emitted by developed countries. Therefore, demanding the sharing of knowledge, technology and technical assistance on climate change with Central American countries is part of a package of measures which, in the concert of nations, the region needs to achieve.

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11. ANNEXES

ANNEX 1 – LEGAL AND INSTITUTIONAL REGIME FOR WATER IN THE CENTRAL AMERICAN SUB-REGION

The legal regime for water addresses a particular issue pertaining both to political and social aspects and to economic and environmental aspects, and therefore reflects the virtues and inequities of the founding social pact. According to the governance effectiveness indicator, part of the Kaufmann Governance Index[13], in 2013 Costa Rica, Panama and El Salvador were ranked in the percentile above 60.00 (out of 100), while Guatemala, Honduras and Nicaragua in the percentile below 27.00.

Water governance and finance in Central America are mainly reflected in three legal systems. The first refers to water resources, traditionally embodied in a Waters Act; the second refers to the public water and sanitation services regime; and the third refers to the natural water resources in basins, a regime linked to conservation and risk management.

LEGAL REGIME FOR WATER RESOURCES

The Water Act refers mainly to the following topics:

1. **Waters of public domain.** Considering the vital and environmental nature of water and its capacity to satisfy public interest, social and private uses in all countries in the region, the owner of inland waters is the State, which is why these are subject to special legal guardianship. In Guatemala this is defined by Section 127 of its Political Constitution, and according to ordinary law, water resources are public property in Honduras (Section 25 of the General Water Act); in Nicaragua (Section 7 of the General National Waters Act); and in Costa Rica (Section 4 of the Mining Code).

2. **Water Rights.** The water rights system is the means through which the State authorizes certain individuals to use public water resources. The legal security afforded by a general water rights system allows exercising rights and fulfilling obligations, ensures investment for water resources development and reduces the possibilities for conflicts. The legal regimes of Costa Rica, Honduras, Nicaragua and Panama have general provisions to grant water use rights and to authorize discharges, while El Salvador and Guatemala only have legal standards for certain sectoral applications.

3. **Terms of use.** In the case of Costa Rica, Honduras, Nicaragua and Panama, the legal regime for water requires the effective use of water according to the granted right under penalty of termination through expiration. This regime prevents hoarding sources and speculation in the development of productive uses of water. It also includes other conditions related to best practices.

4. **Transferability of water rights and water markets.** Water laws in Costa Rica, Honduras and Nicaragua allow transferring water use rights through administrative procedures, without any of these laws regulating a rights market such as the one contemplated by Chilean or Spanish law.

5. **Registries and Cadastres.** Rights registries and use cadastres are organized to provide legal certainty and security to water rights and to demand the fulfillment of obligations by the holders. These institutions exist within the legal systems of Costa Rica, Honduras and Nicaragua. Furthermore, rights registries serve to collect levies and other contributions. Guatemala has a registry for concession rights as part of the General Property Registry where real and personal property and all limitations are registered, but lacks a water use cadastre.

13. This index applies Voice & Accountability, Political Stability and Lack of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption criteria.

6. **Institutional framework for water management.** In Costa Rica water resources management corresponds to the Water Directory attached to the Ministry of Environment and Energy (MINAE); in Honduras the water authority is part of the Natural Resources and Environment Secretariat (SERNA); in Nicaragua, this falls under the purview of the National Water Authority (ANA), which is a specialized and decentralized entity of the Executive Branch; and in Panama to the National Environmental Authority (ANAM).

   Water management in Costa Rica, Honduras, Nicaragua and Panama is also characterized by their reliance on basin entities, among which is the Panama Canal basin. In the case of El Salvador and Guatemala water management is partial and sectoral, but the basin is adopted to execute programs and projects involving forests, soil, and protected areas and basins, which contributes indirectly to water resource protection.

7. **Financial Resources.** Managing and governing water resources requires having sufficient financial resources to learn about the resource and organize an information system for decision-making, as well as to plan, grant and protect rights and apply measures to control resource degradation.

   Costa Rica includes the payment of a fee for both water use and discharge permits and to protect the basins. These funds go to covering administrative management costs, hydrological and meteorological monitoring, planning, control, research, as well as to conserve, maintain, and restore ecosystems and basins.

   Nicaragua's General National Waters Act establishes an economic regime for water use and discharge which is set according to Section 87 - a special law dictated by Congress which still has not been approved - as well as Section 95, a payment for water-environmental services as an incentive to conservation. Fines imposed as sanctions also constitute another source of separate income (Section 124). Proceeds go to the National Water Fund and serve to finance water resources management and to protect basins.

   Honduras' General Water Act establishes payment for administrative services, as well as a tariff regime for water use, for authorizing discharges and for using infrastructure (Sections 11 and 86). Likewise, the law provides for payment for environmental services (Sections 25 and 33) and for the collection of fines imposed as sanctions for breach of the law (Section 95). Proceeds go to the National Water Resources fund, which are mainly used for water resource conservation and protection.
   In addition to a payment for water use rights, Panama sets a payment for technical services (Resolution AG-0009-2006 - January 5, 2006).

8. **Hydrological planning.** Hydrological planning is essential to water resources development, as it is the means for optimizing water use, making it more efficient and for ensuring the inclusion of social equality values and environmental sustainability values.

   Costa Rica's Water Directorate includes several planning tools within its management measures, such as the Costa Rica Water Agenda (2013), the Integrated Water Resources Management Strategy (2004) and the National Water Policy (2009).

   Honduras' General Water Act provides for a complex planning process at the national and at the basin level (Section 82) just as Nicaragua's General National Waters Act (Articles 15-18) integrates planning into the management process.

Guatemala and El Salvador have issued Government water policy tools without even having the legal backing. However, the need to institutionalize a national system for hydrological planning - with its respective system to evaluate and monitor the fulfillment of targets and goals laid out by programs and projects that reflect the planning – is a task still pending in countries in the region.

9. **Conflict Resolution**. The conflicts highlighted by social movements, the media and NGOs in all Central American countries are those arising from water rights granted for mining and energy purposes. However, the low-intensity conflicts between communities, between communities and municipalities, and between municipalities, communities and private users due both to access to water and to the effects of pollution are not perceived clearly even when in fact these affect many more people and involve the management of the majority of sources.

   All countries in the region have some social movements promoting the private sector's non-participation in water and sanitation service delivery unless they are self-managed or community-based organizations, mainly organized in poor urban neighborhoods or in rural areas.

10. **Customary and traditional rights**. Only Nicaragua's Constitution and the General National Waters Acts recognizes the Atlantic Coast communities' right over the water resources located within their territories, according to their culture and way of life.

    The legal regimes for water in other Central American countries do not expressly mention indigenous peoples' or other special communities' rights over water resources, except Guatemala, whose Constitution protects their lands generally.

11. **Protection and sustainability of freshwater ecosystems.** Legal and public policy regimes in Costa Rica, Honduras and Nicaragua adopt measures to protect freshwater ecosystems and to restore their natural conditions - quality, quantity and behavior - in order to achieve a state of sustainability, whereas El Salvador and Guatemala adopt some governmental actions, usually from the environmental sector and regarding water use, with a sectoral approach.

12. **Participation.** An important feature of water governance in Central America is the broad participation of society. Access to drinking water and sanitation happens in two ways: when civil society assumes the responsibility for achieving access to water and sanitation services and assumes the responsibility for operating, maintaining and expanding these systems: ASADAS in Costa Rica, Water boards in El Salvador, COCODES or committees in Guatemala, JAH in Honduras, and Drinking Water and Sanitation Committees (CAPS) in Nicaragua. In all cases, these are community figures.

    The other level of participation consists in bringing before the State the right to participate in decision-making processes regarding the granting of use rights for energy or mining purposes, when this use will be within the territories of indigenous peoples or rural communities, and to claim the right to life, to health, to water and sanitation and to a healthy environment. In the case of indigenous peoples, mainly in Guatemala, to claim the rights established by Convention 169.

13. **Guardianship of public assets and monitoring the exercise of use rights.** As a public asset, water is part of the national wealth and, therefore, it is necessary to preserve it and monitor its status to ensure that it contributes sustainably to economic and

social development. This also involves controlling the exercise of the use rights granted.

Nicaragua's General National Waters Act and Costa Rican and Honduran laws all organize information systems on water as a resource and on the rights granted and the discharges authorized.

As part of all procedures for granting water use rights, countries in the region also require the drawing up and approval of environmental impact assessments. Since Guatemala lacks a special law in this regard, this becomes a way to try to protect use rights for mining and energy purposes. However, all countries in the region suffer from serious degradation and contamination to their surface and underground water sources, which is evidence that the States' current control measures are insufficient.

REGIME FOR PUBLIC DRINKING WATER AND SANITATION SERVICES

The legal regime for public water and sanitation services clearly distinguishes two systems in countries in the region.

1. **Decentralized delivery, no regulator**
   This system is represented by Guatemala where the delivery of public water and sanitation services is characterized by the fact that each of the 336 municipalities in the country is empowered by law to regulate, deliver and/or grant in concession these services under the health stewardship of the Ministry of Health; there is no regulatory entity.

2. **Centralized Delivery, with a governing and regulatory entity**. In Costa Rica, El Salvador, Honduras, Nicaragua and Panama the legal regime is organized with a governing body and a regulatory body, which are independent from each other.

   The governing entity is a centralized body responsible for leading the sector and ensuring that the services are delivered, or delivers the service itself, throughout the national territory with little or no private participation except in the case of the previously mentioned community-based organizations. This would be AyA in Costa Rica, ANDA in El Salvador, CONASA in Honduras, ENACAL in Nicaragua and IDAAN in Panama.

In delivering public water and sanitation services, governing bodies act according to the provisions of an independent regulatory body, also established by an Act of Congress.

According to studies and assessment in the region, the biggest challenge to overcome is the financial sustainability of water and sanitation services. The operations of national entities are covered by Treasury, and the operation and maintenance of water systems is according to different modalities, all introducing tariffs as the ideal means.

LEGAL REGIME FOR WATERS BASINS

The Central American Integration System (SICA) has always shown strong leadership in environmental matters, starting from the approval of the Alliance for Sustainable Development (ALIDES) in 1994, which significantly boosts internal legislation in countries for the legal reorganization of forests and for institutionalization of protected areas.

This institutional movement strengthened the national and regional risk management approach and consolidated the approach to basin management and with it the promotion of payment for environmental services, including hydrological services, when it was acknowledged that protecting natural resources in the upper and middle basin contributes to maintaining flow rates and to dissipating the water's energy.

In terms of risk management, the Coordination Center for the Prevention of Natural Disasters in Central America (CEPREDENAC) promotes a holistic approach to reducing vulnerability, broadening participation and capacity-building according to a Regional Plan and Strategy. All countries have legally instituted national entities responsible for risk management, which in addition have also defined national strategies and plans. In Guatemala this is the National Coordinator for Disaster Reduction (CONRED); in El Salvador this is up to the Civil Protection Directorate; in Honduras, to the Permanent Contingencies Commission (COPECO); in Nicaragua, to the National Disaster Prevention, Mitigation and Relief System (SINAPRED); in Costa Rica this responsibility falls to the National Disaster Prevention and Emergency Relief Commission (CNE); and in Panama, to the National Civil Protection System (SINAPROC).

As for basin protection, while there is no legal system institutionalized at the regional level, Costa Rica has by law defined the payment for environmental services for more than a decade; Nicaragua established it in 2007 when it issued the General National Water Act; and Honduras did so in 2005. El Salvador and Guatemala have established multiple voluntary agreements between public and private actors who adopt this system locally. Proceeds go exclusively to basin protection.