

TECHNICAL FOCUS PAPER

Integrated water
resources management
in Central America:
the over-riding challenge of
managing transboundary waters

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Our mission is to advance governance and management of water resources for sustainable and equitable development.

Global Water Partnership (GWP) is an international network, created in 1996 to foster an integrated approach to water resources management (IWRM). IWRM is a process which promotes the coordinated development and management of water, land, and related resources in order to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

The Network is open to all organisations that recognise the principles of an integrated approach to water resources management endorsed by the Network. It includes states, government institutions (national, regional, and local), intergovernmental organisations, international and national non-governmental organisations, academic and research institutions, private sector companies, and service providers in the public sector.

GWP's Technical Committee is a group of internationally recognised professionals and scientists skilled in the different aspects of water management. This committee provides technical support and advice to the Partnership as a whole. The Technical Committee has been charged with developing an analytical framework of the water sector and proposing actions that will promote sustainable water resources management.

A **Technical Focus Paper** is a publication of the GWP Technical Committee aimed at harnessing and sharing knowledge and experiences generated by knowledge partners and Regional and Country Water Partnerships.

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Acronyms

CCAD	Central American Commission for Environment and Development
CAJ	Central American Justice Court
ECLAC	Economic Commission for Latin America and the Caribbean
GWP	Global Water Partnership
ICJ	International Court of Justice
ILA	International Law Association
ILC	International Law Commission
IUCN	International Union for Conservation of Nature
IWRM	Integrated water resource management
NGO	Non-governmental organisation
OAS	Organisation of American States
PACADIRH	Central American Plan for Integrated Water Resource Management
PROCUENCA SAN JUAN	Environmental Management and Sustainable Development Project for the San Juan River Basin
UN	United Nations
UNESCO-IHP-OAS	UNESCO International Hydrological Programme, Organization of American States

Foreword

This Technical Focus Paper (TFP) is part of a series of papers from the GWP regions that provide a critical review of progress made in planning and putting IWRM into practice. The papers synthesize the challenges, the successes, the setbacks, and the direction for further integration. They provide valuable insights from which others can learn lessons and apply them to their particular, and often unique, circumstances.

This paper focuses on Central America which, unlike other regions in this TFP series, is well-endowed with water resources. However, concerns are growing about the reality of water scarcity in parts of the region, both physically and institutionally, along the drier Pacific coast where droughts do occur and where most of the major cities are located.

In addition, transboundary river basin issues dominate the region. Almost every major river basin crosses two or more national boundaries and conflicts abound among local communities and governments, some of which date back to colonial rule and earlier. Some are still with the international courts for resolution. So IWRM is still very much a 'work in progress' in the region. For some resolving transboundary water management is not so much about how to share water but how to bring peace to communities in conflict over other issues.

My thanks to the authors, who are all partners of the GWP Central America, for their excellent analysis of what is an extremely complex mix of physical, social, economic, and environmental issues across the region. We would particularly like to thank Elisa Colom and Salvador Montenegro Guillen as lead authors, Fabiola Tábora for the coordination of this Technical Focus Paper, Danka Thalmeinerova for her invaluable support and suggestions during the drafting stages, and Melvyn Kay for editorial support. Technical support in writing this paper was also provided by Technical Committee members Adrian Cashman and Dan Tarlock.

Dr Jerome Delli Priscoli
Chair, GWP Technical Committee

Executive summary

Central America includes Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama. This is a region made complex by its varied landscape and climate, its environment and natural ecosystems, and its peoples and cultures. A brief history of the region over the past few centuries provides insights into how nations have developed and are inescapably connected by their borders, by water resources, and by the environment. During the 1990s, borders were globally and regionally manipulated through rural development and environmental conservation measures that were part of a strategy to encourage cooperation between States. Numerous international cooperation initiatives now seek to preserve biodiversity, water, and other basin assets through projects that have introduced the international community's concerns and interests into local management. This includes the new concepts of water security, integrated water resources management (IWRM), and climate change adaptation. Moreover, this cooperation has the capacity to influence public decisions and actions.

The region as a whole is generously endowed with water resources, but concerns are growing about water scarcity in parts of the region in terms of both a physical lack of water at times and a lack of mechanisms and actions for effectively managing, allocating, and developing water resources. The region is considered highly vulnerable to climate change, including the occurrence of extreme events, such as drought, that further exacerbate the challenge of securing access to water for a good percentage of the population. In 2016, Central America's 'dry corridor', along the west coast of Guatemala, Honduras, and El Salvador experienced the worst drought of the past 10 years with over 3.5 million people, mostly in rural communities, in need of humanitarian assistance. Similar dry periods occur in Panama's 'Dry Arch' along the country's west coast.

A strong feature of the region's water resources is the way in which the countries are variously interconnected by 23 international watercourses¹ and 18 transboundary aquifers. Thus a key feature of water resources planning and management is about finding agreeable ways of sharing water resources, which both cross and form national boundaries, and applying the principles of integrated water resource management (IWRM). Several initiatives are now under way, but across the region, cooperation over international waters is very much 'a work in progress'.

There is some progress in terms of national legal systems for water governance, since it is essential to have clear, national-level regulations prior to promoting cooperation among and between States. Recent relations between Honduras and Nicaragua are discussed as well as the way in which Panama manages the Panama Canal Basin in a unique and exemplary way. Guatemala and El Salvador are, however, lagging behind and still lack legal and institutional water frameworks.

Three examples of international cooperation are described. El Trifinio project shares territory in Guatemala, El Salvador, and Honduras and was established to promote rural development in a context of high internal political unrest. After years of working together, local and municipal governments are now turning their attention towards managing transboundary waters that originate in the area.

¹ Basterrechea, M. et al. (2011). Situación de los Recursos Hídricos en Centroamérica: Hacia una Gestión Integrada. GWP Centroamérica.

International cooperation initiatives are promoting bi-national institutional efforts to encourage cooperation over the use of the River Goascorán waters, shared by El Salvador and Honduras.

The Sixaola River Basin, shared by Costa Rica and Panama, is an example of how national and local-level cooperation efforts, supported by international organisations, can generate positive impacts on the life quality of those living in the basin. These efforts favour joint water management even if the main efforts are currently focused on conserving biodiversity.

Not all is going so well, as illustrated by experiences in the San Juan River Basin, which forms part of the largest watershed in the region. Much of the water resource comes from Nicaragua, while Costa Rica has navigation rights. This is a long-standing relationship characterised by tension and conflict that has only been resolved by submitting disputes to the jurisdiction of the International Court of Justice. This has yet to develop in terms of mutual trust and the sharing of benefits, which are seen as the hallmarks of successful transboundary cooperation.

Experience indicates that successful management of international watercourses and transboundary aquifers lies in recognising that developing and sharing water resources involves communities of interest. It requires providing for specific and measurable benefits to every involved State that are proportional to their obligations, duties, and responsibilities. Likewise, it is essential to adopt institutional mechanisms for dialogue and to address the specific issues at the highest governmental levels.

It is recommended that States in the region adopt cooperation as a means for promoting integrated management of transboundary aquifers and watercourses as a path to national and regional development. This means adopting the river basin management approach and taking into account the conventions, UN resolutions, and the vast global experience.

1 The Central American region

The countries of Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama together make up the Central American region (Figure 1). It lies between the Atlantic (Caribbean Sea) and Pacific Oceans covering 521,598 km² and is the isthmus which forms a natural bridge between North and South America. A mountain range, reaching heights up to 4,000 metres above sea level, traverses the region and constitutes part of the volcanic 'Pacific Ring of Fire'. These features make it one of the world's most diverse regions in terms of terrain, climate, flora, fauna, soils, and temporal and spatial distribution of water resources.

Figure 1. Countries of Central America



Source: PeterHermesFurian

The region has a tropical climate with transitional flora and fauna of North and South America. The long volcanic chains with extending seismic fault lines and central mountain ranges divide the lowlands on both the Pacific and Caribbean coasts, with large forests and less fertile valleys which result in two marked climates: rainy and dry (Carmack, 1993. pp. 21–32). The region is extremely vulnerable to hydro-climatological impacts exacerbated by climate variability and the effects of climate change.

Table 1 summarises socio-economic progress using the Human Development Index (HDI) (UNDP, 2014). Belize, Costa Rica, and Panama have reached a high level of human development, while El Salvador, Guatemala, Honduras and Nicaragua maintain a medium level.

Table 1. Central America: Human Development Index (HDI)

Country	Position	HDI 2012	HDI 2014	Change in position	Life expectancy	Nation GDP (US\$ billion)	GDP/capita (US\$)
High Human Development							
Belize	84	0.731	0.732	0	73.9	1,604	9,364
Costa Rica	68	0.761	0.763	-1	79.9	49,621	13,012
Panama	65	0.761	0.765	2	77.6	42,648	16,379
Medium Human Development							
El Salvador	115	0.660	0.662	0	72.6	24,259	7,240
Guatemala	125	0.626	0.628	0	72.1	53,796	6,866
Honduras	129	0.616	0.617	0	73.8	18,550	4,138
Nicaragua	132	0.611	0.614	0	74.8	11,255	4,266

Source: UNDP, 2014.

2 A brief historical perspective

The northern region of Central America, known as Mesoamerica, comprising all of Guatemala, north-western Honduras, and El Salvador, is where the Maya culture was born and flourished. The central region, comprising Nicaragua, southern Honduras, and El Salvador, is home to pre-Hispanic cultures, such as the Pipil, Lenca, and Yiguirro. The much narrower southern isthmus is where present-day Costa Rica and Panama are now located (Carmack, 1993; pp. 21–32).

The Spanish colonization destroyed part of the pre-Columbian cultural heritage, and subjugated native peoples under a new political, social, economic, and cultural order. During colonial times, the Kingdom of Spain, as part of the vice-royalty of New Spain, established the Captaincy General of Guatemala. This included the present-day nations of Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and the Mexican State of Chiapas, while Panama was part of the vice-royalty of New Granada, now known as Colombia.

Drawing the nations' borders was influenced by power struggles between the United Kingdom of Great Britain, the Kingdom of Spain, and the emerging power, which, in the late 18th century, would become the United States of America. Enclaves, such as the Miskito Kingdom, were fought over by English and American pirates, whose legacy was subsequent border disputes between Honduras and Nicaragua. Belize is the result of the United Kingdom usurping Spanish lands in the 18th century and again during the 19th century. This dispute continues to the present day as territorial and maritime claims by Guatemala and Belize require the International Court of Justice (ICJ) to resolve them.

Drawing up the borders between Mexico and the Captaincy General of Guatemala States was marked by strong political tensions and military action both in favour of and against Central American integration. In the end, the States chose to remain separate and become independent republics, establishing borders by using geographical features as landmarks. These include the Usumacinta River between Guatemala and Mexico, the Goascorán River between El Salvador and Honduras, the Wanks, Coco, and Segovia Rivers between Honduras and Nicaragua, and the San Juan River between Nicaragua and Costa Rica.

The Central American republics established in the 19th century reproduced a development model marked by inequality and political, economic, and social exclusion. When democratic movements within the States questioned this during the 1950s and 1960s, the US government viewed this as a threat to its national security, particularly as this was happening at the same time as the East-West Cold War. All these countries, except Costa Rica, were led by US-backed military dictatorships. This ultimately led to internal armed conflicts emerging in El Salvador, Guatemala, and Nicaragua, which concluded with the triumph of the Sandinista revolution in 1979, and peace agreements being signed in El Salvador in 1992 and in Guatemala in 1996.

3 Water resources

The Central American region is generously endowed with water resources (Table 2). According to the FAO AQUASTAT², the average daily per capita water available across the region is over 68,000 litres. The availability of fresh water is clearly well above scarcity and water stress levels³ and, according to data from the 2014 Human Development Index, the abstraction rate by country is low. However, there are still concerns about water scarcity in parts of the region in terms of both a physical lack of water at times and a lack of mechanisms and actions for managing, allocating, and developing water resources.

Table 2. Central America: annual water resources

Country	Total internal renewable water resources (km ³)	Total external renewable water resources (km ³)	Total (km ³)	Dependence (%)	Water resources per capita (m ³)	Annual fresh water extraction (109m ³ /year)
Belize	15.25	6.474	21.73	29.8	65,452	0.8
Costa Rica	113.00	0	113.00	0	23,194	2.4
El Salvador	15.63	10.640	26.27	40.5	4,144	3.8
Guatemala	109.20	18.710	127.90	14.6	8,269	2.6
Honduras	90.66	1.504	92.16	1.6	11,381	1.2
Nicaragua	156.20	8.310	164.50	5.1	27,056	0.7
Panama	136.60	2.704	139.30	1.9	36,051	0.3

Source: UNDP, 2014

² www.fao.org/nr/water/aquastat/data

³ UN-Water (2012) - Managing water under uncertainty and risk, development report 4, V. 1

Central America is a region that is extremely vulnerable to climate change, including the occurrence of extreme events, such as drought, that further exacerbate the challenge of securing access to water for a good percentage of the population. In 2016 Central America's 'dry corridor', along the west coast of Guatemala, Honduras, and El Salvador, experienced the worst drought of the past 10 years with over 3.5 million people, mostly in rural communities, in need of humanitarian assistance (FAO, 2016). Similar dry periods occur in Panama's 'Dry Arch' along the country's west coast. Much of this is associated with the El Niño Southern Oscillation phenomenon which is well documented. However, many of the impacts attributed to this phenomenon are caused by weak governance, lack of sustainable basin management, deforestation, land use change, and unsustainable agriculture and extensive cattle ranching practices.

Watersheds that drain into the Pacific Ocean receive less rainfall than those draining into the Caribbean Sea. They are home to some of the region's largest cities and 70 percent of the population yet only have access to 30 percent of the available water resources. Official data on water and sanitation service coverage are optimistic (Table 3). In practice, especially in rural sectors, optimal coverage continues to be a pending task.⁴

All the States share substantial amounts of water resources with their neighbours and so it is in everyone's interest to collaborate in order to minimise conflicts over water use, promote sustainable use, and maintain and improve the quality of life of their citizens. However, even when there is willingness to cooperate in exploiting and protecting transboundary water basins (in Costa Rica, El Salvador, Guatemala, Honduras, and Panama), the intergovernmental instruments signed so far have proved insufficient to establish and implement agreements for managing and integrating development of international watercourses. Such instruments do not even exist between Costa Rica and Nicaragua. As a result, it is inevitable that occasional friction and conflicts of interest will occur that complicate the development of an integrated water resources management (IWRM) approach in transboundary basins.

The largest cities, located within the Pacific Ocean watersheds face a challenge of domestic water supply. While official data on water and sanitation service coverage are optimistic (Table 3), in practice, especially in rural areas, optimal coverage continues to be a pending task.⁵

Table 3. Data on improved water and sanitation coverage⁶

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

⁴ <http://www.fao.org/nr/water/aquastat/data/queries/show.html?id=35>

⁵ <http://www.fao.org/nr/water/aquastat/data/queries/show.html?id=35>

⁶ ECLAC. 2014. Taken from the Joint Monitoring Programme (JMP) for water supply and sanitation of the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), 2014. Table taken from the Central American Sub-Regional Process (2014)

The region has 23 transboundary watercourses draining about 40 percent of the region's territory (Figure 2 and Table 4). There are also 18 transboundary aquifer systems (Table 5).

Figure 2. Transboundary water course basins



Source: Adapted from a map by CCAD, 2006

Guatemala, shares 25 of its 35 main sources of water. It also shares water sources with Mexico and Belize. Honduras shares 10, El Salvador shares 6, while Nicaragua, Costa Rica, and Panama share 4 water sources.

Table 4. Transboundary basins in Central America

	Basin	Countries	Area in km ²	% of Central American Territory
Caribbean Sea	Hondo River	Guatemala-Mexico-Belize	7,189.0	1.4
	Mopán-Belize River	Guatemala-Belize	12,153.9	2.3
	Moho River	Belize-Guatemala	911.9	0.1
	Sarstún River	Belize-Guatemala	2,009.5	0.4
	Temash River	Belize-Guatemala	476.4	0.1
	Motagua River	Guatemala-Honduras	15,963.8	3.1
	Chamelecón River	Honduras-Guatemala	5,154.9	1.0
	Wangki, Coco or Segovia River	Honduras-Nicaragua	24,866.6	4.9
	San Juan River	Nicaragua-Costa Rica	36,905.0	7.2
	Sixaola River	Costa Rica-Panama	2,839.6	0.5
	Changuinola River	Costa Rica-Panama	3,387.8	0.6
	Pacific Ocean	Suchiate River	Guatemala-Mexico	1,499.5
Coatán River		Guatemala-Mexico	1,283.9	0.2
Lempa River		Guatemala-Honduras-El Salvador	18,234.7	3.6
Paz River		Guatemala-El Salvador	2,161.0	0.4
Goascorán River		Honduras-El Salvador	2,745.3	0.5
Choluteca River		Honduras-Nicaragua	8,132.6	1.6
Negro River		Honduras-Nicaragua	2,371.2	0.4
Grijalba River		Mexico-Guatemala	5,738.1	1.1
Naranjo River		Nicaragua-Costa Rica	9.2	0.0
Colorado-Corredores River		Costa Rica-Panama	1,281.8	0.2
Jurado River		Panama-Colombia	234.3	0.0
Gulf of Mexico	Usumacinta River	Guatemala-Mexico	35,899.3	7.0
Total			191,449.3	36.9

NOTE: In the transboundary basins shared with Mexico and Colombia, only the Central American surface is considered.

Source: Sanchez JC and Rodríguez T in Basterrechea, M. et al. (2011). Situación de los Recursos Hídricos en Centroamérica: Hacia una Gestión Integrada. GWP Centroamérica.

Table 5. Central America: transboundary aquifers

Aquífer	States
Soconusco-Suchiate/Coatán	Guatemala and Mexico
Chicomuselo-Cuilco/Selegua	
Ocosingo-Usumacinta-Pocom-Ixcán	
Marquez de Comillas-Chixoand/Xacbal	
Boca del Cerro-San Pedro	
Trinitaria-Nenton	
Yucatán Peninsula-Candelaria-Hondo	Guatemala, Belize and Mexico
Mopán-Belize	Guatemala and Belize
Pusila-Moho	
Sarstún	
Temash	
Motagua	
Chiquimula-Copan Ruinas	Guatemala and Honduras
Esquipulas-Ocotepeque-Citalá	
Ostúa-Metapán	Guatemala, Honduras and El Salvador
Paz River	Guatemala and El Salvador
Estero Rea–Negro River	
Sixaola	Honduras and Nicaragua
	Costa Rica and Panama

Source: Based on UNESCO-IHP-OAS, 2008.

With the exception of the Trifinio Plan 2006–2010 (Section 5.3) no recent planning studies were identified that dealt with developing water resources as a means of contributing to improving social and economic conditions within the region.

Those studied referred primarily to rural development (Trifinio Plan), to protecting forests and water, improving water and sanitation services, and protecting natural basin assets (Goascorán River Basin Section 5.4). These plans are not considered to be policy tools in themselves or planning for the IWRM of transboundary waters. While they include water management measures, these relate mainly to pollution control and delivery of water and sanitation services.

The strength of the studies and plans consulted lies in the institutional frameworks they promote, as these integrate the efforts of both central and local governments and various sectors of society. The frameworks provide the gateway for introducing the concept of water security as the main aim of water management and operationalising an integrated water resource management (IWRM) approach.

The document, prepared by the Central American sub-region in 2015 as part of the preparatory process for the 7th World Water Forum, proposed seven strategies for addressing water priorities in Central America:

- Universal coverage with good-quality drinking water services
- Prioritise investment in sanitation
- Develop energy potential
- Integrate water management into the agricultural sector
- Ensure aquatic ecosystem sustainability
- Improve water governance
- Incorporate the value of water into water management tools and regulatory frameworks.

4 Regulatory frameworks for IWRM

4.1 Introducing water laws

Within the context of the Dialogue on Effective Water Governance facilitated by GWP in Central America in 2003, Colom (2003) states: “*The challenge of water governance in the region is making water visible as a vital resource for development...to develop sustained conditions in favour of water security and effective water governance.*” Colom points to various political processes under way that are aimed at transforming public water policies, and indicates that introducing an IWRM approach into national policies will be the greatest challenge in the region. (Colom, 2003; p.4 and p.39).

Costa Rica introduced a Water Law in 1942 which is still in force. Panama did the same in 1966, and in 2002 introduced a special legal instrument that established the basin administrative regime. Although El Salvador passed a law to support a planning process for IWRM in 1985, it still does not have a Water Law. In 2007, Nicaragua introduced the General National Water Law which includes IWRM. In 2009 Honduras modernised its water regulations, originally established in 1927, and passed the General Water Law in 2009. In Guatemala, the Congress has yet to honour the constitutional mandate of 1985 to issue a special water law (Colom, 2003; Hantke-Domas, 2011; Embid and Liber, 2015).

Table 6 summarises the region’s water legislation status.

Table 6. Water legislation in Central America

Topic	State					
	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua	Panama
Public good	X	X	X	X	X	X
Specialised institutional framework	X			X	X	X
Participation	X			X	X	X
IWRM Policy	X		X	X	X	X
Water rights system	X			X	X	X
Economic valuation	X			X	X	X
System of violations and sanctions				X	X	
Legal and institutional regime for water and sanitation utilities	X	X	X	X	X	X
International water agreement						

Despite efforts made in recent years to update General Water Laws, only two countries have managed to approve new Water Laws that take into account IWRM principles.

4.2 Transboundary agreements

The limited acceptance of IWRM within the General Water Laws is a limiting factor when seeking cooperation between countries to manage transboundary water courses and aquifers. In 2012, the President of Guatemala approved the State Policy on International Watercourses that laid the foundation on which the Executive can build agreements with the neighbouring States of Mexico, El Salvador and Honduras (). But agreements with Belize cannot proceed until the Territorial, Maritime and Insular Differendum between the two countries is resolved by the International Court of Justice.

Box 1. Guatemala: State policy on international watercourses

The State Policy on International Watercourses was issued based on the Constitution and of the Executive Agency Law, establishing that the State of Guatemala is obliged to continue its efforts to protect, recover, and conserve water resources in the national public interest, and to promote the full exercise of the rights of its people. It also establishes that it will enter into commitments with neighbouring States in so far as they contribute to the protection of such waters and basins.

The policy is based on the principles of sovereignty, sustainable development, trans-generational human development, and common but differentiated responsibilities between States. It guides the negotiating processes involved in the joint management of international watercourses to benefit the State of Guatemala.

State Policy on International Watercourses establishes four general guidelines: “(1) The use of international watercourses should be subject to bilateral treaties; (2) each international watercourse should be negotiated and regulated by a specific bilateral treaty; (3) the State of Guatemala will first consider meeting national needs, and will not be obligated to provide a specific quality and quantity of water because this can be affected by natural factors; and (4) establishment of compensation schemes for environmental services that allow protecting water goods and services, and compensation for the use and utilisation of the water they receive.”

About 70 percent of Guatemala’s land area and 75 percent of the annual available water resources are linked to international water courses – more than 40 billion m³ drain annually towards Mexico; approximately 33 million m³ into the Caribbean; and around 23 billion m³ into the Pacific Ocean.

4.3 South American transboundary experience

The limited progress in establishing the legal regime for the region’s transboundary waters contrasts sharply with the extensive experience in South America where many transboundary agreements have been signed. This wealth of experience offers opportunities for developing similar agreements in Central America.

The content of some international agreements is generic, as is the treaty for the exploitation of shared water resources contained in the border reaches of River Uruguay and its effluent the Pepiri-Guazu (1980), the Treaty for the Rio de la Plata and its Shorefront (1980), and the Uruguay River Statute (1973) (Bernex et al., 2014).

Other international treaties refer to hydropower, such as the Treaty of Yacyretá (1973, Argentina-Paraguay), the Treaty of Itaipú (1973, Brazil-Paraguay), and the agreement to build a hydroelectric plant on the Beni River (1984–1988, Bolivia and Brazil).

Several agreements cover navigation, including the Paraná, Paraguay, and Río de la Plata Rivers Navigation Treaty (1967, Argentina-Paraguay); the multiple Paraguay-Paraná River Transport Agreement (1992, Argentina, Bolivia, Brazil, Paraguay, and Uruguay); the Commerce and Navigation Treaty (1998, Ecuador-Peru); and the agreement on Cross-border River Transport of Passengers, Vehicles and Cargo (1997, Argentina-Brazil).

Multi-purpose international agreements include that for the multiple exploitation of the Bermejo and Grande de Tarija Rivers' upper basins (1996, Argentina-Bolivia); the Plata Basin Treaty (1969, Argentina, Bolivia, Brazil, Paraguay, and Uruguay); the agreement to establish the Bi-national Commission for Management of the Pilcomayo River's Lower Basin (1995, Argentina, Bolivia, and Paraguay); the Treaty for the exploitation of the Merin Lagoon Basin natural resources (1977, Uruguay); and the Amazon Cooperation Treaty (1978, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, and Venezuela) (Bernex et al., 2014).

Transboundary waters management includes the Guaraní Aquifer Agreement (2001, Argentina, Brazil, Paraguay, and Uruguay); the treaty for the exploitation of shared water resources contained in the border reaches of the River Uruguay and its effluent the Pepiri-Guazu (1980, Argentina-Brazil); the Protocol on protection of resources shared by Argentina and Chile (1991, Argentina-Chile); the supplementary agreement on water resource cooperation (1975, Brazil-Uruguay) and the agreements relating to Lake Titicaca (Bolivia-Peru) (Bernex et al., 2014).

4.4 Progress with IWRM

4.4.1 Work in progress

The process of transition towards IWRM includes public participation in water planning and management; overcoming the traditional 'silo' approach to water management; and institutionalising a common and comprehensive management and planning model. It also considers the basin as a planning unit; emphasises measures for environmental protection of water as a natural asset, recognises the human right to water and sanitation; includes water as public property; forbids claims of private ownership; and rejects privatisation of associated services, mainly water and sanitation.

Recent legal innovations in Honduras and Nicaragua and the consolidation of legal regimes for water in Costa Rica and Panama are pertinent and important for increasing water security. These include administrations adopting an IWRM approach which also favours developing agreements for transboundary watercourses and aquifers.

Hantke-Domas (2011) and Embid and Liber (2015) highlighted the legal frameworks as an important first step in this direction, but they are not sufficient for effective and wise water resources management. The reason for this is that enforcing the laws depends on how water planning is developed and implemented, what budgets are allocated, how institutions perform, and how the public's right to participate is exercised.

The need to strengthen water legal frameworks at a national level are seen as an important prerequisite to facilitating agreements between countries in order to make headway towards transboundary basin cooperation agreements.

4.4.2 Implementing IWRM in the region's largest watershed

Lakes Cocibolca (L. Nicaragua) and Xolotlán (L. Managua) in Nicaragua, together with the San Juan River Basin, form the largest international drainage basin in Central America with territory in Nicaragua and Costa Rica (see Source: Montenegro-Guillen, 2003.5 and Section 5.5 for more details on this watershed, also known as the Nicaraguan Great Lakes Basin). These are two countries with very different social and economic conditions. Nicaragua is home to 73 percent of the basin's population with 55 percent living in rural communities. In Costa Rica 85% are rural dwellers. Both countries exploit agriculture and forest resources for wood and energy, but there is an imbalance in employment and income generating opportunities between them. In Nicaragua, water transport on the San Juan River and Lake Nicaragua has played an important part in the country's socio-economic and political development.

In 2002, an important milestone in institutionalising IWRM as a means of managing this resource was the Public Statement by Mayors of the Association of Municipalities surrounding the lakes and river basin. This involved 32 municipalities on the Nicaraguan side and 10 on the Costa Rican side. It led to laws being passed that created the Commission on Sustainable Development of the Lake Cocibolca and San Juan River Water Basins in 2007⁷. Legal gaps were remedied via reforms made two years later⁸. The Commission mandates focus on coordinating and implementing environmental policies, plans, and actions. These include conserving critical habitats; sustainably developing populations living in the basin; and developing conservation plans for the water bodies that flow into the basin.

The Commission is multi-sectoral. It comprises government departments for environment, water and sanitation, forestry, agriculture, and tourism. It also includes municipal authorities for the Lake Apanas, Lake Xolotlán, and Lake Cocibolca Basins, and the San Juan River Basin; NGOs; and academics from the Water Resource Research Centre (CIRA) and the National Autonomous University of Nicaragua (UNAN-Managua). The Commission has the authority to invite the participation of the private sector as and when it is deemed appropriate.

The Commission is based on a national mandate (Act 699). Although 70 percent of the basin lies within Nicaragua, implementing IWRM across the entire basin would require cooperation with Costa Rica through a bi-national agreement yet to be achieved.

The Commission's role includes preparing and approving integrated management plans for water resources, forests, and land use; economic and environmental basin management plans; resource protection and proper ecological and economic functioning; and implementing and monitoring the plan. The law established that the Commission would be funded with government-allocated public funds⁹.

⁷ Law N° 626 published in the Official La Gaceta Journal, N° 159 on 21 August 2007

⁸ Law N° 699, passed on 27 August 2009 and published in the Official La Gaceta Journal, N° 185 on 1 October 2009

⁹ Art. 5 (bis) "The General Budget of the Republic shall include an annual budget allocation that is sufficient for the functioning of the Commission on Sustainable Development of Lake Apanas, Lake Managua and Lake Nicaragua Basins, and of the San Juan River Basin."

However, in spite of all these plans the National Assembly, which approved this law, has yet to approve the budgetary allocation so that the Commission can begin its work.

Proposals have also been made to establish transboundary cooperation, but lack of funds has meant they have yet to be put into practice. One of the best known proposals is the Environmental Management and Sustainable Development Project for the San Juan River Basin – known as the PROCUENCA San Juan initiative (2005). This initiative, between Costa Rica and Nicaragua, sets out strategic sub-programmes, components, and projects, as mechanisms to catalyse investments that work together towards solving key environmental problems. These are consistent with the countries' aims to achieve the UN Sustainable Development Goals (SDGs) of reducing poverty while protecting the environment.

This bi-national association of Nicaraguan and Costa Rican municipalities has been challenged by the Ministries of Foreign Affairs in the two countries on the basis of 'possible implications' to the sovereignty of both nations and cross-border territorial claims. As a result both governments are refraining from requesting Global Environment Facility (GEF) resources to provide a financial bridge that would make Proposal for an Eco-Management Vision for the IWRM and Sustainable Development the San Juan River Basin and Its Coastal Zone (OAS, 2005) possible.

4.5 Conclusions

Central American States are making progress at their own pace, organising the use of national waters and looking for avenues of cooperation around international watercourses and transboundary aquifers. They are motivated more by a spirit of promoting socio-economic development through cooperation than by a water shortage crisis.

The legal systems dealing with water are at different levels of development. These are characterised particularly by the absence of bilateral or multilateral agreements governing international watercourses. There is however, a common practice of promoting joint programmes to develop and manage the shared territories that favour the signing of agreements around international waters.

5 The transboundary water management challenge

5.1 Regulatory frameworks

None of the 23 transboundary surface water sources or 18 transboundary aquifers have a formal legal regime for their development. Some provisions were included in border treaties that date back to the late 19th and early 20th centuries, and other provisions arose from interpretations made by the ICJ, the Central American Justice Court (CCA), and arbitral tribunals (Colom, 2014). Table 7 summarises the current state of legal instruments available.

Table 7. Central America: summary of legal instruments

States	Instrument	Criteria
Guatemala and El Salvador	Salazar – Morales Border Treaty (1938)	The river's midline as a boundary landmark
		Waters are distributed down the middle
		Prohibition of concession of waters to foreign nationals
Guatemala and Honduras	Arbitral Ruling (1933) on the Border Arbitration Treaty	Right bank of the Tinto and Motagua Rivers
Honduras and El Salvador	Border Treaty (1884)	
	ICJ Ruling (1992)	Midline of the river bed as a boundary landmark
Honduras and Nicaragua	Border Treaties (1852, 1856 and 1859)	
	Ruling 1906	Thalweg or the deepest channel in the river
	Sentence 1958	
Nicaragua and Costa Rica ¹⁰	Jerez-Cañas Border Treaty (1858)	The dividing line is the right bank of the River, three nautical miles downstream from El Castillo
		Nicaragua will have exclusive rights over the waters
		Costa Rica will have perpetual navigation rights
	ICJ Sentence (2009)	Defines the extent of Costa Rica's navigation rights
	CCAJ (2012)	Costa Rica found guilty of environmental damage
Costa Rica and Panama	Border Treaty (1941)	Thalweg or the deepest channel in the river

Source: Based on Colom, 2014.

5.2 Transboundary basin experience

Four experiences are presented to show how international cooperation is addressing transboundary water development challenges:

- Trifinio is a tri-national (El Salvador, Guatemala, and Honduras) rural development project that targets the headwaters of El Salvador's most important surface water source, the Lempa River.
- The Goascorán River Basin management initiative (El Salvador and Honduras) describes a strategy based on a multi-level institutional mechanism with participation from the public.
- The Sixaola River initiative (Costa Rica and Panama) describes a cooperation experience to preserve a shared protected area. It favours the adoption of an agreement specifically for IWRM.
- The San Juan River initiative demonstrates how a lack of cooperation and political will between Nicaragua and Costa Rica led to an international court case in order to resolve conflicts.

¹⁰ In addition to the above-mentioned instruments, the Cleveland and Alexander Awards have been issued. Costa Rica does not recognise CCJ's jurisdiction.

5.3 Trifinio: Guatemala, El Salvador, and Honduras

5.3.1 Background

The Trifinio region is the border area where three countries – El Salvador, Guatemala, and Honduras – converge around the protected Montecristo mountain range. It also includes the cloud forest ecological zone, comprising the Cerro Montecristo and El Pital, which together form the La Fraternalidad Biosphere Reserve and the Güisayote Biological Reserve. This was declared an ‘International Reserve of La Fraternalidad’ in 1987 and a heritage of humanity site by UNESCO in 2011 (Figure 3).

Trifinio is a homogeneous region in terms of its social, economic, and productive dimensions, and its natural and biological characteristics. It is the headwaters of the Lempa and Ulúa Rivers – two of the region’s most important water systems. Some “60 percent of the population of three Central American countries are located within a 250 km radius of Trifinio, comprising three capital cities, two port complexes on the Caribbean side and four port complexes on the Pacific. And 75 percent of the Central American road network is concentrated in this area¹¹.”

Figure 3. The extent of the Trifinio region



Source: Adapted from a map by Plan Trifinio

¹¹ www.sica.int

Trifinio is protected by El Salvador, Guatemala, and Honduras, in accordance with the legal instrument called ‘Treaty signed between the Republics of El Salvador, Guatemala, and Honduras for the execution of the Trifinio Plan’. This treaty was signed 31 October 1997 by the Vice Presidents of El Salvador and Guatemala, and by the Presidential Designee of Honduras. It was formally approved by the legislative assemblies of all three States between 1998 and 1999. It provides for rural development measures in general, but it does not include the management of the transboundary water courses (Colom, 2014).

Trifinio comprises 8 municipalities in El Salvador, 22 in Honduras, and 15 in Guatemala. It covers an area of 7,541 km², of which 15.3 percent is in El Salvador, 40 percent in Honduras, and 44.7 percent in Guatemala. This represents about 13 percent of the total land area of the three countries and is home to some 700,000 inhabitants.

The Trifinio Plan¹² is part of the region’s peace process and includes numerous rural development projects resulting from the cooperation agreement signed in 1986 by the States and the Inter-American Institute for Cooperation on Agriculture.

The Treaty establishes an institutional mechanism at the highest political level involving the Vice Presidents of the States. It is called the Tri-national Commission. It creates the Tri-national Executive Secretariat, the national directorates, and the Advisory Committee, made up of local, sectoral, and municipal authorities.

The formal scope of the Trifinio Plan has enabled civil society organisations, local authorities, and the government of El Salvador to promote, before the Commission, conditions conducive to agreements on the joint development of the Trifinio fresh water resources, and to formulate proposals in favour of IWRM. In 2007, the government of El Salvador proposed the Water Agenda. In 2013, Guatemala’s Copán Chortí Association of Municipalities and Honduras’ Ocotepeque Tri-national Lenca River Association of Border Municipalities proposed the El Salvador-Guatemala-Honduras Local Transboundary ‘Shared Waters’ Public Policy.

In promoting IWRM and conservation of the Trifinio region, the government of El Salvador explained that the most important surface water source in El Salvador is part of the Ostúa River-Lake Güija-Lempa River system, whose headwaters are located in Guatemala and Honduras, in the Trifinio area. Municipalities were organised into inter-state associations to enable their broad and active participation. The municipalities were organised because of the need to respond to local societies’ daily concerns about water pollution, conservation, and access to water and sanitation.

5.3.2 Legal issues

Bi-national efforts by Guatemala and El Salvador to establish a legal regime to manage transboundary waters date back to the mid-20th century when the President of Guatemala, Jacobo Arbenz, expressed his willingness to the President of El Salvador, Oscar Osorio, to provide the necessary cooperation to enable El Salvador to carry out works in Lake Güija. In 1955, Guatemala’s President, Castillo Armas, and El Salvador’s President Osorio agreed to form a Joint Commission to study the lake’s energy potential. Based on the Commission’s technical

¹² The first proposal for the Trifinio Plan was called the ‘Comprehensive Development Plan for the Border Regions’. It was completed by the Coordinating Commission in 1988 and updated in 1992 and in 2004. In 1998–1999 the States approved the ‘Treaty signed between the Republics of El Salvador, Guatemala and Honduras for the execution of the Trifinio Plan’. This Treaty sought to strengthen the institutional framework and ensure the Plan’s implementation and updating.

proposal, El Salvador's President, José María Lemus, and Guatemala's President, Castillo Armas, ordered a draft Convention to be drawn up (Colom, 2014).

In 1957, the Ministers of Foreign Affairs of Guatemala and El Salvador signed the International Convention for the Development of Lake Güija. This negotiation was mediated by the Economic Commission for Latin America and the Caribbean (ECLAC). It was associated with the Central American economic integration programme and the regional electrical interconnection system, the scope and content of which is summarised in Table 8. Unfortunately the Convention was neither ratified by the Executive Agency nor approved by Guatemala's legislative body, and never came into force. (CEL, 1958)

Table 8. International Convention for the Development of Lake Güija

Main Elements	General Content	Article
Scope, purpose and parties	Scope: Basis for the use of Lake Güija water flows	Declaratory part of a Law
	Purpose: Regulate water use for energy, irrigation, household, and similar purposes	Declaratory part of a Law
	Parties: Republic of El Salvador, Republic of Guatemala, Central American Integration System	Declaratory part of a Law
Rights of party States	Build works along the banks to utilise waters Generate energy	I
	Receive power at the internal cost of the delivering State, tax-free	II
	Clean up the lake's region. Water protection works	III
	Compensation from neighbouring State for flooding caused by works built to use or regulate water	IV
	Systematically measure the lake's source tributaries	V
Duties and rules of procedure	Works shall not produce level fluctuations exceeding 436 m or below the minimum of 414 m measured above sea level	I
	Receive energy service from the other State if produced with lake waters	II
	Clean up the lake's region. Water protection works	III
	Compensation from neighbouring State for flooding caused by works built to use or regulate water	IV
	Systematically measure the lake's source tributaries	V
	Take measures so that waters feeding the lake do not diminish	V
	Establish how each State sets the compensation payment, and how payment is made. If States do not reach an agreement, a Joint Commission will be formed	IV
Institutional mechanisms	Joint Commission advises and is responsible for overseeing the Treaty's implementation, studies problems, and proposes solutions to Parties	VII
Dispute resolution	No such mechanism is provided for	

Source: Adapted from Colom, 2014.

5.3.3 Management instruments developed at the tri-national level

El Salvador's Water Agenda

El Salvador's Water Agenda in the Trifinio region and a 2006–2010 Management Plan links water resource development to economic growth, environmental management and human development. It seeks transboundary cooperation to take care of waters through dialogue and tri-national cooperation.

The Water Agenda promotes an organisational framework and a regulatory framework that integrates the Trifinio Plan's institutional framework into associations of municipalities, State institutions, basin agencies, and the private user network. It promotes institutional strengthening for shared water management through the establishment of a tri-national information system, human resource training, land use planning, and water monitoring. El Salvador carries out hydrological studies on water sources that are parts of the surface and groundwater transboundary waters located within its territory.

El Salvador's National Executive Trifinio Plan Directorate conducts studies through which it characterises the waters, estimates supply and demand, establishes water balances, and identifies the most relevant management issues regarding the waters provided by El Salvador to the Trifinio surface and underground systems (Guevara Retana, 2009).

The Water Agenda promotes IWRM in the Trifinio region comprising both the sources in El Salvador and those contributed by Guatemala and Honduras, including part of the Ostúa River-Lake Güija-Lempa River surface system and the Esquipulas–Ocoatepeque-Citalá aquifer. This approach is well accepted by El Salvador's National Executive Directorate, but it has yet to be adopted in a joint manner by all three States.

Transboundary 'Shared Waters' public policy

In 2013 El Salvador-Guatemala-Honduras Local Transboundary 'Shared Waters' Public Policy was proposed by Guatemala's Copán Chortí Association of Communities and Honduras' Ocoatepeque Tri-national Lenca River Association of Border Communities. This comprises municipal governments within the Trifinio area and seeks to promote water resource management based on meeting demands and achieving local objectives. It bases actions on each State's national legal regime; and defines Trifinio as one territory as its governing principle.

Implicit in the proposed policy is the national and local authorities' willingness to cooperate. It highlights, among the measures planned, the need to sign international agreements to manage and administer international waters. Thus it recognises that water is a public good and, therefore, subject to being governed by each State's foreign policy, which is the responsibility of the Heads of State through their Ministries of Foreign Affairs.

Thus, this policy and El Salvador's Water Agenda constitute the main contributions to constructing a common agenda among the three States, which are party to the Treaty, to implement the Trifinio Plan.

No international lawsuits have been filed around Trifinio's transboundary surface and underground water sources. Issues are addressed as part of bilateral agendas where States learn about and resolve specific difficulties and problems. Such is the case between El Salvador

and Guatemala, where El Salvador has expressed its concerns over wastewater discharges from Cerro Blanco mining activities in Guatemala. These threaten the water quality of a tributary of the Ostúa River-Lake Güija-Lempa River.

Many favourable conditions are in place to enable El Salvador, Guatemala, and Honduras to sign a specific convention to manage transboundary surface and groundwater. These include the joint activities integral to implementing the Trifinio Plan and numerous rural development and natural resource conservation projects being undertaken. There is also the political will among local governments and the population. However, this strong local interest and the will for change has yet to manifest itself at a national government level among the three countries by establishing a legal instrument with common goals, rights, obligations, procedures, and mechanisms.

5.3.4 The Lempa River

The Lempa River Basin, is El Salvador's most important fresh water source. It is fed by streams originating in Guatemala and Honduras. Thus, defining an agreement between all three States is considered vital for El Salvador. In bilateral communications, El Salvador has requested that both Guatemala and Honduras protect, conserve, and recover waters and natural conditions in the upper basin, but without either acknowledging or compensating these actions. This has made it difficult to establish bilateral agreements between the countries to manage these waters.

The Treaty established by El Salvador, Guatemala, and Honduras has clearly prioritised the Trifinio Plan as a tool to promote sustainable rural development, which includes managing water resources. Its greatest strength is the series of institutional mechanisms ranging from meetings between Vice Presidents to the cooperation among associations of municipalities. But, as yet the Treaty does not constitute a legal instrument to regulate the development and management of transboundary waters.

The formal scope of the Trifinio Plan, El Salvador's Water Agenda, and the strong local authority and civil society interests across all three countries may well encourage the Commission to agree to conditions that favour agreements to jointly develop the shared fresh water resources and to make proposals for an IWRM approach.

5.4 Goascorán River: El Salvador and Honduras

5.4.1 Background

The Goascorán River Basin is shared between El Salvador and Honduras and covers an area of 2,345 km² (Figure 4). It comprises 36 sub-basins in 39 municipalities – 13 in El Salvador in the departments of La Unión and Morazán, and 16 in Honduras in the departments of La Paz, Valle, Comayagua, and Francisco Morazán. The river headwaters are in Loma de Peñas in Honduras. The river flows through three zones across El Salvador to the Gulf of Fonseca and the Pacific Ocean. The upper basin is mainly pine forests growing on rounded, high-relief mountains with slopes above 50 percent. The middle basin consists of steep, rough, high-relief hills between 250 to 750 m above sea level with slopes from 20 to 50 percent. The land up to 250 m above sea level is dedicated to productive activities, such as livestock, agriculture, and fishing. The lower basin consists of old valleys dissected by ravines, creeks, and rivers and is characterised by gentle slopes down to the mouth of the river (Colom, 2014).

Figure 4. Goascorán River Basin shared by El Salvador and Honduras



Source: Adapted from a map by IUCN, 2016

5.4.2 Socio-economics

In 2007 the Goascorán River Comprehensive Management Plan (CATIE, 2007) estimated the population settled in the basin to be 326,247 – 43 percent in Honduras and 57 percent in El Salvador. Some 85 percent live in rural areas and 15 percent in urban centres. Some 40 percent

are concentrated in the municipality of Santa Rosa de Lima in El Salvador. The population density in the El Salvador part of the basin was 138/km² and was 47/km² in Honduras.

The main water challenge facing the communities is universal coverage of water services for drinking and for livestock. Estimates in 2007 suggest that less than 50 percent of the population had access to piped water and only 20 percent had their solid waste collected. Thus a large part of the population was contributing to water pollution through household wastewater discharges, household solid waste disposal, and deforestation resulting from the household demand for firewood as the main source of energy.

The Goascorán River Comprehensive Management Plan reported a lack of employment opportunities and other sources of income in rural areas, which led to greater pressure on land and other natural resources and, in turn, led to conflicts over improper and excessive land use. The Plan reported that 50 percent of basin land is properly used, 34 percent is over-used, and 13 percent is under-used.

Groundwater recharge areas are located in the upper basin where the land is most vulnerable to landslides because of the steep slopes. The lower basin is susceptible to flooding. There is potential for eco-tourism in the lower part of the basin in El Salvador where there is a lot of fishing interests.

The Plan concluded that there was enough public, private, and social institutional capacity to implement a basin management plan and it highlighted the role played by several associations of communities, including the Association of Municipalities of Northern La Unión (ASINORLU) in El Salvador; the Association of Municipalities of Southern La Paz (MANSURPAZ), and the Association of Valle Border Municipalities (MAFRON) in Honduras.

The Goascorán River Comprehensive Management Plan refers to the national laws of both countries. It does not stress the need for any bi-national agreement.

5.4.3 Legal issues

Neither El Salvador nor Honduras have a special legal regime to regulate Goascorán River waters, deemed as international, and neither the Border Treaty nor the ICJ's ruling in 1992 address or resolve the issue.

The Organisation of American States (OAS) mediated and promoted agreements between the States. This culminated in the signing of the General Peace Treaty in the city of Lima on 1980. This Treaty defines and delimits, in perpetuity, seven non-controversial border areas, but leaves pending the delimitation of six other sectors, among them the Goascorán River. The resolution submitted to the ICJ comprised three aspects: (i) the land border dispute; (ii) the status of islands located in the Gulf of Fonseca; and (iii) the maritime space. None of these aspects refer to international waters.

The ICJ handed down a judgement¹³ that ended the border dispute. Regarding the Goascorán River as a border landmark, the ruling described points and coordinates where the border follows the course of the river downstream and adopted the criterion of the centre line of the river. But neither the Treaty nor the ruling indicated how the waters should be distributed

¹³ Judgement handed down by ICJ in The Hague on 11 September 1992

between the States, as the legal nature of both instruments refers to other issues and not to international waters (Colom, 2014).

In spite of the border disputes, the States are currently implementing joint initiatives, such as the Honduras-El Salvador Bi-national Border Development Programme (2004). The two countries have also created a corresponding institutional framework including the Special Demarcation Commission (1986), the Bi-national Commission, and the Bi-national Goascorán River Management Group (2006), as well as the Goascorán River Comprehensive Management Plan (2007).

The performance of the Management Group was evaluated and their capacity in water diplomacy and international water law was strengthened with support from the BRIDGE project¹⁴ implemented by IUCN from 2011 to 2013. Honduras Water Law provided additional support for organising basin authorities. It also contributed to analysing power relations between actors in both countries (Maier, et al., 2016; and Chicas, 2013), which marked a trend towards cooperation and thus towards a joint approach for developing shared water resources.

5.4.4 Conclusions

The plan for the Goascorán River promotes public, private, and social participation to implement a basin management plan. However, neither El Salvador nor Honduras have special legal regimes to regulate Goascorán River waters, which could be considered as international, and neither the Limits Treaty nor ICJ's 1992 ruling address or resolved the issue.

Currently, States have set up joint initiatives, such as the Bi-national Honduras-El Salvador Border Area Development Programme (2004); created institutions, such as the Special Demarcation Commission (1986), the Bi-national Commission, and the Bi-national Goascorán River Management Group (2006); and formulated a Comprehensive Management Plan for the Goascorán River (2007).

5.5 Sixaola River Basin: Costa Rica and Panama

5.5.1 Background

The Sixaola River headwaters are in Costa Rica and much of its lower reaches run along the border between Costa Rica and Panama. The river is 146 km long. The river basin covers an area of 2,848.3 km², of which 5321.5 km² (19 percent) is in Panamanian territory and 2,316.8 km² (81 percent) is in Costa Rica (Figure 5). The basin is divided into six main sub-basins: Yorkin, Uren, Lari, Coen, Telire, and Sixaola (Durán and Majano, cited by Peña Chacón, cited by Colom, 2014).

¹⁴ Water management project implemented by IUCN in the basins of the Coatlán River between Mexico and Guatemala; Goascorán River between El Salvador and Honduras; and Sixaola River between Costa Rica and Panama

Figure 5. Sixaola River Basin



Source: Adapted from a map by EPYPSA-INCLAM

The Sixaola River Basin includes areas with elevations some 3,800 m above sea level in the Sierra de Talamanca in Costa Rica. These lead to gently sloping flood plains on the Caribbean Atlantic coast. The basin has been zoned into lower, middle, and upper basins according to their geomorphological characteristics. The population is multicultural, with Bri Bri and Cábecar indigenous peoples living in the middle basin areas on the Costa Rica side. There is a small group of Bri Bri living along the Yorkin River banks on the Panamanian side. A group of Teribe live in the Yorkin River's upper basin in Panama, and Afro-Caribbean groups, and white settlers, largely from Nicaragua and El Salvador, live in the lower basin.

Approximately 83 percent of the Sixaola River Basin area has a protected area status. This protected area includes La Amistad National Park, Chirripó National Park, Hitoy Cerere Biological Reserve, and National Gandoca-Manzanillo Wildlife Reserve in Costa Rica; and La Amistad International Park, San San Pond Sack Wetlands, and Palo Seco Forest Reserve in Panama (Durán and Majano, cited by Chacón, cited by Colom, 2014).

These protected areas offer a wealth of human, ethnographic, historical, and management resources conducive to ensuring the conservation of natural resources in their territories, which, in addition, are highly attractive to eco-tourism. However, there are some weaknesses in the protected areas. These include management plans which have not been implemented. Some management plans have not been implemented and there was lack of bi-national coordination during their preparation. Also, there was a lack of analysis and consideration of the diffuse pollution from intensive farming activities and poor coordination between the environmental administrations of both countries (BID Costa Rica, 2004).

The basin also provides a series of environmental services to communities, including water for domestic use and for agriculture. There are fertile soils, specifically in the Talamanca valley where the indigenous Cábecar and Bri Bri grow banana and organic cocoa.

5.5.2 General socio-economics description

In 2010, the estimated population in this bi-national basin was 34,000 inhabitants, 58 percent of which resided in the canton of Talamanca in Costa Rica and 42 percent in Guabito in Panama's Changuinola District. The most important economic activities in the middle basin include the production of basic grains, cocoa, and organic bananas. In the lower basin producers, both large and small, grow bananas.

Social indicators show that the basin population lags behind those in adjacent areas and the national averages in both countries. This is especially true in the upper and middle sub-basins, where more than 95 percent of the population is indigenous and engages mostly in agriculture. However, there is significant agribusiness activity around banana production in the lower sub-basin, both on the Costa Rica side and in the Bocas del Toro region in Panama. Even so, the basin is considered to be among the poorest areas in both countries, with very low quality of life indices¹⁵ and high annual population growth of 11.4 percent over the last 10 years (11.4 percent in the lower basin).

5.5.3 Legal background issues

Some of the instruments underpinning Sixaola River Basin management are the Border Cooperation Convention (1979), the Agreement for the establishment of La Amistad International Park (1982), the Border Protected Areas Agreement (1991), and the new Convention on Border Development Cooperation (1992).

None of these instruments constitutes an agreement for integrated water resource management IWRM. According to the border treaty between Costa Rica and Panama, it is the thalweg or (deepest) part of the channel of the Sixaola River channel which defines the border between the two countries and constitutes the border at any given point along it.

According to Colom (2014), the governments of Costa Rica and Panama are developing a social and institutional process for managing the Sixaola River Basin assets that focuses on environmental and social issues. No tensions or conflicts have been detected between the States stemming from the waters' distribution, use, and conservation, which is probably a consequence of the low population density and low demand for water in the river's area of influence.

The amicable relations between Costa Rica and Panama, which are also based on the local population's involvement and support from NGOs, lead to a favourable environment scenario for building agreements able to prevent conflicts and to promote strategic and orderly development of these water resources for the benefit of both countries' local and national interests (Colom, 2104).

¹⁵ Talamanca is the Costa Rican canton with the lowest social development index – SDI1. In Panama, the average human development index (HDI) is 0.707, while in the district of Changuinola the HDI is 0.608

In 1992 the States signed a bi-national agreement, and created a Permanent Bi-national Commission composed of the Ministers of Environment, Finance, and/or Planning from both States which aims to strengthen cooperation relations between the parties. The Commission has adopted the Regional Strategy for Sustainable Development of the Bi-national Sixaola River Basin, supplemented by the Regional Plan of Action, the Regional Indicative Functional Land Use Plan, and the Natural Resource Management Plan (Colom, 2014).

According to Peña Chacón (2013), the implementation of the Sixaola River Basin Strategy is based on the Border Cooperation Convention (1979), the Agreement for the establishment of La Amistad International Park (1982), the Border Protected Areas Agreement (1991), and the new Convention on Border Development Cooperation (1992).

Rodríguez-Echavarría (2013) offers three thoughts concerning hypotheses can be made regarding this bi-national basin:

“The first argues that there is an inescapable relationship between Central American borders and the environment. The second is that there are multiple cooperation projects around environmental matters in the Sixaola River Basin mostly driven by exogenous actors, such as international NGOs and intergovernmental organisations, which, unlike the States, have access to financial resources and technical equipment that the States do not. The third posits that these projects and actors have a growing influence and impact in this basin’s environmental management, an influence that has enabled them to incorporate their concerns and interests – adaptation to climate change and integrated basin management, among other factors – into local management, and allowed the creation of governance spaces that seek to manage shared ecosystems, such as basin commissions and committees.”

The convergence of multiple cooperation initiatives aimed at natural resource management indicates an international interest in the Sixaola River Basin basically because it is home to an important diversity of species that are threatened or endangered, making this area a ‘conservation priority’ (Franklin et al., 2007).

Several initiatives can be identified in the Sixaola River Basin which, from this same logic, promote cooperation actions that consider the ‘basin’ as a spatial unit.

Lucile Medina and Tania Rodríguez (2011), authors of the study ‘Transboundary cooperation dynamics around environmental management of the Sixaola River Basin on the border between Costa Rica and Panama’, conclude that the Sixaola River Basin is obviously an environmentally strategic area for both States involved and for international cooperation agencies, NGOs, and financial institutions.

This bi-national cooperation efforts between Costa Rica and Panama can provide, and should be considered, an example for others in the region to follow.

5.5.4 Conclusions

More than 83 percent of the Sixaola River Basin area is under protected area status, which offers a wealth of human, ethnographic, historical, and medium management resources conducive to ensuring natural resource conservation and a high potential for tourism.

The good relationship that exists between Costa Rica and Panama is also based on the local populations' participation and support from non-governmental entities, which results in a favourable environment scenario for preventing conflicts and building agreements for joint, orderly, and strategic water resource development.

However, it is necessary to consider that protected area management needs to be further strengthened in order to ensure that the implementation of management plans. There is strong consolidated bi-national coordination to draft such plans, complete studies, and take action to control diffuse pollution from intensive agricultural activities.

The bi-national interest in, and the joint actions aimed at protected areas in the Sixaola River Basin, offer an optimal platform for jointly developing water resources, promoting development, and promoting increased water security for the benefit of both States.

5.6 San Juan River Basin: Nicaragua and Costa Rica

5.6.1 Background

The San Juan River Basin forms part of the largest international drainage basin in Central America. The large basin comprises three sub-basins, Lake Xolotlán (or Managua), Lake Cocibolca (or Nicaragua), and the San Juan River Basin. Together the three sub-basins cover 42,035 km² – 69 percent of which is in Nicaragua and 31 percent in Costa Rica (Source: Montenegro-Guillen, 2003.4):

- Lake Xolotlán (or Managua) Basin lies to the north of Lake Cocibolca. It covers 6,877km² and is wholly within Nicaragua. In the past, Lake Xolotlán has been connected intermittently to Lake Cocibolca by the Tipitapa River during very humid rainy seasons, but this is no longer the case and so Lake Cocibolca relies mostly on drainage within its own watershed.
- Lake Cocibolca holds some 104 km³ and is the most important water body in the region. The basin covers an area of 23,545km² and is shared by Nicaragua (19,405 km²) and Costa Rica (4,140 km²).
- The San Juan River Basin lies to the south of Lake Cocibolca. It covers an area of 11,613 km² and is shared by Nicaragua (2,713 km²) and Costa Rica (8,900 km²). Rivers with headwaters in Costa Rica that drain into Lake Cocibolca and the San Juan River contribute significantly to the San Juan River flow. The San Juan River drains water from Lake Cocibolca through the San Juan River Basin and eventually discharges into the Caribbean Sea. For much of its 192 km journey it forms the border between Nicaragua and Costa Rica.

The shared San Juan River Basin is fundamental to sustainable development in Costa Rica and Nicaragua. Establishing transboundary cooperation in this basin is without doubt the biggest water challenge in Central America. At present there are no direct cooperation agreements and both sides have resorted to the ICJ on several occasions to settle differences.

Figure 6. Lake Xolotlán, Lake Cocibolca, and the San Juan River Basin



Source: Adapted from a map by ILEC, 2006

Within the San Juan Basin there are 37 municipalities in Nicaragua and 7 cantons in Costa Rica. Most of the basin is less than 500 m above sea level, but it rises from the flood plains of the Indio Maíz (in Nicaragua) and Tortuguero (in Costa Rica) along the Caribbean coast to highlands between 1,500 and 3,000 m above sea level in northern Costa Rica and some 1,600 m above sea level in Nicaragua. This topography greatly influences average annual rainfall, which ranges between 4,000 mm and 6,000 mm over a period of 9 to 11 months in the more humid regions, and between 1,000 mm and 2,000 mm in the drier areas close to Lake Cocibolca, which has a dry season lasting approximately 7 months.

Given the rainfall regime, the tributaries of the San Juan River are long and fast-flowing throughout the year, while rivers draining directly into Lake Cocibolca are short, with low flows, and are usually dry during part of the year.

5.6.2 Socio-economics

The area dedicated to agriculture covers 60 percent of the basin. In Nicaragua, this produces 26 percent of the national bean production, nearly 21 percent of sorghum, and just over 16 percent of maize and sugar cane. In Costa Rica it produces 54 percent of the bean production, 11 percent of sugar cane, 6 percent of maize and banana, and 90 percent of tuber and root production.

In the past, the basin was largely forest, but agricultural development in both livestock and cropping has led to indiscriminate deforestation. In Costa Rica, virtually all forests of the gently sloping, non-floodable basin areas have disappeared; while in Nicaragua, natural forests have deteriorated all the way to the very limits of the most significant biological reserves. Causes stem not just from agricultural development, but also the destructive exploitation of forest resources, which has left large areas exposed to soil erosion under intense tropical rains. Soil loss is evidenced in the turbidity levels in the rivers.

Inappropriate agricultural practices and technologies, and the intensive use of agrochemicals for some crops is impacting the quality of water resources, though this is not well studied.

There are significant imbalances in terms of the distribution of land and agriculture in the area. Commercial farmers account for some 12 percent of producers and they occupy 55 percent of the land. Smallholder subsistence producers account for 88 percent of all producers and occupy 45 percent of the land.

Primary industries also flourish in the area. In Costa Rica, these include sawmills, agro-industries, banana and citrus, dairy, and coffee. In Nicaragua, these include agro-industries, such as sugarcane, tomato, coffee, and oil palm. The expansion of oil crops (such as African palm) has become a serious environmental problem.

The basin's border population has traditionally maintained strong family, social, and commercial ties. Even though population growth was strong over the past 20 years, quality of life indicators on both sides of the border are lower than national averages. In Nicaragua, 18.4 percent of the nation's population lives in the basin, but this group includes 36 percent of the nation's poor and 43 percent of the country's destitute.

In Costa Rica, the population has doubled over the past 30 years, mainly among rural communities. The urban centres have public water supply systems, adequate excreta disposal systems, and public solid waste services. Only 62 percent of rural dwellings have water supply services, in contrast to urban areas where coverage is 99 percent. Some 61 percent of the population have septic tanks and 38 percent have latrines and pits, while the rest have no adequate on-site excreta disposal systems. Only 32 percent of the population has solid waste collection services, but this waste is disposed of and leaving it in the open.

In Nicaragua, the population has also doubled during the past 25 years, many of whom have migrated to Costa Rica in search of employment.

5.6.3 Legal issues

The current territorial dispute between Nicaragua and Costa Rica can be traced back to the 18th century border delimitation defined by the Cañas-Jerez Treaty (1858), the Cleveland Award (1888), and the first and second Alexander Awards (1897). According to this Treaty, the right bank of the San Juan River marks the border between Nicaragua and Costa Rica up to a certain point, but disagreements over navigation rights and sovereignty over the river resulted in arbitration by the President of the United States, whose ruling, known as the Cleveland Award, validated the agreements outlined in the Cañas-Jerez Treaty of 1858. The Alexander Awards were issued in 1897, and are the result of field engineering work carried out by a US Army Commander and engineer EP Alexander, who used the best technical means to learn about the natural factors that modified the original layout of the border.

5.6.4 Diplomatic tensions

Tensions between the States stemmed from three interconnected issues – the territorial issue, the Nicaraguan dredging programme, and the Costa Rican road project. All were brought before the ICJ in 2013.

Barely one year after the dispute over dredging the river, a new dispute arose over the construction of a rural road running parallel to the San Juan River on the Costa Rican side. This rural road, known as Route 1856, begins at the point where the San Juan River becomes the international border and runs parallel to it to the Colorado River delta. Nicaragua filed a suit with the ICJ six months into the project, forcing Costa Rica to conduct an environmental impact assessment and to re-assess the success of this project.

The ICJ handed down its judgement on 16 December 2015, ruling in favour of Costa Rica with regard to its right of sovereignty over the disputed territory. It held Nicaragua accountable for violating Costa Rica's territorial sovereignty by having a military presence in the disputed territory and digging three additional channels in 2013. Additionally this violated precautionary measures issued by the ICJ in 2011, preventing Costa Rica from exercising its right to free navigation on the San Juan River. Furthermore, the ICJ ruled that Nicaragua was obligated to compensate Costa Rica for damages. The ICJ also pointed out that Costa Rica had violated its obligation to conduct environmental impact studies prior to building the road known as Route 1856. Following the ICJ's ruling, in June 2016 Costa Rica asked Nicaragua to pay US\$ 6,000,000 in compensation for damages.

This situation exemplifies how, regardless of tensions caused by water issues, friction between States can also be caused by historical and political difficulties.

In consideration of the significant efforts made by the Governments of Costa Rica and Nicaragua, with support from the Global Environment Facility (GEF), UNEP, and the OAS, during the PROCUENCA San Juan project, it was discontinued just when the Strategic Actions Programme was scheduled to begin (2005–2007). The recommendations in the Strategic Actions Programme included:

- Generating a participatory process from basic social and communal organisations in both countries
- Creating an institutional structure to prepare for PAE-PROCUENCA, with participation from key actors so that both countries understand the work – Ministries of Environment, Rural Development and Foreign Affairs, Tourism; and Planning Institutes, and municipalities
- Gathering scientific knowledge of cross-border issues, undertake a Transboundary Environmental Diagnosis, and address the root causes of conflict by defining strategic areas for integrated management
- Agreeing a Strategic Actions Programme between the countries (PAE-PROCUENCA) composed of strategic sub-programmes, components and projects, as a mechanism to catalyse investments that work together towards solving global environmental problems. The sub-programmes must be consistent with both nations' Sustainable Development Goals and the previous UN Millennium Goal in order to reduce poverty and protect the environment.

5.6.5 Conclusions

With support from GEF, UNEP, and OAS, the Governments of Costa Rica and Nicaragua demonstrated the institutional capacity to implement a technical cooperation project to manage the San Juan River. However, these efforts were called off for political reasons.

The current territorial dispute between Nicaragua and Costa Rica has yet to be resolved. A lack of political will by both governments continues to hinder the joint development of San Juan River water resources despite the initiatives raised and institutional mechanisms established, but which remain inactive.

Without political will and well-defined common development objectives, it is almost impossible to restore the spirit that led to the development of PROCUENCA initiative.

6 Proposals for managing transboundary waters

Achieving agreement on the development of transboundary water resources in Central American States has the main aim of increasing water security among riparian States using an IWRM approach within the context of international water law.

Water security is defined as

“The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.”

Source: UN-Water, 2013

An IWRM approach includes all waters, all actors, all sectors, upstream-downstream actions, all interests and water uses, measures for protecting natural assets, the value of water, and actions for prevention, mitigation, and adaptation to natural hazards and risks.

The social and economic benefits that come from implementing IWRM are shown to be relevant in Panama’s Chagres River Basin whose waters feed Lakes Gatun and Alhajuela. This experience shows how a properly preserved basin allows the Panama Canal to operate even under the effects of the region’s severe drought. This basin is protected against poor agricultural practices, deforestation, and fires, which are all covered under a State policy that includes laws, institutions, and a budget to enforce the rules and monitor progress towards targets and objectives. However, this situation is much more complex when transboundary waters are involved.

Dealing with transboundary waters involves both international law and international water law. International law has principles of sovereignty, cooperation, good faith, and a desire to search for the peaceful settlement of disputes. International water law adds the principles of equitable and reasonable use, and the participation of all riparian States in benefits derived from water use. It includes causing no significant harm to the resource; adopting measures for environmental protection; complemented with social equity, economic efficiency, and environmental sustainability as promoted by an IWRM approach. Other features include

discretionary procedural obligations, such as notification, information sharing, consultations, and environmental impact studies as relevant tools for transboundary water cooperation.

Equitable water use involves harmonising and balancing States' interests in accordance with reasonable and beneficial use, which, according to the Convention on the Law of the Non-Navigational Uses of International Watercourses, does not involve respecting any priority of use with respect to future development of water resources (McIntyre, 2013). This constitutes one of the most important challenges to achieving agreement between States on managing shared waters.

The Convention codifies much of the global cultural experience in transboundary water management and governance derived from both customary practice and agreements. It is based on the duty to cooperate and to act in good faith, which is the core spirit of the UN Charter and of international relations. Table 9 summarises the Convention's content according to the analysis matrix recommended by Wouters (2013) and others.

Table 9. Summary of Convention on the Law of the Non-Navigational Uses of International Watercourses

Main elements	General content	Article
Scope, Object and Parties	Scope Use of international watercourses and of their waters for purposes other than navigation Protection, preservation and management measures related to use Optimal utilisation and sustainable protection	Article 1 (1, 2) Article 8
	Object International watercourses System of surface waters and ground waters constituting a unitary whole and normally flowing into a common terminus	Article 2 (a, b) Article 2 (a)
	The entire international watercourse, or any part thereof, or project, programme, or particular use	Article 3 (4)
	Parties Watercourse State means a State in whose territory part of an international watercourse is situated Party that is a regional economic integration organisation	Article 2 (c) Article 2 (d)
Rights of Party States	Watercourse State's right to participate in the use, development and protection of an international watercourse in an equitable and reasonable manner Each Watercourse State uses waters in its territory in an equitable and reasonable manner, taking into account relevant factors and circumstances No use has priority over another, although special regard must be given to human needs Protection and preservation of ecosystems, whether individually or jointly	Articles 5 and 6 (1 and 3) a-g Article 10 (1) Article 20
Rules of Procedure	General duty to cooperate Duty to take appropriate measures to avoid causing significant harm to another State when using waters within its territory If significant harm is caused, to take measures to eliminate or mitigate it Regular sharing of data and information Collect and process data and information for common use Duty to notify and consult any planned measures Consultation regarding pollution Consultation on management of a watercourse Consultation to adapt or apply the Convention	Article 3, 5 (2), 7 (1) (2) 8 Article 9 (1, 2, 3); 11 – 19, 21 (2,3), 24 (2)
Institutional Mechanisms	Specific or designated, in order to operationalise the modality of cooperation adopted between the Parties For consultations regarding the management of an international watercourse, joint body	Article 8 (2) Article 24 (1)
Dispute Resolution	If derived from the interpretation or application of the Convention, the States shall, in the absence of specific regulation, seek a settlement by peaceful means Adopt one of the means provided for by the Convention – not binding (good offices of, or request mediation or conciliation by, a third party), or binding (arbitration or judicial decision)	Article 33 (1) Article 33 (2 – 10)

Source: Colom, 2014; pp. 5–6.

It is also important for States to note that, according to global cultural practice, governance of international waters takes into account various levels – global, regional, bilateral, and multilateral. It may refer to international watercourses and transboundary aquifers in general, or be confined to a particular river or aquifer, a section or part thereof, or to a specific project. The key point for transboundary cooperation depends on the States' willingness to cooperate in solving specific challenges or adopting common goals, and to start it around a specific geographical space or water source, as the 'Handbook for Integrated Water Resources Management in Transboundary Basins of Rivers, Lakes and Aquifers' (INBO and GWP, 2012) emphasises.

For Tarlock (2015), cooperation among States must be effective, able to reduce tensions, and encourage water security-based water resource development. This requires States to adopt a different understanding of the way they exercise their right to sovereignty so that it ensures cooperation based on attaining continuous bilateral or multilateral relations with specific, reciprocal, balanced, and measurable benefits. It involves moving beyond agreement or acknowledging international and customary law principles, or the UN Convention on the Law of the Non-Navigational Uses of International Watercourses. It means promoting conditions that allow all States to achieve targets and goals as part of water security.

Tarlock's approach recognises the importance of the principles created by doctrine and custom, as expressed by the Convention, about the duty to cooperate, the interested States' participation in equitable and reasonable water use, the obligation of not causing significant harm to other States, environmental protection, and the procedural principles of notification and information sharing.

Before starting a process to design a Convention, a clear understanding is needed of the current situation and the way forward. A useful start is to adopt a matrix to analyse all natural, social, economic, and environmental factors involved. Examples include the one established in Article 6 of the Convention on the Law of the Non-Navigational Uses of International Watercourses, and Article V of the Helsinki Rules (1966), proposed by ILA and Wouters (2013).

These factors can be grouped as biophysical, demographic, population growth and behaviour trends, economic, current uses and water potential for development, positive and negative externalities of use, environmental status of waters in terms of basin deterioration and water pollution, and comparable value alternatives regarding a particular current or intended use. Wouters (2013) recommended organising relevant factors around six categories (Table 10).

Table 10. Relevant factors for negotiating transboundary waters agreements

Category	Component	Comments and data	Data sources, methodology, assumptions, problems, and solutions
Physical (natural) characteristics	Geographic	Context	
	Hydrographic	Extension of drainage basin or aquifer (extension of recharge area)	
	Hydrological	Availability Variability Water quality Contribution of water by State Hydrological aspects and climate change	
	Climatic	Possible impacts	
	Ecological environmental	Environmental goods and services	
Who? dependent population	Present	Population in each State within the basin Distribution Livestock	
	Projected	Distribution	
What uses?	Existing uses	By sector Consumptive Non-consumptive Assessment	
	Potential uses	Natural or planned Type of use Supply and demand Suitable areas	
	Vital human needs	Water required for supply and sanitation Water required for subsistence food production	
	Existing structure of use	Demand in quantity and quality, efficiency and technology used, by type of use	
	Dependence of the economy	Population dependent on economic activities that use water Share of GDP, tax revenues, employment, foreign exchange earnings	
	Social use	Human Development Index Customary uses (common) Gender uses	
	Ecological/environmental use	Water to maintain/restore ecosystems Population dependent on the ecosystems	
What impacts? Effects of use on other States	Impacts of existing and potential uses	Beneficial impacts Adverse impacts Assessment and determination of social and economic impacts	
What options? Efficiency of use and supply alternatives	Specific (comparative efficiency of use)	Present and projected use consumptive and non-consumptive	
	Broad (alternatives to use)	Alternative sources of water for existing or planned uses Alternatives to using water which provide similar benefits	
Other relevant factors			

Source: Adapted from Wouters, 2013 by Colom, 2014.

Collecting data and information on relevant factors will allow each State to ponder the actual status of transboundary waters with respect to their own development, their economic and social demands, and the real possibilities for sharing water resource development with neighbouring States.

The success of the process lies in recognising that developing transboundary aquifers or watercourses involves a community of interests. And so it is essential to identify specific and measurable benefits for every member State proportional to their obligations, duties, and responsibilities.

It is strongly recommended that interested States need to adopt a specific institutional mechanism for dialogue and cooperation; and agree upon specific methods for conflict resolution, such as negotiation, good offices and mediation, investigation, and conciliation, all of which have one common feature – the involvement of a third party. This is an independent person unrelated to the controversies to be resolved. This is seen as an important complement to resolving the San Juan River Basin disputes.

The Central American States, and indeed all the States on the American continent, are not yet party to the UN Convention on the Law of the Non-Navigational Uses of International Watercourses. But this Convention can provide a lighthouse to guide all the States in establishing agreements that facilitate cross-border cooperation for internationally shared water resources.

7 Conclusions

All the Central American States face the common challenge of developing shared surface and groundwater resources that both form and cross national boundaries. Together they need to define specific agreements, as these assets will continue to suffer pressure from population growth, increased economic demands, and the need to environmentally protect waters. Failing to do so will create a source of conflict.

Sharing transboundary water resources will be an essential part of reaching the UN Development Agenda's SDGs, particularly the Water Goal (Goal 6). Target 6.5 requires water planners, managers, and users to adopt an IWRM approach with strong national institutions and legal frameworks.

The global experience of managing shared resources expressed through principles, customs, and conventions is vast and varied, and is an important source to inform relations, dialogue processes, and the signing of agreements between States. Moreover, this experience also offers numerous institutional mechanisms for conflict resolution.

The urgent need to both rationally utilise and protect shared waters to ensure social and economic development in the region makes this a vital issue to promote improved quality of life among the population and to secure their livelihoods. It is particularly urgent in this vulnerable region to employ territorial management instruments developed by various entities in order to achieve progress in terms of transboundary waters management.

The encouraging progress made by El Salvador, Guatemala, and Honduras in the Trifinio Project; by El Salvador and Honduras collaborating in the Goascorán River Basin; and by Costa Rica and Panama in the Sixaola River Basin, are notable examples based on good will and joint efforts to address transboundary problems. The benefits generated for all the participating nations are evident.

The agreements in place in the Trifinio region protect its world ecological status and offer ideal vehicles to promote the signing of a tri-national transboundary waters management agreement. This is an initiative that is strongly promoted by local governments in all three countries and by Trifinio's national office in El Salvador.

The arrangements in the Sixaola River Basin currently emphasise conserving biodiversity in the protected areas by maintaining the low population density, by the expression of diverse native cultures, and the existence of numerous plans to utilise natural assets. Based on this, Costa Rica and Panama have established a direct and totally amicable relationship.

Relations between Costa Rica and Nicaragua over the San Juan River Basin are a continuing source of tension and conflict. Neither State has found a direct mechanism to address and settle their differences, and both have resorted to the International Court of Justice. This is likely to become a factor that limits any proposal for joint management of shared waters.

Costa Rica, Honduras, Nicaragua, and Panama have national water management legal regimes that favour international negotiating processes. But El Salvador and Guatemala have not yet resolved, domestically, a way to manage freshwater resources, which in turn limits possible negotiations with other States regarding transboundary waters.

Only Guatemala has so far defined a public policy to address shared water resources with neighbouring States. But this is a huge challenge given the number of international watercourses and transboundary aquifers originating in or flowing through its national boundaries.

Defining how Central American transboundary water resources will be managed is important for the economic and social development of all States in the region. This will require establishing and/or strengthening dialogue processes, as well as building institutions, and establishing legal arrangements.

Building on existing structures is a way forward. Recommendations include promoting discussions with Ministries of Foreign Affairs, Central American Parliament (PARLACEN is its Spanish acronym), and Central American Integration System (SICA, is its Spanish acronym) through a regional programme that would also inform and educate various authorities and levels (political, managerial, and operational) about the benefits of agreeing to cooperate over developing shared water resources. They could share experiences from other places, which show that cooperation and developing a community of interests are principles that can work among States so that international waters become an integral part of development.

It is essential to promote an atmosphere of equality and respect in order to identify difficulties and enable cooperation agendas to be constructed that facilitate attracting international support from financing and technical agencies in order to launch and implement them.

As for the region's largest watershed – Lakes Xolotlán and Cocibola, and the San Juan River Basin – circumstances unfortunately continue to deepen the rift between the governments of Nicaragua and Costa Rica. The lack of goodwill incurs costs and delays in finding ways to resolve problems and exacerbate severe degradation processes that have social, economic, and environmental costs, which impact populations in both countries.

One way forward is to begin building capacity in international water law in both countries. This would help government officials and the public to become more aware of national and international legal instruments that apply to this matter, and which constitute the basis for strengthening bilateral or multilateral relations to manage international waters.

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