

Annex 7: Summary of consultations and Stakeholder Engagement Plan

SUMMARY OF CONSULTATIONS

There has been extensive consultation with regional and national stakeholders for the development of the proposed project, as outlined below.

1. Meetings of the Council of Ministers of the Central American Commission on Environment and Development (CCAD)

The Council of Ministers CCAD has been engaged on the developments of the preparation of the project proposal on seven different occasions:

- 48th Extraordinary Meeting of the Council of Ministers, San Pedro Sula, Honduras, 27 April 2016, Agreement N°13.
- 52nd Extraordinary Meeting of the Council of Ministers, Puntarenas, Costa Rica, 7 June 2017. Agreement N°9.
- 57th Ordinary Meeting of the Council of Ministers, Roatán, Honduras, 29 June 2017. Agreement N°9.
- 59th Ordinary Meeting of the Council of Ministers, Panama, 8 August 2017.
- 54th Extraordinary Meeting of the Council of Ministers, Santo Domingo, Dominican Republic, 19 June 2018
- 61st Ordinary Meeting of the Council of Ministers, Placencia, Belize, 2 August 2018.
- 62th Ordinary Meeting of the Council of Ministers, Guatemala City, Guatemala, February 1st, 2019.
- 57th Extraordinary Meeting of the Council of Ministers, (virtual), November 26th, 2019.

2. Initial consultation meetings (June–July 2016)

Six national consultation meetings took place in the participating countries during June and the first week of July 2016 to identify priorities to be included in the project proposal. The dates and participants are listed in the table below.

Table 1. List of participants in the national consultation workshops.

Country	Name	Institution	E-mail address
Costa Rica 17 June 2016	Roberto Flores	MAG	rflores@mag.go.cr
	Lorena Jiménez	MAG	ljimenez@mag.go.cr
	Manuel Jiménez	SE-CAC	manuel.jimenez@iica.int
	Ligia Córdoba	SE-CAC	ligia.cordoba@iica.int
	Oscar Vásquez	MAG	ovasquez@mag.go.cr; magdrch@mag.go.cr
	Mariano Espinoza	SINAC	mariano.espinoza@sinac.go.cr
	Leonardo Cascante	DA	lcascante@da.go.cr
	Patricia Campos	MINAE	pcampos@minae.go.cr
	Eduardo J. Somarriba Chávez	CATIE	esomarri@catie.ac.cr
	Carolina Reyes	Fundecooperación	creyes@fundecooperacion.org
	Julio Calderon	CAC	
	Ligia Cordoba	CAC	ligia.cordoba@iica.int
	Dennis Sanchez	FAOCR	Dennis.Sanchez@fao.org

Country	Name	Institution	E-mail address
Dominican Republic 2 June 2016	Marta Villegas Murillo	FAOCR	Marta.VillegasMurillo@fao.org
	Juan Mancebo	MA	juan.mancebo@agricultura.gob.do
	Dominga Zorrilla	MA	digna.zorrilla@agricultura.gob.do
	Ronny Sepulveda		ingronnyabreu@gmail.com
	Nathalie Gomez	MA	nathalie.gomez@ambiente.gob.do
	Yamir Antonio Encarnación Bello		yamirencarnacion@gmail.com
	Fatima Espinal	FAODO	Fatima.Espinal@fao.org
El Salvador 13 June 2016	Daniel Velerio	FAODO	Daniel.Valerio@fao.org
	Luis Napoleón Torres Berríos	MAG	luis.torres@mag.gob.sv
	Manuel Sosa	MAG	manuel.sosa@mag.gob.sv
	Carol Simonson	Fundemas	carol.simonson@fundemas.org
	Luis Torres	MAG	luis.torres@mag.gob.sv
	Patricia Alfaro	MAG	patricia.alfaro@mag.gob.sv
	Juan Fuentes	MAG	juan.fuentes@mag.gob.sv
	Walter Gonzalez	MARN	wgonzalez@marn.gob.sv
	Jorge Quezada	MARN	jquezada@marn.gob.sv
	Sol Muñoz	MARN	smunoz@marn.gob.sv
	Doris Gamero	MARN	medioambiente@marn.gob.sv
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	Carlos Ghiringhello	MARN	crghiringhello@rree.gob.sv
	Lilian Vega	Banco de Gobierno Agropecuario	presidencia@bfa.gob.sv
	Julio Sánchez		
	Mario Lobo	MAG	mario.lobo@mag.gob.sv
	Sandra Gutierrez Poizat	MARN	sgutierrez@marn.gob.sv
	Manuel Sosa	MAG	manuel.sosa@mag.gob.sv
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	Judith Odipa	Banco de Fomento Agropecuario	judith.odepa@bfa.gob.sv
	Jesus Constanza	FAOSV	Jesus.Constanza@fao.org
	Emilia Barraza	FAOSV	Emilia.Barraza@fao.org
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	Miriam Monterroso	MAGA	guatemalalegalservices@hotmail.com
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	Luis Alfredo Rivas		lrivas.erna@gmail.com
	Miguel Ernesto Briceño Torres		bricenotorres@yahoo.com
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	Sandra Rivera	PESIC	srivera@pesic.org
	German Flores	FAOHN	German.Flores@fao.org

Country	Name	Institution	E-mail address
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Panamá 6 July 2016	Juan Manuel Ríos	MIDA	juan01manuelrios@yahoo.es
	Virgilio Salazar	MIDA	virgilio2732@gmail.com
	Noel Trejos	MIAMBIENTE Panamá	natrejos@miambiente.gob.pa
	Lorena Vanegas	MIAMBIENTE Panamá	lvaneegas@miambiente.gob.pa
	Edecer Cedeño	MIAMBIENTE Panamá	elcedeno@miambiente.gob.pa
	Ana Posas	FAOPA	Ana.Posas@fao.org

During the national workshops a focal point for the proposal development was selected for each country and the CCAD, as listed in the table below.

Table 2. Focal points for the development of the proposal.

Country	Name	Institution	E-mail address
CCAD	Salvador Nieto	CCAD	snieto@sica.int
Costa Rica	Mariano Espinosa and Patricia Campos	Ministerio de Ambiente y Energía (MINAE)	mariano.espinoza@sinac.go.cr pcampos@minaet.go.cr;
Dominican Republic	Pedro Brito, Nathalie Gomez	Ministerio de Medio Ambiente y Recursos Naturales (MARN)	pedro.garcia@ambiente.gob.do nathalie.gomez@ambiente.gob.do
El Salvador	Javier Magaña	Ministerio de Medio Ambiente y Recursos Naturales (MARN)	jmagana@marn.gob.sv
Guatemala	Saul Perez	Ministerio de Ambiente y Recursos Naturales (MARN)	saul_perez_arana@yahoo.com
Honduras	Luis Rivas	Ministerio de Energía, Recursos Naturales, Ambiente y Minas (MiAmbiente)	lrivas.serna@gmail.com
Panama	Noel Trejos	Ministerio de Ambiente (MiAmbiente)	natrejos@miambiente.gob.pa

Nicaragua was incorporated into the process at a later stage; therefore, no specific workshop was held in the country. The stakeholders consulted in Nicaragua are listed in the table below.

Table 3. Stakeholders consulted in Nicaragua.

Country	Name	Institution	e-mail
Nicaragua	José Milán	MARENA	jmilanperez@gmail.com
	Ana Marcia Zeledón	MAG	anamarcia.zeledon@magfor.gob.ni
	José Ramón Rivas	MAG	ramon.rivas@magfor.gob.ni

3. Second round of consultations (October–November 2017)

On 13 October 2017, the Executive Secretariat of CCAD circulated a first draft of the concept note among the participating countries for comments and suggestions. Comments were received from the focal points (see Table 9 below) until 27 October 2017. On 1 November

2017 a video-conference was held to discuss the document, preceded by bilateral preparatory meetings with the focal points listed below.

Table 4. Focal points for the review of the first draft of the concept note.

Country	Name	Institution	e-mail
CCAD	Salvador Nieto	CCAD	snieto@sica.int
Guatemala	Juan Carlos Díaz	Ministerio de Ambiente y Recursos Naturales (MARN)	jcdiaz@marn.gob.gt
El Salvador	Jorge Quezada	Ministerio de Medio Ambiente y Recursos Naturales (MARN)	jequezada@marn.gob.sv
Honduras	Luis Rivas	Ministerio de Energía, Recursos Naturales, Ambiente y Minas (MiAmbiente)	lrivas.serna@gmail.com
Nicaragua	José Milán	Ministerio del Ambiente y los Recursos Naturales de Nicaragua (MARENA)	jmilanperez@gmail.com
Costa Rica	Sonia Lobo	Ministerio de Ambiente y Energía (MINAE)	sonia.lobo@sinac.go.cr
Panamá	René López	Ministerio de Ambiente (MiAmbiente)	rlopez@miambiente.gob.pa
Dominican Republic	Rosa Otero	Ministerio de Medio Ambiente y Recursos Naturales	rosa.otero@ambiente.gob.do

4. Contributions from the regional workshop "Climate solutions through technology and financing in Central America"

A regional workshop on "Climate solutions through technology and financing in Central America"¹, organised by UNEP, CTCN and the Central American Bank for Economic Integration (CABEI), was held in Panama City from 18 to 19 October 2017.

The concept note incorporates contributions from representatives of governmental and non-governmental organisations of the region collected during the workshop, in particular during the panel on "Water security and flood prevention", which was moderated by Ana Lily Mejía from BCIE. These contributions concerned: i) experiences on economic incentives in the region, including Water Funds; ii) governance and local participation mechanisms for watershed management; and iii) opportunities to improve municipal and national regulatory frameworks, and to diversify sources of funding.

5. Structured dialogue with GCF

A meeting about this proposal was held during the GCF structured dialogue meeting that took place in Bogotá, Colombia, on March 7th, 2018. The objective of this meeting was to receive feedback from the GCF on the concept note sent on February 4th, 2018 and discuss the way forward. This meeting had the participation of the following stakeholders:

Table 5. Structured dialogue with GCF.

Country	Name	Institution	e-mail
CCAD	Salvador Nieto	CCAD	snieto@sica.int

¹ For more information see <http://www.cambioclimatico-regatta.org/index.php/en/workshops/category/2017-taller-regional-soluciones-climaticas-a-traves-de-tecnologia-y-financiamiento-en-centroamerica>

Country	Name	Institution	e-mail
Guatemala	Juan Carlos Díaz	Ministerio de Ambiente y Recursos Naturales (MARN)	jcdiaz@marn.gob.gt
El Salvador	Antonio Cañas Calderón	UNFCCC Focal Point, Ministry of Environment and Natural Resources	acanas@marn.gob.sv
Honduras	Rosibel Martínez Roberto Portillo	Ministerio de Energía, Recursos Naturales, Ambiente y Minas (MiAmbiente) Climate Change National Observatory for Climate Change and Sustainable Development	rmarriagamiambiente@gmail.com
Nicaragua	Javier Gutiérrez	Ministry of Environment and Natural Resources	
Costa Rica	Norma Patricia Campos Mesén	Ministry of Energy & Environment	pcampos5714@gmail.com
Panamá	Elba Cortés	Ministerio de Ambiente (MiAmbiente)	ecortes@miambiente.gob.pa
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	Patrick Van Laake	GCF	plaake@gcfund.org
	Carmen Argüello	GCF	carguello@gcfund.org

During this meeting, there was an analysis of the proposal which had been shared on February 4, 2018 by Mr. Patrick Van Laake, Senior Ecosystems Management Specialist of the GCF. Country representatives also had the chance to provide comments during this meeting. The technical comments were incorporated into the current version of this proposal. It is important to highlight: the significant national ownership and political support at the highest level of this initiative, as well as its potential to promote regional integration, and the potential of the initiative to transform an endemic underdevelopment into an opportunity to recover ecosystems and for the revitalization of the region and, the combination of political instruments and financial mechanisms as a driver for innovation.

6. International Central American Dry Corridor Symposium

An international symposium was carried out on October 23, 2018, which aimed at presenting state-of-the-art technical information about climate change impacts, current threats of climate change in the region, innovative technical solutions, and innovative finances. This symposium also served as a meeting for high-level government representatives (including ministers and vice ministers of the environment of Central America), who participated in a panel and provided specific support to the proposal.

The high-level government officials participating were:

Table 6. High-level government officials participating.

Country	Name	Post
El Salvador	Ms. Lina Pohl	Ministra, Ministerio de Medio Ambiente y Recursos Naturales
Dominican Republic	Ms. Patricia Abreu	Viceministra de Cooperación Internacional, Ministerio de Medio Ambiente y Recursos Naturales
Guatemala	Mr. Alfonso Alonzo	Ministro, Ministerio de Ambiente y Recursos Naturales
Honduras	Mr. Elvis Rodas	Viceministro, Secretaría de Recursos Naturales y Ambiente
Panamá	Mr. Emilio Sempris	Ministro, Ministerio de Ambiente

7. Bilateral meetings in December 2018-February 2019

During December 2018, a group of consultants had bilateral meetings to gather preliminary information about the pre-selected areas, for example: agricultural systems, environmental characteristics, population, presence of development projects, major stakeholders, etc. The consultants also began planning the area selection workshop: calendar, institutional participation, methodology. The consultants also gathered initial information about availability of information generated by projects on climatic resilience. Below, a table of staff consulted.

Table 7. Bilateral meetings.

Country	Name	Institution	Position
Guatemala	Vanessa Franco	MARN	Director of Catchments and Strategic Programs
Guatemala	Astrid Gabriela Castellanos		Chief department of Degradation, Desertification and Drought
Guatemala	Francisco Ávila		Official of the department of Degradation, Desertification and Drought
Guatemala	Laura Melo	WFP	Resident Representative
Guatemala	Irma Palma		Official
Guatemala	Lena Schubmann		Official
Guatemala	Juan Antonio Fernández	USAC	Professor, Agrarian conflicts expert
Guatemala	Silvel Elías		Professor, Dry Corridor expert
Guatemala	Columba Sagastume	Consultant	Agriculture and gender expert
Nicaragua	José Antonio Milán	MARENA	Adviser to the Ministry
Nicaragua	Germán Quesada	Centro Humboldt	Consultant expert in territorial management
Nicaragua	Carlos Landero	PRODEP	Cadaster Technical Director
Nicaragua	José Luis Rojas	PGR	National Environmental Attorney
Nicaragua	José Uvence López	Indigenous community of Mozonte	Community President
Nicaragua	Consuelo de Jesús Rivera	Municipality of Mozonte	Majoress

Costa Rica	Sonia Lobo Valverde	SINAC	Sustainable use of Wildlife
Costa Rica	José Joaquín Calvo Domingo	SINAC	Climate change focal point
Costa Rica	Norma Patricia Campos Mesén	MINAE	Climate change subdirector
Honduras	Luis Alfredo Rivas	MiAmbiente:	Dry Corridor Project Focal point
Honduras	Carmen Cartagena	MiAmbiente	Technician specialist in Climate change
Honduras	Roberto Aparicio	MiAmbiente	Technician specialist in Climate change
Honduras	Miguel Gómez	MiAmbiente	Technician specialist in Climate change
Honduras	Audy Reniery Rodas	MiAmbiente	Technician specialist in Climate change
Honduras	Alexis Irías	PNUD	Environmental Specialist
Honduras	Delton Allen	PNUD	Indigenous peoples specialist
Honduras	Santiago Flores	Confederación de Pueblos Autóctonos de Honduras (CONPAH)	Legal advisor
Honduras	Rafael Trejo	PMA	Manager, Climate change Resilience program
Honduras	José Llopis	Universidad Autónoma de Honduras	Researcher
Panama	Mirta Benítez	Ministry of Environment	Climate Change Analyst, Climate change Unit
Panama	René López	Ministry of Environment	Dry Corridor Project Focal point
Dominican Republic	Esmeldy García	Ministry of Environment	Adaptation department*

Phone meeting

8. Expert Consultation Workshops

Between January and April 2019, expert consultation workshops were held in each participating country. The objectives of these workshops were to: i) present the project to key government representatives and technicians; and ii) begin detailing the target watersheds in which project interventions will be implemented. Detailed workshop reports, including participant lists, were generated by the consultants and can be found in the Supplementary Information at the end of this document.

Below the comprehensive list of participants and dates:

Table 8. List of participants to expert consultation workshops.

Country	Name	Institution	E-mail address
Costa Rica 12 February 2019	José Joaquín Calvo Domingo	SINAC-MINAE	joaquin.calvo@sinac.go.cr
	Rocío Córdoba Muñoz	Consultant CCT	coradoarocio11@gmail.com
	Alejandro Villalobos González	SENARA	avillalobos@senara.go.cr
	Francisco Ramírez	SINAC-ACG	jramirez@acguanacaste.ac.cr
	Evelyn Solano Brenes	SINAC-ACG	evelyn.solano@acguanacaste.ac.cr
	Yarely Díaz Gómez	SINAC-ACAT	yarely.diaz@sinac.go.cr
	Natalia Meza Ramírez	Strengthening of ASADAS AyA-PNUD	natalia.meza@undp.org
	Alexander León Campos	SINAC-ACAT	alexander.leon@sinac.go.cr
	Roger León Segura	ACG-SINAC	rblanco@acguanacaste.ac.cr
	Sonia Lobo Valverde	SINAC-CUSBSE	sonia.lobo@sinac.go.cr
	José Carlos Leal Rivera	SINAC-ACT	jose.leal@sinac.go.cr
	José Carlos Castillo Rojas	OET	jose.castillo@tropicalstudies.org
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	Ruth Martínez	UNEP	ruth.martinez@un.org
	Raúl Artiga	CCAD	rartiga@sica.int
	Olman Varela D	CUDECA	olman.varelad@gmail.com
	Jaime Valverde	CUDECA	jaime.valverde@cudecasc.org
Nicaragua 27 February 2019	José A. Milan Pérez	MARENA	vmilanperez@gmail.com
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	Rene Castellana	MARENA	rcastellon@marena.gob.ni
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	Sebastián Rodríguez	UNEP	sebastianrodriguez@un.org
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	Emilio Valderrama	MIDA-Coclé	evalderrama@hotmail.com
	Héctor Henrrriquez	Miambiente-LS	
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Guatemala 11 April 2019	Carlos David Aroche Quesada	MARN	cdaroche@marn.gob.gt
	Anibal Alvarado Morales	MARN-Headquaters	alvam05@yahoo.com
	Oswaldo Cividanz Cairón	MARN-Quiche	jorgecivi22@gmail.com
	Erick Homero	Mingo-BU	
	Rudy Morales Soberano	CONRED	rudy.morales@gmail.com
	Byron Giovani Palacios	MARN	byron.palacios79@yahoo.com
	Juan Francisco Icooy Ramón	MARN	juanfranir@gmail.com
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	Virginia Juarez Santiago	MARN-BV	mavirjuarez12@yahoo.com
	Rosibel Méndez Toledo	MARN-BV	rosibletoledo@hotmail.com
	Astrid Cortéz Ramos	MARN-BV	acortez@marn.gob.gt
	Ada Corina Alarcón Tista	MARN-BV	alarconcorina209@gmail.com
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	Sergio Prera	MAGA-BV	sergioprera@hotmail.com
	Lourdes Lobos Luna	MAGA-BV	lourdes.loboluna@gmail.com
	César Antonio Sánchez	MAGA Watersheds H	cesarantoniosanchez@gmail.com
	Matías Chavez Lobos	MARN-Quiche	matias.chavezlobos@gmail.com
	Ramiro Pérez Chocoj	MARN-Quiche	rampecho@yahoo.es
	Francisco José Ávila León	MARN-OTDESEQ	favila@marn.gob.gt
	Saturnino Ordoñez	INSIVUMEH	jsordonez@insivumeh.gob.gt
	Gabriela Castellanos Méndez	MARN	sgcastellanos@marn.gob.gt
	Professional staff from institutions involved in this proposal		
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	Raúl Artiga	CCAD	rartiga@sica.int
	Ruth Martínez	UNEP	ruth.martinez@un.org
	Olman Varela Duran	CUDECA	olman.varelad@gmail.com
República Dominicana 30 April 2019	Laura Virginia Díaz Rosario	MIMARENA	lauradiazv86@gmail.com
	Dominga Polanco	MIMARENA	dominaga.blanco@ambiente.gob.do
	Juan Aquilino Bueno	MIMARENA	juan_a1964@hotmail.com
	Ferneli Gómez	Ministry of Environment	
	Patricia Ortiz	Ministry of Environment	patricia.ortiznavarrete@ambiente.gob.do
	Nilsio Gómez	Ministry of Environment-Valverde	nilsiomao@gmail.com

Jonatan Britio Quezada	Ministry of Environment	jjbritio01@ambiente.gob.do
Catia Sánchez	Ministry of Environment	pebe.sanchez@ambiente.gob.do
Cristina Qutania Soto	Soils and Water	cristina.soto@ambiente.gob.do
Lemuel Familia	Department of Biodiversity	lemuel.familia@ambiente.gob.do
Emilio Osario Fernández	Ministry of Environment-Santiago	emilio050@icloud.com
Yluminada Ortega López	Ministry of Environment-Santiago	ylumi811@hotmail.com
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Ruth Martínez	UNEP	ruth.martinez@un.org

9. Regional workshop with CCAD Focal Points for Contribution and Feedback to the Project

A regional workshop with CCAD Focal Points for Contribution and Feedback to the Project, was held in Panama City 20-21st June 2019.

The workshop had the following objectives: i. Socialize the project's Concept Note of with the Focal Points of the Central American Commission for Environment and Development (CCAD); ii. Receive feedback on good practices and lessons learned from the experience of similar interventions in the countries; iii. Strengthen the regional focus of the proposal. iv. Share the proposed work schedule for the preparation of the final version of the proposal. A detailed workshop report is found in the supplementary information section, including summaries of feedback obtained during the meeting. Below, the comprehensive list of participants.

Table 9. List of participants to Regional workshop.

Country	Name	Institution	E-mail
Guatemala	Juan Carlos Díaz	Ministry of Environment and Natural Resources	jcdiaz@marn.gob.gt
Guatemala	César Chacón	Ministry of Environment	chechacone29@gmail.com
El Salvador	Jorge Quezada	Ministry of Environment and Natural Resources	jequezada@marn.gob.sv
Honduras	Luis Alfredo Rivas	Ministry of Natural Resources and Environment	lrivas.serna@gmail.com
Costa Rica	José Joaquín Calvo	Ministry of Environment and Energy	joaquin.calvo@sinac.go.cr
Nicaragua	Esperanza Rodríguez	Ministry of Environment and Natural Resources	erodriguez.marena@gmail.com
Panama	Mirta Benítez	Ministry of Environment	mbenitez@miambiente.gob.pa
Panama	Eric Rodríguez	Ministry of Environment	erodriguez@miambiente.gob.pa
Dominican Republic	Daniel Cabrera	Ministry of Environment and Natural Resources	daniel.cabrera@ambiente.gob.do

Country	Name	Institution	E-mail
Dominican Republic	Lisandra Rodríguez	Ministry of Environment and Natural Resources	lisandra.rodriguez@ambiente.gob.do lisandrarodriguezvicente@gmail.com
Dominican Republic	Luis Reyes Tatis	Vice-Ministry of Soils and Waters	luis.reyes@ambiente.gob.do
Professional staff from institutions involved in this proposal			
	Salvador E. Nieto	CCAD	snieto@sica.int
	Otty Ramos	SE-CCAD	oramos@sica.int
	Raúl Artiga	SE-CCAD	artiga@sica.int
	Griseida Ponce	CABEI	ponceg@bcie.org
	Oscar Calvo Solano	CUDECA	oscar.calvosolano@gmail.com
	Olman Varela Durán	CUDECA	olman.varelad@gmail.com
	Jaime Valverde Rojas	CUDECA	jaime.valverde@cudecasc.org
	Elena Pita	UNEP	elena.pita@un.org
	Ruth Martínez Rodríguez	UNEP	ruth.martinez@un.org

10. Bilateral meetings in September-October 2019

Table 10. Presentation about the project progress to local authorities and interested parties.

Country	Name	Institution	E-mail address
Nicaragua 01 October 2019	Liliana Díaz	MARENA	ldiaz@marena.gob.ni
	Jacqueline Gutiérrez	MARENA	jgutierrez@marena.gob.ni
	Professional staff from institutions involved in this proposal		
	German Alfredo Quezada Guerrero	Local Consultant	germanquezada@gmail.com
	Ruth Martinez ²	UNEP	ruth.martinez@un.org
Guatemala 01 October 2019	Francisco José Ávila	MARN/DTDESEQ	favila@marn.gon.gt
	Gabriela Castellanos	MARN/DTDESEQ	sgcastellanos@marn.gob.gt
	Professional staff from institutions involved in this proposal		
	Columba Sagastume Paiz	Local Consultant	columbasagas@gmail.com
El Salvador 01 October 2019 ³	Eng. Miguel Gallardo	MARN-DEV	mgallardo@marn.gob.sv
	Javier Magaña	MARN-DEV	jmagana@marn.gob.sv
	Cristina Ardón	MARN-DEV	cardon@marn.gob.sv
	Professional staff from institutions involved in this proposal		
	Margarita Meléndez	Local Consultant	mmelendez1517@yahoo.com
	Ruth Martinez	UNEP	ruth.martinez@un.org
Panama 16 October 2019	Alberto Sáenz	Stakeholder of Macaracas	
	Professional staff from institutions involved in this proposal		

² By phone

³ Meetings with the head of the focal group (Eng. Miguel Gallardo) and the team of the Ministry of Environment and Natural Resources were attended through WhatsApp, e-mail and phone, informing each of the steps that were taken during the development of the proposal.

	Yuriza María Guerrero Pineda	Local Consultant	yguerrero@catie.ac.cr
Panama 17 October 2019	Rafael Meléndez	FERTICA Tonosí	
	Professional staff from institutions involved in this proposal		
	Yuriza María Guerrero Pineda	Local Consultant	yguerrero@catie.ac.cr

Table 11. Work meetings on ecosystem diagnosis and adaptation solutions.

Country	Name	Institution	E-mail address
Costa Rica 30 September 2019	Sonia Lobo	SINAC	sonia.lobo@sinac.go.cr
	José Joaquín Calvo	SINAC	joaquin.calvo@sinac.go.cr
	Professional staff from institutions involved in this proposal		
	Olman Varela	Local Consultant	olman.varelad@gmail.com
Guatemala 03 October 2019	Gabriela Castellanos	MARN/DTDESEQ	sgcastellanos@marn.gob.gt
	Gabriela Castellanos	MARN/DTDESEQ	sgcastellanos@marn.gob.gt
	Professional staff from institutions involved in this proposal		
	Columba Sagastume Paiz	Local Consultant	columbasagas@gmail.com
Costa Rica 03 October 2019	Sonia Lobo	SINAC	sonia.lobo@sinac.go.cr
	José Joaquín Calvo	SINAC	joaquin.calvo@sinac.go.cr
	Professional staff from institutions involved in this proposal		
	Olman Varela	olman.varelad@gmail.com	
Panama 03 October 2019	Jackeline Calderón	MiAmbiente	jcalderon@miambiente.gob.pa
	Ednadeliz Flores	MiAmbiente	eflores@miambiente.gob.pa
	Cinthia Farrugia	MiAmbiente	cfarrugia@miambiente.gob.pa
	Professional staff from institutions involved in this proposal		
	Juan Monterrey	UNEP	Juan.monterreygomez@un.org
	Yuriza Guerrero	Local Consultant	yguerrero@catie.ac.cr
El Salvador 04 October 2019	Margarita García	MARN	rmgarcia@marn.gob.sv
	Xiomara Aquino	MARN	xhenriquez@marn.gob.sv
	Javier Magaña	MARN-DEV	jmagana@marn.gob.sv
	Norma Cerón Rauda	MARN	nceron@marn.gob.sv
	Professional staff from institutions involved in this proposal		
	Margarita Meléndez	Local Consultant	mmelendez1517@yahoo.com
El Salvador 10 October 2019	Josué Vidal Barahona Flores	Environmental Unit of the Municipality of El Carmen, La Unión	Vidalbarahona9@yahoo.es
	Walberto Gallegos	MARN	wgallegos@marn.gob.sv
		Environmental Unit of the Municipality of El Transito, San Miguel	
	José Armando Cisneros		armandoc64@hotmail.com
	Claudia Azucena Campos	Municipality of El Transito, San Miguel	clagocam@gmail.com
	Aracely de Calderón	Social Rehabilitation Technician, Municipality of El Transito, San Miguel	aracelydc@gmail.com

	Lorena Liseth Medrano	Environmental Unit of the Municipality of Concepción Batres	lorenaquinteros81@gmail.com
	Cesar Enrique Juárez	Civil Protection of Jucuarán	cjuarez@proteccioncivil.gob.sv
	Santana Rivera	Environmental Unit of the Municipality of Jucuarán	js.rivera@hotmail.com
	Juan Torres	FISDL - Jucuarán	torresfranko@gmail.com
	Berta Alicia Rivera	UMM of the Municipality of Jucuarán	ber.rivera@hotmail.com
	José Pedro Martínez	ADESCO- Jucuarán	
	Mardo Arcides Posada	MARN	mparada@marn.gob.sv
	Professional staff from institutions involved in this proposal		
	Margarita Meléndez.	Local Consultant	mmelendez1517@yahoo.com
El Salvador San Miguel 15 October 2019	Xiomara Aquino	MARN	xhenriquez@marn.gob.sv
	Javier Magaña	MARN-DEV	jmagana@marn.gob.sv
	Professional staff from institutions involved in this proposal		
	Margarita Meléndez	Local Consultant	mmelendez1517@yahoo.com
	Alba Verónica Paniagua	Local Consultant Assistant	veronica.panmel@gmail.com
	Leyla Zelaya	UNEP	leyla.zelaya@um.org
	Marta Moneo	UNEP	marta.moneo@um.org
Dominican Republic 17 October 2019	Héctor Almonte	NATURALEZA	hectoralmontemella@gmail.com
	Professional staff from institutions involved in this proposal		
	Pablo José Ovalles Ureña	Local Consultant	pabloovalles@yahoo.es

Table 12. Meetings to discuss adaptation activities in the selected municipalities.

Country	Name	Institution	E-mail address
Panama 30 September 2019	Mirta Benítez	MiAmbiente	mbenitez@miambiente.gob.pa
	Jackeline Calderón	MiAmbiente	jcalderon@miambiente.gob.pa
	Ednadeliz Flores	MiAmbiente	eflores@miambiente.gob.pa
	Cinthia Farrugia	MiAmbiente	cfarrugia@miambiente.gob.pa
	Professional staff from institutions involved in this proposal		
	Yuriza Guerrero	Local Consultant	yguerrero@catie.ac.cr
Honduras 2 October 2019	Marlon Ramirez	Municipality of de Duyure	
	Orlin Valladares	Municipality of Morolica	
	Professional staff from institutions involved in this proposal		
	Dalila Sierra	Local Consultant	dalisierra@hotmail.com
Honduras 15 October 2019	Juan Benito Guerra Fúnez	Municipality of Choluteca	
	Santos Emilio	Municipality of Apacilagua	

	Eugenio Alvarez	Municipality of Orocuina	
	Professional staff from institutions involved in this proposal		
	Dalila Sierra	Local Consultant	dalisierra@hotmail.com
El Salvador	Kevin Turcios	Group of Scout 33 Lencas	jevin.turcios24@gmail.com
17 October 2019 ⁴	Daniel Alas	Oikos solidaridad	
	Professional staff from institutions involved in this proposal		
	Margarita Meléndez	Local Consultant	mmelendez1517@yahoo.com
El Salvador	Doris Elizabeth Nieto	ASIBAHIA	dorisnieto.asibahia@gmail.com
18 October 2019	Professional staff from institutions involved in this proposal		
	Margarita Meléndez	Local Consultant	mmelendez1517@yahoo.com
Costa Rica	Juan Bravo	CENEDE	
18 October 2019	Professional staff from institutions involved in this proposal		
	Olman Varela	Local Consultant	olman.varelad@gmail.com
Costa Rica	Suray Carrillo	Fedeagua	suraycarrillo@gmail.com
22 October 2019	Professional staff from institutions involved in this proposal		
	Olman Varela	Local Consultant	olman.varelad@gmail.com
Costa Rica	Nelson Marín	Conservation Area of Tempisque	nelson.marin@sinac.go.cr
22 October 2019	Professional staff from institutions involved in this proposal		
	Olman Varela	Local Consultant	olman.varelad@gmail.com

Table 13. Other meetings: Meetings with municipal authorities.

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Guatemala	Adelso Revolorio Quevedo	INAB	arevolorio@inab.gob.gt
01 October 2019	Professional staff from institutions involved in this proposal		
	Columba Sagastume Paiz	Local Consultant	columbasagas@gmail.com
Guatemala	Marvin Raúl García	Delegate MARN Quiché	garciamarvinr@yahoo.com
02 October 2019	Professional staff from institutions involved in this proposal		
	Columba Sagastume Paiz	Local Consultant	columbasagas@gmail.com
Guatemala	Rudy Vásquez	MAGA	rudymas@gmail.com
02 October 2019	Professional staff from institutions involved in this proposal		

⁴ Meetings through WhatsApp and e-mail.

	Columba Sagastume Paiz	Local Consultant	columbasagas@gmail.com
Honduras 02 October 2019	Marlon Ramírez	Municipality of de Duyure	
	Orlin Valladares	Municipality of Morolica	
	Professional staff from institutions involved in this proposal		
	Dalila Esperanza Sierra Arita	Local Consultant	dalisierra@hotmail.com
Nicaragua 04 October 2019	Mario Gabriel Rosa	MARENA	grosa@marena.gob.ni
	Iara Bethzaida Rodríguez Acuña	MARENA	irodriguez@marena.gob.ni
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	Liliana Díaz	MARENA	ldiaz@marena.gob.ni
	César Vidal Molina	MARENA	cmolina@marena.gob.ni
	Professional staff from institutions involved in this proposal		
	German Alfredo Quezada Guerrero	Local Consultant	germanquezada@gmail.com
Honduras 15 October 2019	Juan Benito Guerra Fúnez	Municipality of Choluteca	
	Santos Emilio	Municipality of Apacilagua	
	Eugenio Alvarez	Municipality of Orocuina	
	Professional staff from institutions involved in this proposal		
	Dalila Esperanza Sierra Arita	Local Consultant	dalisierra@hotmail.com
Costa Rica 21 October 2019	Nazareth Porras	Mideplan	nazareth.porras@mideplan.go.cr
	Professional staff from institutions involved in this proposal		
	Olman Varela	Local Consultant	olman.varelad@gmail.com
El Salvador 30 October 2019	Deysi Herrera	Project Coordinator of FIAES Territory	daisy.herrera@fiaes.org.sv
	Professional staff from institutions involved in this proposal		
	Margarita Meléndez	Local Consultant	mmelendez1517@yahoo.com

11. Community consultation workshops

In October 2019, local workshops were held in each participating country to consult with representatives from *inter alia* public institutions, environmental organisations, water boards, agricultural institutions and local communities in the target municipalities where project interventions will take place. These consultations were used to gather granular detail in target municipalities on a range of topics, including: i) land use; ii) local perception of climate change; iii) perceived impacts of climate change on ecosystems/agroecosystems; iv) perceived impacts of climate change on the population; and v) examples of adaptation measures currently used. Importantly, these consultations were also used as an opportunity to present the proposed project activities and validate their appropriateness in each of the local contexts. Detailed workshop reports, including participant lists, are presented in the Supplementary Information at the end of this document.

Table 14. Comprehensive list of participants.

Country	Name	Institution	E-mail address
Honduras 14 October 2019	Luis Adalberto Mendoza	Municipality of Apacilagua	luismendoza1920@yahoo.es
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	Santos Emilio Baquedano	Municipality of Apacilagua (UMA)	
	Ronal Arquímedes Hernández	Municipality of Apacilagua Water Board of Apacilagua	
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	Ernesto Flores Guillen	Nation Plan /CP	netor-91975@yahoo.com
	José Adalid Nuñez	MiAmbiente+/ Regional Office of South Area	joseadalid35@yahoo.com
	Gabriel Sánchez	MiAmbiente+ (CESCCO)	sanchezgramon@yahoo.com
	Victor Suárez	Municipality of Choluteca	
	Juan Benito Guevara Fúnez	Municipality of Choluteca (UMA)	umacholuteca@yahoo.es
	Jose Reinaldo Escalante	Municipality of Choluteca, Water Board	
	Julio Peralta	Water Board of Choluteca	cesarpastrana34@yahoo.com
	Guillermo Pérez	National Plan	memoperez64@hotmail.com
	Wilmer Elias Cárcamo	Municipality of Duyure	wilmercarcamo1993@gmail.com
	Marlon Ariel Ramírez	Municipality of Duyure	marlonramirez8@gmail.com
	Alexa Jarely Guevara	Municipality of Duyure (JCGG)	
	Arnulfo Avidail Ramírez	Patronato Pro-Mejoramiento4 Duyure	
	Baltamar Reyes	Municipality of Marcovia	reyesbaltamar@gmail.com
	Edwin Banegas	Municipality of Marcovia (UMA)	edma.marcovia@gmail.com
	Orlin Valladares	Municipality of Morolica (DC)	valladaresorlin@yahoo.es
	Enna Valladares	Municipality of Morolica (OMM)	enavallapal09@gmail.com
	Elda Sagrario Izaguirre	Municipality (Vice-Mayor)	elbaizaguirre21@gmail.com

	Xiomara Yamileth Valladares	Municipality of Morolica ODC	xiomyamileth96@gmail.com
	Omar Aristides López	Municipality of Morolica	
	Eugenio Alvarez Lagos	Municipality of Morolica (UMA)	sevala61@gmail.com
	Patricia Nicole Ortiz Mendieta	PROSASUR	portizprosasur@gmail.com
	Luis Fuentes	Municipality of Orocuina	cfuentesprosasur@gmail.com
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	Lorenzo Olivas	CCAD, Consultant	olivas_lorenzo@yahoo.com
	Nicaragua 14 October 2019	Edixon A. Carro Cruz	Municipality of Yalagüina edixon.carro@yahoo.es
		María Santos López	Municipality of Yalagüina
		Araceli Cruz Prado	CAPS-Los Enc-Yalagüina
		Jimmy Benavides V.	Municipality of Yalagüina jimmy.b080@gmail.com
	Álvaro Baladid	MARENA N.S	Amarena.gob.ni
	José Apolino	GFCY	
	Veronica Antonia Aguirre	GFCY	
	Emilio Muñoz Muñoz	Municipality of Telpaneca	munozmunozemilio97@yahoo.com
	Oscar D. Lazo A.		
	Norman R. Martinez M.	Alcaldía Palacaguina	nogledo@yahoo.es
	Ivania Laguno G.	Alcaldía Palacaguina	ivalagugi@yahoo.com
	Martha López Hernández	Alcaldía Palacaguina	
	Caridad Vanegas Suárez	CAPS	
	Franklin Padilla	Municipality of Somoto	apadillaguillen@gmail.com
	Adaluz Corcena Arguijo	Municipality of El Jícaro	
	Lidia I. Florián Nájera	Municipality of El Jícaro	Egbeinfo83@yahoo.com
	Celso Torres Rivas	Municipality of El Jícaro	Torresrivascelso12@yahoo.com
	Donald Moncada	MARENA/Madriz	dfmoncada@marena.gob.ni
	Fany Moyes Ruiz	MARENA/Madriz	fmoyes@marena.gob.ni
	Noel Elieser Ochoa	Municipality of Somoto	Somoto76@hotmail.com
	Enriqueta Vallecillo	Municipality of Somoto	
	Santos Mercedes Hernandez	Municipality	

El Salvador 16 October 2019	Marcia Estrada	MARENA, headquarters	mestrada@marena.gob.ni
	Felipe Hernández Pérez	MARENA, headquarters	
	Edgard Huete Acevedo	Municipality	edgardhuete@yahoo.com
	Juan Carlos Sepera		
	Professional staff from institutions involved in this proposal		
	German Quesada	Consultant	germanquesada@gmail.com
	Ruth Martínez	UNEP	ruth.martinez@un.org
	Alexandra Sánchez	SE CCAD	msanchez@sica.int
	José Armando Cisneros Cruz	Municipality of El Tránsito	armandoc64@hotmail.com
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	Oscar de Jesús Jovel	CTN El Brazo SM	
	Wilfredo Parada	CASSA Chaparrastigue	wilfredo.parada@grupocassa.com
	Rudys López	Cooperative	
	Enrique Mendoza	Ramsar Jocotal, chairperson	
	Saúl Guzmán	ASPRO Jocotal	
	Daniel Eduardo Mas	OIKOS	oikosoudoridad99@gmail.com educrd_46@hotmail.com
	José Guillermo Rivera	OIKOS Solidaridad	josepanchimalco@hotmail.com
	Ramón Sabel Zorala	GTCHA C. Brioco L.	gthaparostique@gmail.com
	Lorena Liseth Medrano	UAM Concepción Batres	lorenaquinteros81@gmail.com
	Christian Stanley Pérez Turcios	GC 33 Lencas	christianturcios94@gmail.com
	Kevin Ricardo Pérez Turcios	GS 33 Lencas ASES	jevin.turcios24@gmail.com
	Salvador Enrique Pérez Cardona	GS 33 Lencas ASES	salvapeca60@hotmail.com
	Onis Eser Palma Cordero	GS 33 Lencas ASES	seminloti@hotmail.com
	José Biacnmonte	Municipality of El Tránsito	
	Santana Rivera Pérez	Municipality of Jucuarán	js_rivera@hotmail.com
	José Angel Bustos B.	Municipality of El Tránsito, Ramsar Committee of El Jocotal	jabbcc@gmail.com
	José Martín Bonilla	Cantola Puerta, El Pital	
	Felicitio Ortiz	Cantola Puerta, El Pital	
	Ana Raquel Conde de Pineda	ACAMAY Association, Water Board of El	conde.2607@gmail.com

	José Vidal Barahona Flores	Municipality of El Carmen	vidalbarahona9@yahoo.es
	Xiomara Aquino	MARN/DEV	xhenriquev@marn.gob.sv
	María Elena Rivas de Palacios	Ramsar ASIBAHIA, chairperson	mariaelena_riva@hotmail.com
	Dora Elizabeth Nieto	ASIBAHIA	dorasnieto@gmail.com
	Professional staff from institutions involved in this proposal		
	Otty Ramos	SE CCAD	oramos@sica.int
	Alba Margarita Meléndez	Local Consultant	mmelendez1517@yahoo.com
	Alba Verónica Paniagua	Assistant of the Local Consultant	veronica.panmel@gmail.com
	Raúl Artiga	CCAD	rantiga@sica.int
	Marta Moneo	UNEP	marta.moneo@un.org
Costa Rica 18 October 2019	Anthony Ruiz Rodríguez	SINAC/ACT/RNUSC	anthony.ruiz@sinac.go.cr
	Esteban Blanco Calvo	Direction of Climate Change	estebanbcalvo@gmail.com
	Jorge Alvarez R.	INDER/RCDCH	j Alvarezr@inder.go.cr
	Roberto Zúñiga Muñoz	SINAC-ACT	roberto.zuniga@sinac.go.cr
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STAKEHOLDER ENGAGEMENT PLAN

This Stakeholder Engagement Plan (SEP) addresses the importance of ensuring the comprehensive and effective participation of all stakeholders in the development and implementation of the “Ecosystem-based adaptation to increase climate resilience in the Central American Dry Corridor and Arid Zones of the Dominican Republic” Project. The stakeholder participation and consultation processes are top priority in the development, implementation, evaluation and monitoring of project activities, as they ensure that the perceptions, concerns, needs and interests of the stakeholders involved are taken into account in the execution of each of the activities, with the purpose of avoiding and / or mitigating the adverse impacts that may be caused, and improving the well-being of vulnerable populations, including indigenous populations and women.

This SEP serves as a participation strategy that provides the Project team with basic guidelines and guidance on how to meet the requirements for stakeholder participation and consultation. This strategy is based on the principles of transparency, inclusion, non-discrimination and action without harm, which meets the guidelines of the GCF to ensure a significant participation of stakeholders, as described in the document “Design and guarantee significant stakeholder participation in projects supported by the GCF” (GCF, 2019b).

Therefore, the participation strategy will be used by the project team as a guideline to involve all stakeholders from an early stage which allows them, on one hand, to announce Project detailed activities and risks, impacts and benefits in a clear, accessible and understandable manner for each stakeholder, and on the other, acknowledge stakeholder concerns and needs, so that they can be integrated in the project activities, either to make changes or improvements.

This plan will provide the basic mechanisms and methodologies to guarantee such participation in each of the Project activities, as well as stakeholder engagement strategies with special attention to those parts traditionally marginalised or underrepresented. It will be the basis for the SEP implementation and for developing the monitoring, follow-up and evaluation of both, the participation strategy and the implementation of project activities.

Phases to develop the Stakeholder Participation Strategy

In accordance with the Green Climate Fund’s guidelines for the development of the Project participation strategy, the following steps must be followed:

1. Participation strategy design

In this phase, the entire participation plan will be elaborated in detail, taking into account the specific characteristics of each country and each group of stakeholders. It is important to consider the guidelines of this document for its formulation. This phase seeks to:

- Link a team of experts
- Hold informative meetings with stakeholders identified in the stakeholder map and under the proposed relationship criteria, to present the project and to obtain the

perceptions, concerns, interests and needs of each stakeholder, and understand how to work successfully with each one of them.

- Conduct training activities with the entire work team, especially those who will be in the field, on the economic, political, social and cultural context of the places where they will work, ensuring that they will carry out their work in a respectful manner and in compliance with the guidelines proposed.
- Design the participation plan for each activity and sub activity of the project. The team of experts and the technical team of the project describe each of the activities to be implemented with each of the stakeholders and the methodologies to be used to achieve the proposed participation objectives and follow the relationship guidelines proposed in this plan.
- Update the stakeholder map with the new information collected;
- Set a work schedule in which the time for doing the participation activities is determined, the time for analysing information, coupled with the activity implementation schedule and sub activities of the project, so that they are fully coordinated. This schedule must be presented to all stakeholders taking into account their contribution to it and receive their confirmation of receipt and agreement.

The effective participation of the stakeholders involved in the project ensures that it is beneficial for them, especially for those in more vulnerable situations. Although the project seeks to have a positive impact through the implementation of ecosystem-based adaptation strategies, it can only meet its objective if the people who live and relate to these dry corridor ecosystems in Central America and the arid areas of the Dominican Republic are involved in the project in both decision making and activity execution.

Therefore, the specific characteristics and features of each of the groups of stakeholders should be considered, which means considering also the places where they are located and from where they will participate in the Project. This implies an understanding and reflection on the economic, political, social and cultural contexts of the target areas of the project and of each of the stakeholders.

These considerations will provide a better understanding of who the stakeholders are, and properly identify those who are most vulnerable due to their socioeconomic conditions and are subject to oppression due to their gender, race / ethnicity and class status, which will therefore avoid producing or increasing these oppressions at any time. Likewise, stakeholders in positions of economic and political power could better understand and not exercise this power over the other vulnerable stakeholders during the Project implementation, using that power to serve Project's objectives instead.

With this in mind, it is essential to balance the levels of influence of each stakeholder in the Project implementation with the effort and purpose of giving voice and decision-making power to those who historically have had less access to decision-making and to whom the project will impact more directly. This is the main goal of developing a participation plan as one of the backbones of the project.

These considerations also imply that the entire work team, from the Project's general coordinators, to those who work on field (especially them), have clarity about the context in which they will work and the importance of considering the specific characteristics of each of the stakeholders, especially the rural, ethnic and female populations. The participation

plan must then guarantee respect, transparency, inclusion, non-discrimination and action without harm.

Team. It is essential that in each country a team of specialists with extensive experience in research and intervention work in the specific Project areas is created, with knowledge on local, community, institutional and private stakeholders, as well as economic, social and political dynamics. This team will oversee the designing of specific instruments and activities for each Project stages, as well as analysing the information and providing recommendations to those responsible of each activity.

Methodology. The methodologies to be developed must guarantee the effective participation of all stakeholders ensuring all stakeholders play a tangible part in decision making. They must consider the characteristics of the stakeholders with whom they are going to work with and the objectives of each activity, in this sense it should be considered whether the population is literate or not, if they speak Spanish or not, what their cultural references are, among others, in order to develop appropriate resources and know which language to use. Each of the activities to be developed must contemplate the methodologies that have already been used successfully in other projects with similar populations, contexts and focus; similarly, methodologies proposed from the social sciences can be included, as social mapping, in-depth interviews focus groups, age and gender groups, food flows diagrams, and other resources.

2. Stakeholder map

The identification of the target area is made in this phase, as well as stakeholder mapping. With this information an initial approach is made between the project team and the stakeholders in which, through a horizontal and clear dialogue, the project's objectives and activities to be executed are presented. This first dialogue will be useful for:

- Obtaining information about other stakeholders interested in the Project and determine the way to initiate a dialogue with them.
- Getting information on what the initial perceptions are about the project and the activities to be done.
- Finding out what the main concerns and needs of each of the parties regarding the project are.
- Recognize the main relationship difficulties among the stakeholders
- Analyse the work team's strengths in order to enhance them.

The complete stakeholder map provides a detailed knowledge of the stakeholders, their incidence level, their responsibility in the process, their interests, the areas in which they are and act, and their relevance in each of the Project activities, which enables them to determine the best way to establish a relationship with them, as well as to generate more appropriate strategies for dialogue and consultation that lead to a more horizontal, transparent and respectful dialogue of its individuals.

The map serves not only to identify and provide the characteristics of the stakeholders, but also to identify the alliances and tensions between them, their perceptions, interests and concerns regarding the project, the position they assume in relation to the project, their location, their level of impact and involvement in the proposed activities. This is

valuable information that helps to determine more accurately the forms or mechanisms of dialogue, as well as having better analysis through the information received from the stakeholders.

In addition, this map should be constantly updated, since during the process it is possible that new stakeholders may appear, that they change positions, that new interests arise, that new alliances or tensions occur, or that with the modification of some activity the most directly impacted stakeholders are changed.

In mapping the stakeholders, it is important to make a prioritized participation list using a hierarchy system. This implies an analysis of multiple factors related to the possible social and environmental impacts of the activity and the commitment level or intensity level that may be necessary for each group of stakeholders.

During project formulation, initial stakeholder mapping, socialization exercises and meetings about project activities were done. Therefore, the following existing information on the types of stakeholders, their levels of incidence and responsibility in the Project are as follows.

- a) **Communities**: these stakeholders are those belonging to the various rural communities that are located in the area of the direct influence of the project. They are the ones who will have a direct impact on the implementation of each of the activities, and in some of them they are the main beneficiaries. They may or may not be organized and their performance space and level of influence is mainly local. Several categories are divided: peasants, women, ethnic peoples and within these indigenous and afro descendants; the following gives further explanation of the main features:
 - i. **Farmers**: they inhabit rural areas and are in conditions of illiteracy, poor access to public services, low income and food insecurity, characteristics that make them a vulnerable population. A part of them is not organized or affiliated with any organisation.
 - ii. **Women**: they are part of rural or ethnic communities, however, they are specifically mentioned because women are the ones who suffer the most from structural violence, that is, they are more illiterate women, more poor women, more women who are not competent in the Spanish language, more women at risk of work-related illnesses and most likely to have food insecurity. They have less access to decision-making, less access to power scenarios, less considered in processes of participation and consultation. A part of this population is not part of any organisation.
 - iii. **Ethnic Groups**: they are a population with cultural peculiarities that are subject to special protection by international and national legislation. These indigenous and Afro-descendant peoples have low levels of basic needs met, minimum access to formal education, food insecurity, poor access to decision-making and have no positions of power, are the main victims of armed violence and have minimal access to land, among others. Some of these towns have a level of organisation that has allowed them to have dialogues with public and private institutions.
- b) **Non-governmental Organisations (NGOs)**: These are organisations that work for political purposes, are autonomous and act non-profit. They carry out their work

around a particular problem and / or population group and seek resources to develop projects for the benefit of the populations.

- c) **Government Institutions:** These public stakeholders consist of local, regional and national government institutions that deal with some aspects of the project. These are represented by public officials. These institutions are responsible for part of the process as many of these institutions make environmental, social and cultural policies which directly affect the project. Likewise, it is their responsibility to guarantee the consultation and concertation rights of the citizens and be able to monitor the Project achievements. In all the target countries, there are Public Ministries, Municipalities / City Halls, Conservation Institutes and Conservation Area Systems.
- d) **Private sector:** refers to companies, cooperatives and profit organisations to which individuals and corporations belong. In this sector are agricultural, livestock, forestry and mining bodies that have some impact on the target area of the project, the companies that are in the area and the financial corporations that are involved in component 1 of the Project. The impact level of this sector is local or regional depending on the area of action.

The different types of mapped stakeholders for each country are shown in Table 15.

Table 15. Relevant stakeholders in each country.

Stakeholders			
Community	NGOs	Institutions	Private and financial entities
Panamá			
<ul style="list-style-type: none"> - APASPE - Association of silvopastoral producers - Pocrí and Paritilla Craft Association - Fishermen's Association - Basin committees, sub-basin committees and JAAR (Administrative Board of Rural Aqueducts) - Association of bean producers - Association of tomato farmers - Association of organic producers - Association of Cucurbitaceae Agroexporters - Association of bean-friendly producers of the environment - Association of irrigation users El Hato de Antón. - Vegetable cooperatives in Antón (for marketing, supply demand). - Azuero ecological group. - Association of Agro-silvopastoral Producers of Pedasí (APASPE Pedasí). - Tonosí Rice Association - Salineros Association: in Guararé. - Association of corn producers - "Amigos del manglar" (organised group for mangrove protection) - National Association of Ranchers (Anagam, are members of the National Commission of Climate Change and the Association of Milk Producers of the Central Province, APREPECE) - Local authorities - May 1st settlement - Tonosí Agroecological Farm 	<ul style="list-style-type: none"> - Azuero Ecological Project - Peace Corps - Pedasí turtles 	<ul style="list-style-type: none"> - Ministry of Environment (MiAmbiente) - Social security fund - National Secretary for the Food and Nutrition Security Plan - National land administration authority - Vice Ministry of Indigenous Affairs - Emergency operations center - National civil protection system - Ministry of housing and land planning - Ministry of Economy and Finance - Ministry of Agricultural Development (MIDA) - Ministry of Health (MINSa) - Institute of National Aqueducts and Sewers (IDAAN) - Municipalities 	<ul style="list-style-type: none"> - Savings bank - Panama national bank - Microserfin - Agricultural Development Bank - Nuevo Amanecer multi-service cooperative - Santa Catalina Savings and Credit Cooperative - Advance R.L. - Savin Group - Coop. Gladys B. De Ycaza - José del Carmen Domínguez Cooperative - BAC Credomatic - Banistmo - Azteca Bank - Global Bank - PROECO Azuero - APASPE - Albatross - APAIS - TOP - COESAN
Costa Rica			
<ul style="list-style-type: none"> - National Indigenous Council (CONAI) - Guanacaste Women Agenda - Women's Federation of the Gulf of Nicoya - District councils - Cantonal Unions (of Liberia) - Cantonal meetings - Association of Sabaneros and Cooks 	<ul style="list-style-type: none"> - Cultural Rescue - Pan American Ladies - UN Habitat - NICOYAGUA - UNAFOR Chorotega - GTZ 	<ul style="list-style-type: none"> - National Environmental Technical Secretariat - Central American Agricultural Council - Costa Rican Social Security Fund 	<ul style="list-style-type: none"> - Fundecooperacion - Nicoya Rotary Club - Active Club 20-30 - International Lions Club - Sand industry - Cantonal agricultural center - BAC, Communal BAC

Stakeholders			
Community	NGOs	Institutions	Private and financial entities
<ul style="list-style-type: none"> - Association for Children and Adolescents - Cooperatives and chambers of livestock, agricultural, business and tourism - Cantonal Agricultural Centers - Santa Cruz Environmental Commission - Regional Development Council, Local Councils of Biological Corridors, Local and Regional Conservation Councils, Territorial Councils for Rural Development - Associations of Local Development, Associations and Associations of Rural Development, Integral Development Association (ADI), (from Nicoya, Socorro, Cartagena, Tempate) - CCCI (Cantonal Council of Interinstitutional Coordination) - Salvation Army Association - FEDEAGUA - Farmers Association - Security Committee - Board of Education - Health Board - Emergency Committee - Neighbors Committee - Roads Committee - Inter-institutional Committee of the Río Tempisque basin (private company, NGOs, public institutions) - Local Forest Council - Committee of Healthy Wetlands of the Corral de Piedra Wetland - Association of small farmers of Mata Redonda, Local Council CB Las Morrocochas - Associations administering the Community Aqueduct and Sewer Systems (ASADA) - Guanacaste Community Fund - Communal Water League - Committee of healthy wetlands in Tempisque 	<ul style="list-style-type: none"> - Foundation for Sustainable Development (FUNDECODES) - Foundation of the Arenal Tempisque Conservation Area (FUNDACA) - Dry Forest Conservation Fund - Costa Rica Forever (CxS) - International Conservation (CI) - Guanacastecan fellowship - FUNDECONGO 	<ul style="list-style-type: none"> - National Emergency Commission - Rural Development Institute - National Commission of Indigenous Affairs - Costa Rican Institute of Fisheries and Agriculture - National production council - Comprehensive agricultural marketing program - PAACUME - Ministry of Education (MEP) - National Meteorological Institute (IMN) - National University (UNA) - University of Costa Rica (UCR) - Ministry of Environment and Energy (MINAE) - National System of Conservation Areas (SINAC) - National Commission for Biodiversity Management (CONAGEBIO) - CADETI (Advisory Commission on Land Degradation) - Aqueducts and Sewers (AYA) - Costa Rican Institute of Fisheries and Aquaculture (INCOPESCA) - National Underground Water, Irrigation and Drainage Service (SENARA) - Ministry of Agriculture and Livestock (MAG) - National Institute of Innovation and Transfer in Agricultural Technology (INTA) - Secretariat of Environmental Planning (SEPLASA) 	<ul style="list-style-type: none"> - National Bank - Bank of Costa Rica - Popular Bank - COOPEANDE - COOCIQUE - COOPECAJA - COOPEALIANZA - COOPSERVIDORES - Servicoop - Mutual Group Alajuela La Vivienda - COOPENAE - COOPEMEP - Desyfin - Scotiabank - Promerica - Lafise - Improsa - Global Exchange - DAVIVIENDA - COOPEANDE, ANDE Box - Organisation for Tropical Studies (OET) - Center for Studies in Peninsular and Tempisque Waters, Sustainable Development - Guanacaste Dry Forest Conservation Fund

Stakeholders			
Community	NGOs	Institutions	Private and financial entities
		<ul style="list-style-type: none"> - National Center for Geoenvironmental Information (CENIGA) - National Monitoring System for Land Use, Land Cover and Ecosystems (SIMOCUTE) - Directorate of Environmental Quality Management (DIGECA) - National Directorate for Community Development (DINADECO) - PHONAFIFO - Biodiversity Forum - INDER - ONAMEC - FOLLOW - SNITTPR - National Insurance Institute (INS) 	
Nicaragua			
<ul style="list-style-type: none"> - 10 de Mayo Cooperative - Bamboo Cooperative - Orfilia Vásquez Cooperative - Santiago Cooperative - Nuevo Horizonte Cooperative - ASSUMPTION - Drinking Water Committees (CAPS) - Family, Community and Life Cabinets - Nicaraguan Community Movement - Central of Cooperatives of Multiple Services R.L. (Prodecoop) - National Farmers Union (UNAG) - Cooperativa Reina del Café - Agricultural cooperative Corcazán - Union of Agricultural Cooperatives (UCA) - Association of Northern Producers (APRODER) - Forestry Cooperative Central (CECOFOR), - Peasant Federation (FEDICAMP) - Community health networks - Faith and Hope Lutheran Church of Nicaragua 	<ul style="list-style-type: none"> - COSUDE - Water for Life - Nicaraguan American Foundation (ANF) - Radiofone Foundation - Wildong - Help in Action - Catholic Relief Services - ONGAWA - Magic hands 	<ul style="list-style-type: none"> - Nicaraguan Women's Institute - National Institute for Training and Labor Development - National Energy Commission - National Water Authority - ENACAL - CATIE - Institute of Agricultural Protection and Health - National Commission for Food and Nutrition Sovereignty and Security - General Directorate of Physical Cadastre of the Nicaraguan Institute of Territorial Studies - Regional Council - Community assemblies - Autonomous regional councils - Autonomous regional governments 	<ul style="list-style-type: none"> -MCN -UNAG -APRODEIN -COSMUSOL -Prodecoop - Dairy the Lilies - FUNDENUSER Financial - Financial local development fund, s.a. - Bank of Central America - Production bank - Banco Finanzas S.A. - FAMA Financial - LAFISE BANK - BANCENTRO - FUNDENUSE - Coop. Santiago - FAMESA - FINANCIAL FINCA NICARAGUA - MyPymes

Stakeholders			
Community	NGOs	Institutions	Private and financial entities
<ul style="list-style-type: none"> - UCAFE - Campesino Forest Development Association (ADEPROFOCA) - Municipal Office, UMAS (Municipal Units for the management of a Sustainable Environment) - Community leaders - APRODEIN 		<ul style="list-style-type: none"> - Nicaraguan Institute of Cultural - Humboldt Center - Social Promotion - International Center for Tropical Agriculture (CIAT) - Ministry of Family, Community, Cooperative and Associative Economy (MEFCCA) - Ministry of Environment and Natural Resources (MARENA) - Nicaraguan Institute for Municipal Development (INIFOM) - National Forestry Institute (INAFOR) - Institute of Protection and Animal and Plant Health (IPSA) - Nicaraguan Institute of Agricultural Technology (INTA) - Ministry of Agriculture and Livestock (MAG) - Nicaraguan Aqueduct and Sewer Company (ENACAL) - Ministry of Health (MINSA) - Ministry of Education (MINED) - Institute for Human Promotion (INPRHU) - Fire Brigades - Ministry of the Interior (MIGOB) - Property Intent - National Assembly (AN) - Ministry of Labour (MITRAB) 	
Honduras			
<ul style="list-style-type: none"> - Federation of Chorotegas Indigenous Communities of Honduras (FCIC) - Association of producers OROCUINA - Marine Farms Group - Water seals - Association of farmers 	<ul style="list-style-type: none"> - Forcuencas - USAID - EMPRENDESUR - Prosasur - WMO - Caritas 	<ul style="list-style-type: none"> ental Impact Assessment - National Council for Coordination and Articulation of Social Policies - National Women's Institute 	<ul style="list-style-type: none"> - La Grecia SA sugar industry - Choluteca sugar industry - COEXMAR - CUMAR - Montelibano agroindustry - Snail industries

Stakeholders			
Community	NGOs	Institutions	Private and financial entities
<ul style="list-style-type: none"> - Women's network - Health committees - Microbasin tips - Association of producers - Municipal mayors, Municipal Environmental Units (UMAs) - MILPA (indigenous peoples) - ADETRIUNF - ASECHS - Community Advisory Councils - The Pespirens Development Association (ADEPES) - NASMAR Commonwealth - MAMBOUCARE Commonwealth - Risk Management Board - Water Boards 	<ul style="list-style-type: none"> - CESAL - EMPRENDESUR - USAID - Swiss Red Cross 	<ul style="list-style-type: none"> - Honduran Social Security Institute - National Electric Power Company - Ministry of Industry and Commerce - National Food and Nutrition Security Council - Permanent Contingency Commission - National Council of Drinking Water and Sanitation -Territory Planning Council - Property Institute - National Commission for Housing and Human Settlements - National Institute for Forest Conservation and Development, Protected Areas and Wildlife - Honduran Institute of Anthropology and History - Municipal Women's Office - Basin councils - Rural Boxes - Patronatos - Risk management roundtable - Environment, risk management and climate change adaptation roundtable. - IHCAFE - MiAmbiente - REDD - FIDA - Water and Sanitation of Honduras (ERSAP) - National Development Tables, Security Tables and Climate Change - Ministry of Agriculture (SAG). - ICF 	<ul style="list-style-type: none"> - Cooperative San Marqueña Limitada - Atlantida Bank - Western Bank - Banpais - Central Bank of Honduras - Fichosa Bank - Azteca Bank - Workers Bank - Finsol Choluteca - Cooversat Cooversur - ELGA Cooperative - San Andrés Cooperative - Banrural - Adel microcredits - My credit - Cooperatives of saving and credit - FIPA (Honduran Foundation for Participatory Research). - AGROLÍBANO - FERTICA - DISAGROW - Shrimp Packers - The Pantaleón of La Grecia Foundation - Melonitas Businessmen (Melon) - CABI - OFID - Global Comunity - Rural Box “Aldea De Carrizal Prieto” - Duyure Centro Rural Savings and Credit Center - Rural Box "Village of Red Lands" - Rural Box Morolica Centro - Agualcagua Community Rural Fund - Central Bank of Honduras - Bac Credomatic - Community Rural Fund - Finca Vieja Community Rural Box - RURAL BOX "VILLAGE THE OVEN" - Rural Box community El Potrero

Stakeholders			
Community	NGOs	Institutions	Private and financial entities
		- Forest Conservation Institute	
El Salvador			
<ul style="list-style-type: none"> - Fishing, coffee, agricultural, shrimp, sugarcane cooperatives - National Indigenous Coordinating Council of El Salvador (CCNIES) - La Primavera Association - ASUAGUA - ADESCOS - ANDA - Association of Municipalities (Association Chasparastique, Tepaca-Chinameca, MANORSAN) - Association of Irrigators (farmers organised for irrigation) - Ramsar Local Committee - Tecapa-San Miguel Advisory Committee (Work with Protected Natural Areas) - Oriental youth network - Associative, productive ventures without irrigation and irrigation associations 	<ul style="list-style-type: none"> - JIKA - Save the children - Salvadoran Foundation for Social Promotion and Economic Development (FUNSALPRODESE) 	<ul style="list-style-type: none"> - Presidency of the Republic - Salvadoran Social Security Institute - National Food and Nutrition Commission - National Commission for Civil Protection, Disaster Prevention and Mitigation - National Council of Territorial Development - Salvadoran Institute of Agrarian Transformation - National Geographic and Cadastral Institute - Agricultural Government Bank - Municipal environmental management team - Ministry of Agriculture and Livestock (MAG) - Ministry of Health - Water Boards - National Administration of Aqueducts and Sewers (ANDA) - Ministry of Environment - Municipal Mayors - PNC environment 	<ul style="list-style-type: none"> - Fundemas - COAGRI - Cooperative Society of Producers of Mara��n (SCPM) - Agricultural Bank of El Salvador - Workers Bank - Cooperative association of savings and credit and agricultural production El Salvador forward - Credim��s - Cooperative Association of savings, credit and consumption of Pensioners of INPEP Usulut��n - Agricultural Development Bank - Credicampo - Credit box - Prom��rica Bank - Bancovi - Hipotecary Banc - City Bank - Cuscatlan - Scotia - Atlantis - Local Economic Development Agency (ADEL-AMC) - PADECOMPS - Chaparastique sugra mil (FUNDAZUCAR) - Miguele��a De R.L. Savings and Credit Cooperative Association - Promerica Bank - COOPAS DE R.L. - Acocr��dito De R.L. - Credim��s - ACOSETVI - ACOCAYCO - ACODEZO - Com��dica

Stakeholders			
Community	NGOs	Institutions	Private and financial entities
			<ul style="list-style-type: none"> - AMAPALITA SAVINGS AND CREDIT COOPERATIVE ASSOCIATION - COOPERATIVE ASSOCIATION OF SAVINGS, CREDIT AND PROVISIONING SANTIAGO DE CONCHAGUA - Azteca Bank - Davivienda Bank
Guatemala			
<ul style="list-style-type: none"> - Black Guatemalan Organization (Onegua) - Network of Afro-Latin American, Afro-Caribbean and Diaspora Women - Association of Afro-American Women Afro-American XXI Afro-descendants and Their Friends (AFROSA) - Association of Garifuna Women of Guatemala (ASOMUGAGUA) - Xinka People Coordinating Council (COPXIG) - Parliament of the Guatemalan Xinka People (PAPXIG) - AMISMAXAJ (Association of Xinkas Women of Jalapa) - Council of Mayan Organizations of Guatemala (COMG) - Coordinator of Organizations of the Mayan People of Guatemala (COPMAGUA) - Union of the Mayan People and the Mayan Council Tekum Umam - Council of Mayan women - Indigenous mayorships - Community development councils (COCODE) - COFRADIA - CONADIGUA - ASPREMKI - Association of midwives - Waxaq'ip Tijax - New Life Social and Productive Integral Development Association - AGACAN Livestock Association - Promising Committees - Guardians and health promoters 	<ul style="list-style-type: none"> - Mercy corps - Save the children - Friends of Canillá Association - Mayan Ombudsman - MOVIMONDO - Indigenous Ombudsman - Manuel Madrazo Foundation - Foundation of the cent - CONALFA - INAB 	<ul style="list-style-type: none"> - Development councils - Office of Social Support of Municipalities - National Food and Nutrition Security Council - Secretariat of Planning and Programming of the Presidency - National Coordinator for the Reduction of Natural or Caused Disasters - Water Secretariat attached to the Ministry of the Presidency - Land Fund - Institutional Commission for the Development and Strengthening of Land Ownership. - Guatemalan indigenous development fund - Ministry of Communications, Infrastructure and Housing - University of San Carlos - Municipal Women's Office - Mediation center - Municipal forestry office - Peace Corps - National compensation program - Justice of the peace - Ministry of Public Health and Social Assistance - Ministry of Education 	<ul style="list-style-type: none"> - Banrural - FUNCAFE - IGER - Banco de Desarrollo Rural, S.A. - Chicamán Business Genesis - Aztec Chicamán CIACUS - Business Genesis - Fondesol - Finca - Credichapin - Lions Club Association - Flor de Naranjo Association - ANACAFE (Rabinal, Cobulco and El Chol) - Nature Defense Foundation of Baja Verapaz - Users Association of the San Jerónimo Irrigation Canal - Bayer (Research) - Association of Forest Producers of Verapaces - Quiché is managed by the Community Development Councils (COCODES) and there is also a Municipal Environmental Management Unit (UNAM) - Quiché Forestry Association (AFORQ) - Company El Valle - Los Cerritos Association - Departmental Water Commission (RASSQ) - SHARE - COMPARTAMOS - Banrural - Estrella del Norte Cooperative - Micoope-Cotoneb

Stakeholders			
Community	NGOs	Institutions	Private and financial entities
<ul style="list-style-type: none"> - Land legalization committees - Association of users of the irrigation unit - Municipal women's coordinator - Brotherhoods - Women's local development committees - Ecotourism Committee - Association of Integral Development of Cholatenses Farmers - Association for the integral development Los Altos - Peasant Association for Integral Development Waquib'noj -CADIWAN- - Association of mini-irrigation and agricultural producers AMPA - Associations for the integral development of agricultural producers Palquiadip - El Sembrador Integral Farmers Association - Potato Producers Association El Caracolito - Rural Association for the Integral Indigenous Development Cholá -ARDICH- - Association of tomato farmers - ASOCAU - Sicaché Village Livestock Committee - AURSA Association (Irrigation Users Association) - Municipal Environmental Management Units - MANCOSEQ Commonwealth - Departmental Water Commission - Water Committees - Association of Integral Development of Zacualpa, ASODINZA - Catholic churches 		<ul style="list-style-type: none"> - Ministry of Social Development - Ministry of Agriculture and Livestock (MAGA), Learning Centers for Development (CADER) - National Forest Institute (INAB) - Ministry of Environment and Natural Resources (MARN) - Institute of Agricultural Sciences and Technologies (ICTA) - National Council of Protected Areas (CONAP) - Rural University - Commission for Prevention and Disasters - Secretariat of Food Security - National Secretariat of the Presidency - General Secretariat of Planning (SEGEPLAN) 	<ul style="list-style-type: none"> - CIACUS, R.L. - Maya Procredit - COOPER, R. L. - Zacualpa Integral Development Association - ASODINZA - Quick Express - Chapin Express - Western Union - IBC Polaris Load
República Dominicana			
<ul style="list-style-type: none"> - School committees - Integral social development association - Pro-land committees - Church groups - Mothers Center - TEGULINA Group - Group of guano weavers - Neighborhood Boards - Water Fund 	<ul style="list-style-type: none"> - Livestock association of la Sierra - Nature Center - Save the Children - World Vision - Sierra Plan - Diocesan Caritas - Corpo Bao - ASOCALPA 	<ul style="list-style-type: none"> - National Monitoring and Evaluation Commission - National Occupational Health and Safety Council - National Social Security Council - Dominican Corporation of State Electric Companies 	<ul style="list-style-type: none"> - Mamoncito Cooperative - Dominican Forest Chamber - CoopForest - Companies of Exporters and Suppliers of Agrochemicals - CoopBueno - Border Development - BanReservas - Agricultural bank

Stakeholders			
Community	NGOs	Institutions	Private and financial entities
<ul style="list-style-type: none"> - Council for the Management of the Mao River Basin - Regantes Boards - Chacuey-Mahuaca Basin Council - PROLINO - Dam Council - Producer associations 	<ul style="list-style-type: none"> - Northwest Development Institute (INDENOR) - Churches Social Service - Coffee Producers Association of Cidra de Toma - Farmers Association of Palmarejo - Forest Producers Association - Foundation for Community Development (FUDECO) - FUNDEPRODA - Center for Nature Education - Border Solidarity - FUNDEPRODA - GIZ - PROPAGAS - NATURALEZA 	<ul style="list-style-type: none"> - National Network for Cleaner Production and Efficient and Sustainable Use of Resources - National Energy Commission - National Council for Food and Nutrition Sovereignty and Security - National Council for Disaster Prevention, Mitigation and Response - National Emergency Commission - General Directorate of National Cadastre - National Directorate of Registry of Titles - National Directorate of Cadastral Measures - Dominican Agrarian Institute - National Institute of Hydraulic Resources, Watershed Management, Environmental Management Department - Agricultural bank - Coffee Institute - Special Fund for Agricultural Development - Yaque Plan - Autonomous University of Santo Domingo - National Institute of Drinking Water and Sewerage (IINAPA) - Northwest Development Institute (INDENOR) - Ministry of Environment and Natural Resources - MAG - Ministry of Public Health 	<ul style="list-style-type: none"> - Coopsano - Coopglobal - Banco La Nacional - Women's Bank - San José Cooperative - FONDESA - Gomez Investments - ADOPEM - Agricultural bank - ADEMI - RUAMAR - San Ignacio Cooperative - Media

2.1 Initial socialization activities of the Project

The Project development team made an initial approach to the different stakeholders in each of the countries involved in the Project; Once the stakeholders of each municipality were identified, the national Project consultants organized meetings with community and institutional stakeholders and NGOs in each of the countries. In these exercises, it was possible to make an initial characterization of the land uses and economic activities in each area, identify the main problems perceived in relation to climate change, as well as the adaptation measures that have been previously implemented and the sustainability alternatives of the project.

The meetings had equal participation of men and women and the contributions of each group were valued. They were done in workshops and revolved around the following points:

- a) Land use: determine land use in the municipalities, benefits perceived by the local population.
- b) Local perception of climate change: perceived changes in climate, perceived impacts on ecosystems and agroecosystems, perceived impacts on the population, proposals for adaptation measures
- c) Prior adaptation processes in the area
- d) Sustainability of the project: perception of the components and activities, perceived barriers and mitigation strategies, stakeholders for sustainability, key policies.
- e) Financial mechanisms.

The information given allows us to have first context of each one of the zones to intervene, as well as the perceptions of the local stakeholders on climate change, the adaptation processes and the effectiveness / feasibility of the components and activities of the project. The results of these meetings were considered to refine the design of the Project and should also be taken into account when methodologically considering the participation plan and the development of the sub activities. The characteristics of the sessions done by country are listed below:

Table 16. Characteristics of the initial socialization activities of the Project in each of the countries.

Country	Date	Municipalities	Attendees		
			Women	Men	Total
Honduras	14/10/2019	Choluteca, Marcovia, Duyure, Morolica, Apacilagua y Orocuina	8	25	33
Nicaragua	14/10/2019	Somoto	13	16	29
El Salvador	16/10/2019	San Miguel	9	21	30
Panama	18/10/2019	Pedasí	12	18	30
Costa Rica	18/10/2019	Nicoya, Guanacaste	11	24	35
Guatemala	22/10/2019	Santa Cruz del Quiché	1	28	29
Dominican Republic	22/10/2019	San Ignacio de Sabaneta, Prov. Santiago Rodríguez	8	14	22

3. Stakeholders engagement

This phase gives the basic guidelines of establishing a relationship with the stakeholders so that:

- There is transparency, respect, non-discrimination and action without harm.
- The specific characteristics and features of the stakeholders are taken into account, especially those that are most vulnerable.
- Clear, accessible, understandable and smooth communication between the stakeholders and the work team is achieved.
- The stakeholders have the conditions to freely express their concerns, needs and interests.

By fully identifying the stakeholders involved in the initial map it is possible to determine the ways in which relations with them will develop throughout the project. This identification implies reaching the people and groups identified to deepen the understanding of people's expectations, interests and motivations. In addition, initial approaches provide the opportunity to share detailed information about activities, gather ideas on the most appropriate approaches to communication and engagement, and help refine the stakeholder map and participation strategy.

It is crucial to meet with all the stakeholders identified in the mapping exercise and not just those that are closer or more interested or are more susceptible to the project. This requires creativity in terms of the multiple ways and mechanisms to bring closer and dialogue with all parties throughout the entire process. It is also important to classify the stakeholders in three categories:

- 1) The key stakeholders, who are the ones who will be most directly impacted by the implementation of project activities, who are the highest priority and with whom there will be greater interaction in dialogue and negotiation. These are mainly the communities settled in the target area farmers and ethnic groups-, local governments and some private entities with a very local impact.
- 2) The stakeholders, who are those who have a high degree of interest in the project and have the will and experience to participate but are not so directly affected by the activities to be developed. These are civil society organisations, the private sector and national institutions. And finally;
- 3) The less interested stakeholders, who are not so interested in the dialogue and negotiation processes but are interested in receiving information about the project and its activities. These could be some national institutions or the private sector.

Similarly, it is essential to create some relationship rules that involve big and small details and that take into consideration the characteristics of each group:

- a) Communities: with these stakeholders all decisions must be made in a systematic manner so that the same people and organisations can decide the means by which they want to be informed, where to meet, how and who can provide services, what is the food they want to receive, establish communication channels and means of communication. The dialogue will always be respectful of their positions, beliefs and

cultural sensitivities. It should be transparent and horizontal and take into account the following:

- Find the means of communication that they can effectively use to make invitations to gatherings and other meetings and planned activities. Where applicable, go to the places to make the invitations so that everyone can be informed.
- Hold meetings in places that are as close as possible to where they are, seeking equidistant places and using the spaces they usually use to meet and, in case of needing food or any other resource they can provide, allowing them to have an economic income.
- Use language that is understandable when presenting and explaining project activities, clearly exposing the risks, impacts and benefits of these, using visual and methodological resources to carry out the activities to ensure that the people have understood.
- Establish direct communication channels through which people can make inquiries at any time and have access to clear information about the project. In the same manner allowing the reception of complaints and requests that are attended to in a timely manner.
- Generate information in understandable formats for all groups of stakeholders; If a stakeholder is illiterate, oral information must be generated.
- Seek equal participation of men and women in all activities.
- Be informed about the characteristics of the population that involves being aware of their characteristics when relating to them and keep in mind their needs and aspirations. Do not use racist, discriminatory, offensive terms, do not refer to conflicts that are still in force, do not bring together communities / organisations / institutions in conflict and that destabilize general dialogue.

There are some characteristics depending on each stakeholder, besides the one mentioned above:

- i. Farmers: paying special attention to young people and older adults, taking into account their contributions and feelings.
- ii. Women: avoiding the use of sexist and / or degrading terms towards women, using inclusive language, acknowledging the contributions of women in the analyses, as well as their vision of the project.
- iii. Ethnic groups: In case a person speaks a language other than Spanish, there must be the use of a translator in each and every one of the spaces in which the persons participate and whenever they talk with the project team. The translator should ideally be from the same community and should have a remuneration for his or her work. Together with the community, it will be decided who or who will perform this function and the way in which it will be carried out. Considering the systems and organisational structures of each town and community. Respecting hierarchies in internal decision making. It is important to keep in mind that for these stakeholders the prior, free and informed consultation defined by the 169 International Labour Organisation (ILO) Convention applies; In this case, national legislation should be consulted to determine the procedures that apply to these cases.

- b) Civil society organisations:
- With these organisations it is crucial that they are always all equally summoned to meetings and activities.
 - Considering the studies, papers, reports and documents carried out by them that account for the situation of the population regarding a specific problem.
 - Keep information channels open.
- c) Government institutions:
- To ensure that the same people always participate in the whole process, which allows for continuity in the process and in decision making.
 - To ensure that those who participate have the capacity to decide and influence within their institutions, allowing the established agreements to be fulfilled.
 - It is important that dialogue with these stakeholders can also be developed within the territory where the community stakeholders are located.
 - Establish a channel and means of communication that allows constant dialogue, flow of information and also enable the discussions and decisions taken within the institutions and that affect the project in some way to be communicated quickly.
- d) Private Sector:
- With this sector it is key that the dialogue can also be developed within the territory where the community stakeholders are located.
 - Take advantage of the information and documentation generated by them that meets the needs of the project.

4. Plan implementation

In this phase the activities and sub-activities of the Project are implemented, therefore here is where the Plan is put into practice. It is important to respect the guidelines of the relationship, the schedule, and the decisions made within the team and with the stakeholders. The following defined guidelines should be considered for each of the project activities where stakeholders, mechanisms and participation objectives are set.

Table 17. Mechanisms and stakeholders by activity.

Activity	Stakeholders	Mechanisms	Objectives
Output 1. Financial products and services to finance EbA investments are offered by Partner Financial Institutions (PFI), including PFI access to EbA on-lending funds and support mechanisms.			
Activity 1.2. Establish the grant facility to support bottom-up selection and promotion of local EbA activities through non-reimbursable financing and start operations	Communities: farmers and producers and their associations, indigenous communities, women's organisations, community associations.	<ul style="list-style-type: none"> • Summon all identified community stakeholders taking into consideration the proposed guidelines • Conduct meetings with community stakeholders in which it is explained what a trust fund is, how it works and how it can be accessed, in a didactic way so that all participants can understand it, using examples that are close to their own realities and making simulations. 	<ul style="list-style-type: none"> • Provide information to community stakeholders about what the trust fund means and how it works. • Identify the needs and expectations of farmers, as well as their expectations in terms of economic gains and quality of life improvement. <p>Ensure that the fund responds to the needs and expectations of the stakeholders involved.</p>

Activity	Stakeholders	Mechanisms	Objectives
Activity 1.3. Establish the blended EbA lending facility to enable EbA finance via CABEL's network of financial institutions directly to end beneficiaries or indirectly via non-regulated financial institutions and initiate operations	Private: commercial farmers, businesses, small farmers, financial institutions	<ul style="list-style-type: none"> • Hold meetings in neutral places where all stakeholders are comfortable to participate. • Hold meetings with stakeholders so that they know the scope of the activity. It is important that these meetings be joint as each of them can express their concerns and needs, as well as answer questions. By generating this dialogue each party can know the position of the other. However, it is essential that the dialogue be maintained in clear and understandable terms for all attendees. 	<ul style="list-style-type: none"> • Strengthen capacities of financial institutions. • Provide specific information on activities to the stakeholders. • Ensure that the credit lines created respond to the needs and characteristics of the target population and avoid economic displacement • Ensure that financial institutions can resolve unforeseen events at the time of execution. • Ensure the proper functioning of the institutions when activating the credit lines. • Ensure that the financial, social, environmental and technical criteria for accessing to credit lines are met and avoid the expansion of the agricultural frontier. • To inform the target population of the mechanics of access to the credit line, the risks associated with the payment terms.
Activity 1.4. Technical assistance (TA) facility to strengthen technical capacity of accredited and non-regulated financial institutions to access and channel funds for small- and large-scale EbA investments.	Private: financial institutions	Hold meetings with accredited financial institutions that want to get involved in the project to let them know the specifications of the project, as well as the specific characteristics of the population that would access the investment funds. In these meetings, the problems and needs of the target population that allow financial institutions to design resources that respond to them must be presented.	<ul style="list-style-type: none"> • Strengthen capacities of financial institutions. • Provide specific information about the target population in order to respond to their needs and particularities. • Provide information about the objectives of investment funds so that they address the needs of the target population. • Ensure that investment funds respond to the particular needs of ethnic groups • . Ensure that the funds meet the stated objectives. • Ensure the proper functioning of institutions when executing investment funds.
Output 2. Strengthened technical capacity of local government, farmers and rural communities to implement EbA and other adaptation measures.			
2.1. Develop site-specific intervention plans for the 7 target catchments to integrate EbA measures through a participatory process with municipal authorities, local communities and other stakeholders.	NGOs and Community, local, national and private institutions.	<ul style="list-style-type: none"> • Summon all identified community stakeholders considering the proposed guidelines. • Hold meetings by municipality where the activity and objective of the community monitoring evaluation committee are described in great detail. • Define a mechanism with the people through which the committee that considers people's knowledge and skills and is balanced between men and women, youth and adults. • Define the objectives and rules of the committee and leave minutes of the meetings. • Generate a methodology that allows a collaborative construction of the intervention plans in each basin, which especially values the contributions of the most vulnerable stakeholders. • Communicate according to the proposed guidelines to the community stakeholders about this activity, clearly. • Agree on the places and schedules of the workshops, looking for the ones that are most accessible and comfortable for all the people. • Design methodologically the workshops that allow them to be didactic, that people get involved and understand the exercises. • Facilitate the movement of representatives of vulnerable groups to ensure their participation in the workshops. 	<ul style="list-style-type: none"> • Understanding the nature and scope of the activity. • Strengthen capacities of community stakeholders • Provide specific knowledge about the activity. • Guarantee the conditions for all the stakeholders to attend the proposed meetings, workshops and meetings. • Offer support material that is understandable to all the people. • Ensure that the most vulnerable stakeholders are taken into account so as not to generate harm on them. • Assess the knowledge of each of the community stakeholders. • Provide knowledge to people about basin intervention plans • Generate spaces for dialogue between the different stakeholders and the project team. • Incorporate the aspirations, concerns, needs and interests of the locals in the intervention plans. • Ensure that the project involves the interests of each of the stakeholders, giving prominence to community stakeholders. • Validate intervention plans broadly and transparently. • Comply with agreements made with the stakeholders in each meeting.

Activity	Stakeholders	Mechanisms	Objectives
		<ul style="list-style-type: none"> • Inform all stakeholders about the activity in advance. • Conduct this workshop preferably in a neutral place that allows quiet dialogues between stakeholders. • . Design a methodology that allows the stakeholders to understand the activity and get involved in it, as well as to talk with each other, for example: rotating worktables. • Perform exercises by sectors in which they can comprehensively review intervention plans. • Generate analysis socialization exercises by sectors that enable feedback • Clearly ask for the approval or not of analysed documents. • Use methodologies that adapt to the needs and characteristics of the stakeholders so that the information is clear and ensure that all stakeholders understand it. The formats and tools must be adapted for each stakeholder. 	
2.2. Provide technical assistance to municipal authorities, farmers and rural communities for the implementation of EbA practices and water-efficient technologies	Commercial farmers, identified community stakeholders	<ul style="list-style-type: none"> • Consider the guidelines established for the relationship with stakeholders in terms of meeting places, language and information. • Hold meetings with commercial farmers to raise awareness of issues related to forest resources and land management and generate alternative solutions. • Hold meetings with experts to train commercial farmers in AbE practices. Develop clear, understandable and applicable methodologies. • Accompany the farmers in the application of knowledge. • Conduct workshops with commercial farmers and community stakeholders establish protocols for sustainable AbE practices. • Conduct training workshops with community stakeholders where issues of AbE and efficient water technologies and technologies that reduce the demand for firewood are developed. • The training must be adapted to the cultural characteristics of each of the stakeholders. • Design the training program for trainers in a way that corresponds to the characteristics of the stakeholders that will participate. A training program that also allows the generation of a dialogue on shared knowledge and the appreciation of the knowledge of each of the stakeholders. • Use experiential and applied methodologies that allow the use of the knowledge acquired in the ABE training workshops and combine them with the background knowledge of the stakeholders. 	<ul style="list-style-type: none"> • Generate a system to centralize cooperation agreements with commercial farmers and generate compliance monitoring. • Strengthen capacities of commercial farmers in AbE sustainable practices. • Reception of technical assistance. • Establish consensus • Provide technical tools to community stakeholders on AbE. • Ensure that all stakeholders understand the information and can use it according to their cultural characteristics. • Prevent restoration activities from leading to ecosystem alterations. • Prevent AbE activities from expanding the agricultural frontier • Strengthen capacities in community stakeholders through ABE training • Generate knowledge sharing among stakeholders. • Value the knowledge of each of the stakeholders. • Guarantee the means for the most vulnerable stakeholders to participate.
2.3. Provide technical assistance to farmers and rural communities for the development of natural resource-based businesses and alternative climate-resilient livelihoods.	Community: all identified	<ul style="list-style-type: none"> • Consider the guidelines established for the relationship with stakeholders in terms of meeting places, language and information. • Conduct meetings with the community stakeholders in each basin to collectively assess existing livelihoods and identify climate risks and options to address them. • Workshops for the elaboration of action plans must be adapted to the cultural 	<ul style="list-style-type: none"> • Receive technical assistance • Establish consensus • Give technical tools to community stakeholders. • Ensure that all stakeholders understand the information and can use it according to their cultural characteristics. • Generate knowledge sharing among stakeholders.

Activity	Stakeholders	Mechanisms	Objectives
		sensitivities of each of the stakeholders. • Design the training program in livelihoods in a way that responds to the characteristics of the actors that will participate, that allow generating the dialogue of knowledge and the valorisation of the knowledge of each of the stakeholders. • Develop clear and understandable and applied methodologies.	• Value the knowledge of each of the stakeholders. • Guarantee the means for the most vulnerable stakeholders to participate. • Incorporate the aspirations, concerns, needs and interests of the stakeholders interested in the action plans.
Output 3: Information on climate change adaptation and its financing disseminated across the region and mainstreamed into local and national policies.			
3.1. Regional knowledge hub established for the dissemination of information on EbA in the Dry Corridor and Arid Zones.	Local and national institutions, NGOs, identified community stakeholders.	• Establish dialogues with national public institutions for the creation of the knowledge management centre. • Establish the operating criteria of the knowledge management centre. • Collect and systematize the experiences of the project and analyse them to account for the lessons learned. • . Generate institutional alignment recommendations for the implementation of AbE. • Generate environmental public policy guidelines for each of the countries. • Develop knowledge products taking into account different formats, languages, languages that link all knowledge and knowledge and that can be accessible to all the stakeholders. • Design training for decision makers at the municipal level on the impacts of climate change and the role of the EbA in its mitigation. • Design methodologies that correspond to the abilities of public officials that allow them to understand and appropriate knowledge.	• Understanding the nature and scope of the activity. • Ensure the means for the most vulnerable stakeholders to participate. • Ensure that all actors understand the information and can appropriate it according to their cultural particularities • Value the knowledge of each of the actors. • Ensure that knowledge products are in all formats, languages and languages that correspond to the needs and capacities and cultural characteristics of all stakeholders. • Strengthen the capacities of community organisations. • Strengthen capacities in local public institutions on the impacts of climate change. • Ensure the integration of knowledge about the impacts of climate change and the role of the EbA in local decision makers. • Ensure the adoption of AbE in community organisations.
3.2. Raise awareness of financial mechanisms for the implementation of CCA interventions	Municipal public officials, private farmers, community stakeholders identified.	• Design training for municipal public officials on the different financial mechanisms. • Design methodologies that correspond with the abilities of public officials that allow them to understand and appropriate knowledge. • Generate teaching materials in different formats and languages, which support the appropriation and replication of knowledge about financial mechanisms • Design training for private farmers on the different financial mechanisms • Accompany vulnerable communities throughout the process of accessing the AbE credit lines and the trust fund. • Present experiences and successful cases of community organisations that have accessed the AbE line of credit or the trust fund.	• Understanding the scope of the activity. • Understanding the credit line system and its benefits and risks to medium-scale farmers. • Understanding the credit line system and its benefits and risks to vulnerable communities. • Capacity building of public officials and agencies on the designed financial mechanisms. • Provide tools to local public officials so they can accompany community stakeholders in making decisions about the adoption of financial mechanisms. • Provide clear and understandable information according to the characteristics of each stakeholder that enable the making of informed decisions about credit lines for AbE initiatives.
3.3. Enhanced capacity of local-level policymakers to integrate climate change adaptation and the valuation of natural capital into local policies	NGOs, universities, local governments,	• Gather a team of experts • Develop methodologies for collecting evidence, experiences and research for analysis. • Make documents that provide elements for the incorporation of the EbA in the development of municipal public policies. • Design workshops aimed in the municipalities of the Dry Corridor and the Arid Zones where project experiences, the achieved benefits, and the lessons learned are dynamically presented so that they can	• Generate products in languages accessible to all stakeholders. • Generate solid documents that support the actions of AbE. • . Provide capacity for local governments to generate policies for the adoption of AbE. • Generate very diverse materials that provide information about the EbA to local governments to make decisions about the management of the effects of climate change. • Provide information to local governments

Activity	Stakeholders	Mechanisms	Objectives
		incorporate AbE initiatives. <ul style="list-style-type: none"> • Ensure the availability of EbA's experiences materials in different formats and languages, which are accessible to all interested stakeholders. • Generate documents with guidelines to local governments so that they can adopt the application of economic incentives for AbE initiatives. • Promote in-depth dialogues with local governments about the experiences developed that enable them to use the knowledge in the generation of AbE adoption policies. • Conduct collaborative meetings with local governments in which the integration of natural capital profiles to development plans is made. 	about the importance of linking community stakeholders in decision making and in policy formulation for the adoption of AbE. <ul style="list-style-type: none"> • . Provide information to local governments about the importance of generating economic incentives.
Output 4: Large-scale adaptation interventions implemented across seven catchments in the Dry Corridor and Arid Zones.			
4.1. Implement AbE interventions within rural communities across the seven target catchments.	Rural communities	<ul style="list-style-type: none"> • Link rural communities in each of the sub-activities. • Link local staff in the development of activities. • Provide training and security conditions to the people in the community who participate in the activities. • Hold informational meetings with the communities before carrying out each activity 	<ul style="list-style-type: none"> • Ensure the participation of the local community in all activities. • Avoid the arrival of foreign personnel. • Guarantee the consent of the communities for intervention with the activities.
4.2. Implement water- and energy-efficient technologies within rural communities across the seven target catchments.	Rural communities	<ul style="list-style-type: none"> • Link local communities to each of the sub-activities. • Make decisions together with the beneficiaries. • Hold informative meetings with the communities before carrying out each activity. 	<ul style="list-style-type: none"> • Ensure that communities know in detail the activities to be carried out. • Guarantee the consent of the communities for intervention with the activities. • To arrange with the communities the details for the development of the activities.

5. Monitoring and following up

This is a transversal phase to the others as is important to constantly review and receive feedback of the entire Project, especially the participation plan, as this enables the following:

- Update the stakeholder map.
- Design new, more successful methodologies.
- Fulfil the commitments pledged among the stakeholders.
- Respond to interests and needs.
- Resolve conflicts generated in the implementation

The time in which to conduct the evaluation must be specified, it can be established for certain periods of time or at the end of each activity. It is also important to establish a methodology to carry out the evaluations within the work team and between the team and the stakeholders, through extensive exercises, generating comfortable spaces in which the stakeholders can freely express their agreements and disagreements, and with methodologies that enable agreements to be reached.

SUPPLEMENTARY INFORMATION

S1. Expert Consultation Workshops

Guatemala



**Ecosystem-Based Adaptation Proposal and Transformational Measures
to increase climate change resilience in the Central American Dry Corridor
and the arid areas of the Dominican Republic.**

Workshop Memory – Baja Verapaz, Guatemala, April 11, 2019.

Performed by:

Oscar David Calvo-Solano

Olman Varela Durán

Jaime Valverde Rojas.

UN-Environment technical support

Coordinated by Ruth Martinez, UN Environment

2019

1. INTRODUCTION

This Expert Consultation Workshop was conducted within the framework of the formulation of the project called "Ecosystem-Based Adaptation (AbE) and Transformational Measures to Increase Climate Change Resilience in the Dry Corridor of Central America and Arids of the Dominican Republic".

This project responds to the request of the Ministers of Environment of Central America and the Dominican Republic, grouped through the Central American Commission on Environment and Development (CCAD) of the Central American Integration System (SICA). The present formulation of the expanded green climate fund (GCF) proposal is being technically led by UN-Environment with the support of the Central American Bank for Economic Integration (BCIE) and the support of CCAD.

The impacts of climate change caused by rising temperatures, droughts and extreme rainfall threaten the livelihoods of vulnerable communities in the Central American Dry Corridor and in the Arid Zones of the Republic Dominican. Water supply is especially at risk.

This project proposes to address this type of impact at the landscape and home level in priority basins by promoting: (i) Ecosystem-based adaptation (AbE) through ecosystem restoration and agroforestry systems; and (ii) water-efficient technologies in communities. To this end, it is proposed: (i) capacity building for local governments, financial institutions and communities; (ii) the development of loans and microfinance for AbE activities and small green businesses; and (iii) the integration of AbE into policies and incentive creation.

1.1. Pre-coordination of the workshop

There was preparatory work before this workshop could be successfully carried out. First ly noted that this event is based on the results of workshops organized by UN Environment in 2016, where large priority geographical areas for the project were identified; in the case of Guatemala, as a result of this process, the departments of El Progreso, Zacapa and Chiquimula were established as the preliminary areas of action of the project; these zones were chosen based on criteria of:

1. Exposure to the impact of extreme phenomena (particularly droughts) linked to the climate.

2. Vulnerability to the impact of such phenomena, which is basically determined by three types of factors:

mainly deforestation and soil degradation.

Social Affairs, linked to the poverty of the affected households.

Economic, depending on how much the livelihoods of populations are affected.

Considering this previous work, and the fact that the formulation proposal plans to work at the basin level, the focal points of the project (Ing. Sigrid Castellanos and Lic. Juan Carlos Díaz) were requested to define and communicate one or more basins of interest within the prioritized area, for characterization work. From previous communications with focal points, follow-up calls and technical inputs by the team associated with the focal points,

the Salinas River basin was defined, due to its vulnerability to climate change and also, because this basin has not had the same number of adaptation projects that have had other previously prioritized areas.

Based on this, the advisory team collected basic information available from secondary sources in this basin, which is developed in paragraph 3 below.

In addition, as part of the previous organization of the workshop, it was indicated that a space could be available for technical presentations relevant and complementary to the information to be synthesized by the consultants. In this case, the supplementary presentation of Mr. Francisco Avila (See Annex 7.1: Agenda) was available.

1.2. Objectives and participants

The present workshop was held on April 11, 2019 in the city of Salamá, department of Baja Verapaz, Guatemala.

The objective of the workshop was (i) to present the project to key government technicians and (ii) to advance the process of characterization of the project intervention basin (Salinas River Basin), through the analysis of starting information and consult national experts.

Within the framework of this event and in line with its objectives, the country's government technicians and state authorities were present (see detailed list of participants in Annex 7.2), as well as the focal points of the project in Guatemala, the Ing. Sigrid Castellanos and Mr. Juan Carlos Díaz.

The participation of Mr. Raúl Artiga, a regional liaison for this project by CCAD, was also involved. On the part of UN Environment, Dr. Ruth Martínez, Senior Specialist in Adaptation of the Regional Office of Latin America and the Caribbean, participated, with the technical support of Dr. Olman Varela and the B.Sc. Oscar Calvo de Culturas y Desarrollo en Central America (CUDECA).

As part of the preparatory work, the profile of the participating officials was requested to meet the following requirements:

Personnel related to water management, drought, water commissioners, watershed management and/or representatives of the agricultural sector.

Personnel of protected areas, conservation and natural resources.

Personnel related to the management and territorial planning, community management of water or part of the Institutes of Rural Development.

It was emphasized that all participating technicians had knowledge of territorial dynamics. This workshop included 27 participants representing the environmental and agricultural sectors (see Annex 7.2: List of Participants).

1.3. Working methodology

The workshop was organized in three sessions (see Annex 7.1: Agenda) namely:

a. Introductory Session: In this session, attendees were given prior information on the project proposal and processed information on the Salinas River Basin was presented:

Socio-economic information such as productive activities, demographics, poverty, urbanization, migration;

Biophysical characteristics such as land use, wood cover, flow data;

Vulnerability information of the basin to climate change.

b. Expert consultation session on the estimated vulnerability: In a second session, three groups were worked on. According to Worksheet 1 (Annex 7.3), all workshop attendees were divided into three groups according to their technical expertise. Each subgroup, led by different members of the UN-Environment technical support team, discussed key information on: a. Impact of climate change, b. Ecosystem degradation and, c. Adaptive capacity.

c. Expert consultation session on the relevance of the basin: 2 random working groups were formed; one group discussed a series of questions focused on representativeness, complementarity with other initiatives, and another group focused on the importance financial institutions, natural resource governance, and relevant social organizations. The questions and criteria used in this session can be seen in Worksheet 2 (see Annex 7.4).

The discussions initiated during the workshop will continue after the process, through bilateral meetings, if any of the experts deem it necessary, in order to further deepen the information gathered and provided.

2. INTRODUCTORY SESSION

Mr. Juan Carlos Díaz's national focal point of the project refers to the importance and necessity of such initiatives that are part of national climate change policies and contribute to territorial adaptation efforts.

In turn, Mr. Raúl Artiga of CCAD thanked the Government of Guatemala for its availability and interest in the process of this project. It also outlined the general context in which CCAD is involved in this proposal, as well as mentioned some background to the process of drafting the conceptual document submitted to the Green Climate Fund. Artiga mentioned that it is an initiative that responds to the problems of the countries of the region. Since 2011, it has been developed with international cooperation and governments around actions on climate change. The Councils of Ministers of the Environment have been addressing this issue since 2017 and establishing links with the Central American Bank for Economic Integration (BCIE) for initial support. He indicated that Central America and the Dominican Republic are located in a territorial area where the greatest poverty is concentrated and, the Dry Corridor and arid areas are characterized by similar climatic conditions, marked by the season of dry season that affects the quality of life of populations. For this reason, the proposal identifies the most vulnerable territories that need comprehensive care.

At the end of his presentation, Mr. Artiga stressed the importance of addressing the issue of climate change and the Central American dry corridor in a project that also helps to minimize the negative impacts of natural events that are presented more common in the region. It indicated that the final proposal would be submitted in October or November of this year, once the conceptual note prepared by UN Environment had already been delivered.

Dr Ruth Martinez, Senior Specialist in Adaptation at UNEnvironment, then outlined the background and phase in which the project is currently located. In addition, he explained how the project integrates the Ecosystem-Based Adaptation (AbE) approach and strengthens capacity building in vulnerable areas and their finances. It also emphasized the importance of this workshop and how it is part of the efforts of this regional proposal with a view to opting for green climate fund (GCF) funding through a conceptual note that has already been invited to be developed as a extended proposal.

Then, Mr. Francisco Avila of the Ministry of Environment and Natural Resources (MARN) presented information on the area in the Guatemalan territory that is under threat of drought. With regard to the basin of interest, it also showed up-to-date socio-economic information that had not been made available to the public before. It also included information on the topic of poverty in its presentation. It is important to mention that the detail of the information presented by Mr. Avila emphasizes how the Salinas River basin is vulnerable to climate change; It is also a watershed of interest because it lacks the number of projects that other previously prioritized areas have.

For his part, Mr. Olman Varela (CUDECA – UN-Environment), commented on existing information gaps and emphasized the objectives of UN– Environment as part of this project. He discussed the issue of population in the territories around the Salinas River basin and emphasized the need to know and have information about vulnerability to food insecurity, socio-economic information, resource management water and on the current and projected land use. This information was previously collected by the UN-Environment advisory team and is presented in paragraph 3 and Annex 7.6 of this document. In the last presentation, The Lic. Saturnino Ordóñez of the Institute of Seismology, Vulcanology, Meteorology and Hydrology (INSIVUMEH) indicated that the country is currently divided into eight climatic regions. It noted that INSIVUMEH as an institution had the need to know up-to-date information regarding land use in the country. Mr. Ordóñez continued his presentation explaining the two periods of canicle in Guatemala, the first presenting from 10 to 20 July and the second, from 5 to 20 August. Finally, he emphasized that INSIVUMEH had just published documentation on Variability and Climate Change in Guatemala and also has information on vector diseases associated with Climate Variability.

3. CHARACTERIZATION OF THE SALINAS RIO BASIN

3.1. Physical description of the basin

It is important to mention that Guatemala has a Dividing Line of Continental Waters (MARN, 2019). It distributes the country's 38 Watersheds in three major areas: Vertiente Pacífico, Vertiente Mar de las Antillas and Vertiente Golfo de México (MAGA, 2001). The Salinas River basin is located within the Gulf of Mexico Slope (op.cit.). A representation of Guatemala's watersheds can be found in Figure 1:

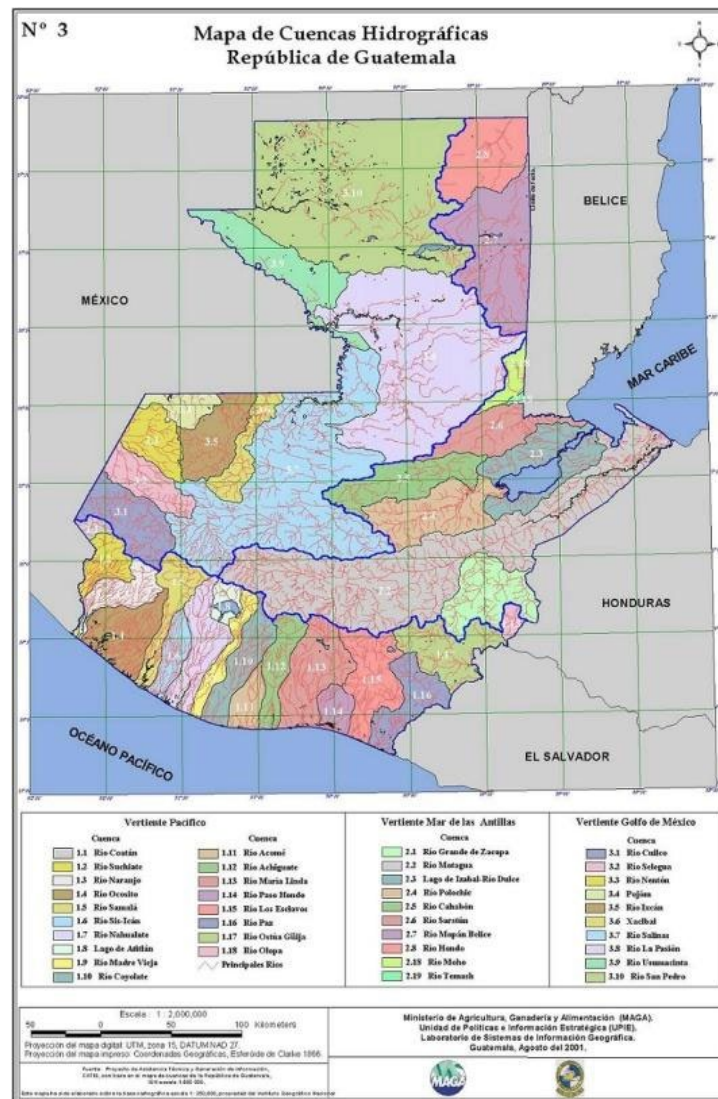


Figure 1. Map of Watersheds of the Republic of Guatemala.

Source: MAGA (2001).

With respect to the Salinas River basin (also known as the Chixoy River, or Rio Negro), this is the longest and most flowing tributary of the Usumancite River (MARN, 2019). It begins as the Rio Negro in the vicinity of Santa Ana Malacatán, and receives the influx of rivers from the mountains. The Salinas River is formed by the Hondo rivers, coming from

the department of Totonicapán, Xecunabaj belonging to the department of Quiché, San Juan Blanco and Aguacatán, which originate in the Sierra de The Cuchumatanes. On the North between Mexico and Guatemala, it begins to be called the Salinas River and ends up joining the La Pasión River to form together the Usumancita River (op.cit).

The MARN (2019) refers that the salinas river basin has a length of 112.70 km. It also has an average flow rate of 551 m³/s measured in San Agustín Chixoy as a checkpoint. At the climatic level, a precipitation range between approximately 500 and 5400 mm is present throughout the basin and its ambient temperature varies between 8°C and 27°C (op.cit).

The Salinas River basin covers the departments of Alta Verapaz, Baja Verapaz, Huehuetenango, Quiché and Totonicapán (MARN, 2019). A representation of the areas that are part of the Salinas River basin is shown in the figure below:

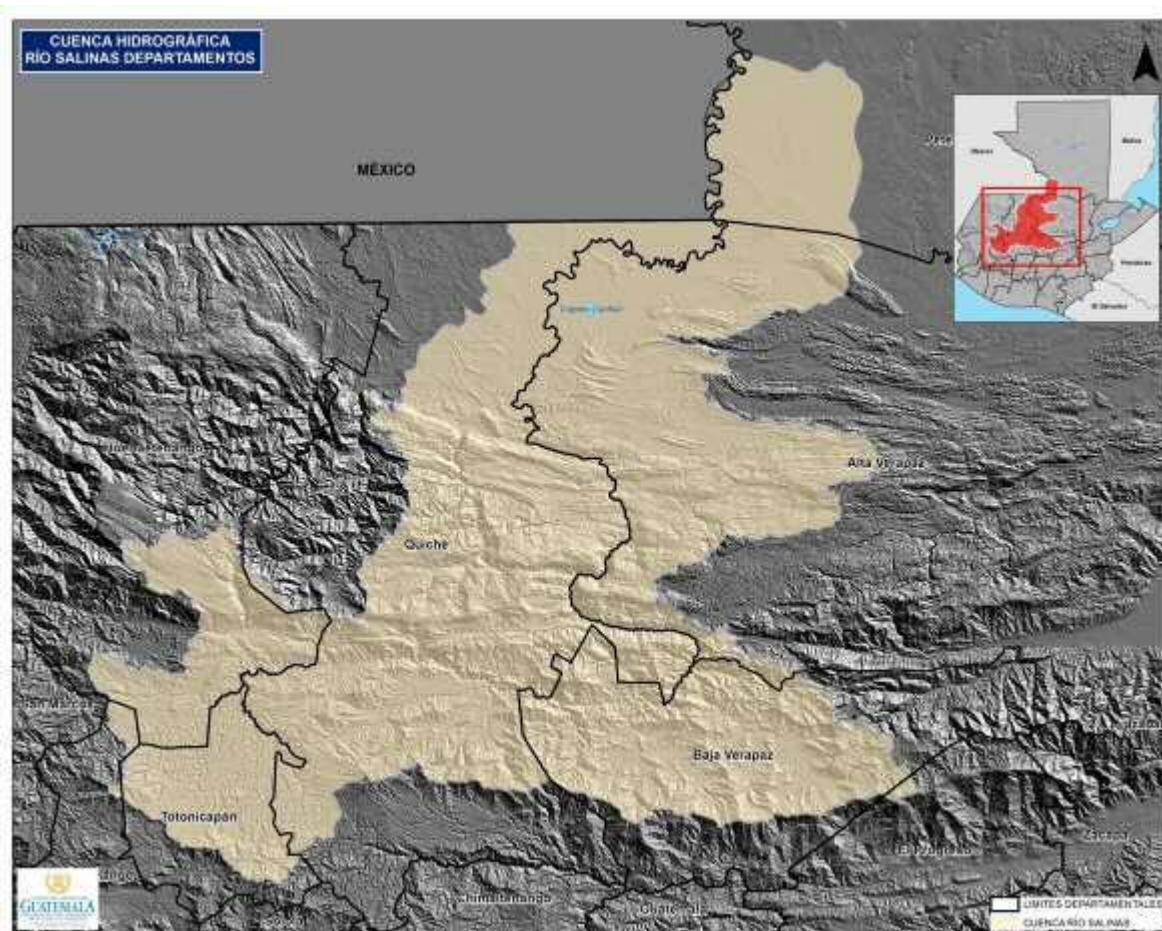


Figure 2. Departments in the Salinas River basin.
Fuente: MARN (2019).

3.2. Population

The detail of the population associated with the territories of the Salinas River basin as of 2003 according to MARN (2019), was 576,120 inhabitants, distributed in 1,638 villages. The detail by department and municipality can be found below:

Table 1⁵

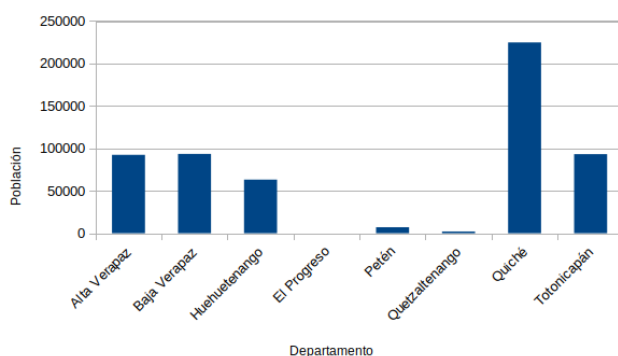
Population by department and municipality associated with the Salinas River basin

Department	Municipality	Number of Villages	Population
Alta Verapaz	Cobán	183	41.481
	Santa Cruz Verapaz	8	1.309
	San Cristobal Verapaz	47	11.084
	Tactic	5	1.294
	San Pedro Carchá	51	25.599
	Chisec	51	11.619
Baja Verapaz	Salamá	37	20.464
	San Miguel Chicaj	35	17.287
	Rabinal	48	22.080
	Cubulco	103	23.692
	El Chol	0	0
	Saint Jerome	29	9.252
	Purulhá	3	705
Huehuetenango	Huehuetenango	14	5.176
	Chiantla	32	12.695
	Malacatancito	51	11.323
	All Santos Cuchumatán	2	1.142
	San Sebastian Huehuetenango	0	0
	Aguacatán	38	32.803
Petén	Sayaxché	26	7.087
Quetzaltenango	San Carlos Sija	4	2.040
Quiché	Santa Cruz del Quiché	37	26.092
	Chinique	0	0
	Zacualpa	3	1.016
	Chajul	7	8.847
	Patzité	7	3.475
	San Antonio Ilotenango	26	13.612
	San Pedro Jocopilas	45	15.066
	Cunén	37	17.589
	San Juan Cotzal	18	14.137
	Joyabaj	1	842
	Nebaj	3	1.382
	San Andrés Sajcabaja	55	13.802
	Uspantan	124	26.137
	Sacapulas	81	26.100
	St. Bartholomew's Jocotenango	29	4.971
	Canillá	29	6.481
	Chicamán	68	16.971
	Playa Grande - Ixcán	94	28.285
Totonicapán	Totonicapán	6	2.518
	San Francisco El Alto	0	0
	Momostenango	97	52.946
	Santa Maria Chiquimula	54	24.873
	Saint Lucia La Reforma	31	7.877
	San Bartolo Aguas Calientes	19	4.969

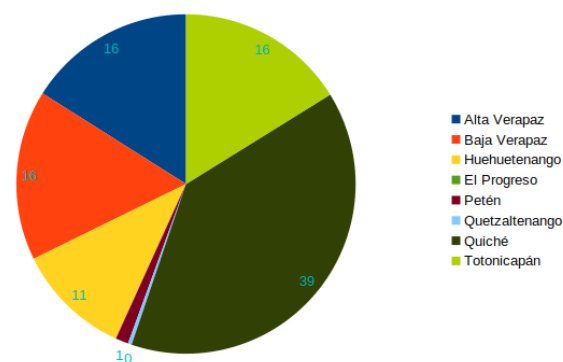
Fuente: MARN (2019).

A more general representation of the population of the departments in the area of influence of the Salinas River can be found below:

⁵ For the department of El Progreso and its municipality Morazán, no data were available; therefore, they were not included in Table 1. Similarly, the values reported as zero in Table 1 correspond to an absence of data (MARN, 2019).



(a)



(b)

Figure 3. (a) Population by departments in the Salinas River basin. (b) Proportion of the population by department in the Salinas River basin.

Source: Own elaboration from MARN (2019).

In this way it can be seen that the department of Quiché has the largest amount of population within the territories covered by the Salinas River basin (MARN, 2019).

3.3. Land use and forest cover

With regard to forest cover in the Salinas River basin, the table below shows in detail the information found:

Table 2
Forest coverage in the Salinas River basin

Forest Coverage	Hectares	Area Percentage (%)
Area Without Forest Coverage	561.542,74	46.41
Secondary Forest/Arbustos	6.132,56	0.51
Conifers and Crops	51.432,83	4.25
Latifoliadas and Crops	80.571,91	6.66
Mixed and Crop	187.015,55	15.46
Conifers Forest	22.090,78	1.83
Latifoliadas Forest	180.301,85	14.90
Mixed Forest	51.989,41	4.30
Secondary Forest/Arbustal	68.818,36	5.69
Total	1.209.896,00	100.00

Fuente: MARN (2019).

On the other hand, around the Salinas River basin, a classification of the intensity of urban land use has been made in a general way, both showing whether it is correct (corresponds to the use for which it is suitable), over or underused, if there is the presence of bodies of water or urban areas. The information corresponding to the area and its percentage with respect to the total intensity of land use is given by:

Table 3
Land use in the Salinas River basin

Intensity of Use	Hectares	Area Percentage (%)
Correct Use	543.658,21	44,93
Sobreutilizado	387.056,73	31,99
Underutilized	275.677,24	22,79
Bodies of Water	2.066,66	0,17
Urban Areas	1.437,16	0,12
Total	1.209.896	100,00

Fuente: MARN (2019).

As a result of the above information, it is apparent that MARN (2019) refers that approximately 45% of the territories associated with the Salinas River basin there is a correct use of land.

3.4. Vulnerability

With regard to vulnerability to drought, Guatemalan territory is under constant threat. The figure below shows the varying degrees of drought threat in 2002:

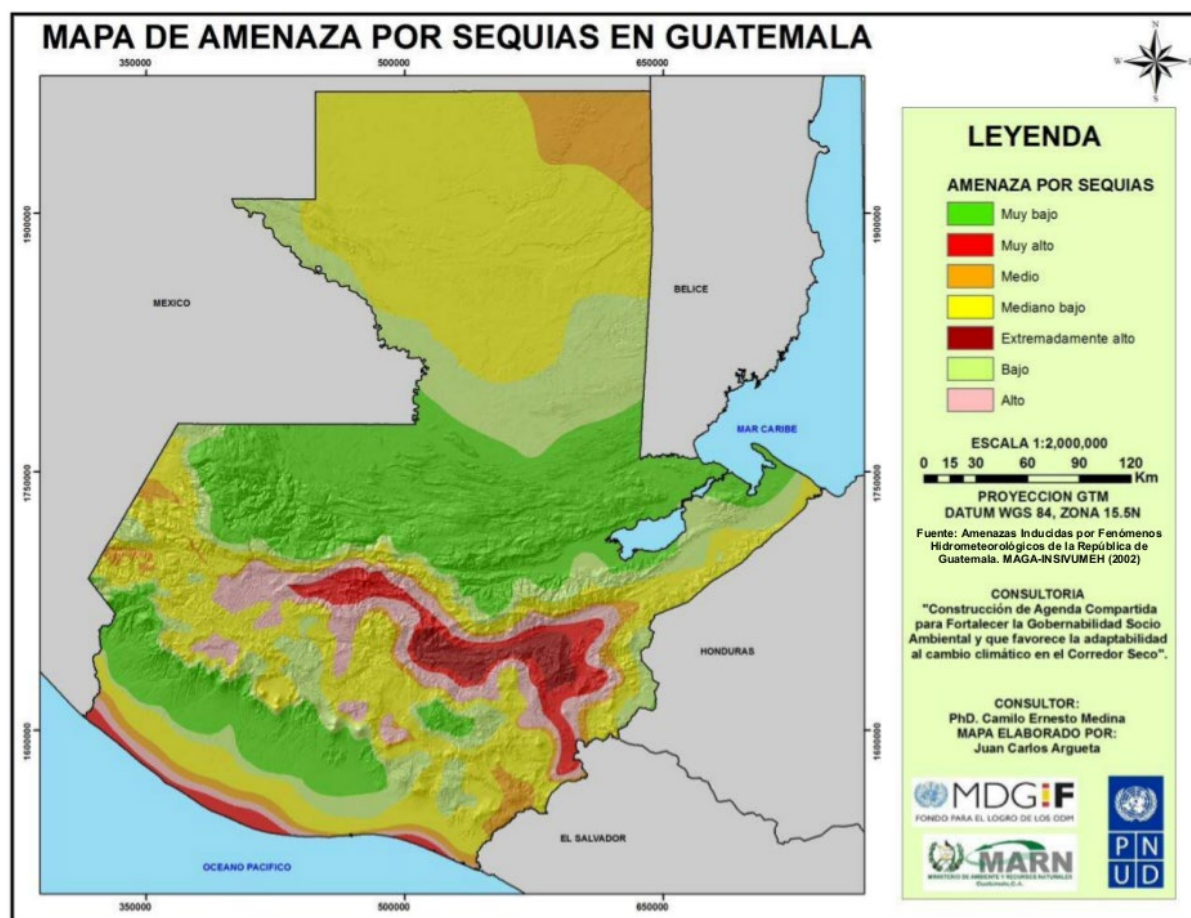


Figure 4. Map of Threat from Droughts in Guatemala.

Source: Medina (2010).

With regard to the basin of interest, it presents a percentage of territory with a threat classified as "Extremely High" to drought. The detail of the amount and percentage of area of the basin that is facing drought threat is shown below:

Table 4
Drought Threat in the Salinas River Basin

Threat Grade	Hectares	Area Percentage (%)
Extremely high	532,46	0,04
Very high	51.192,00	4,23
High	211.233,57	17,46
Middle	70.892,94	5,86
Medium bass	290.645,83	24,02
Under	117.521,02	9,71
Very low	467.878,18	38,67
Total	1.209.896,00	100,00

Fuente: MARN (2019).

It can be seen from the table above that, the Salinas River basin most of the associated territory is under a major to low medium threat (approximately 52%) (MARN, 2019). Also, it emphasizes that the municipality of Baja Verapaz is the one with a higher proportion of departmental area with areas of high and medium susceptibility to droughts (op.cit).

3.5. Migration

Generally speaking, adverse weather conditions in the Central American Dry Corridor negatively affect food and nutrition security through decreased local food production and reduced availability of opportunities for food Work. This leads to a precariousness of employment and an increase in unemployment, as noted in the research report called Food Security and Emigration (WFP, 2017).

Under this characterization there is a first relationship between the conditions of the Dry Corridor and migration, since the pre-eminence of poverty and unemployment are the most widespread causes of migration (State of the Region, 2016). In recent decades, limited economic and social development has been one of the main reasons for migration of people in the region.

Climate adversity and its effect on agriculture leads to a sharp deterioration in the quality of life of individuals and their families. This emigration of people has resulted in family members staying in the territory being able to go through a period of problems aggravated by not being able to meet their food needs as they lose a provider, which, added to high levels of indebtedness complicates the situation. The combination of such situations with other scenarios is leading to situations of greater vulnerability of individuals and families in the Central American Dry Corridor.

In the particular case of Guatemala, displacement is the long-term result of long-term internal armed conflicts, with Indigenous Peoples being the most affected proportionally (Maplecroft, 2014).

4. RESULTS OF GROUP WORK

In this section we proceed to systematize the findings – results of work in groups related to: 1. impacts of climate change – 2. ecosystem degradation and 3. adaptive capacity in the Salinas River basin.

4.1. Current impact of climate change

4.1.1. Forestry and agroforestry activities present in the territory

Participants provided this information regarding the presence of forestry and agroforestry activities in the basin:

Forest activities (reforestation, management and harvesting) are present in the middle between 400 m. and 1000 m. of height.

The National Forest Institute (INAB) has forest incentive projects for both large and small holders.

Firewood is an important fuel in the area and therefore its extraction and use is important.

4.1.2. Problems arising from drought and water resource situation:

Regarding the drought situation in the Salinas River basin, participants provided this information:

In Salamá and San Jerónimo, in 2018 the precipitation did not exceed 420 mm per year. THE INSIVUMEH sends climate reports, the state of the El Niño-Southern Oscillation phenomenon (ENSO).

Drought and lack of water resources has impacted morbidity, particularly children.

Producers have a lot of ignorance of drought-resilient practices.

There's no resilience to the canicle. The population migrates because there are no productive processes and projects.

Groundwater is considered to be of low quality.

The cost of water is varied(e.g. Q.60 monthly for only fifteen minutes of water per day).

The situation of drought and high temperatures have had an impact on insecurity and unemployment.

The departments are prolific and there is no availability of water resources for the entire population.

In Baja Verapaz there is Orange Alert due to drought. This means that the MAGA provides financial aid to producers and the emergency funds are implemented.

4.1.3 Water resource problem

Drought and the problem of water resources have created conflicts at the social level. Other problems include:

There are land tenure issues where the water tanks are located.

There is a state of ungovernability with respect to the water resource.

Currently, not the entire population has the service of drinking water. There is chlorination in some places but there is no potability.

4.2. Ecosystem degradation

4.2.1. Barriers to conservation

There are aspects that in practice operate as barriers to conservation in the Salinas River basin. Some of them are:

Poor access to financial resources.

Very few investment projects are conservation oriented. Many producers rely on NGO support, with an assistive approach.

4.2.2. Other associated situations

Some related aspects that should be highlighted are the following:

There are many illegal logging in the water reloading areas.
Part of the population deforested and squandered forest resources.

At the institutional level:

There are no agricultural insurance in the Salinas River basin region.
Financial resources and technical human resources are needed for conservation activities.
However, the levels of communication with the Municipal Environmental Units (UMAS) has been a good start.

b. Additional elements:

While it is true that the laws define actions, there is also ignorance of them. There is clear resistance to implementation by local authorities. There is also a lack of training for the general population so that they can demand their rights and know their duties. In addition, governance problems are evident and environmental impact assessment tools are lacking. In addition to this, there is poor administrative management at the local level.

It would be relevant for environmental education to go hand in hand with legal education and the participation of citizen bodies.

On the implementation of existing climate change adaptation policies, there is no clarity in the territorial progress of large projects.

The territorial planning plans of some municipalities have made climate change assessments and resilience measures, as well as training actions on prevention issues.

4.2.3. Ecosystem-Based Adaptation Experiences

There are no experiences with the "Ecosystem-Based Adaptation" approach. However, some strategies for adapting to climate change have been given. Within these, MAGA is developing community agroforestry initiatives, soil conservation measures and is also working in an Agroforestry Regional Nursery.

On the other hand, the adaptation actions carried out in the area associated with the Salinas River basin, currently, consist of the deepest drilling of wells for access to water. In the basin of the Cachí River 60% is by gravity. Also, rainwater harvesting has been seen to be a medium-term option.

The Association of Forest Owners has interference in irrigation activities, which gives them an advantage over the rest of the population. In addition, the National Electrification Institute has forest and fruit nurseries, and they donate to planting communities to reforest. The Nature Defenders Foundation with the Green Basins project, also works on forest fire prevention.

4.3. Adaptive capacity

4.3.1. Types of employment that predominate in the region

The area associated with the Salinas River basin is quite diverse. Much of its population grows corn. In the case of El Quiché, there is the agriculture of garlic, sweet potato and onion and, in the Baja Verapaz is grown tomato in greenhouse. It is important to add that the parrot and the Jamaican rose are crops that occur in the southern part of Salamá and that require little rain. On the other hand, there is no diversity of crops (all farmers grow the same at the same time). In this regard, there is a need for greater coordination between farmers as well as coordination with markets to pay a fair price.

An important element to consider is that the number of producers is decreasing, due to the high rate of land use exchange commended to a low availability of water resources. Even commercial farmers are not using the valley because of the water deficit; farmers are going to high areas. It also happens that producers are becoming day laborers. It is important to mention that in the territories associated with the Salinas River basin there is a lot of migration of the economically active population, mostly young people. Some commercial farmers have been looking for fixed jobs, or migrating to the United States.

In addition, producers are no longer sowing because for six years their staple grain crops have had losses, a situation attributed to climate change. Among the innovations that have been made to address this situation is the switch from Creole maize to short-cycle corn (40 days) and the switch to hybrid varieties when you have the economic resources to do so.

It is important to add that the parrot and the Jamaican rose are crops that occur in the southern part of Salamá and that require little rain.

4.3.2. Access to domestic water use and irrigation

Municipal development plans have the detail of the population with access to water. There are villages that have only the resource, a product of the rainwater harvest in Quiché and in Lower Verapaz. In the case of commercial crops, gravity irrigation is used (in Salamá and San Jerónimo); Drip irrigation is available only to producers who have some form by which to stock up on water. The vast majority appeal to dry farming. Finally, participants

emphasize that few producers may have technical assistance because of MAGA budget and staff shortages.

4.4. Relevance of the basin

4.4.1. Complementarity with other initiatives

There are programs that are implemented in the area with which synergies can be made. These are:

PINPEP Forest Incentive Program.

Family Agriculture Program for strengthening the peasant economy (MAGA/PAFEC).

Climate Change-focused projects in union with GIZ.

Forests and Water for Concordia Program (national project).

PRODENORTE- IFA in Rabinal (MAGA-FAO).

International Plan, with young people on human rights issues (HRD).

Debt Redemption Program pending with GIZ-KFW in Quiché.

In addition, linked to the Salinas River basin, the following projects are located:

In Quiché, the Food and Agriculture Organization of the United Nations (FAO) and the United States Agency for International Development (USAID) worked in municipalities in the northern part of the basin, working with plans to adapt to change in six municipalities, which are about to be published.

FAO works on micro-basin committees and has given space to local actors.

The Project EDPTATE of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) is about to begin its third phase.

At MARN they have an initiative to adapt to climate change together with the bank Kreditanstalt für Wiederaufbau (KFW), which have made Finca Plans with external technicians hired for the project.

The MAGA has designed climate change adaptation strategies through green crops and lombriculture.

MarN is working on Environmental Education. In this regard, there is a program called "Ecological Guardians", which is given to teachers.

The MAGA is developing the "Ecological Family Gardens". In addition, there are CADER (Learning Centers for Rural Development).

MAGA is currently responsible for the availability of food together with the Ministry of Food and Nutrition Security (SESAN) and the Public Health Promoter.

Also, there are adaptation projects with farmers, GIZ and MARN, develop farm plans for stubble management, soil conservation and agroforestry systems (SAF).

4.5. Institutional Capacity at the local/governance level

4.5.1. Financial aspects

Presence of financial organizations

The situation shared by the participants regarding the presence of financial organizations in the Salinas River Basin region is as follows:

There is an incentive for forest management (PROBOSQUE), which is very common in the area and has a capital of 144 million quetzales.

There are state-owned banks that provide loans for agriculture, targeting medium-sized producers (normal loan guarantees) but do not mention specific issues of adaptation or climate change.

Financing options include:

Private banking loans.

Cooperative banks.

SHARE.

COMPARTAMOS (which finances entrepreneurship).

There is also the presence of lenders, who charge high interest on their loans. Many farmers use them, such as medium-scale commercial tomato producers who have more than one production apple.

Many of the loans and financing options are given within producers' social networks, informally.

Other options for accessing funds and credit

Some other financing options identified in the workshop include:

MAGA-project DIPRODU: It is an agricultural credit. It is only provided to individual producers who want to place irrigation (e.g. place drip irrigation).

MAGA-Fonagro: Loans to productive associations of any crop. Mainly for the improvement of productive infrastructure, supplies, gray works, new crops. They must be enrolled and demonstrate ability to pay.

State banks: They provide loans for agriculture, aimed at medium-sized producers.

Cooperative banks: They have low interest rates. For a small producer it is difficult to access them due to their credit condition (they are usually not creditable).

4.5.2. Governance

Institutionality in the Salinas River basin

A large number of public institutions relevant to climate change adaptation are present in the Salinas river basin:

Ministry of Public Health and Social Assistance: Sailing for water hygiene. They carry out the monitoring of the chlorination of the water resource but, not of the water purification.

Ministry of Education.

Ministry of Social Development.

Ministry of Agriculture and Livestock (MAGA).

National Forest Institute (INAB).

Ministry of Environment and Natural Resources (MARN).

Institute of Agricultural Sciences and Technologies (ICTA).

National Council of Protected Areas (CONAP).

Universidad de San Carlos (USAC).

Rural University.

Commission on Prevention and Disasters.

Ministry of Food Security.

National Secretariat of the Presidency.

General Secretariat of Planning (SEGEPLAN).

Municipalities: These have a municipal policy for the deconcentration of environmental management, so that they can create strategies and formulate initiatives. In addition, MARN provides them with technical accompaniment.

In addition, there are different instances at the organizational-institutional level in the region. These are:

The AURSA Association (Association of Irrigation Users).

The Community Councils for Urban and Rural Development (COCODES).

Municipal Environmental Management Units. It is a commitment of the municipalities, but in many cases there are no funds, so sometimes they are supported by NGOs. They are present in several municipalities of Baja Verapaz.

National Environmental Deconcentration Policy.

Private organizations, associations and companies

With regard to private organizations, associations and companies present in the area, the following stand out:

Lions Club Association.

Orange Blossom Association.

ANACAFE (Rabinal, Cobulco and El Chol).

Lower Verapaz Nature Defense Foundation.

Association of Users of the Irrigation Channel of San Jerónimo.

Bayer (Research).

Verapaces Forest Producers Association.

Quiché is managed by the Community Development Councils (COCODES) and there is also a Municipal Environmental Management Unit (UNAM) where there is a forestry technician. In addition, they have the Quiché Forest Association (AFORQ).

El Valle Company.

Association of The Cerritos.

Departmental Water Commission (RASSQ): It is composed of inter-agency actors, Well Associations, tank water vendors, etc.

There are Water Committees, related to the collection, service and generation of infrastructure at the community level.

There are currently 13 communities organized by groups of neighbors who are buying land (in Rabinal and San Miguel Chicaj) for water management.

MANCOSEQ Commonwealth.

There is a Departmental Water Commission, a framework in which the inter-agency coordination necessary for profiling was generated.

5. FINAL CONSIDERATIONS AND CONCLUSION

With regard to the workshop carried out, with an emphasis on the Salinas River basin, the following final considerations stand out:

More information is needed around the socio-economic context of the territories associated with the basin. On this:

Information on land tenure is also key and, although consultations were known to be undocumented, institutional efforts are needed for this process to take place.

It is also necessary to know information regarding the use, management and prices of the water resource in the territories associated with the basin.

First-hand information is needed on the processes and projects that are being carried out directly in the basin. Also on the governance scheme and territorial management structure specifically present in the Salinas River basin.

Finally, this workshop was useful to identify key players in the Salinas River basin, learn about the financial mechanisms available for adaptation actions, the biophysical context and their interrelationship with social conditions. On this basis, key informants identified in this workshop will be contacted to collect specific data and information for use in the development of a vulnerability analysis and various feasibility studies of the project .

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7. ANNEXES

7.1. Agenda



Ecosystem-Based Adaptation (AbE) and Transformational Measures to Increase Climate Change Resilience in the Dry Corridor of Central America and the Arid Zones of the Dominican Republic

Expert consultation workshop

Baja Verapaz, Guatemala, Thursday, April 11, 2019.

8:30-9:00	INTRODUCCION	
8:30-8:45	Words of welcome Presentation of participants	Ministry of Environment
8:45 -9: 00	Presentation of workshop objectives and methodology	Dr Ruth Martinez, UN Environment
9:00 -10:00	SESSION I: PRESENTATION OF THE INITIATIVE	
9:00-9:15	Problem of the Dry Corridor in a Central American perspective.	Mr. Raúl Artiga, CCAD
9:15-9:30	Presentation of the project	Dr Ruth Martinez, UN Environment
9:30-9:45	Presentation of the Ministry of Environment and Natural Resources on the topic of Vulnerability	Mr. Francisco Avila Ministry of Environment and Natural Resources Technician
9:45-10:00	Characterization of the basins	Engineer. Olman Varela, UN Environment Expert
10:00-10:15	Presentation of the Institute of Seismology, Vulcanology, Meteorology and Hydrology on the subject of the Dry Corridor in Guatemala	Mr. Saturnino Ordóñez Head of forecasts at INSIVUMEH
10:15-10:30	Coffee break	
10:30-12:30	SESSION II: CONSULT EXPERTS -VULNERABILITY	
10:30-10:40	Introduction to the methodology of the session	Dr Ruth Martinez, UN Environment
10:40-12:00	Group work around: Current and potential impact of climate change Ecosystem degradation Adaptive capacity	Engineer. Olman Varela, UN Environment Expert
12:00-12:30	Plenary: presentation of results	
12:30-1:30	Lunch	
1:30-3:15	SESSION III: CONSULT EXPERTS - RELEVANCY	
1:30-1:40	Introduction to the methodology of the session	Dr Ruth Martinez, UN Environment
1:40-2:40	Group work around: Representativeness Complementarity with other initiatives Institutional capacity at the local level/Governance Financial aspects of the areas	Ing. Olman Varela, B.Sc. Oscar Calvo. UN Environment Experts
2:40-3:10	Plenary presentation of Working Results in Groups	
3:10-3:30	Next Steps and Closing	
3.30-3:45	Coffee	

7.2. List of participants

The figures below include the details of the participants who attended the expert consultation workshop:

Guatemala 11 April 2019	Carlos David Aroche Quesada	MARN	cdaroche@marn.gob.gt
	Anibal Alvarado Morales	MARN-Headquaters	alvam05@yahoo.com
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	Professional staff from institutions involved in this proposal		
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	Ruth Martínez	UNEP	ruth.martinez@un.org
	Olman Varela Duran	CUDECA	olman.varelad@gmail.com

7.3. Group Worksheet 1

Dimension/working group	Criteria	Guiding questions
Current and potential impact of climate change	Availability of ecosystem services	<p>Agricultural activities Presence of agroforestry Forestry activities Other</p> <p>Drought characterization (current and projected)</p> <p>What's the trend?</p> <p>What studies/data/evidence does it exist?</p> <p>What are the information gaps?</p> <p>Are there experiences in Ecosystem-Based Adaptation?</p>
Ecosystem degradation	<p>Remaining ecosystems.</p> <p>Degradation processes.</p> <p>Consequences of ecosystem degradation</p>	<p>What are the barriers to conservation?</p> <p>-Knowledge and understanding of the impacts of climate change among decision makers</p> <p>-Implementation of existing policies on climate change adaptation</p> <p>-Technical capacity to implement adaptation measures within local communities and institutions</p> <p>Causes and consequences of degradation?</p> <p>What adaptation actions are performed in the area?</p>
Adaptive capacity	<p>Basic needs</p> <p>Access to technical assistance, credits and other resources.</p> <p>Workforce</p>	<p>What types of employment predominate in the region?</p> <p>What is the situation regarding access by villagers in water use?</p> <p>Do villagers have access to technical assistance?</p> <p>What percentage of crops in the territory use artificial irrigation?</p>

7.4. Group Worksheet 2

Dimension	Criteria	Guiding questions
Opportunity	National representation	Which institutions are present in the area, mechanisms, especially to manage water and other key resources for adaptation?
	Complementarity with other initiatives	Which local initiatives (projects, programs, etc.) have a presence in the area?.
Institutional capacity at the local level	Financial aspects	What are the main financial organizations? Financing mechanisms? (Credit Options)
	Governance	What is the level of presence and strength of key players such as community organizations, water or basin committees, producer organizations, etc.?

7.5. Photo Summary

In this section, the photographs below show the process carried out in this Workshop:





7.6. Country-level overview

7.6.1. Poverty:

With regard to poverty, Guatemala is one of the countries in Mesoamerica with one of the highest rates of poverty (Maplecroft, 2014). This is associated with an increased risk of vulnerability. It is important to mention that this means that Guatemala, in 2013, was the second most at-risk country in Latin America and the Caribbean (op.cit.).

One way to get a general idea of the poverty situation in Guatemala is through the Human Development Index (HDI). Maplecroft (2013) states that by 2013, Guatemala was among the countries with the lowest HDI in Latin America.

7.6.2. Economic activities and livelihoods:

Within the economic activities, the Guatemalan population can be classified into three livelihood seating areas:

Agroindustry, mining and coffee.

Basic grains in the border area with Honduras and El Salvador.

Basic grains and labor sales.

In addition, Medina (2010) indicates that for the region covered by Guatemala's Semi-Arid Zone, there are also other economic activities. Among these activities stand out:

Technical agricultural production.

Trade.

Transport.

7.6.3. Vulnerability:

In the Semi-Arid Zone of the country, it has been documented that since 2004 impacts have been presented due to drought and other associated modulators (e.g. the El Niño-Southern Oscillation phenomenon [ENOS]), of which a detail is you can see below:

Table 5
Impacts associated with drought in Guatemala's Semi-Arid Zone

Year	Reported impact
2004	Loss of staple grain crops in the CSO region.
2009	Loss in maize, beans and sorgo crops due to the phenomenon of ENOS. In addition, there was an 8% decrease in coffee production and a 50% loss of renovated plants in the CSC region.
2010	Loss of 55% of maize production in the Department of Quiché .
2015	Losses in 80% of premium crops of corn and beans. 55,000 metric tons of maize and 11,500 bean were lost due to drought, representing a total loss of approximately USD 83 million.

Source: Calvo-Solano et al. (2018).

7.6.4. Urbanization:

With regard to urbanization, Maplecroft (2014) says that by 2013 about 51% of Guatemala's population lived in rural areas. Of this population, approximately 32% work in agricultural work and also highlights the fact that more than half of this rural population is in poverty(op.cit.). A more visual representation of the urbanization for the year 2013, can be seen in the following figure:

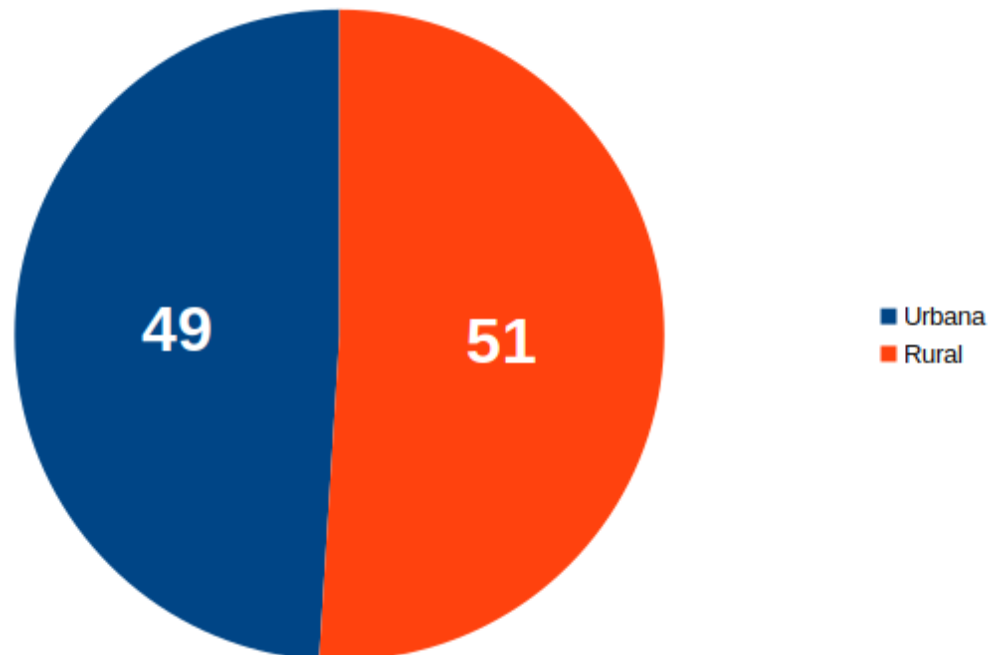


Figure 5. Urbanization in Guatemala to 2013.
Source: Own elaboration from Maplecroft (2014).

7.6.5. Forest cover:

With regard to forest cover in Guatemala, the following are available:

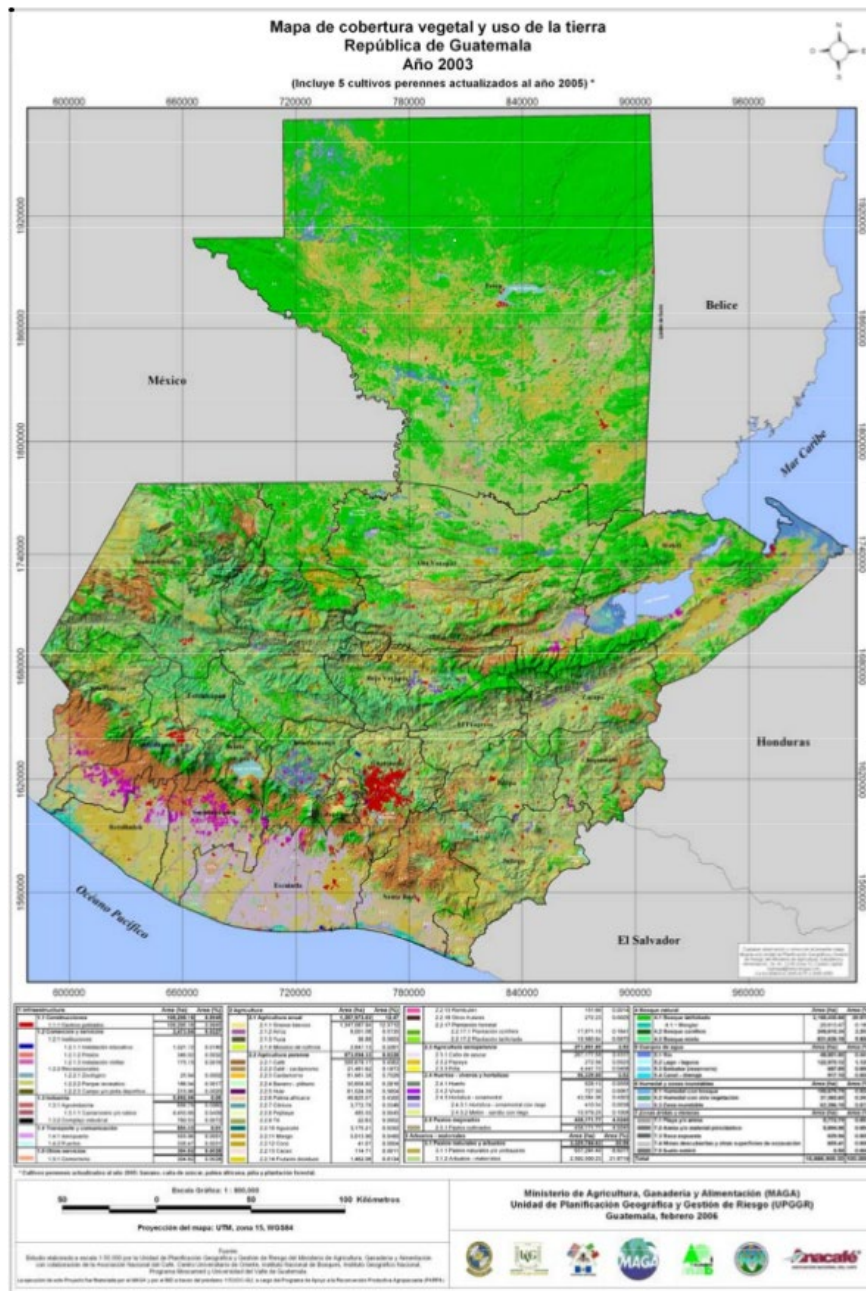


Figure 6. Map of plant cover and land use in Guatemala.

Fuente: MARN (2006).

Honduras



Ecosystem-Based Adaptation Proposal and Transformational Measures
to increase climate change resilience in the Central American Dry Corridor
and the arid areas of the Dominican Republic.

Workshop Memory – Tegucigalpa, Honduras, 8 March 2019.

Performed by:
Oscar David Calvo-Solano
Olman Varela Durán
Jaime Valverde Rojas.
UN-Environment technical support
Coordinated by Ruth Martinez, UN Environment

2019

1. INTRODUCTION

This Expert Consultation Workshop is carried out within the framework of the formulation of the project called "Ecosystem-Based Adaptation (AbE) and Transformational Measures to Increase Climate Change Resilience in the Dry Corridor of Central America and Arids of the Dominican Republic".

This project responds to the request of the Ministers of Environment of Central America and the Dominican Republic, grouped through the Central American Commission on Environment and Development (CCAD) of the Central American Integration System (SICA). The present formulation of the expanded green climate fund (GCF) proposal is being technically led by UN-Environment with the support of the Central American Bank for Economic Integration (BCIE) and the support of CCAD.

The impacts of climate change caused by rising temperatures, droughts and extreme rainfall threaten the livelihoods of vulnerable communities in the Central American Dry Corridor and in the Arid Zones of the Republic Dominican. Water supply is especially at risk.

This project proposes to address this type of impact at the landscape and home level in priority basins by promoting: (i) Ecosystem-based adaptation (AbE) through ecosystem restoration and agroforestry systems; and (ii) water-efficient technologies in communities. To this end, it is proposed: (i) capacity building for local governments, financial institutions and communities; (ii) the development of loans and microfinance for AbE activities and small green businesses; and (iii) the integration of AbE into policies and incentive creation

1.1. Pre-coordination of the workshop

There was preparatory work before this workshop could be successfully carried out. First of all, it should be noted that this event is based on the results of events organized by UN Environment in 2016, where large priority geographical areas for the project were identified; in the case of Honduras, as a result of this workshop in 2016, the departments were identified: La Paz, Intibucá and Lempira as the preliminary areas of action of the project; these zones were chosen based on criteria of:

Exposure to the impact of extreme phenomena (particularly droughts) linked to the climate. Vulnerability to the impact of these phenomena, which is basically determined by three types of factors:

environmental conditions, mainly deforestation and soil degradation linked to the poverty of affected households.

Economic, depending on how much the livelihoods of populations are affected.

Considering this previous work, and considering that the formulation proposal plans to work in a basin by country, the focal point of the project (Ing. Luis Rivas) was requested to define and communicate one or more basins of interest within the prioritized area, for the characterization work. In this case the Lempa, Choluteca, Nacaome and Goascorán basins were defined.

Based on this, the advisory team collected basic information available from secondary sources in this basin (based on mostly municipal data), which is developed in paragraph 3 below.

In addition, as part of the previous organization of the workshop, it was indicated that a space could be available for technical presentations relevant and complementary to the information to be synthesized by the consultants. In this case, additional presentations by Luis Rivas, Ibis Meza and María José Bonilla were available (see Annex 7.1: Agenda). Also before the workshop there was a meeting with Luis Rivas and his technical team to analyze the contents of the presentations and finish logistical details.

1.2 Objectives and participants

This workshop was held on March 8, 2019 in the city of Tegucigalpa, Honduras.

The objective of the event was (i) to present the project to key government technicians and (ii) to advance the process of characterizing the project intervention basin (San Miguel River Basin), through the analysis of information and consultation with national experts, the presentation of the project to key government technicians, and advancing with the characterization of the Lempa, Choluteca, Nacaome and Goascorán basins.

Within the framework of this event and in line with its objectives, the country's government technicians and state authorities were present, including the Deputy Minister of Environment, Mr. Elvis Rodas (see detailed list of participants in Annex 7.2: List of participants), as well as with the focal point of the project in El Salvador, Ing. Luis Rivas. The Executive Secretary of CCAD, Mr. Salvador Nieto, and Mr. Raúl Artiga, were also attended by the CCAD regional liaison for this project. On the part of UN Environment, Dr. Ruth Martínez, Senior Specialist in Adaptation of the Regional Office of Latin America and the Caribbean, participated, with the technical support of Dr. Olman Varela and the B.Sc. Oscar Calvo of CUDECA.

As part of the preparatory work, the profile of the participating officials was requested to meet the following requirements:

Personnel related to water management, drought, water commissioners, watershed management and/or representatives of the agricultural sector.
Personnel of protected areas, conservation and natural resources.
Personnel related to territorial management and planning, community water management or part of rural development institutes.

It was emphasized that all participating technicians had knowledge of territorial dynamics. This workshop included 21 participants, 17 of whom were nationals, representing the environmental, forestry, agricultural and climate change sectors.

1.3 Working Methodology.

The workshop was organized in three sessions (see Agenda Annex 7.1). Namely:

Introductory session: In this session, attendees were given prior information on the project proposal and processed information on the Lempa, Choluteca, Nacaome and Goascorán river basins was presented:

Socio-economic information such as productive activities, demographics, poverty, urbanization, migration;
Biophysical characteristics such as land use, wood cover, flow data;

Vulnerability information such as exposure to extreme events, water security, food security, among others.

Expert consultation session on estimated vulnerability: A second session focused on three groups that analyzed the impact of climate change, ecosystem degradation and adaptive capacity in the basins. The guide to carrying out this group analysis can be seen in Worksheet 1 (see Annex 7.3).

Expert consultation session on the relevance of the basin. 2 random working groups were formed; one group discussed a series of questions focused on representativeness, complementarity with other initiatives, and another group focused on the importance of financial institutions, natural resource governance, and relevant social organizations. The questions and criteria used in this session can be seen in Worksheet 2 (see Annex 7.4).

The discussions initiated during the workshop can continue after the process, through bilateral meetings, if any of the experts deem it necessary, in order to further deepen the information gathered and provided.

2. INTRODUCTORY SESSION

Deputy Minister of Environment, Mr. Elvis Rodas, referred to the complementarity of this proposal with other initiatives in the country, and stressed the importance of leveraging the experience of the Climate Resilience Pilot Programme (PPCR), particularly in relation to with the National Food and Nutrition Security Strategy (SAN), water safety, knowledge management and weather data..

Mr. Salvador Nieto underlined the interest of CCAD and Central American environmental authorities in the Green Climate Fund (VCF), which funds climate action-focused interventions, which may have development co-benefits. It also underlined the importance of having the Central American Bank for Economic Integration (BCIE), UN Environment and CCAD for the development of the proposal. He referred to other CCAD programmes complementary to this proposal, such as the one they carry out with the Coordination Centre for the Prevention of Natural Disasters in Central America (CEPREDENAC) and the Regional Water Resources Committee (CRRH) for response droughts, among others.

Dr Ruth Martinez, Senior Specialist in Adaptation at UN-Environment, outlined the background and phase in which the project is currently located. In addition, he explained in detail the Ecosystem-Based Adaptation (AbE) approach and how it is articulated in this project; it also emphasized the importance of this workshop and how it is part of the efforts of this regional proposal with a view to opting for the Green Climate Funds (VCF).

The Ing Luis Rivas Technical Sub-Coordinator UTI-PPCR , Secretariat of Natural Resources, Environment and Mines made a presentation highlighting the importance of pre-selected watershed governance, prior to the general analysis of the basins in Honduras presenting biophysical maps on precipitation, hydrology, aridity, fires, among others. He ended up pointing out the importance of institutionalility at the level of the pre-selected basins with a preliminary list of the different actors.

In addition, SERNA's Ibis Meza Ing. emphasized the importance of watershed organisms and how they are established in each of the pre-selected basins, as well as their susceptibility to degradation. Finally, María José Bonilla mentioned about the National Strategy for Climate Change and Ecosystem-Based Adaptation.

3. CHARACTERIZATION OF THE CUENCAS OF INTEREST



Figure 1. Official map of Honduras official basins.

Source: Monserrate, Valencia, Leverón, Pineda and Cartagena (2017).

The pre-selected basins are Goascorán, Lempa, Choluteca and Nacaome, the largest being Choluteca with 7,580 km² and the smaller that of Goascorán with 1,803 km². The Lempa River basin is trinational (Guatemala, El Salvador and Honduras) and Goascorán, binational (Honduras and El Salvador).

In the four basins, average rainfall fluctuates between 1,327 mm and 1,813 mm, which are concentrated in a short rainy season whose duration has steadily declined over the past decades. Some physical characteristics of these basins are displayed in the following table.

Table 1
Characterization of the project's interest basins in Honduras

Basin	Surface (km ²)	Length (km)	Contribution (million m ³ /year)	Average Precipitation (mm/year)
Lempa	5.717	60	3.872	1.804
Choluteca	7.580	349	3.032	1.327
Nacaome	5.892	110	2.061	1.666
Goascorán	1.803	141	1.200	1.813

Fuente: Global Water Partnership (GWP) (2015).

Goascorán River Basin:

The Goascorán River originates in the department of La Paz and has a length of 141 kilometers. In its last 18 km, before flowing into the Gulf of Fonseca, it is one of the natural boundaries between Honduras and El Salvador. Its total basin covers an area of 2,345 km². There are 12 municipalities in Honduran territory.

Table 2
Municipalities in the Goascorán River basin

Department	Municipality
Comayagua	Lamaní
Peace	Aguanqueterique
	Guajiquiro
	Lauterique
	San Antonio del Norte
	San Juan
	Mercedes from the East
	Opatoro
	Peace
	Santa Ana
Valley	Charity
	Alliance
	Goascorán
	Aramecina
	tongue
	Nacaome
Francisco Morazán	Curaren
	Lepaterique

Source: ESA Consultores y Acciona Ingeniería (2016a).

SERNA, has estimated that the Goascorán basin is inhabited by 80,281 people. Among them, 94% live in rural areas (SERNA, 2019).

In 2013,⁶the Goascorán basin had an Economically Active Population (PEA) of about 27,306 people. Among them, 94% were in rural areas and, of the total, 61% were in an inactive state, 1% completely unoccupied and 38% were working.⁷ Of the workers, about 70% were engaged in the primary sector.⁸

⁶ Inec. XVII Census of Housing and Population. Tegucigalpa, INEC, 2014.

⁷ ESA Consultores y Acciona Ingeniería, 2016b.

⁸ Ibid.

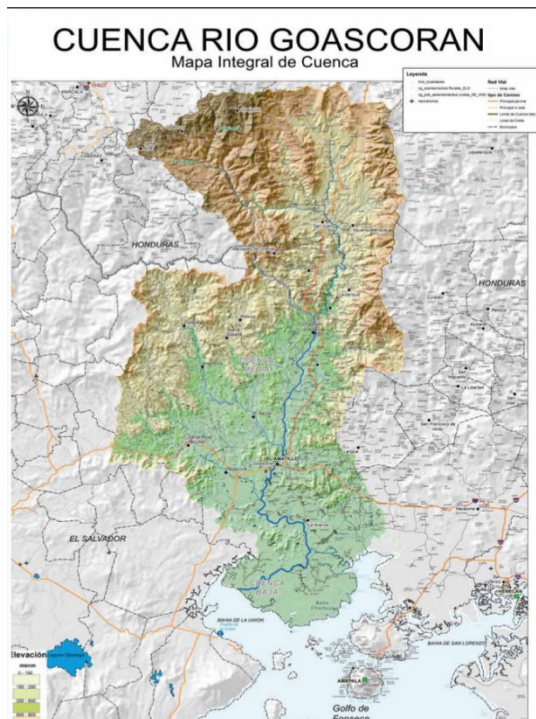


Figure 2. Basin of the Goascorán River.

Fuente: Maier, Porras, Córdoba, MacQuarrie y Welling (2016).

The Goascorán basin consists of eight subbasins: Goascorán Bajo, Lauterique, Apasilina, Apasapo, Apane, Rancho Grande, Matagua and Palagua.

In this basin, the following vulnerabilities stand out:

Annual loss of approximately 3% of forest cover, leading to a reduction in the volumes of water source uptake.

An irregular precipitation regime exists in the basin area. This limits the agricultural and economic development of the inhabitants of the area.

The population is in a food insecurity and there is a high percentage of malnutrition.

There is a permanent risk of drought.

The population that inhabits the area of the Goascorán River basin is in a situation of Food Insecurity and there is a high percentage of malnutrition in the basin.

The area around the river basin presents a high percentage of forest fire risk.

The management of forests in the territory of the basin has poor management.

There is a significant lack of infrastructure aimed at preventing and mitigating natural disasters.

In relation to the management of water resources, the population is constantly exposed to gastrointestinal diseases and skin diseases, due to lack of access to basic sanitation and safe water. With regard to territorial governance and social management of water, in the Goascorán River basin, there are serious problems at the level of governance, since the basin is not legalized, delimited and transferred to the Council of Cuenca and 10 Microcuenca.

⁹ Ibid.

¹⁰ Ibid.

LEMPA RIO CUENCA

The Lempa River, which flows into the Pacific Ocean, is one of the longest in Central America and runs through Guatemala, Honduras and El Salvador, with a length of 422 km. Its trinational area is 17,790 km², of which 5,251 km² are located in Honduras. Its maximum elevation is 2,805 meters above sea level.

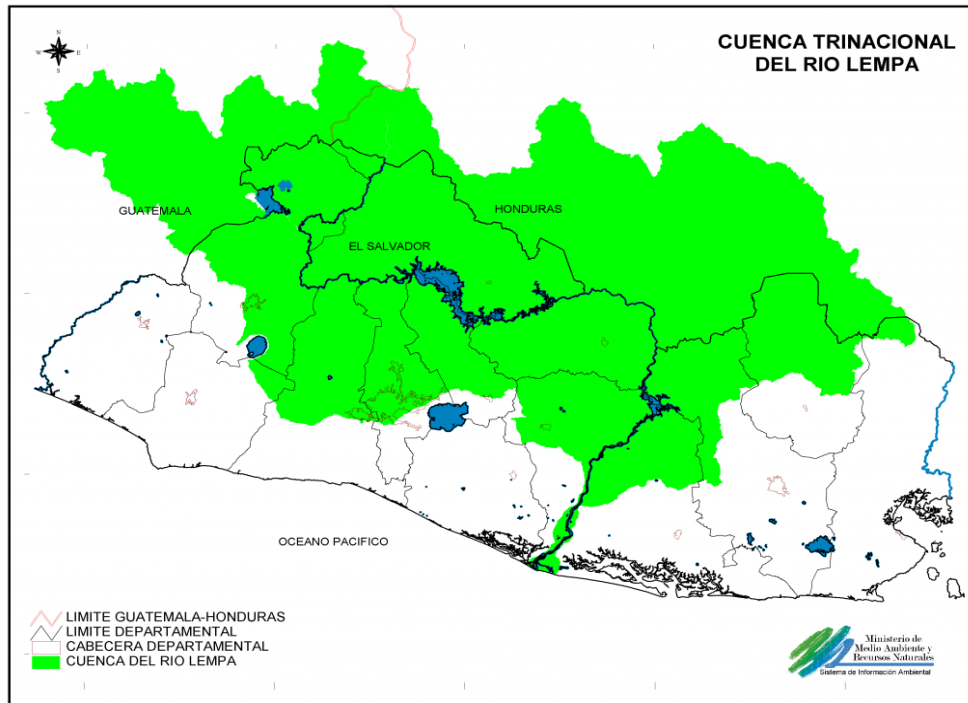


Figure 4. Trinational Basin of the Lempa River.

Source: Ministry of Environment and Natural Resources Honduras (2010).

In Honduras, the Lempa River basin covers 43 municipalities in the departments of Intibucá, La Paz, Lempira and Ocotepeque with a population of 449,898 people, of whom about 87% are rural populations (SERNA, 2019).

In the Lempa River basin, most of the population is engaged in activities related to the primary sector (agriculture, livestock, forestry and fisheries), as a result, climate change has a direct impact on the region's economy and society. In Intibucá, in the municipalities of Camasca, Concepción, La Esperanza, Magdalena, Yamaranguila and San Marcos de la Sierra, 66.2% of the population is engaged in activities in the primary sector and a third is engaged in trade (INE, 2018b; 2018c; 2018e; 2018f; 2018h; 2018h; 2018i). In the municipality of Yarula, department of La Paz, 83% of its economically active population (PEA) is also engaged in the primary sector (INE, 2018j).

On the other hand, SERNA indicates that in the Lempa River basin, the problems are associated with the following causes:

- Socioeconomic insecurity.
- High percentages of poverty and social exclusion.
- Social exclusion.

- Weak local organizations.
- Difficulty accessing financing.
- Duplication of institutional and cooperation actions.

Some territorial actors in the region point to the following issues:

- Little environmental awareness.
- Illegal logging of forests.
- Emigration.
- Low agricultural investment.
- Ungovernability.
- Land tenure conflicts.
- Reduction of the quality of life of the population.

The deterioration of production conditions (eroded soils, environmental pollution, desertification, etc.) contributes to the increase in rural poverty and the reduction of food security. Firstly this is presented by a decrease in diversity equivalent to 48.2% of the territory of the region, secondly there is a compaction that represents 26.8% and thirdly, there is a variation in plant cover with 17% of the territory of the region. According to SERNA, this has the following direct causes:

- Inadequate irrigation technologies.
- Soil contamination by agrochemicals.
- Development of agriculture on the hillside.
- Inappropriate land use techniques.
- Lack of security in land tenure.
- Poor watershed management.
- Population growth.
- Misuse of coffee benefits.
- Lack of territorial planning.
- Open pit mining.
- Illegal cutting of wood.

Regional actors in the environmental sector indicated that water resources are affected by industrial agriculture that generates pollution of water sources and poor management of solid and liquid waste. This also affects the health conditions of the population. They also stressed the importance of considering the following factors:

- Alteration of the hydrological cycle.
- The incidence of wildfires.
- The lack of a comprehensive approach to basin management.
- Excessive use of agrochemicals.
- The emission of gases by factories and the consequent contamination.
- The settlement of population on the banks of rivers.
- Mishandling of garbage and the emission of methane by garbage dumps.

Due to the above, impacts are generated in the region such as vulnerability to acid rains, increased climate variability, droughts, floods and landslides, reduced air quality and alteration of microclimates.

CHOLUTECA RIVER BASIN

The Choluteca River is born in the municipality of Lepaterique, in the department of Francisco Morazán, and continues in an east and northeast direction until it passes through Tegucigalpa where the Guacerique and Chimbo or Chiquito rivers meet. From here it continues to the north, describing a semicircle to the east and south, it runs through the departments of El Paraíso and Choluteca and flows into the Gulf of Fonseca, passing first through the head of Choluteca and through the village of Marcovia. It has a length of 250 km and its basin has an area of 7,570 km².

With regard to the territory associated with the Choluteca River basin, a situation similar to the previous one is presented, where territorial actors have manifested a problem around the following causes (SERNA, 2014):

1. Inadequate irrigation technologies.
2. Soil contamination by agrochemicals.
3. Agriculture on slopes.
4. Inappropriate land use techniques.
5. Extra legal possession of the land.
6. Bad watershed management.
7. Population growth.
8. Misuse of coffee benefits.
9. Lack of territorial order.
10. Lack of political will.
11. Open pit mining development.
12. Illegal cutting of wood.

Similarly, SERNA (2014) indicates that territorial actors have expressed the following effects due to these causes:

1. Change of land use.
2. Uncultivated lands.
3. Advancement of the agricultural border.
4. Low productivity.
5. Soil erosion.
6. Illegal trafficking of flora and fauna.
7. Existence of drought seasons.
8. Low quality and quantity of water.
9. Floods, landslides, landslides.
10. Loss of biodiversity.
11. Poor arrangement of honey water (contamination).
12. High consumption of firewood.
13. Arid Suelo.
14. On farm.
15. Agricultural border advance.

At this point, it is important to mention that similar to what has been presented in the previous case, soil degradation processes are focused on inadequate agricultural practices, with very little institutional assistance. This leads to a reduction in soil productivity; the water resource is also affected by a number of factors related to

agricultural and industrial production that generates pollution of water sources and therefore poor quality of the resource, increased by the poor management of solid and liquid waste affects also the health conditions of the population in the region (SERNA, 2014).

Vulnerability to soil degradation is enhanced by the lack of implementation of the competent legal framework, generating less effect on government and cooperation actions in the region, as well as a weak participation of the population in the management of resources that impede the integral development of communities. SERNA (2014) indicates that the types of degradation in the region are firstly due to the decrease in biodiversity (Bs) equivalent to 42.9% of the territory of the region. Second, soil degradation is due to the variation plant cover (Bc) representing 18.8% and thirdly, compaction (Pc) with 12.6% of the total territory of the region.

CUENCA RIO NACAOME

It has an approximate length of 90 km and its basin has 2,642 km² of surface area; Born in the mountains of Yerba Buena and flows into the Bay of Chismuyo in the Gulf of Fonseca, its main tributaries are; hill, Moramulca and Guacirope. It consists of an agricultural area of 291 km² and has an average annual rainfall of 2,000 mm.

In a study conducted by SERNA,¹¹ it indicated that the territorial actors considered that, among others, the causes of this situation are: the mismanagement of available resources, the lack of economic incentives, the lack of lack of business vision, unemployment and non-compliance with laws. It is worth mentioning that the problems of land tenure and lack of access to arable land and water by poor peasants are not mentioned. As causes of these problems, they mentioned declining quality of life, lack of skilled labour, lack of governance in the territory, low levels of education, unemployment and migration.

With regard to the territories around the Nacaome basin, they present a common problem around land use. SERNA states that the causes of this problem are as follows:

Inadequate soil management practices.

Burnand and wildfires.

Deforestation.

Advance of the agricultural border.

Agrochemical abuse.

Extensive grazing.

Lack of planning for water resource use.

Lack of concerted regional planning.

Climate change.

Little law enforcement.

Low awareness among the population.

It should be noted that the information relating to this problem was also referred to by territorial actors who, according to SERNA (2014) attribute the following effects, inter alia, to the aforementioned causes: (i) loss of soil fertility, (ii)) land degradation and drought affecting production systems, (iii) environmental pollution, (iv) food insecurity, (v) malnutrition, (vi) migration to cities, (vii) shortage of (viii) poverty and, (ix) weak livelihoods.

¹¹ Ibid.

In addition, it is important to note that within the types of degradation associated with the territories of the Nacaome basin are the following: the variation plant cover equivalent to 30.4% of the territory of the region; secondly compaction of 20% and, thirdly, soil pollution with 23.3% of the regional area.

It is important to mention that the Nacaome basin presents a significant vulnerability to drought. The associated territorial actors state that the causes of this vulnerability are, inter alia: (i) lack of rain, (ii) approval of laws that put natural resources at risk, (iii) changes in the movement of winds, (iv) use of agrochemicals, (v) overexploitation of agricultural and livestock soils, (vi) lack of knowledge and population information, (vii) industrial activities, (viii) bad production practices.

4. RESULTS OF GROUP WORK

4.1 Limitations or barriers

Among the main limitations for the development of climate change projects are the following:

A significant flow of increasing migration of men to the United States that decreases the workforce in basin communities.

Early Warning Systems (SATs) need to include soil variables (soil moisture in the canicle for example).

4.2 Ecosystem degradation and climate change

MiAmbiente has a Climate Change Area that addresses all aspects related to the Honduran Dry Corridor, as well as climate vulnerability, development tools and adaptation measures.

Those present at the workshop mentioned in the groups that there is a methodological guide for territorial decision-making on climate change. Areas under forest management and municipalities work on adaptation actions: management of farms, forests, systematization of experiences and restoration of the landscape.

Adaptation measures are carried out in different areas of the basins, mainly with water reservoirs. RedD actions are also developed in dry corridor. The ICF in turn carries out ecosystem monitoring actions at the basin level and with forest management plans: 6 municipalities of La Paz and Choluteca and 2 municipalities in El Paraíso, also Ecosystem-based Adaptation actions with reforestation projects of more than 250,000 trees planted in affected areas.

They are identified as main causes of ecosystem degradation in the basins designated for extensive agriculture, forest fires, diseases to vegetation (case of the pine sweeping worm) and illegal logging of trees.

Adaptation actions carried out in these basins are: reforestation, Agroforestry systems, agroforestry projects and resilience if they work in specific actions, 50 water harvesting initiatives in La Paz, ICF infiltration trenches pilot project in Choluteca. I also pay for Environmental Services for conservation.

Within the 4 pre-selected basins, Goascarán has possibilities to work on restoration actions because it has better institutionality conditions and 65 management plans in microbasins.

As for land tenure, the Lenca Indigenous Territorial Council is highlighted in the upper Goascarán basin as a local organizational model. Other forms of tenure in the basins are private, ejidal, municipal (Forest Heritage Center).

Further data on degradation and reforested areas in the basins can be found on the SIGMOF Platform.

4.3 Adaptive Capacity

Goascorán River Basin:

There are small micro-irrigation and water harvesting projects for orchards. There are communities with experience in payment for environmental services (PSA), and a consolidated commonwealth in the upper area of the basin. They have articulation capacity among local actors. The experience of sustainable projects (IUCN) is highlighted but through subsidies, although no analysis has been made whether they are economically feasible. In the high coffee areas you can see a high social and organizational cohesion. There are many Community water entities (Watershed Councils). There is an important social organization for water in the upper and lower basin of the Goascorán River basin, but they are not well connected in their management in the middle. Through the Basin Councils they are better appropriated.

Lempa River Basin:

Subsistence and rnajote agriculture predominates. The upper part of the basin is mostly protected with an obvious greater plant cover. There are small programs supported by USAID with the creation of irrigation districts.

Nacaome River Basin:

The main productive activities in this basin are agribusiness and day labor. Access to safe drinking water is extremely limited for rural communities because of a lack of infrastructure. Some small-producer irrigation projects have been harmful due to mishandling and lack of planning. In this basin the commonwealths are also strong, well organized and are potential local project partners. In terms of water management: an organism is required to bind the Water Boards as they are not organized.

Choluteca Basin:

There is a presence of large agribusiness consortiums (cane, watermelon, shrimp, salt), some fishing in the Gulf, agricultural labor and in addition, there are ranchers. In terms of access to drinking water, in this basin it is more problematic than in the others, due to the absence of infrastructure for distribution. One indicator is the great condition of kidney disease. There is also a significant presence of large cane producers and other agro-industrials. The lower part is being worked on a lot and not so much in the upper basin. There are very strong impacts due to flooding, this is in addition to the effects that have also been caused in large part by the great urban influence of Tegucigalpa.

Private initiatives to promote harmful technologies (use of agrochemicals) that degrade natural resources are presented in all basins. Technical assistance is contradictory, for example there are large technological packages of agrochemicals at the same time as

other projects promote sustainability. Also inappropriate schemes of assistance, with staff underprepared and unfollowed. As well as a high complexity of institutional-to-donor relations (disorderly actions)

It is suggested that the National Association of Municipalities of Honduras (AMHON) take advantage of the strengths and lessons learned from water management organizations and the need to generate inter-community capacities to share experiences.

Choluteca River

According to SERNA, territorial actors considered that the following anthropogenic factors add to the impacts of climate change in the basin: Alteration of hydrological cycles, forest fires, factory pollution, poor management overuse of agrochemicals, migration of people to the banks of rivers, mismanagement of solid waste, methane emission by waste dumps. These are the same causes for the other basins. These factors are related to territorial governance and social water management.

In addition, they indicated that the basin is susceptible to acid rains, floods and landslides. Also, climate variability has influenced the presence of droughts, floods and landslides. In the same vein, the territorial actors pointed out that due to the above, the following impacts have been presented in the territory associated with the Choluteca River basin: Decreased plant cover, poor water quality, landslides, overflows of rivers and streams, water turbidity, azolvación and increased leaks of the El Cajon reservoir, flooding of the lower parts, low agricultural production, groundwater and surface pollution.

Finally, when referring to the challenges currently facing in the basin, new human settlements, the lack of natural resource management tools, illegal hunting, habitat loss and ecosystems that lead to wildlife extinction stand out. In addition, they repeatedly mentioned cultural factors such as lack of environmental awareness.

Goascorán and Nacaome rivers:

A census of wells is underway in the municipalities of Alianza, Goascorán and Nacaome. There are already 1200 censados.

Lempa River:

MiAmbiente and USAID are doing a joint study in 6 Departments. This study is at the supply level of the water resource in 2017.

Goascorán River:

ICF, CIAT, FAO, FIA and the Honduran Institute of Earth Sciences have done studies on agricultural activities in this region.

In the basin, every irrigation project is sought to have an adequate land use plan. USAID has supported the development of water resource maps in microbasins including Goascorán. They also have the information by Subzone (forest protection, recovery, restoration and human settlement).

CLIFOR, DGRH, ICF, El Zamorano and the Honduran Institute of Earth Sciences of the National University, have information on the incidence of drought in the Goascorán basin.

There is a Water, Soil and Forest Plan associated with the basin as a strategy against the effects of drought.

Lempa River:

CATIE has historical drought information in the Lempa River basin.

Among the information gaps and some recommendations that were mentioned at the general level for the basins are the following:

A sustainable soil and water management strategy needed at the watershed level

Conditions need to be improved to work more on dryland farming.

More work needs to be done on human development, institutionality and water use at the watershed level.

Digital mapping of basins is required in order to improve decision-making on their management.

There is no mapping of experiences from successful climate change projects.

The institutions' human team needs to be constantly trained, especially on action against climate change.

Workshop attendees mentioned that one of the main problems is that many of the climate change-related research is archived and on the other hand there are information platforms that are not socialized.

There is no budget for research and more staff presence is needed in the field.

Participants indicate that there is extensive information at the national level, but there is a need to delve into risks in a way that is accessible to decision-makers and civil society.

Therefore, the development of an Information System with information to visualize the different risks in the regions of the basins of interest is considered key and priority.

4.4 Institutionality and complementarity with other initiatives

The table discussing complementarity with other initiatives established a list of interventions, institutions and organizations that form the basis for the necessary development of a map of actors:

The importance of considering the participation of the Municipal Environmental Units (UMAs) in the different projects carried out in the territories of the basins was emphasized.

The strategic role of the commonwealths of municipalities such as MAMLESIP (<http://www.mamlesip.com/>), in Lempira: Mocal-Lempa, the Commonwealth of the Sun, south-east of Lempira, CAFEC in Lempira, in Intibucá is ANFFI (Association of Municipalities of Intibucá).

ASOMAINCUPACO, the Councils of Cuenca de La Paz (The commonwealth is more organized in Goascorán).

Proyecto Gema (USAID).

ICF – SAG.

Project ICF – WFP, Activities Similar to Global, Partnerships have been established.

CESAL (Spanish NGO)

MILPA (indigenous peoples).

FIPA (Honduran Participatory Research Foundation).

ADEPES is located in Nacaome. NASMAR commonwealth (municipalities facing the sea), MANSURPAZ.

Projects: PRASA (OXFAM-Continuidad Nuestra Cuenca Goascorán), Red Cross Switzerland (Works in comprehensive risk management).

In the Choluteca River basin, there is a Risk Management Board.

EUROSAN – EU.

ADETRIUNF (Choluteca).

ASECHS (Choluteca).

Cooperatives: Santa Rosa, Corquín and San Juan, have more than 1000 members and have their own environmental program.

IHCAFE has Agroforestry and Soil Agroforest Programs.

Presence of private companies:

AGROLONO, FERTICA, DISAGRO, Shrimp Packers. In Nacaome there are shrimp companies from El Triunfo to Marcovia. Honduras is the second largest shrimp exporter in the world after Ecuador.

The Pantaleón Foundation of La Grecia (Cañeras Companies): they produce energy with cane bagasse and have environmental responsibility programs.

There is a presence of Melonite entrepreneurs (Melon) in Pacilagua (PACILAGUA).

The ENEE, through the San Lorenzo Project, is producing Solar Energy. There is also a wind project.

In El Triunfo there is a rural box that is processing the casheon. Also are EMPRENDESUR (NGO), the SAG Programme funded by external cooperation programmes (BCIE, IFAD, OFID). The Forest Conservation Institute (ICF) is present with regional offices in Comayagua–West, and there are USAID, Global Community in microbasin projects, in addition, there are Community Advisory Councils and Forest Management Plans.

In Goascorán the Cuenca Councils are working and are a successful case to take as a reference. The Our Goascorán Basin project with IUCN has come to strengthen this process.

The Adaptation Fund supports climate vulnerability issues in the basins, helps identify technologies for adaptation and in the mapping of actors that are worked together with the commonwealths.

In MiAmbiente there is a Project Coordination Office that follows REDD projects, productive landscapes and Ecosystem-Based Adaptation (AbE).

ASOMAINCUPACO is a territorial body that functions as a technical arm of water boards in the basins in Goascorán.

There are also the so-called Central Councils: COCEPRADE and COCEPRADIL that provide technical and protection services to water sources in the basins, also in recovery of areas for water recharge.

EUROSAN serves the communities of the West in this same regard.

Other institutions present in the Goascorán area: IHCAFE, Water and Sanitation of Honduras (ERSAP), National Development Tables, Security and Climate Change Tables (both are Presidential Commissions).

There is also the Chamber of Commerce and Industry, as well as private owners of Forests.

In Lempa:

South Commonwealth -MOCALEMPA.
Commonwealth of the Municipalities of the South West of Lempira-MANCOSOL.
Municipalities Association of Intibucá (ANFI).

In Nacaome:

The Pespirens Development Association (ADEPES).
NASMAR Commonwealth.
Commonwealth of La Paz- MASUPAZ.
Swiss Red Cross (Nacaome and Goascorán).
Risk Management Table (Choluteca).
EUROSAN/FAO.

The private company is mainly present in Nacaome and Choluteca with: Agrolíbano, FERTICA, DISAGRO, Camaroneras, ENEE with Solar Energy, Pantaleón Foundation with sugar cane and the Melonite Association with melon production.

La Caja Rural has initiatives in the basins with Empredesur where BCIE, IFDA and DFID are involved.

SAG has an agricultural development project, known as Pro-Lenca with IFDA funds.

The following instances are present in all basins:

Municipal Environmental Units(UMAs).

Associations.

ICF.

Secretariat of Agriculture (SAG).

CESAL (Spanish NGO).

Honduran Participatory Participatory Research Foundation (FHIPA).

4.5 Financial aspects

Rural boxes have a chapter of contingency funds in climate emergencies (extreme weather events). For example, in the rural box of MANORCHO in the northern area of Choluteca.

There is a presence and strength of financial organizations in the regions associated with the basins.

Alliance for the Dry Corridor: They have multilateral and bilateral funds (including the Central American Bank for Economic Integration [BCIE]) for climate change activities. In addition, Empredesur is part of Alliance for the Dry Corridor.

Cooperativism has made projects for climate change adaptation and sustainable development for women.

The Southern Lempira Mixed Cooperative is a financial institution, which provides loans with alternative guarantees. Being a member has rural boxes.

San Marcos Ltda Cooperative., you have financial products of interest.

The MANCOSOL Commonwealth has an alternative financial center dependent on a revolving fund and which has been consolidated, with legal personality. They are focused on AbE practices.

Honduras Strategic Investment: Manage several of the funds for the Dry Corridor centrally (from the World Bank, the Inter-American Development Bank (IDB) and some of the funds are from the United States Development Agency International (USAID).

Protected Area And Wilderness Funds: Operate in all areas where there are protected areas. They serve to train co-handlers and to ensure a series of sustainable guidelines for organizations (specific management plans for areas, etc.) in core and buffer zones.

Water Management Land Purchase Funds: Community water boards do their own management and purchase land for rehabilitation, reforestation, restoration and self-management. Sometimes municipalities make some kind of contribution.

IDB-Secretariat of Finance (SEFIN): They have initiatives in the upper choluteca.

They have funds through sustainable forest management in conjunction with the ICF, for areas affected by the plague of the pine sweeper weevil. These funds are used to leverage efforts between government and civil society

The BCIE is funding a Small Irrigation Program (PPR) at the watershed level of the Goascorán River.

5. FINAL CONSIDERATIONS AND CONCLUSION

The final considerations of this process include the following:

This workshop was useful to identify key players in the basins of the Goascorán, Lempa, Nacaome and Choluteca rivers, to learn about financial mechanisms available for adaptation actions, biophysical context and their interrelationship with social conditions. The information gathered has served to fuel the feasibility study of the expanded proposal, as well as serves as the basis for next steps such as the analysis of lessons learned.

On this basis, key informants identified in this workshop will be contacted to collect specific data to be used in vulnerability analysis and feasibility studies of the project.

At the end of the workshop, it is considered that the main information gaps are with respect to: Institutionality, CSOs, Cooperatives, HDI, inequality, percentages of producers and use of irrigation in agricultural crops, which will be solved in consultations Further.

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7. ANNEXES

7.1. Agenda



Secretariat of Natural Resources and Environment

And

Central American Commission on Environment and Development

Ecosystem-based adaptation and transformational measures to increase resilience to climate change in the Dry Corridor of Central America and the arid areas of the Dominican Republic"

Expert Meeting Invitation

Prioritization of intervention sites of the Project for the Proposal of the Central American Dry Corridor and Arid Zones of the Dominican Republic

AGENDA

Time	Activity	responsible
8:30 - 9:00 am.	Registration and presentation participants	All
9:00 - 9:10 am	Welcome Words	Minister of MiAmbiente+ Ing. José Antonio Galdámez
9:10 - 9:20 am	Words alluding to the event by the Representative of CCAD	Mr. Salvador Nieto. Secretary General of CCAD
9:20 - 9:35 am.	Presentation of the objectives of the workshop and agenda of the day.	Ruth Martinez, UN Environment
9:50 - 10:05 am.	Dry Corridor Problem in a Central American Perspective	Mr. Raúl Artiga. CCAD Regional Liaison
10:05 - 10:20 am	Initial presentation of the project. Conceptual Note Basics	Ruth Martinez, UN Environment
10:20 - 10:30 am	Questions and clarifications.	
10:30-10-45	Coffee break	
11:00 - 11:15 am	General situation of the priority basins of the Seco Corridor of Honduras.	Directorate-General for Water Resources
11:15 - 11:30 am	Presentation on the description and justification of each of the Criteria that were considered for the preselection of basins and municipalities to be selected for the proposal.	Ing. Luis Rivas Focal Point for the Dry Corridor Initiative
10:45 - 11:00 am	Impacts of climate variability and climate change in the Honduran Dry Corridor.	Maria José Bonilla

Time	Activity	responsible
		Directorate-General for Climate Change
11:30 - 11:45 am	Q&A	
11:45 - 12:00 am	Presentation of key information from pre-selected basins	En. Olman Varela. UN Environment Expert
12:00 – 1:00 pm	Lunch	
1:00 – 1:45 pm	<p>I work in groups around:</p> <p>Current and potential impact of climate change</p> <p>Eco-system degradation</p> <p>Adaptive capacity</p>	<p>Dr. Ruth Martinez. UN Environment Expert</p> <p>En. Olman Varela. UN Environment Expert</p> <p>Bach. Oscar D. Calvo. UN Environment Expert</p>
1:45- 2:30 pm	<p>I work in groups around:</p> <p>Representativeness</p> <p>Complementarity with other initiatives</p> <p>Financial aspects</p> <p>Institutional capacity at the local level</p>	<p>Dr. Ruth Martinez. UN Environment Expert</p> <p>En. Olman Varela. UN Environment Expert</p> <p>Bach. Oscar D. Calvo. UN Environment Expert</p>
2:30 – 3:00 pm	Coffee. Closing	

7.2 List of participants

The figures below include the details of the participants who attended the expert consultation workshop:

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7.3 Group Worksheet 1

Dimension/workgroup	Criteria	Orientating Questions by Basin	Basin Goascorán	Basin Lempa	Basin Choluteca	Basin Nacaome
Current and potential impact of climate change	Availability of ecosystem services	<p>Agricultural activities</p> <p>Presence of agro-forestry</p> <p>Forestry activities</p> <p>Other</p> <p>Drought characterization (current and projected)</p> <p>What's the trend?</p> <p>What studies/data/evidence does it exist?</p> <p>What are the information gaps?</p> <p>Are there experiences in Ecosystem-Based Adaptation?</p>				
Dimension/workgroup	Criteria	Guiding questions				
2. Ecosystem degradation	<p>Remaining ecosystems.</p> <p>Degradation processes.</p> <p>Consequences of ecosystem degradation</p>	<p>What are the barriers to conservation ?</p> <p>Knowledge and understanding of the impacts of climate change among decision makers</p> <p>Implementation of existing policies on climate change adaptation</p> <p>Technical capacity to implement adaptation measures within local communities and institutions</p> <p>Causes and consequences of degradation?</p> <p>What adaptation actions are performed in the area?</p>				
Dimension/workgroup	Criteria	Guiding questions				

Adaptive capacity	Basic needs: percentage of poor households	What types of employment predominate in the region?				
	Access to water (see attached sheet	What is the situation regarding access in the use of water by the inhabitants? Do villagers have access to technical assistance?/What kind of assistance? What percentage of crops in the territory use artificial irrigation?				

7.4 Group Worksheet 2.

Dimension	Criteria	Goascorán Basin	Lempa Basin	Nacaome Basin	Choluteca Basin	Key topics
Institutionality and associativity at the local level	Governance: Institutional					Institutions present in the area, mechanisms, especially to manage water and other key resources for adaptation.
	Asociatividad					Development associations, cooperatives, roasts, commonwealths, etc. Presence and strength of key players such as community organizations, ASADAS, etc.
2.Oportunidad/ Sinergias	Complementarity with other initiatives					Existence of complementary initiatives. Existing overlapping initiatives or duplication of efforts.
	Financial aspects					Presence and strength of financial organizations Producers' strength/weaknesses to finance adaptation activities

7.5 Photo Summary.



Source: Own photographs (2019).

7.6. Country-level overview

The Honduran Dry Corridor is a vast region that starts on the border with Guatemala, in the west of the department of Copán, continues to encompass the Honduran Trifinio region in the department of Ocotepeque, then borders the border with El Salvador (Lempira, Intibucá and La Paz), to end up in the department of Choluteca that borders Nicaragua. It is a region with high poverty rates, with still significant percentages of forest cover in the highlands, a recent expansion of high-quality coffee cultivation at the expense of forests and a high vulnerability of agricultural production and food security due to increased drought periods.

In 2009, there was a reduction in precipitation due to the phenomenon of El Niño-Oscillation of the South (ENOS), affecting the food security of the inhabitants and income agriculture (notably coffee, of increasing importance in the area). There was also a decrease in rice production in the 2008-2009 agricultural year and increases in the price of beans in 2014 in Honduras. The same situation was presented in the Trifinio region in 2015 for maize and beans (Calvo-Solano et al., 2018). So, on a general level, it can be seen that not only the area around the basins of the Goascorán and Lempa rivers are affected, but also the entire Honduran region of the Dry Corridor is vulnerable to drought, largely because of the Warm Phase of the E phenomenon NOS which is the main modulator of the climate in Central America.

One way to describe the behavior of drought in the region is the Aridity Index. A representation of the behavior of that index can be seen in the following map:



Figure 6. Aridity index by basins.
Source: Own elaboration (2019).

6.6.1 Poverty

With regard to poverty in Honduras, the National Statistical Institute (INE) (2017) says that approximately 61% of the population lives in poverty. Of this population, about half are in conditions of chronic poverty.

A comparison of estimates of poverty and inequality by department is as follows:

Cuadro 1: HONDURAS, Comparación de estimaciones de pobreza y desigualdad según la metodología empleada^{(1), (2)}

Departamento	% de población urbana	Proporción de población pobre				Distribución de ingresos (Coef. de Gini)			
		Con encuesta		Con censo-encuesta		Con encuesta		Con censo-encuesta	
		Proporción	Error Est.	Proporción	Error Est.	Proporción	Error Est.	Proporción	Error Est.
Atlántida	50.8	0.676	0.018	0.714	0.011	0.488	0.017	0.486	0.011
Colon	27.3	0.789	0.018	0.789	0.016	0.514	0.020	0.546	0.022
Comayagua	41.5	0.756	0.018	0.768	0.020	0.530	0.034	0.495	0.017
Copan	33.2	0.771	0.020	0.802	0.014	0.536	0.031	0.523	0.018
Cortes	65.9	0.567	0.011	0.606	0.006	0.473	0.009	0.477	0.006
Choluteca	29.9	0.823	0.015	0.831	0.011	0.555	0.020	0.608	0.016
El Paraíso	27.9	0.737	0.018	0.742	0.020	0.519	0.019	0.533	0.016
Fco. Morazán	74.9	0.587	0.011	0.613	0.008	0.515	0.012	0.509	0.007
Gracias a Dios				0.788	0.027			0.565	0.052
Intibuca	19.1	0.901	0.016	0.885	0.015	0.492	0.036	0.514	0.050
Islas de la Bahía				0.576	0.046			0.523	0.029
La Paz	23.0	0.875	0.019	0.895	0.016	0.522	0.031	0.523	0.024
Lempira	12.7	0.942	0.011	0.947	0.008	0.464	0.025	0.444	0.025
Ocatepeque	30.0	0.752	0.033	0.779	0.022	0.481	0.041	0.505	0.030
Olancho	27.2	0.722	0.018	0.749	0.020	0.513	0.018	0.489	0.013
Santa Bárbara	26.6	0.865	0.013	0.859	0.008	0.505	0.021	0.509	0.014
Valle	29.9	0.769	0.025	0.771	0.024	0.503	0.021	0.551	0.022
Yoro	39.3	0.751	0.014	0.790	0.009	0.472	0.014	0.483	0.010

Figure 7. Comparison of estimates of poverty and inequality in Honduras by Department.
Source: IDB/MECOVIP Program, Honduras Statistics (2003).

6.6.2 Forest cover and land use

With regard to forest cover and land use, the Forest Conservation Institute (ICF) through the Department of Watersheds has registered 372 microbasins that have been legally declared, these have a total area of 4,198 3.7% of Honduras' area. The purpose of this declaration is to provide legal protection to the forest and water resource to supply water mainly for human consumption. Therefore, it is of the utmost importance to know that 62.6% of the area of the microbasins is covered by forest, of which 31.6% is wet latifoliated forest, 21.5% is conifer forest, 6.7% mixed forest and 2.9% is deciduous forest (CCAD-GIZ, 2015).

On the other hand, the remaining percentage corresponds to 38% non-forest cover which can be classified as follows: 20.7% corresponds to pastures and crops, equivalent to 87,176 hectares, 7.6% is covered by wet secondary vegetation, 3.8% consists of secondary deciduous vegetation, 3.3% in agroforestry systems (13,740 hectares), trees scattered out of forest correspond to 1.35% (5,674 hectares), urban areas occupy

approximately 0.37% (1,567 hectares) and finally 0.27% is due to other uses (CCAD-GIZ, 2015). A representation of forest cover and land use is shown below:



Figure 8. Forest Map and Land Coverage in Honduras.
Source: MiAmbiente (2014).

6.6.3 Migration

Generally speaking, adverse weather conditions in the Central American Dry Corridor negatively affect food and nutrition security through decreased local food production and reduced availability of food opportunities which leads to a precarious employment and increase in unemployment, as noted in the research report called Food Security and Emigration (World Food Programme [WFP], 2017).

Under this characterization there can be a first relationship between the conditions of the Dry Corridor and migration, since the pre-eminence of poverty and unemployment are the most widespread causes of this (documents the State of the Region, 2016). Precisely the limited economic and social development have been in recent decades, one of the main reasons for migration of people in the region.

Climate adversity and its effect on agriculture leads to a sharp deterioration in the quality of life of individuals and their families. This emigration of people has resulted in family members staying in their territories being able to go through a period of problems

aggravated by not being able to meet their food needs, since they lose a provider, which added to high levels of indebtedness complicates the situation. The combination of such situations with other scenarios is leading to situations of greater vulnerability of individuals and families in the Central American Dry Corridor.

6.6.4 Urbanization

With regard to urbanization in Honduras, Hernández (s/f) refers that as of 2001, the population in Honduras was 6,535,344 inhabitants with a density of 58.1 inhabitants per km². In addition, the population growth rate was 2.64, one of the highest in the Americas. It is important to mention that 54.4% of the population resides in the rural area, 20% is concentrated in the cities of Tegucigalpa, the capital and center of government, and in San Pedro Sula, the main industrial city located in the north of the country (op.cit).

6.6.5 Water Governance

With regard to water governance related to the basins of interest, to date 33 Basin Agencies (8 Basin Councils, 4 Subbasin Councils and 21 Microbasin Councils) have been formed to date, which are responsible for it. These benefit a population of approximately 900,000 inhabitants, in the Departments of Valle, La Paz, Francisco Morazán, Comayagua, Ocotepeque, Choluteca and Atlántida (MiAmbiente: technical note, 2017).

Goascorán River Sub-basins

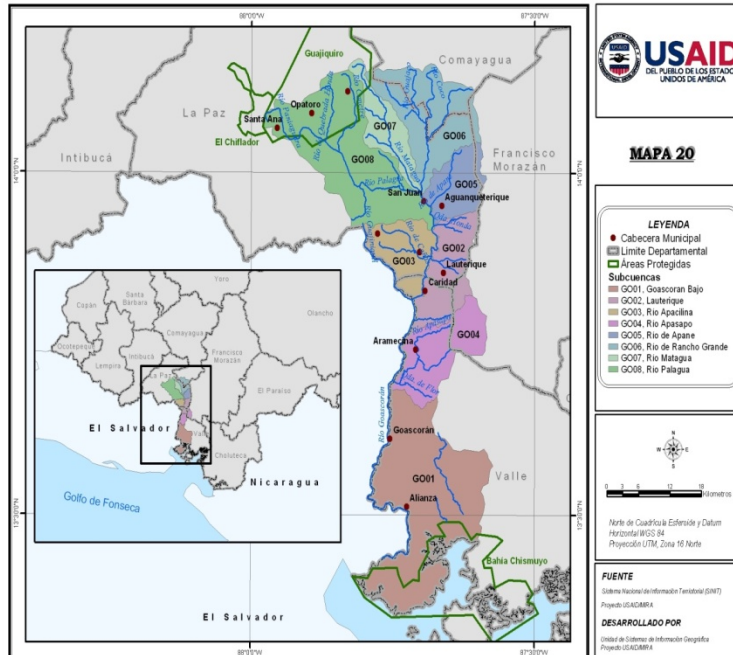


Figure 3. Goascorán River sub-basins.
Fuente: USAID (s/f).

El Salvador



Ecosystem-Based Adaptation Proposal and Transformational Measures
to increase climate change resilience in the Central American Dry Corridor
and the arid areas of the Dominican Republic.

Commension Report– San Salvador, El Salvador, 19 March 2019.

Performed by:
Oscar David Calvo-Solano
Olman Varela Durán
Jaime Valverde Rojas.
UN-Environment technical support
Coordinated by Ruth Martinez, UN Environment

2019

Introduction

This Expert Consultation Workshop is carried out within the framework of the formulation of the project called "Ecosystem-Based Adaptation(AbE)and Transformational Measures to Increase Climate Change Resilience in the Dry Corridor of Central America and the Arid Zones of the Dominican Republic."

This regional project responds to the request of the Ministers of Environment of Central America and the Dominican Republic, grouped through the Central American Commission on Environment and Development (CCAD) of the Central American Integration System (SICA). This formulation of the expanded Green Climate Fund (GCF) proposal is being technically led by UN-Environment with funding from the Central American Bank for Economic Integration (BCIE) and CCAD support.

The impacts of climate change caused by rising temperatures, droughts and extreme rainfall threaten the livelihoods of vulnerable communities in the Central American Dry Corridor and in the Arid Zones of the Republic Dominican. Water supply is especially at risk.

This project proposes to address these impacts at the landscape and home level in priority basins by promoting: (i) Ecosystem-based adaptation(AbE)through ecosystem restoration and agroforestry systems; and (ii)) water-efficient technologies in communities. To this end, it is proposed: (i) capacity building for local governments, financial institutions and communities; (ii)the development of loans and microfinance for AbE activities and small green businesses; and (iii)the integration of AbE into policies and incentive creation.

1.1. Pre-coordination of the workshop

There was preparatory work before this workshop could be successfully carried out. First of all, it should be noted that this event is based on the results of the events organized by UN Environment in 2016, where large priority geographical areas for the project were identified. In the case of El Salvador, as a result of this process, the departments of San Miguel, Usulután, La Unión, Ahuachapán, Santa Ana, Morazán were prioritized as the preliminary areas of action of the project; these areas were chosen on the basis of criteria of:

Exposure to the impact of extreme phenomena (particularly droughts) linked to the climate. Vulnerability to the impact of these phenomena, which is basically determined by three types of factors:

environmental conditions, mainly deforestation and soil degradation linked to the poverty of affected households.

Economic, depending on how much the livelihoods of populations are affected.

Considering this previous work, and that the formulation proposal plans to work at the basin level, the focal point of the project (Dr. Jorge Quezada) was requested to define and communicate one or more basins of interest within the prioritized area, for the work of Characterization. In this case the basin of the Rio Grande de San Miguel was defined by its high vulnerability, as found in paragraph 3. Based on this, the advisory team collected basic information available from secondary sources in this basin, which is developed in paragraph 3 below.

In addition, as part of the previous organization of the workshop, it was indicated that a space could be available for technical presentations relevant and complementary to the information to be synthesized by the consultants. In this case, additional presentations by the Ings were available. Nelson Saz and Guillermo Cornejo, officials of the Ministry of Environment and Natural Resources (MARN) (See Annex 6.1: Agenda).

1.2. Objectives and participants

This event was held on March 19, 2019 in the city of San Salvador, El Salvador. The objective of the workshop was (i) to present the project to key government technicians and(ii)to advance the process of characterization of the project intervention basin (Rio Grande de San Miguel basin), through the analysis starting information and consultation with national experts.

Within the framework of this event and in line with its objectives, it had the participation of 19 government technicians from the country (see detailed list of participants in Annex 2: List of Participants), as well as with the focal point of the project in El Salvador, Dr. Jorge Quezada. Mr. Raúl Artiga, a regional liaison for this project in CCAD, was also involved. On the part of UN Environment, Dr. Ruth Martínez, Senior Specialist in Adaptation of the Regional Office of Latin America and the Caribbean, participated, with the technical support of Dr. Olman Varela and the M.Sc. Jaime Valverde, of Cultures and Development in Central America (CUDECA).

During the preparatory work, the following profiles of the participating officials were requested:

Personnel related to water management, drought, water commissioners, watershed management and/or representatives of the agricultural sector.
Personnel of protected areas, conservation and natural resources.
Personnel related to the management and territorial planning, community management of water or part of the Institutes of Rural Development.

It was emphasized that all participating technicians had knowledge of territorial dynamics. This workshop included a total of 24 participants, of which 19 national participants represent the environmental and agricultural sectors (see Annex 6.2 List of participants).

1.3. Working methodology

The workshop was organized in three sessions (see Annex 6.1: Agenda):

Introductory session:

In this session, attendees were given prior information on the project proposal and processed information on the Rio Grande basin of San Miguel was presented, namely:

Socio-economic information such as productive activities, demographics, poverty.
Biophysical features such as land use, wood cover.
Vulnerability information such as exposure to drought and extreme rains.

Expert consultation session on the estimated vulnerability: In a second session, three groups were worked on. According to Worksheet 1 (Annex 6.3), all workshop attendees were divided into three groups according to their profile (referred to in section 1.2). The groups discussed key questions to obtain information for each of the dimensions detailed

in this instrument, namely: a. Impact of climate change, b. Ecosystem degradation, c. Adaptive capacity.

Expert consultation session on the relevance of the basin: Two random working groups were formed; one group discussed a series of questions focused on representativeness, complementarity with other initiatives, and another group focused on the importance financial institutions, natural resource governance, and social organizations in the basin of interest. The questions and criteria used in this session can be seen in Worksheet 2 (see Annex 6.4).

The discussions initiated during the workshop will continue after the process, through bilateral meetings, if any of the experts deem it necessary, in order to be able to further deepen the information gathered and provided.

Introductory session

The workshop began with a few words from Dr. Jorge Quezada del MARN, the national focal point of the project, who mentioned how this proposal relates to local initiatives, highlighting in particular the importance of the Decade of Restoration, El Salvador and approved by the U.N. in 2019.

Also, Dr. Quezada made an extensive presentation in which he highlighted El Salvador's National Ecosystem and Landscape Restoration Program (PREP) as a starting point. He also emphasized the country's priority restoration sites, which include the San Miguel River basin.

Dr Ruth Martinez, Senior Specialist in Adaptation at UNEnvironment, then outlined the background and phase in which the project is currently located. In addition, he explained how the project integrates the Ecosystem-Based Adaptation (AbE) approach, and how it strengthens capacity building and finance. It also emphasized the importance of this workshop and how it is part of the efforts of this regional proposal with a view to eligible for Green Climate Fund (GCF) funds through a conceptual note that has already been invited to be developed as an expanded proposal.

Mr. Raúl Artiga of CCAD, for his part, initially thanked the Government of El Salvador for its availability and interest in this project. Mr Artigas set out the general context in which CCAD is involved in this proposal, as well as mentioned some background to the process of drawing up the conceptual note submitted to the FVC. In addition, in the framework of this introductory session, he stressed the importance of addressing the issue of climate change and the Central American Dry Corridor in a project that also seeks to minimize the negative impacts of natural events that occur more frequency in the region.

Finally, engineers Nelson Saz and Guillermo Cornejo of MARN presented a detailed description of the San Miguel River Basin and other associated tributaries. The main physical aspects were presented through descriptive maps on soil types, precipitation, drought, vulnerability, hydrology, among others. Both stressed the importance of working in this basin considering the climate impacts that have been occurring in recent years and that have effects on the availability of water and affecting agriculture in communities.

Characterization of the Rio Grande basin of San Miguel

El Salvador, has ten hydrographic regions: Lempa, Paz, Dirty Face-San Pedro, Grande de Sonsonate-Banderas, Mandinga-Comalapa, Jiboa-Estero de Jaltepeque, Bahía de Jiquilisco, Grande de San Miguel, Sirama and Goascorán (National Plan for Integrated Water Resource Management of El Salvador (PNGIRH), Ministry of Environment and Natural Resources [MARN], 2017b).

As Table 1 shows, the Rio Grande basin of San Miguel ranks third in extension, after the Lempa and Goascorán river basin, respectively (MARN, 2017b), with a total area of 2396.70 km². The population projected to 2010 in the basin was one million people (Magaña and Sagner, 2005).

Table 1
El Salvador's hydrographic regions and values of national and shared extension

Hydrographic Region	Total area (km ²)	Area in El Salvador (km ²)	Area in Honduras (km ²)	Area in Guatemala (km ²)
Lempa	17935,50	10200,93	5180,40	2554,17
Goascorán	2455,14	1082,56	1372,58	-
Great St. Michael's	2396,70	2396,70	-	-
Peace	2163,89	893,95	-	1269,94
Jiboa-Estero de Jaltepeque	1638,85	1638,85	-	-
Mandinga-Comalapa	1302,91	1302,91	-	-
Sirama	1064,30	1064,30	-	-
Jiquilisco Bay	916,79	916,79	-	-
Grande de Sonsonate-Banderas	769,17	769,17	-	-
DirtyFace-St. Peter's	768,69	768,69	-	-
Total	31411,94	21034,85	6552,98	3824,11

Fuente: MARN (2017b).

The Rio Grande basin of San Miguel is located in the eastern part of the country. It is born near the canton Joya Grande, at an elevation of 600 meters above sea level, and is called Agua Zarca (Magaña y Sagner, 2005). It drains directly into Jiquilisco Bay, in the Pacific Ocean. The basin of the Rio Grande de San Miguel has the length of the longest channel (137 km), with an average slope of 12.5%, and average elevation of 279.6 meters(op.cit.).

A representation of the hydrographic regions of El Salvador is found in Figure 1, where the basin of the Rio Grande de San Miguel is appreciated in greater detail.



Figure 1. El Salvador Hydrographic Regions
Fuente: MARN (2017b).

The region is divided into three climatic zones: hot tropical savannah, hot tropical savannah and tropical climate of height (Magaña and Sagner, 2005). Throughout the territory associated with the Basin, temperatures range from 17°C to 37°C. Figure 2 shows the behavior of drought at the national level, where you can see in red that the territories associated with the Rio Grande Basin of San Miguel are located in the area of the country that presents a greater vulnerability to drought.



Figure 2: Map of Drought in El Salvador in 2003.
Fuente: MARN (2017b).

On the other hand, the San Miguel River Basin is located in a flood risk zone of approximately 4450 km² of area, which puts on alert about 1240 settlements, representing a population of 28,000 people (MARN, 2017). Of these settlements, 438 are at high risk, putting 14,500 people (op.cit.) in vulnerable condition. In the territories associated with the basin of interest, some 9,000 hectares of cultivation have been considered potentially vulnerable to flooding.

On the other hand, the contribution and precipitation in the Rio Grande basin of San Miguel, is as follows:

Table 2

Area, contribution and precipitation in the Rio Grande basin of San Miguel

Basin	Area (Km ²)	Contribution (m ³ /year)	Accumulated annual precipitation (mm)
San Miguel's Rio Grande	2396,70	1267,50	1689,91

Fuente: MARN (2017b).

According to the data in Table 2, precipitation values are within the national annual cumulative (2203 mm) and can be considered normal (MARN, 2017b). However, it has been shown that along the Rio Grande basin of San Miguel there are approximately 15 km that cross areas of high risk of drought in which both water and precipitation contribution is

insufficient for ensure crop yields, affecting the food security of the area's population (Calvo-Solano et al., 2018).

The Rio Grande Basin of San Miguel encompasses the departments of Usulután, Morazán, San Miguel and La Unión. On a finer scale, the detail of the municipalities that crosses the Rio Grande San Miguel Basin is shown below:

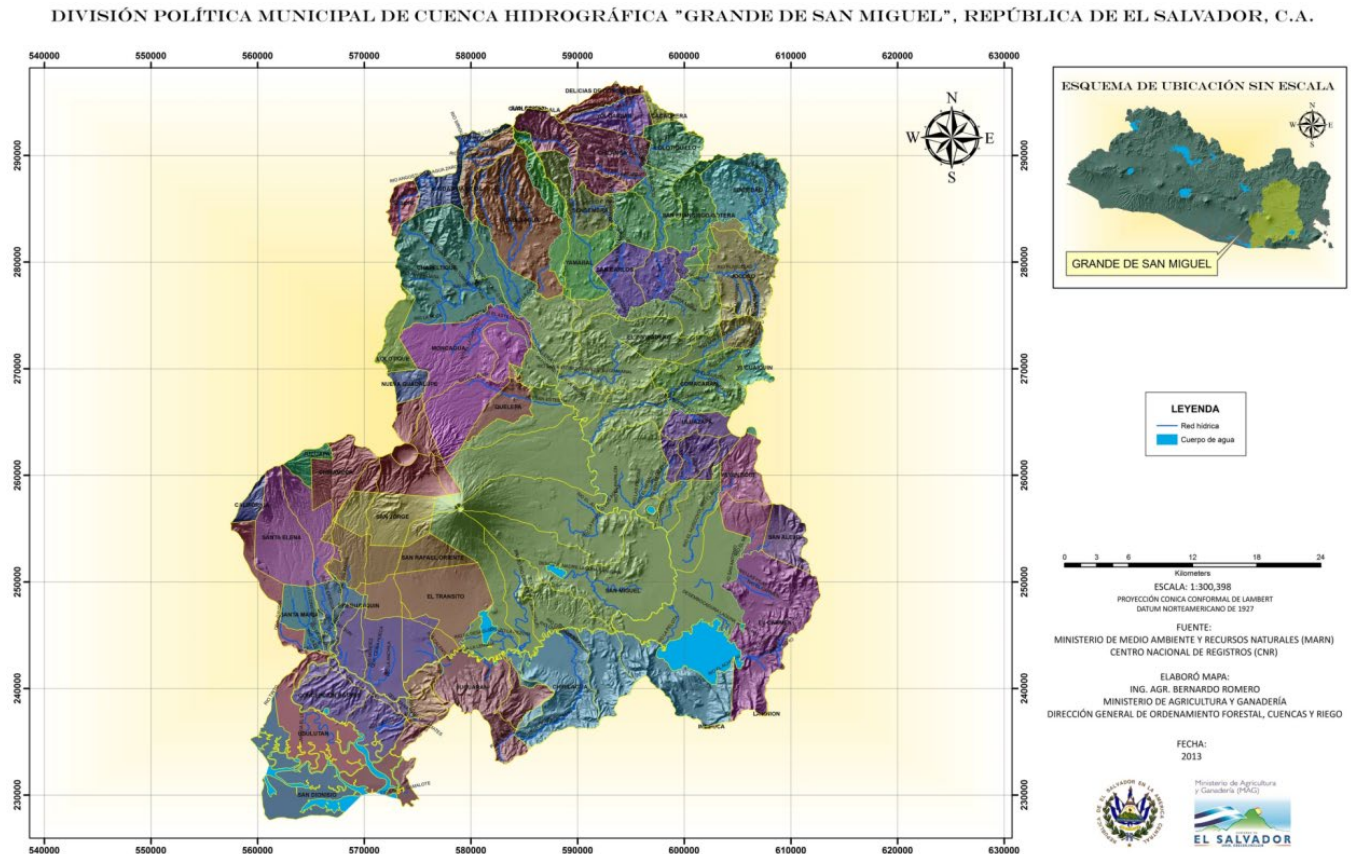


Figure 3: Municipalities covered by the Rio Grande basin of San Miguel.
Fuente: MARN (2013).

The list of departments and municipalities shown in Figure 3 can be seen in the annex:
Figure 4 shows the multidimensional poverty¹² by department of El Salvador:

¹² The Multidimensional Poverty Index (MPI) is the product of the poverty incidence rate and the poverty intensity rate. For more details, see STPP and DIGESTYC (2015).

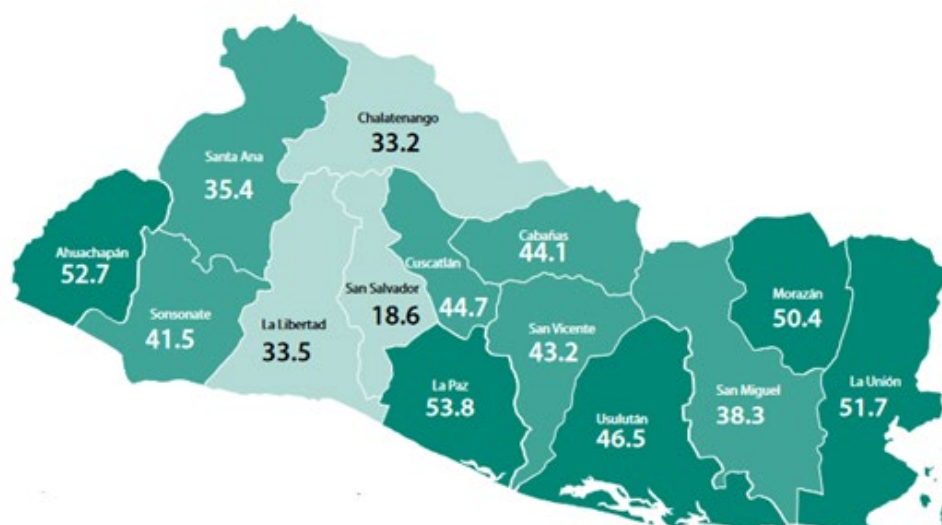


Figure 4. Incidence of multidimensional poverty by department (expressed as a percentage of households).

Source: STPP and DIGESTYC (2015).

As can be seen in Figure 4, the incidence of multidimensional poverty in the main departments in the San Miguel River basin has the Department of San Miguel with 38.3% and the department of Morazán with 50.4%, The Union with 51.7% and Usulután with 46.5%, with an average of 47% being higher than the national average of 34% (STPP and DIGESTYC, 2015).

Group Work Results

4.1 Current and potential impact of climate change

4.1.1 Impacts of climate change in San Miguel's Rio Grande

In the middle basin of the Rio Grande de San Miguel there is a reduction in flows in dry season, up to 60% less than the estimated average rainfall, according to the participants

In general terms it can be indicated that there are no long-standing records (no wide series) of precipitation. There are hydrometeorological stations that have been given continuity (there is a station with robust data in San Miguel).

There are two very important lagoons for the Rio Grande basin of San Miguel. They are flood buffer zones and storage for the dry area. Both present the biggest erosion problems in the area and are very vulnerable to climate change. The lagoons are the scene of problems between farmers and fishermen.

Likewise, both the Ministry of Environment and Natural Resources (MARN) and the Ministry of Agriculture and Livestock (MAG) are technically well prepared in general terms on this subject but not at the territory level, farmers know climate change for its production

activities, which are very strongly linked to assistance. There is a lack of rapprochement between non-governmental organizations (NGOs) and the government in the territories.

As for the implementation of existing policies on climate change adaptation, there are policies at the national level. The challenge is to provide resources to municipalities to carry out adaptation actions. In addition, institutional rapprochement at the territory level is generally poor.

4.1.2 Agricultural activities in the Rio Grande basin of San Miguel

At the level of the upper, middle and lower parts of the Rio Grande basin of San Miguel, the following information was obtained regarding Agricultural Activities:

Upper part: The upper part of the Rio Grande basin of San Miguel, which is a protection zone in the Cacahuatique mountain range, supplies water to almost all the municipalities of San Miguel and Morazán. There is a conflict of use in zones 6 and 7, where there are small producers of basic grains and small crops of irrigated vegetables. Also, in this area, there is an important production of coffee.

Middle part: In the middle part of the basin is small-scale livestock (in the areas of Chilanga, San Francisco, Jocoro, San Carlos, Comacarán, Divisadero, Chapeltique, Uluazapa, Sensembra, Guatajiagua).

Bottom: In the lower part is presented the production of cane (by agroindustries) due to the presence of large owners. It is an area vulnerable to flooding.

4.2. Ecosystem degradation

It is important to mention that the workshop participants indicated that the main causes of ecosystem degradation in the Rio Grande basin of San Miguel are intensive livestock farming, deforestation (the vision of seeing the tree only as a timber product and not as a provider of multiple ecosystem services), overexploited soils, low-lying monoculture pressure (e.g. cane), pressure on forest resources and flooding in the low basin.

In addition, although there is the technical capacity to implement conservation measures within local communities, participants indicated that another barrier to conservation is coordination and communication between institutions. The attendees proposed that solutions in this area must be built, through participatory processes that take into account the criteria of local knowledge.

In 32 municipalities in the Rio Grande basin of San Miguel, USD 7 million has been invested in adaptation strategies (including some of AbE). Examples of this are given at the level of genetic material, small infrastructure (dead barriers), soil conservation practices, etc. In this regard, a project of the National Center for Agricultural and Forestry Technology "Enrique Alvarez Córdova" (CENTA) is implemented.

In relation to adaptation strategies developed in the areas associated with the Rio Grande basin of San Miguel, the MAG has carried out interventions with water reservoirs for the production of vegetables. Also, MARN has been developing some projects; however, abE-related practices have been few, as participants mention that they depend on project intervention.

In addition, participants indicated that there are land-use conflicts and that there is an additional vulnerability because of the small size of the country, making it difficult to develop adaptive actions. This situation, together with the high population density, limits the possibility of having adaptation actions without being productive, while proposing productive landscapes to address this issue.

Private ownership is another factor that limits the development of these initiatives. This is because interventions depend on the will of the owners, who decide which actions are carried out and which are not.

4.3 Adaptive Capacity

The jobs that predominate in the region associated with the Rio Grande basin of San Miguel are agricultural. In addition, it is an area where there is income from remittances from abroad, which have an impact on family economies and complement their incomes.

Access to water use depends on the specific area where the property is located. There are higher areas that have greater access, as well as areas at medium heights with less access. Moreover, micro-irrigation is more common in the lower part of the basin.

In terms of technical assistance, local people have qualified support through government institutions. For example, Morazán has the MAG Training/Demonstrative Center (CEDAF), which provides technical assistance to visiting producers. It also happens in San Miguel and Santa Rosa de Lima, where the approach to technical assistance is oriented around livestock issues.

In addition, there are 10 CENTA agencies in Morazán, San Miguel, La Unión and Usulután, especially to provide technical assistance in basic grains. In this case, the emphasis revolves around the transfer of technology for resilience to climate change. There are CENTA extension agencies with 305 producers per group. These, work through organizational methodologies in small groups - demonstrative families, among others.

4.4 Complementarity with other initiatives

At the project level, in the Rio Grande basin of San Miguel the situation is as follows: The South Korean government spent \$8 million for the development and implementation of the national strategy and climate change regulations. This is a process in which 9 pilot municipalities participate in the San Miguel basin and which is dedicated to soil conservation and reforestation, as well as the development of institutional regulations.

In addition, it is necessary to highlight the following projects launched: Japanese cooperation funds (JICA) are available for wetland ecosystems (e.g. in Jocotal Lagoon and Olomega Lagoon). This is a budget managed by MARN.

Plantation Project: This project is given as part of the Bonn 2030 Challenge in different areas of interest. This initiative is also carried out by the MARN.

In Chilanga, Delicia and San Francisco Gotera operate other projects linked to reforestation, which are managed by the Environmental Investment Fund of El Salvador (FIAES). This fund has resources from MARN.

Other complementary initiatives in the territory associated with the Rio Grande basin of San Miguel are:

Watershed Agency Projects supported by the Spanish Cooperation (AECID).
Catholic Relief Services (CRS)-Cacao Alliance are developing productive projects.

4.5 Institutional and financial capacity at the local level / governance

Regarding the presence of financial options for adaptation actions in the Rio Grande basin of San Miguel the context is as follows:

There are presences of private banks, such as Banco Agrícola, Banco de Fomento, Banco Hipotecario, Banco City, Cuscatlán, Scotia, Atlantis and credit banks. The downside is that they all require guarantees that producers don't normally have.

Other financing access options include:

CREDICAMPO. It finances some small works. It has a management area similar to an NGO; they also provide production loans at a high cost.

Local Economic Development Agency (ADEL-AMC). They have a micro-financial called AMC. It handles productive loans and micro-enterprises under market conditions.

PADECOMPS. It uses the same system as ADEL.

AGRICULTURAL DEVELOPMENT BANK. They have specific lines of credit for production, but difficult to access. This indicates that if the financial conditions of the producers are limited, they are not subject to credit to this entity.

Linked to the financial issue, there is a problem of land tenure. The downside is that many of the producers are tenants, not landlords, which limits the use of the property as a loan guarantee. This is an important constraint as it refers to a structural problem – in substance – that restricts entrepreneurship and the management of new sustainable practices.

With regard to Institutionality, it should be noted that at the local level of San Miguel the main actors relevant to the theme of adaptation and water management are:

The communities of Municipalities (Association Chasparastique, Tepaca-Chinameca).
Salvadoran Foundation for Social Promotion and Economic Development (FUNSALPRODESE).

Ministry of Agriculture and Livestock (MAG).

Ministry of Health.

Water gaskets.

National Aqueduct and Sewerage Administration (ANDA).

Some private initiatives in the territory:

Association of Regantes (organized farmers for irrigation, who appoint a water judge).

Ramsar Local Committee.

Tecapa-San Miguel Advisory Committee (Works with Protected Natural Areas).

Ingenio Chaparastique (FUNDAZUCAR).

The network of young Orientals leads MAG projects (e.g. Rural Dawn, Eastern Prodemor) with an emphasis on the management of domestic water. There are also associative, productive, non-watering ventures and irrigation associations that provide in groups the maintenance of the irrigation gutter (they do not carry out other types of activities in association).

In the case of the commonwealths associated with the Rio Grande basin of San Miguel, the will of the mayors is fundamental to their foundation and existence. There are commonwealths in the area of influence of San Miguel (MANORSAN), and others such as the Association of municipalities Chaparrastique and Micsur. It is important to mention that, at present, a key factor in making the commonwealths active is the resources of the Initiative Fund of the Americas (FIAES-AID). On the other hand, there are no local coordination spaces.

Final Considerations and Conclusion

Following the workshop, in relation to the process of formulating the ecosystem-based adaptation and transformational measures to increase climate change resilience in the Dry Corridor of Central America, the arid areas of the The Dominican Republic draws the following conclusions for the formulation of the complete proposal:

Despite extensive information in the country at the national level (see annexes), there is little specific documentation available online about San Miguel's Rio Grande basin.

El Salvador has a wide range of projects and institutions in the field of Adaptation to Climate Change and Integrated Water Resource Management at the national level; however, the work of organizations and commonwealths needs to be made more useful in the proposal.

There is a wide variety of geospatial information that should be used by decision makers for the proposal to generate the best climate change adaptation strategies.

Finally, this workshop was useful to identify key players in the Rio Grande basin of San Miguel, to learn about the financial mechanisms available for adaptation actions, the biophysical context and their interrelationship with social conditions. The information gathered has served to fuel the feasibility study of the expanded proposal, as well as serves as the basis for next steps such as the analysis of lessons learned.

On this basis, key informants identified in this workshop will be contacted to collect specific data and information for use in the development of a vulnerability analysis and various feasibility studies of the project .

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University of El Salvador, Faculty of Agronomic Sciences, Map of Forest Coverage of El Salvador, 2012

Annexes

7.1. Agenda



Ecosystem-based adaptation and transformational measures to increase resilience to climate change in the Dry Corridor of Central America and the arid areas of the Dominican Republic"

Expert Meeting

Prioritization of intervention sites for the Project for the Proposal of the Central American Dry Corridor and Arid Areas of the Dominican Republic
AGENDA EL SALVADOR

Time	Activity	responsible
8:30 - 9:00 am.	Registration and presentation of participants	All
9:00 - 9:15 am	Welcome Words	Dr. Jorge Quezada National Technical Liaison View
9:15 - 9:25 am	Words alluding to the event by the Representative of CCAD	Mr. Raúl Artiga. CCAD Regional Liaison
9:25 - 9:40 am.	Presentation of the objectives of the meeting and agenda of the day.	Dr Ruth Martinez, UN Environment
9:40-10:10 am.	Presentation on the National Ecosystem and Landscape Restoration Program PREP	Dr. Jorge Quezada, MARN Technical Link
10:10 –10:30 used to create the superlative	Presentation of basic aspects of the Conceptual Note	Dr Ruth Martinez, UN Environment
10:30 - 10:40 used to create the superlative	Questions and clarifications.	
10:40-10:55 am	Coffee break	
10:55-11:25 am	Presentation characterization of pre-selected basins	Engineers Nelson Saz and Guillermo Cornejo, Specialists in Strategic Assessment and Watersheds View
11:25-11:35 am	Questions and clarifications	

11:35 – 12:00 md	Presentation of key information from pre-selected basins	Ing. Olman Varela, UN Environment Expert
12:00 – 1:00 pm	Lunch	
1:00 – 1:45 pm	Introduction to the methodology of the session I work in groups around: Current and potential impact of change Climate Ecosystem degradation Adaptive capacity	Dr Ruth Martinez, UN Environment
		All
1:45- 2:30 pm	Introduction to the methodology of the session I work in groups around: Representativeness Complementarity with other initiatives Financial aspects Institutional capacity at the local level	Dr Ruth Martinez, UN Environment All
2:30 - 3:30 pm	Coffee break and closing	

7.2. List of participants

El Salvador 19 March 2019	Francisco Antonio Rodríguez Vásquez	DGSV	francisco.roriguez@mag.gob.sv
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	Olman Varela Durán	CUDECA	olman.varelad@gmail.com

7.3. Group Worksheet 1

Dimension/workgroup	Criteria	Orientating Questions by Basin	Basin San Miguel
---------------------	----------	--------------------------------	------------------

What are the agricultural activities in the territory?

What forestry and agroforestry activities are present in the territory?

Current and potential impact of climate change

Availability of ecosystem services

With regard to drought characterization (current and projected)
What's the trend?
What studies, data or evidence are there?

What are the information gaps?/Key contacts

Are there experiences of Ecosystem-Based Adaptation basins?

Dimension/workgroup	Criteria	Guiding questions
---------------------	----------	-------------------

Ecosystem degradation

Remaining ecosystems.

Degradation processes.

Consequences of ecosystem degradation

What are the barriers to conservation regarding:
Knowledge and understanding of the impacts of climate change among decision makers
Implementation of existing policies on climate change adaptation
Technical capacity to implement adaptation measures within local communities and institutions

What are the causes and consequences of degradation?

What adaptation actions are performed in the area?

Adaptive capacity	Basic needs: percentage of poor households	What types of employment predominate in the region?
		What is the situation regarding access by villagers in water use?
	Access to water	Do villagers have access to technical assistance?/What kind of assistance? What percentage of crops in the territory use artificial irrigation? What kind?

7.4. Group Worksheet 2

Dimension	Criteria	Guiding questions
Opportunity	National representation	Which institutions are present in the area, mechanisms, especially to manage water and other key resources for adaptation?
	Complementarity with other initiatives	Which local organizations (Development Associations, Cooperatives, ASADAS, Commonwealths, etc.) have a presence in the area?.
Institutional capacity at the local level	Financial aspects	What are the main financial organizations?
	Governance	What is the level of presence and strength of key players such as community organizations, ASADAS, etc. ?

7.5. Photo Summary

The photographs below show the process carried out in this workshop.



Source: Own photographs (2019).

7.6. Country-level overview

7.6.1. Poverty

With regard to poverty in El Salvador, it is divided into extreme and relative poverty (GWP, 2016). This classification is carried out by means of the Basic Food Basket (CBA). For 2014, at the urban level the CBA had a cost of approximately \$50 per person; whereas, this was worth around \$31 per person in rural areas. The Global Water Partnership (GWP) (2016) indicates that at the urban level approximately 6% of the population is in extreme poverty and, in rural areas, about 11% are in the same situation. It should be noted that these households are unable to cover the cost per person of the CBA.

On the other hand, households in relative poverty are those that fail to cover the cost of the expanded CBA twice per person. According to EHPM-2014, by 2014 23% of the urban population was in this condition while, in rural areas this value reached 27% (GWP, 2016).

7.6.2. Economic activities

With regard to economic activities, in El Salvador the Economically Active Population (PEA) is considered from the age of 16 and that by 2014, it comprised 44.4% of the national population (GWP, 2016). For the same year, the unemployment rate comprised about 7% and also highlights the fact that in 2014, there was an illiteracy rate of 10.9% (op.cit).

With regard to income distribution, the GWP (2016) indicates that by 2014 the Gini coefficient¹³ had been showing a trend towards decline and stands at XX. This behavior is associated with the implementation of social programs, specifically in the areas of education, health and agriculture.

7.6.3. Land use

According to land use in El Salvador, it is currently classified into five levels according to marn (2017b) namely:

Table 3
Land-use occupancy levels in El Salvador

Occupancy level	Type of Use
Level 1 (ArtificialTerritories)	Urbanized areas
	Industrial or commercial areas and communication networks
	Mines, decombreras and construction sites
	Artificial green areas, non-agricultural
	Annual crops

¹³ The Gini Index or Coefficient is an economic measure used to calculate income inequality between citizens of a territory (Montero, 2019).

Occupancy level	Type of Use
Level 2 (Agricultural Territories occupying the largest in the country)	Permanent crops
	Pastures
	Heterogeneous agricultural areas
Level 3 (Forests and Semi-Natural Media)	Forests
	Media with bushy and/or herbaceous vegetation
	Open spaces, without or with little vegetation
Level 4 (WetZones)	Indoor wetlands
	Maritime wetlands
Level 5 (Water Bodies)	Inland waters
	Seawaters

Fuente: (MARN, 2017b).

The main land use in El Salvador is agriculture (MARN, 2017b). Throughout the country, crops of fruit trees, sugar cane, pineapple, coffee, basic grains, vegetables, bananas, bananas and other permanent crops are predominant, as well as other annual crops associated with permanent ones. Currently, the main farmed crops in El Salvador are maize, beans, sorgo, fruits, vegetables and vegetables. These foods are the food base of Salvadoran society and are currently in a condition of vulnerability to drought that predominates in the Dry Corridor (MARN, 2017b; Calvo-Solano et al, 2018)

A broader perspective on land use distribution in El Salvador is provided by MARN (2017b) below:

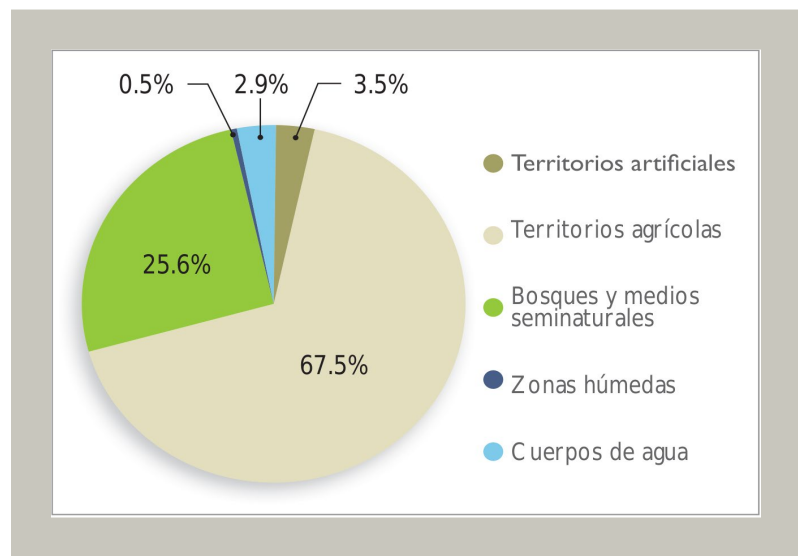


Figure 7. Distribution of Land Use in El Salvador.

Fuente: MARN (2017b).

It is interesting to note that the amount of territory dedicated to agricultural use and, in addition, even more interesting than the second place of land use in El Salvador is occupied by forests and semi-natural means. A more didactic way to appreciate land use in El Salvador is by image disuse the map. A very appropriate version of this use, shown below:

7.6.4. Forest cover

With regard to forest cover in El Salvador, its distribution can be seen in the following figure:

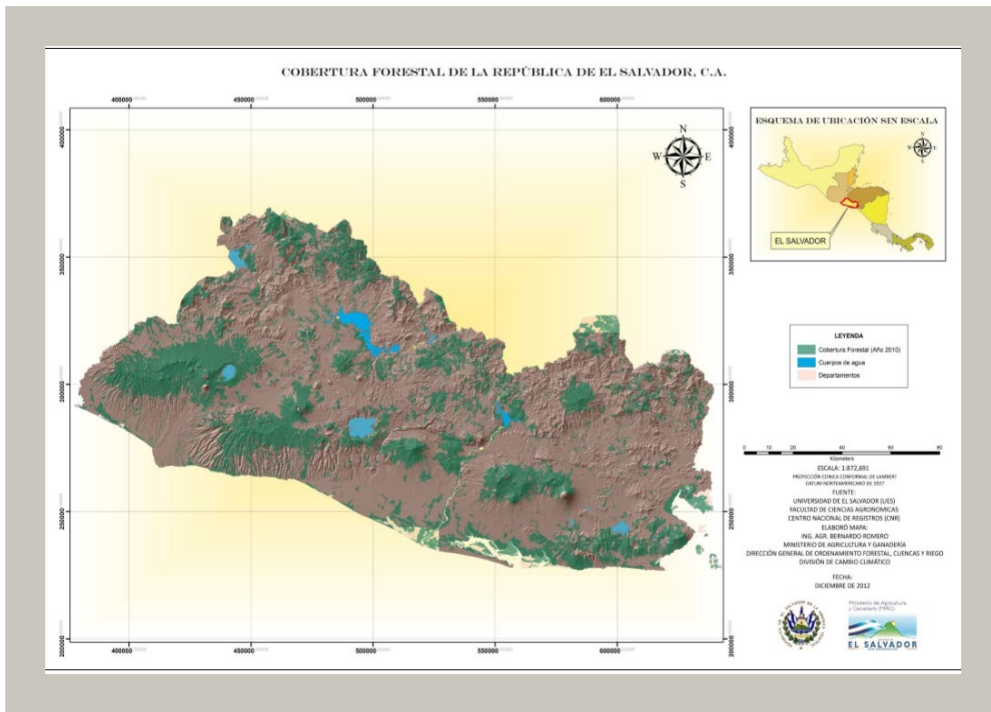


Figure 6: Forest cover of the Republic of El Salvador.
Source: University of El Salvador, Faculty of Agronomic Sciences (2012).

From Figure 6 it can be seen that the remnants of forests in El Salvador are located in the upper parts that are basically areas of aquifer recharge and are under protection. Most forest resources are latifoliated forests and account for 15% of the total area. (University of El Salvador, 2012).

7.6.5. Water governance

On this point, in El Salvador, this issue focuses on the institutionalality that promotes this Water Security. In addition, they also highlight the efforts, which have been made through the Central American Fund and the Dominican Republic of Drinking Water and Sanitation (FOCARD-APS) that seeks to develop water links throughout the region (GWP, 2016). It is also noted that within the large number of institutional plans in El Salvador, the aim is to significantly improve the network of aqueducts and sewers in the Metropolitan Area of San Salvador (AMSS) (GWP, 2016). It is important to mention that no information on Basin and

Microbasin Councils was found in secondary sources. In addition, no information on Water Boards or Water User Companies was found in basins of interest that cover water safety at a local level.

7.6.6. Vulnerability

In relation to vulnerability, it is key to emphasize El Salvador's climate modulators. Calvo-Solano et al.(2018) indicate that the El Niño-Southern Oscillation (ENOS) phenomenon significantly influences the climate variability of the country and the region, but is nonetheless not the only one. climate processes that occur in the Caribbean affect the precipitation of the Pacific Coast of the Central American region. For example, the phenomena of El Niño and La Niña and the Low-Level Jet Stream of the Caribbean (CLLJ) strong or weak, during the rainy season are related to low intensity or high intensity rains in the CSC. The behavior of these climate modulators favors that at certain times non-periodic, and therefore El Salvador are vulnerable to agricultural, hydrological and socioeconomic droughts in the dry corridor (Calvo-Solano et al., 2018). In addition, it should be mentioned that not only El Salvador, but also the basins of the Grande rivers of San Miguel and Goascorán, are prone to flooding.

Part of the drought present in El Salvador can be explained by means of the canicle, which consists of a period in which there is a considerable decrease in precipitation between the months of July and August (Maldonado, Rutgersson, Alfaro, Amador and Claremar,2016).

7.7.7. Food Safety

With regard to Food Safety, the Famine Early Warning Systems Network (FEWS NET) (2006) indicates that consumption patterns in the Salvadoran population vary considerably across the country. It is clearly marked that, many of the differences in this aspect lie in the amount of income that the inhabitants receive and that, there is a clear variation between the urban and rural populations. For example, in urban areas, wheat and rice are key foods (FEWS NET, 2006). An approach to these consumption patterns at the national level is as follows:

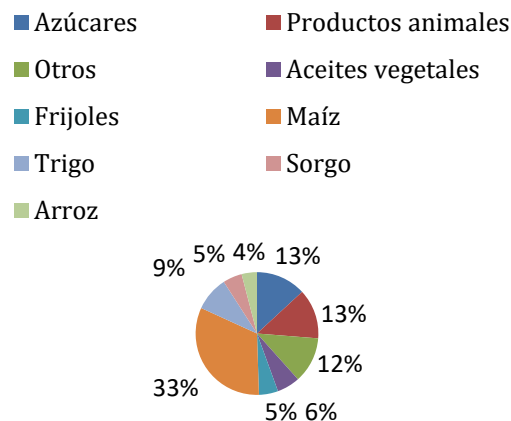


Figure 7. Patterns of food consumption in El Salvador.
Source: FEWS NET (2006).

From the figure above it can be seen, that about half of the Salvadoran diet consists of cereals, highlighting in greater quantity corn, wheat, sorgo and rice. Also, the consumption of sweets and sugars and animal products stands out secondly.

7.6.8. Migration

Generally speaking, adverse weather conditions in the Central American Dry Corridor negatively affect food and nutrition security through decreased local food production and reduced availability of opportunities for food work; this results in a precarious employment and increase in unemployment, as noted in the research report called Food security and emigration (PMA, 2017).

Under this characterization we can find a first relationship between the conditions of the Dry Corridor and migration, since the pre-eminence of poverty and unemployment are the most widespread causes of migration (the State of the Region documents 2016). Precisely the limited economic and social development have been in recent decades one of the main reasons for migration of people in the region.

Climate adversity and its effect on agriculture leads to a sharp deterioration in the quality of life of individuals and their families. This emigration of people has resulted in family members who remain able to go through a period of problems aggravated by not being able to meet their food needs as they lose a provider, which added to high levels of indebtedness complicates the situation. The combination of such situations with other scenarios is leading to situations of greater vulnerability of individuals and families in the Central American Dry Corridor.

7.6.9. Urbanization

On the subject of urbanization, the Multiple Purpose Household Survey (EHPM-2014) (GWP, 2016) indicates that about 62% of the population lives in the urban area; while approximately 38% are made up of rural population. A more visible approach can be seen below:

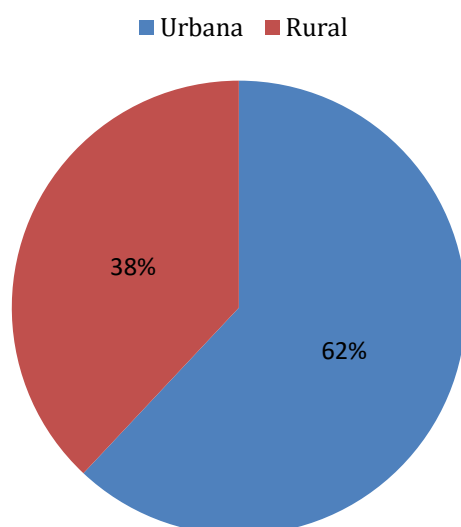


Figure 8. Percentages of urban and rural urbanization in El Salvador.
Fuente: GWP (2016).

Annex 7.8 Information at the basin of interest level

Table 4
Municipalities covered by the Rio Grande basin of San Miguel

Department	Municipality
Usulután	California
	Batres Concepcion
	Ereguayquín
	Jucuapa
	Jucuarán
	San Dionisio
	Santa Elena
	Santa Maria
	Usulután
San Miguel	City Neighborhoods
	Comacarán
	Chapeltique
	Chinameca
	Chirilagua
	The Transit
	Lolotique
	Moncagua
	New Guadalupe
	Quelepa
	San Jorge
	San Miguel
	San Rafael Oriente
	Sesori
Morazán	Uluazapa
	Cacaopera
	Chilanga
	Concepción Delights
	The Currency
	Guatajiagua
	Jocoro
	Lolotiquillo
	San Carlos

Department	Municipality
	San Francisco Gotera
	St. Simon
	Sensembra
	Society
	Yamabal
	Yoloaiquin
The Union	El Carmen
	San Alejo
	Yayantique
	Yacuaiquín

Source: Own elaboration (2019) based in Magaña and Saguer (2005).

Nicaragua



**Ecosystem-Based Adaptation Proposal and Transformational Measures
to increase climate change resilience in the Central American Dry Corridor
and the arid areas of the Dominican Republic.**

Workshop Memory– Somoto, Nicaragua, 27 February 2019.

Performed by:

Oscar David Calvo-Solano

Olman Varela Durán

Jaime Valverde Rojas.

UN-Environment technical support

Coordinated by Ruth Martinez, UN Environment

2019

1. INTRODUCTION

This Expert Consultation Workshop is carried out within the framework of the formulation of the project called "Ecosystem-Based Adaptation (AbE) and Transformational Measures to Increase Climate Change Resilience in the Dry Corridor of Central America and Arids of the Dominican Republic".

This regional project responds to the request of the Ministers of Environment of Central America and the Dominican Republic, grouped through the Central American Commission on Environment and Development (CCAD) of the Central American Integration System (SICA). This formulation of the expanded Green Climate Fund (GCF) proposal is being technically led by UN-Environment with funding from the Central American Bank for Economic Integration (BCIE) and CCAD support.

The impacts of climate change caused by rising temperatures, droughts and extreme rainfall threaten the livelihoods of vulnerable communities in the Central American Dry Corridor and in the Arid Zones of the Republic Dominican. Water supply is especially at risk.

This project proposes to address these impacts at the landscape and home level in priority basins by promoting: (i) Ecosystem-based adaptation (AbE) through ecosystem restoration and agroforestry systems; and (ii) water-efficient technologies in communities. To this end, it is proposed: (i) capacity building for local governments, financial institutions and communities; (ii) the development of loans and microfinance for AbE activities and small green businesses; and (iii) the integration of AbE into policies and incentive creation.

Pre-workshop coordination

This project in formulation will work at the basin level. There were meetings of the advisory team with Dr. Joaquin Milan, technical liaison of this project for the country, in which the need to pre-select basins to be characterized for further work was communicated. It was emphasized that to preselect the site, it was considered:

- a) Exposure to the impact of extreme events (particularly droughts).
- b) Vulnerability to the impact of such phenomena.

Based on various technical supplies from the country, Dr. Milan reported that the basin selected for this work was the Alta del Río Coco basin. Based on this, the advisory team collected information on the basin, which is developed in paragraph 3. In addition, as part of the workshop organization, it was indicated that a space could be available for technical presentations relevant and complementary to the information to be presented. In this case, there was a presentation of the technical link of the project.

1.2. Objectives and participants

This workshop was held on February 27, 2019 in the city of Somoto, Madriz Department, Nicaragua.

The objective of the workshop was (i) to present the project to key government technicians and (ii) to advance the process of characterization of the project intervention basin

(Coco River High **Basin**), through the analysis of information and consultation with national experts.

Within the framework of this event and in line with its objectives, 32 municipal and central government technicians were present (see detailed list of participants in Annex 2: List of Participants), as well as the focal point of the project in Nicaragua, Dr. José Milan and the Mayor of Somoto, Ms. Dania Martínez.

Mr. Salvador Nieto, Secretary General of CCAD and Mr. Raúl Artiga, also participated in the regional liaison for this project in CCAD. On the part of UN Environment, Dr. Ruth Martínez, Senior Specialist in Adaptation of the Regional Office of Latin America and the Caribbean and with the technical support of Olman Varela, Cultures and Development in Central America (CUDECA), participated.

During the preparatory work, the following profiles of the participating officials were requested:

Personnel related to water management, drought, water commissioners, watershed management and/or representatives of the agricultural sector.

Personnel of protected areas, conservation and natural resources.

Personnel related to the management and territorial planning, community management of water or part of the Institutes of Rural Development.

It was emphasized that all participating technicians had knowledge of territorial dynamics. This workshop included a total of 32 participants, representing the environmental, agricultural sectors at the municipal level and the central government (see Annex 7.2: List of Participants).

1.3 Working methodology

The workshop was organized in three sessions (see Annex 7.1: Agenda):

a. **Introductory Session:** In this session, attendees were given prior information on the project proposal and processed information on the upper Coco River basin was presented:

Socioeconomic information such as productive activities, demographics, poverty, urbanization, migration.

Biophysical features such as land use, wood cover, flow data.

Vulnerability information such as exposure to extreme events, water security, food security, among others.

b. **Expert consultation session on the estimated vulnerability:** In a second session, three groups were worked on. According to Worksheet 1 (Annex 7.3), all national workshop assistants were divided into three groups according to their profile (referred to in section 1.2). The working groups were moderated by the UN-Environment technical team. They discussed key questions to obtain information for each of the dimensions detailed in this instrument, namely: a. Impact of climate change, b. Ecosystem degradation, c. Adaptive capacity.

c. **Expert consultation session on the relevance of the basin:** Two random working groups were formed; one group discussed a series of questions focused on representativeness, complementarity with other initiatives, and another group focused on financial institutions, governance of natural resources and relevant social organizations in

the basin of interest. The questions and criteria used in this session can be seen in Worksheet 2 (see Annex 7.4).

The talks initiated during the workshop will continue after the process, through bilateral meetings, if any of the experts deem it necessary, in order to be able to further deepen the information collected and provided.

2. INTRODUCTORY SESSION

The mayor of Somoto, Ms. Dania Martínez gave the welcome and opening of the workshop mentioning the importance of capturing water eyes by local governments since 2014 and the need for education and awareness of citizens for the execution of projects.

Mr. Salvador Nieto, Secretary General of CCAD, initially thanked the Government of Nicaragua for its readiness and interest in this project. Mr Nieto set out the general context in which CCAD is involved in this proposal, as well as mentioned some background to the process of drafting the concept paper submitted to the Green Climate Fund. At the end of his speech, he stressed the importance of addressing the issue of climate change and the Central American dry corridor in a project that also helps minimize the negative impacts of the increasingly followed natural events in the region.

On the part of the Government of Nicaragua, Dr. José Antonio Milán mentioned that the new basin nomenclature in Nicaragua, from now on, the Upper Coco River Basin is referred to as a project intervention area. This basin (formerly called Macuelizo) includes 8 hydrological units. He also mentioned that no municipality is outside this project at this time.

Dr Ruth Martinez, Senior Specialist in Adaptation at UN-Environment, outlined the background and phase in which the project is currently located. In addition, he explained in detail the Ecosystem-Based Adaptation (AbE) approach and how it is articulated in this project; it also emphasized the importance of this workshop and how it is part of the efforts of this regional proposal with a view to opting for the Green Climate Funds (VCF).

3.CHARACTERIZATION OF THE UPPER COCO RIVER BASIN



Figure 1. Map of Nicaraguan Watersheds
Source: National Dry Forest Alliance (2011).

The Coco River basin corresponds to number 45 of the map, in the area bordering Honduras.

Table 1
Municipalities of the upper Coco River basin

Municipality	Total area of the municipality (Km ²)	Area of the municipality in the basin (km ²)	Percentage of municipality in the basin (%)
Macuelizo	259,6	234,5	90,3
Santa Maria	158,5	1,2	0,8
Dipilto	104,6	26,4	25,2
Ocotol	86,5	55,5	64,2
The Savannas	68,2	65,7	96,2
San Lucas	154,2	134,9	87,5

Tototalpa	148,9	62,7	42,1
San José de Cusmapa	129,9	16,4	12,6
Somoto	465,6	341,3	73,3
New People	204,4	1,2	0,6
Yalagüina	71,0	2,5	3,5
San Juan de Limay	436,5	0,7	0,2
Total	2.288,0	942,9	

Source: MARENA. General features of the territory of intervention for the Central American Dry Corridor project. Somoto, 2019. Presentation by Dr. José Milan.

As shown in Table 1, along the upper basin of the Coco River are 12 municipalities covering a total area of 2288 Km², of which 942.9 Km² are directly part of the basin, being the municipalities of Las sabanas and I smash those who have a larger area within it.

3.1 Physical description of the Coco River Upper Basin

The Upper Basin of Río Coco is located in the north of Nicaragua, between the departments of Madriz and Las Segovias. It is one of the areas in the country where the lack of water is most critical. The area suffers from prolonged periods of drought that put the food security of the peasant families living in it at risk.

In Figure 2, you can see graphically the Upper Basin of the Coco River:

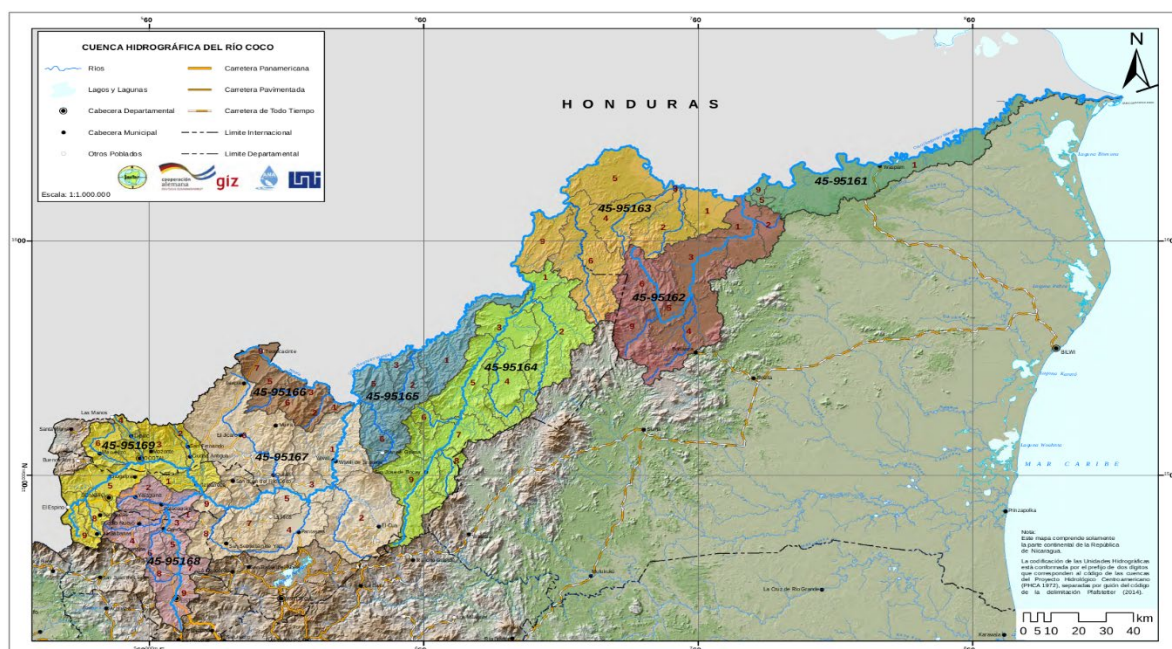


Figure 2. Geographic units in the Upper Coco River Basin.

Source: Nicaraguan watersheds under the Pfafstetter methodology, INETER-GiZ (2014).

3.2. Poverty

With regard to poverty in the departments covered by the Upper Coco River Basin, the following are observed:

Table 2 Poverty in the Upper Coco River Basin

Department	Municipality	Population	Families	Percentage of Extreme Poverty (%)
Madriz	Somoto	12.538	2.075	30,1
	Tototalpa	7.339	1.090	53,7
	San José de Cusmapa	5.037	800	64,6
	San Lucas	7.718	1.258	52,2
	The Savannas	2.015	301	39,4
New Segovia	Jalapa	23.791	4.033	36,2
	Santa Maria	2.252	368	44,1
	Dipilto	2.347	395	35,5
	Macuelizo	3.280	551	46,5
	Ocotol	9.134	1.654	21,4

Source: Dumazert and Orozco (2017).

There are important differences with regard to poverty between municipalities due to economic and social activities. And in most it exceeds the national average which is considered at 23.5% according to the Nicaraguan Foundation for Economic and Social Development (Funides) in 2018 data.

3.3 Economic activities

Agriculture is the main economic activity of the department of Madriz, in which there are essential crops for export purposes such as tobacco in the Municipality of Somoto, as well as the cultivation of henequén and coffee in the Municipality of San Juan del Río Coco and to a lesser extent in Telpaneca and Las Sabanas. The basic grains of self-consumption (beans, corn and sorgho) are also important. A smaller percentage of the population is engaged in livestock activity. (Dumazert and Orozco, 2017)

3.4 Forest Cover and Land Use

Bushy vegetation (42%) and grass (24%) cover most of the territory; being the first possibly vestiges of deforestation in the basin and that could not be recovered over time or agricultural land that were left at rest because they had lost their fertility.

Grasslands reflect the level of intervention of extensive livestock farming in the region. In relation to forest cover was found 17.5% distributed in the different categories present in the basin as they are: dense latifoliado forest (1.6%), ralo latifoliado forest (7.4%), dense conifer forest (5.4%) and ralo conifer forest (3%) (Milan, 2019).

On the other hand, a graphical representation of land use in the Upper Coco River Basin is shown in Figure 3:

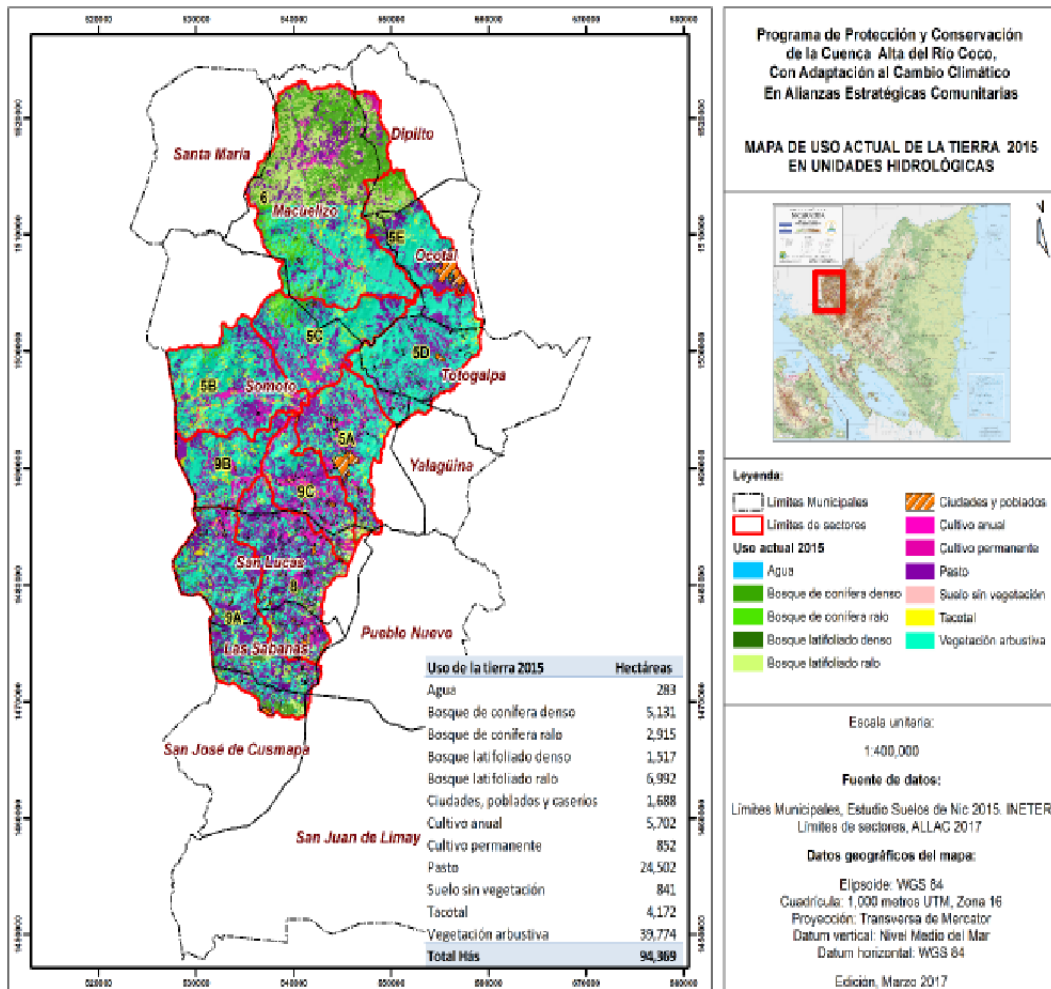


Figure 3. Land use in the Upper Coco River Basin.
Source: Nicaraguan Institute for Territorial Studies (INETER) (2017).

In general, soils in the Upper Coco River Basin have restrictions on agricultural use. However, the population and resource utilization pattern indicates that about 53% are used for agricultural purposes and 38% for livestock activities. The cultivation of basic grains is the main agricultural activity, and is concentrated mostly on farms smaller than five apples. In practice, although some technical criteria classify soils as forestry, they are used for agricultural purposes and no radical changes in this trend can be foreseen.

3.5 Water safety

The area of high water recharge of the Upper Coco River Basin is estimated at 24,816 Ha which represents 26% of the basin. Medium-level water recharge areas correspond to 40,165 Ha, and account for 66% of the basin's total. (Dumazert and Orozco, 2017)

3.7 Urbanization

Dumazert and Orozco (2017) indicate that the average population density for that year was 88 inhabitants per square kilometer (higher than the national average for the date it was 47 inhabitants per square kilometer).

A representation of population density at the top of the Coco River basin is as follows:

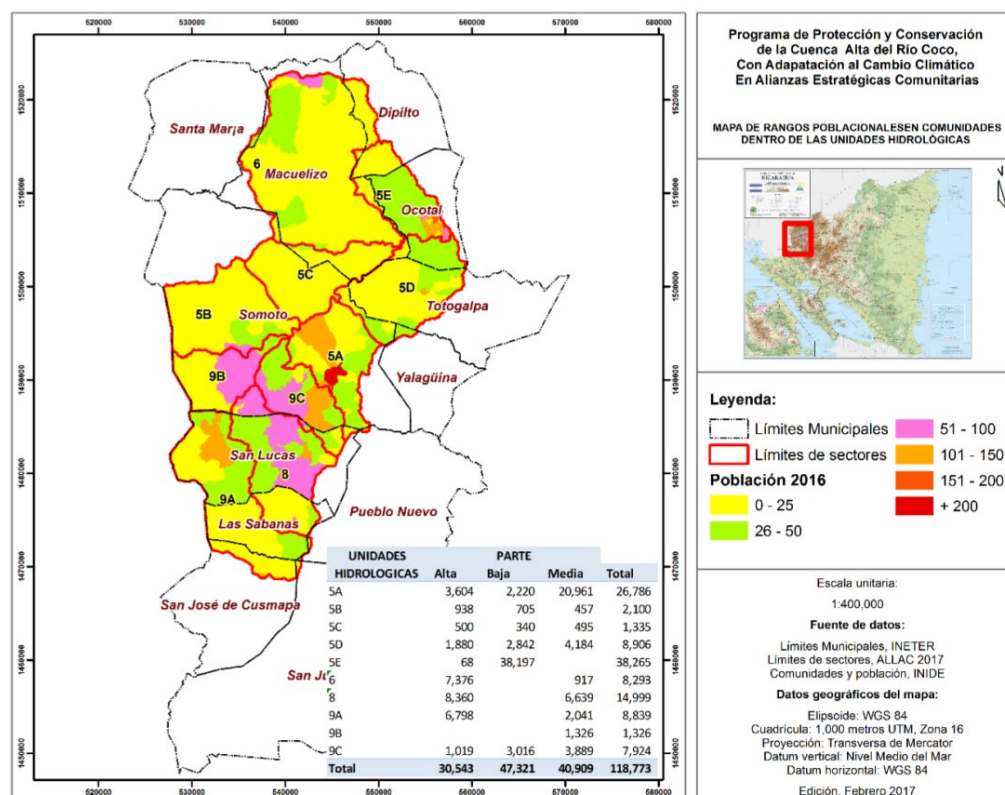


Figure 4. Population density in the upper part of the Coco River basin.
Source: Dumazert and Orozco (2017).

The most populated areas are composed of those units where the urban centers of the city of Somoto, San Lucas and surrounding areas are located. In the hottest areas of the valleys, a consolidated latifundista property has remained over the years since the 1930s of the previous century; in addition, they are areas of extensive livestock and therefore the population is dispersed (op.cit.).

4. RESULTS OF GROUP WORK

This section proceeds to systematize the results-results of the work in groups related to: (i) Impacts of climate change, (ii) ecosystem degradation and, (iii) adaptive capacity in the Upper Coco River Basin.

The overall results of the discussions are presented below:

4.1 Current impact of climate change

As for climate variability, the main affectation is suffered by farmers for their planting and harvesting seasons, due to the alteration in the early rainy season.

The waters are deepening due to excessive erosion, extreme rainfall variability and excessive logging mainly in the Jalapa area. In the municipality of Macuelizo, participants indicate that there is a large water deficit. In 2015 the Macuelizo River dried up. There are limited sources of water, wells that have dried and surface sources have changed their flow. In Telpaneca (middle part of the basin) 70% of communities found in the dry area. Rivers dry more frequently and there are fewer water reservoirs.

There is evidence that the attack of pests and diseases is a consequence of climate variability. Climate change has been attributed to the rust attack on coffee cultivation. As a result, some producers diversified maize and beans. Producers in communities have linked the weevil to climate change. This causes poor performance. There is also evidence that some wild trees have altered flowering phenology and that oaks no longer dump leaves completely. So, then there is less pollination due to deforestation.

As for information gaps on climate change, weather stations are needed to keep precipitation records. There is collected information that is not available electronically.

4.2 Ecosystem-Based Adaptation Experiences:

With SUSCIS, bioengineering works have been done on the degraded basin of Macuelizo. Grey work has been replaced with bamboo, vetiver (grass) and reforestation actions. The Cooperative April 8 in Macuelizo, Ocotlán with 20 members has planted more than 150 thousand trees. There is more institutionality now to support environmental issues, risk management, etc.

Some mayoral and project initiatives have led to certain AbE practices such as: living fences, living barriers, conservation works in high places, and other AbE-compatible actions, such as school talks and water harvesting experiences for agriculture and construction of cisterns for rainwater harvesting.

Telpaneca is developing a United Nations Development Programme (UNDP) project on drought-resistant coffee varieties. In Totogalpa and Telpaneca there is also an Aid in Action project to try to improve water production (demonstrative plots, Agroforestry Systems [SAF], water collection works) and covers 6 communities.

4.3 Ecosystem degradation

In Telpaneca there is culture of logging, brushing and burning in the dry area (70% of the territory), forest fires occur for this reason. There are small mountain areas where you are recovering and there are fire campaigns. 30% of the area associated with the basin is semi-humid and is moving from forest to coffee (for example: at the water reserve level, the agricultural frontier continues to grow). In Dipilto there was a change of use of forest soil for coffee. At first it is not appreciated that they are felling for coffee.

In Macuelizo there are many large producers (more than 100 mz) and, there are also informal land loan schemes of large and small on the condition that they clean the land (roughing and burning).

There is a presence of agro-forestry activities in the basin, although there is also a lack of habit and awareness towards this productive activity.

MARENA can give permission for controlled burns with guidelines, but to evade the process large producers have that land lease scheme in lease.

In Jalapa there are bad practices: Pollution by indiscriminate logging and high use of tobacco and excessive changes in land use.

On the other hand, they consider the significant amount of mini-unfundios to be a limitation to conservation actions due to their large quantity. At the other end, they also mention that latifundios with extensive livestock generate environmental degradation problems that need to be addressed.

Participants did not consider technical capacity as a problem, but emphasized resources for implementation and also the need for concrete and long-term actions.

On the degradation of ecosystems mentioned that pine, coniferous and latifoliated forests are located in the upper part of the basins and tacotals and weaks in the lower parts. It is important to mention the Tepesomoto la Pataste Reserve as a reservoir of ecosystems. Mitigation and adaptation measures are taken in municipalities, through ordinances, environmental laws, decrees and sanctions. In transitional ecosystems there is the affectation of the use of firewood (energy forests and coal production).

In addition, the participants mentioned some adaptation actions carried out in the municipalities. These are:

Promotion of rational use of water.

Alternative crops.

Measurements in impact areas: Planting of resistant varieties.

Comprehensive conservation projects.

A number of consequences of degradation were noted such as species loss, river sediment trawling, damage to surface sources, sand extraction from rivers, water scarcity for human and animal consumption. This lack has been one of the reasons why producers have migrated to areas with greater water availability.

It was also indicated, as one of the main barriers, the lack of territorial planning, the high demand for resources and the fact that some projects did not directly address the underlying problems.

4.4 Adaptive capacity.

The working table considered the Water Committees to be a strength in the area; indicated that they work on the traceability of the water resource and mentioned this as an advantage because it has a strong weight by law. They also mentioned the Community Response Brigades and the Health Brigadier Network as strengthened entities.

Participants mentioned that by law, mayors contribute 7.5% of their budget for water and sanitation and 5% for environmental activities. They also referred to NICAVIDA, a water, water and sanitation harvests programme, Food Safety and reforestation and cooperatives working on water taps and reservoir construction, finally highlighted NICADATA working in the management of the honey waters of coffee.

4.5. Complementarity with other initiatives

SCOS implements actions within the framework of a Community management programme of the Dipilto River in coordination with MARENA, INETER, Mayor of Ocotil and Dipilto. This project ends later this year and its activities are water capacity building, environmental education in schools, training of promoters, mitigation works and multi-threat brigades.

In Ocotil, there is a community management program of the Dipilto River basin. Investment plans are made for the lower part of the basin, biofilter, eco-stoves, fruit planting and rainwater collection. There is a Basin Committee within the municipality with a comprehensive management formulation plan.

In Jalapa, they do not have any programs but have a budget of 5% for a forestry nursery for small producers (a share of plants is given to producers and the producer is monitored for planting). Sawmills in the area must plant 30,000 trees in the cutting areas.

In Telpaneca, with external cooperation funds for mitigation, actions are carried out in water harvesting, cistern, collection piles, water reservoirs, model plots, soil conservation works, agricultural improvements. UCOM is the Municipal Concertation Unit and works on improving water systems, consumption and involves the mitigation and capture of water and improvement of deforested areas to improve the water quality of families. The Help in Action project in 2018 is a pilot project with a 10-year trial period, with initiative from the same community in reforestation issues, radio schools, water collection tanks in the middle and lower upper part of the Quebrada Grande basin. There are also reforestation plans with the National Forestry Institute (INAFOR) to take advantage of the forest but also mitigate through replanting.

In Tototalpa there is a municipal seedling donation initiative. In the Cuje region, a nursery was established with funds from the National Institute of Vocational Training (INFOP) to produce 4,000 seedlings for the development of reforestation activities in nine counties.

Dipilto is a Community management programme of SDUS with priority actions in the upper part of the¹⁴ basin: with coffee producers, biofilters are developed to benefit wet, training, demonstration plots for basin conservation works, adaptation strategies, improved farm plans, rainwater harvesting. With livestock producers, silvopastoral systems are being promoted; with forest producers, regeneration and energy forests. In infrastructure, water systems have been rehabilitated. In risk management, brigade equipment has been given. Also, 7 telemetric stations and a limnometric (goes directly to INETER) have been installed. INTA is introducing alternative crops, municipal nursery production for water committees, forest fire logistics and environmental education.

In Lahuila there is ONGAGUA which is a Spanish Non-Governmental Organization (NGO) that works on the improvement, strengthening and legalization of water systems. FIDER (national organization) also works on improving forest cover and establishing energy forests.

In Macuelizo, COSUDE works with initiatives related to the water resource. Work is underway on water for the urban area. INTA works with plant breeding and a bank of Creole seeds and promotes soil conservation works in plots.

The Municipality of Las Sabanas is supporting potato and strawberry producers on the sustainable use of water. Coffee Cooperatives work on some sustainable actions (by international standards), for example the Cooperative June 5 and other small cooperatives.

In Santa Maria, SOLDE has local water working initiatives in the urban area, palm, water by electric pumping, water harvesting and tilapia production. The mayorality provides 5% control of forest fires, forest seedlings and fruit trees for vulnerable communities.

In Macuelizo, Santa María and Mozonte NICAVIDA with financing for producers for sustainable planting. In Las Sabanas, the Americas-Nicaragua Foundation supports family garden programs focused on food security with donations. Also, this includes donations to radio schools for rainwater harvesting.

As part of the iterative process of delimitation of this project, it is important to review the lessons learned from the project "Protection and Conservation of the High Basins of the Coco River with Adaptation to Climate Change in Community Strategic Alliances" with the European Union (EU), as it worked on adaptation issues in the basin. In addition, it is suggested to consider data from the Information Unit of the Upper Coco River Basin.

4.6. Institutional capacity at the local level

There is non-specific funding for sustainable actions in the basin by the Ministry of Family, Community, Cooperative and Association Economy - MEFCCA. and Production Bank (Banpro).

Participants referred to institutional diversity in the area and indicated the institutions and organizations that constitute the main actors of governance related to natural resources and adaptation:

In the mayors' streets, the Environment Units (UMA).

At the community level, the Drinking Water Committees and the Family, Community and Life Cabinets.

The state institutions with presence in the territory are: The Ministry of Environment and Natural Resources (MARENA), the Nicaraguan Institute of Municipal Development (INIFOM), the National Forestry Institute (INAFOR), the Ministry of Family Economy, Cooperative and Association (MEFCCA), the Institute of Animal and Plant Protection and Health (IPSA), the Nicaraguan Agricultural Technology Institute (INTA), the Ministry of Agriculture and Livestock (MAG), the Nicaraguan Agricultural Aqueducts and Sewers (ENACAL), the Ministry of Health (MINSAL), the Ministry of Education (MINED), the National Police, the Institute for Human Promotion (INPRHU), the fire brigades, the Development of Inclusive Education in Nicaragua (PRODEIN).

Although they are not part of the actors of national territorial governance, the financing of management-related projects makes it relevant to mention international cooperation agencies present in the area. For example, SSUMP was mentioned as a relevant actor.

Among the civil society actors that were considered important by the participants at the table are the Nicaraguan Communal Movement, the Central Multi-Service Cooperatives R.L.(Prodecoop)and the National Union of Farmers (UNAG), all with presence in the area through their local affiliates. Other actors are: the Cooperative Reina del Café, the Cooperativa Agropecuaria Corcazán, the Union of Agricultural Cooperatives (UCA), the Radiofonia Foundation, the NGO Agua para la Vida, the Nicaraguan American Foundation (ANF) , the Northern Producers Association (APRODER), the Forest Cooperatives Central (CECOFOR), the Wildong (USA Foundation), the Peasant Federation (FEDICAMP), Aid in Action and community health networks. Churches were also mentioned with territorial actions such as the Lutheran Church Faith and Hope of Nicaragua, and Catholic Relief Services that promotes a climate change resilience program.

Other initiatives with an impact on the territory were mentioned: the twinning with the cities of Fougères and Champigny in France and with the city of Boulder in the state of Colorado in the USA, water and Sanitation that performs ONGAWA¹⁵, UCAFE, Magic hands working with pine needle, ADEPROFOCA with coffee and the International Center for Tropical Agriculture (CIAT) with water harvest.

It is very important to note that there are territories and indigenous communities organized in Cusmapa, San Lucas, Totogalpa and Telpaneca. These communities, in their entirety, have property titles duly registered in the Land Registry, with internal regulations of territorial governance and natural resources and their management rights are covered by the standards international rights recognized by the Nicaraguan State.

5. FINAL CONSIDERATIONS AND CONCLUSION

The following are the main final considerations and conclusions drawn and made with respect to this workshop:

There are already projects in the middle and lower basin of the Coco River, which allows opportunities for new initiatives and complement with the rest of actions along the Basin.

The experience and participation of mayors, as well as their willingness to participate in initiatives related to climate change adaptation, should be leveraged.

This workshop was useful to identify key players in the upper Rio Coco basin, learn about financial mechanisms available for adaptation actions, biophysical context and their interrelationship with social conditions.

On this basis, key informants identified in this workshop will be contacted to expand specific data to be used in vulnerability analysis and feasibility studies of the Ecosystem-Based Adaptation and Transformational Measures project to increase resilience to climate change in the Dry Corridor of Central America and the arid areas of the Dominican Republic.

¹⁵ Since 2015, ONGAWA, Engineering for Human Development, leads the PARAGUA Initiative, an alliance of Nicaraguan organizations and Spanish NGOs to improve water and sanitation coverage and quality in rural areas of the country, protect and manage recharging areas, and strengthen local and national organizations involved in the exercise of water and sanitation rights. The initiative will improve the situation of more than 20,000 people and is supported by the Spanish Agency for International Cooperation for Development (AECID).

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7. ANNEXES

7.1. Agenda



**ADAPTATION BASED ON ECOSYSTEMS AND TRANSFORMATIONAL MEASURES
TO INCREASE RESILIENCE TO CLIMATE CHANGE IN THE DRY CORREDOR OF
CENTRAL AMERICA THE ARID AREAS OF THE DOMINICAN REPUBLIC**
Expert consultation workshop, Somoto, Nicaragua
February 27, 2019
WORK PROGRAMME

8:30-9:00	Introduction	
8:30-8:45	Words of welcome Presentation of participants	Dr. José Antonio Milan, MARENA
8:45 -9: 00	Presentation of workshop objectives and methodology	Dr Ruth Martinez, UN Environment
9:00 -10:15	SESSION I: PRESENTATION OF THE INITIATIVE	
9:00-9:15	Problem of the Dry Corridor in a Central American perspective.	Raúl Artigas, CCAD
9:15-9:30	Presentation of the project	Dr Ruth Martinez, UN Environment
9:30-9:45	Presentation on the Upper Coco River Basin and its characteristics.	Dr. José Antonio Milán Pérez, representative of the Ministry of Environment and Natural Resources (MARENA)
9:45-10:00	Presentation Additional information on resilience to climate change in the Upper Coco River Basin	Ing. Olman Varela, UN Environment Expert
10:00-10:15	Questions	
10:15-10:30	<i>Coffee break</i>	
10:30-12:30	SESSION II: CONSULT EXPERTS -VULNERABILITY	
10:30-10:40	Introduction to the methodology of the session	Dr Ruth Martinez, UN Environment
10:40-12:00	Group work around: Current and potential impact of climate change Ecosystem degradation Adaptive capacity	Ing. Olman Varela, UN Environment Expert Dr Ruth Martinez, UN Environment
12:00-12:30	Plenary: presentation of results	
12:30-1:30	<i>Lunch</i>	
1:30-3:15	SESSION III: CONSULT EXPERTS - RELEVANCY	
1:30-1:40	Introduction to the methodology of the session	Dr Ruth Martinez, UN Environment
1:40-2:50	Group work around: Representativeness Complementarity with other initiatives Institutional capacity at the local level/Governance	Ing. Olman Varela, UN Environment Expert Dr Ruth Martinez, UN Environment

2:50-3:45	<p>Dialogue in plenary to identify key aspects in the area:</p> <ul style="list-style-type: none"> a. Identify the specific areas where the project will be developed b. Possible activities to be developed according to the characteristics of the area (agro-ecological-productive – and cultural characteristics of the area) c. More relevant sources of information at the national and regional level / documents other than those already available. 	
3:45-4:00	Summary information of the Upper Coco River Basin (by municipality)	
4:00- 4:15	Next steps	
4:15	Closure and coffee	

7.2. List of participants

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7.3 Worksheet 1

Dimension/workgroup	Criteria	Guiding questions
<i>Current and potential impact of climate change</i>	<i>Availability of ecosystem services</i>	<i>Agricultural activities</i> <i>Presence of agro-forestry</i> <i>Forestry activities</i> <i>Other</i> <i>Drought characterization (current and projected)</i> <i>What's the trend?</i> <i>What studies/data/evidence does it exist?</i> <i>What are the information gaps?</i> <i>There are experiences in Ecosystem-Based Adaptation?</i>
Dimension/workgroup	Criteria	Guiding questions
Ecosystem degradation	Remaining ecosystems. Degradation processes. Consequences of ecosystem degradation	What are the barriers to conservation ? Knowledge and understanding of the impacts of climate change among decision makers Implementation of existing policies on climate change adaptation Technical capacity to implement adaptation measures within local communities and institutions Causes and consequences of degradation? What adaptation actions are performed in the area?
Dimension/workgroup	Criteria	Guiding questions
Adaptive capacity	Basic needs: percentage of poor households Access to water (see attached sheet)	What types of employment predominate in the region? What is the situation regarding access in the use of water by the inhabitants? Do villagers have access to technical assistance? What percentage of crops in the territory use artificial irrigation?

7.4 Worksheet 2

Dimension	Criteria	Upper Coco River Basin	Key topics
Institutionality and associativity at the local level	Governance: Institutional		Institutions present in the area, mechanisms, especially to manage water and other key resources for adaptation.
	Asociatividad		Development associations, cooperatives, roasts, commonwealths, etc. Presence and strength of key players such as community organizations, ASADAS, etc.
2	Financial aspects		Presence and strength of financial organizations Producers' strength/weaknesses to finance adaptation activities
2.Oportunidad/ Sinergias	Complementarity with other initiatives		Existence of complementary initiatives. Existing overlapping initiatives or duplication of efforts.

7.5. Photo Summary



Source: Own photographs (2019).

7.6 Overview at the country level

7.6.1 Migration

Generally speaking, adverse weather conditions in the Central American Dry Corridor negatively affect food and nutrition security through decreased local food production and reduced availability of opportunities for food which generates a precarious employment and increase in unemployment, as noted in the Research report called Food Security and Emigration (WFP, 2017).

Under this characterization we can find a first relationship between the conditions of the Dry Corridor and migration, since the pre-eminence of poverty and unemployment are the most widespread causes of migration (documents the State of the Region 2016). In recent decades, limited economic and social development has been one of the main reasons for migration of people in the region.

Climate adversity and its effect on agriculture leads to a sharp deterioration in the quality of life of individuals and their families. This emigration of people has resulted in family members who remain able to go through a period of problems aggravated by not being able to meet their food needs as they lose a provider, which, coupled with high levels of

indebtedness, Situation. The combination of such situations with other scenarios is leading to situations of greater vulnerability of individuals and families in the Central American Dry Corridor.

7.6.2 Survey conducted

The participants in the tables also assessed the situation of the municipalities of the basin. From now on, some of them:

Table 3
Situation of the municipality of Dipilto

Variables	Valuation			
	Criticism	Very serious	grave	Less serious
Rural poverty			X	
Advance of deforestation			x	
Drought risk			x	
Food security			x	
Soil status				x

Source: Own elaboration (2019).

On this municipality, the participants indicated that most of the land is private and that the main land uses are annual crops and forest. The communities most affected by climate change are Dipilto, Nuevo San Agustín, El Zapotillo and El Horno.

Table 4
Situation of the municipality of Jalapa

Variables	Valuation			
	Criticism	Very serious	grave	Less serious
Rural poverty				x
Advance of deforestation	x			
Drought risk			x	
Food security				x
Soil status	x			

Source: Own elaboration (2019).

In Jalapa, annual crops and forest were also indicated as main uses. The priority communities due to being the most affected by climate change are: Grapes, Mercedes, Santa Barbara, Sacateras, Nuevo Amanecer, Champinic, San José Lirios, Campo Hermoso, San Judas, Santa Cruz, and La Estancia. For participants, most of the land is privately managed.

Table 5
Situation of the municipality of Ocotlán

Variables	Valuation			
	Criticism	Very serious	grave	Less serious
Rural poverty	X			
Advance of deforestation	X			
Drought risk			x	
Food security	X			
Soil status	x			

Source: Own elaboration (2019).

In Ocotil, participants considered the municipal governance of lands and the forest cover of the municipality relevant. They listed as the communities most affected by climate change, the following: Barrio Roberto Gomes, Nuevo Amanecer, Pueblos Unidos, Quebrantadero and Teodoro López.

A reality can be seen, based on participants' perceptions, with levels between critical and severe for strategic variables (poverty, deforestation, drought, food security and soil status). This situation tends to be repeated and aggravated throughout the basin.

Table 6
Situation of the municipality of San Lucas

Variables	Valuation			
	Criticism	Very serious	grave	Less serious
Rural poverty			X	
Advance of deforestation			X	
Drought risk		X		
Food security	X			
Soil status		X		

Source: Own elaboration (2019).

In San Lucas the most affected communities are: Miquilse, Malpaso, Las Lajitas, Matazano, La Manzana, Chichicaste, El Volcán, El Cedro and La Playa. It is important to mention that in this municipality there are indigenous territories.

Table 7
Situation of the municipality of Las Sabanas

Variables	Valuation			
	Criticism	Very serious	grave	Less serious
Rural poverty			X	
Advance of deforestation			X	
Drought risk	X			
Food security			X	
Soil status		X		

Source: Own elaboration (2019).

In order of priority the most affected communities in La Sabana municipality are: Cruce, Buena Vista, El Castillito, El Ciprés and Villa **Esperanza**.

Private, municipal and protection lands predominate here. With a vocation of varied use such as fallow, pastures and perennial and annual crops.

Table 8
Situation of the municipality of Macuelizo

Variables	Valuation			
	Criticism	Very serious	grave	Less serious
Rural poverty		X		
Advance of deforestation			X	
Drought risk		X		
Food security			X	
Soil status		X		

Source: Own elaboration (2019).

The most vulnerable communities are: AlcayanTables, Amatillo, Arrayanes, Zurzular and Loma Larga. Private land predominates here and use is in annual and perennial crops as well as forests.

Table 9
Situation of the municipality of Totogalpa

Variables	Valuation			
	Criticism	Very serious	grave	Less serious
Rural poverty				X
Advance of deforestation			X	
Drought risk				X
Food security			X	
Soil status			X	

Source: Own elaboration (2019).

In terms of types of tenure, indigenous and municipal territories predominate. As well as the intensive use of pastures. The communities most affected by the drought are: Enoc Ortiz, Wascasony, El Cacao, San José and La Ceiba.

Table 10
Situation of the municipality of Santa Maria

Variables	Valuation			
	Criticism	Very serious	grave	Less serious
Rural poverty				X
Advance of deforestation			X	
Drought risk			x	
Food security				X
Soil status			X	

Source: Own elaboration (2019).

In this municipality the most affected communities are: Hatos, Calpoles, Guayabal, Las Minas and Tule. Predominantly private property and activities of fibecho and forests.

Table 11
Situation of the municipality of San José de Cusmapa

Variables	Valuation			
	Criticism	Very serious	grave	Less serious
Rural poverty			X	
Advance of deforestation			X	
Drought risk	X			
Food security			X	X
Soil status		X		

Source: Own elaboration (2019).

In this municipality predominates annual crops and forests and there are indigenous lands. The communities most affected by climate change are: El Rodeo, La Fuente, Mojón, Llanitos and Urbano.

Table 12
Situation of the municipality of Somoto

Variables	Valuation
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	Criticism	Very serious	grave	Less serious
Rural poverty			X	
Advance of deforestation			X	
Drought risk		X		
Food security			X	
Soil status			X	

Source: Own elaboration (2019).

In Somoto, pastures, pastures and forests predominate. As well as private tenure. The communities most affected by climate change are: Motoce, La Unión, Santa Isabel, La Carbonara and San José de Icolape.

Costa Rica



Ecosystem-Based Adaptation Proposal and Transformational Measures
to increase climate change resilience in the Central American Dry Corridor
and the arid areas of the Dominican Republic.

Workshop Memory – Guanacaste, Costa Rica, February 12, 2019.

Performed by:
Oscar David Calvo-Solano
Olman Varela Durán
Jaime Valverde Rojas.
UN-Environment technical support
Coordinated by Ruth Martinez, UN Environment

2019

Introduction

1.1. Context

This Expert Consultation Workshop is carried out within the framework of the formulation of the project called "Ecosystem-Based Adaptation (AbE) and Transformational Measures to Increase Climate Change Resilience in the Dry Corridor of Central America and Arids of the Dominican Republic".

This project responds to the request of the Ministers of Environment of Central America and the Dominican Republic, grouped through the Central American Commission on Environment and Development (CCAD) of the Central American Integration System (SICA). The present formulation of the expanded green climate fund (GCF) proposal is being technically led by UN-Environment with the support of the Central American Bank for Economic Integration (BCIE) and the support of CCAD.

The impacts of climate change caused by rising temperatures, droughts and extreme rainfall threaten the livelihoods of vulnerable communities in the Central American Dry Corridor and in the Arid Zones of the Republic Dominican. Water supply is especially at risk.

This project proposes to address this type of impact at the landscape and home level in priority basins by promoting: (i) Ecosystem-based adaptation (AbE) through ecosystem restoration and agroforestry systems; and (ii) water-efficient technologies in communities. To this end, it is proposed: (i) capacity building for local governments, financial institutions and communities; (ii) the development of loans and microfinance for AbE activities and small green businesses; and (iii) the integration of AbE into policies and incentive creation.

1.2. Pre-coordination of the workshops

There was preparatory work before this workshop could be successfully carried out. First of all, it should be noted that this event is based on the results of the workshops organized by UN Environment in 2016, where large priority geographical areas for the project were identified. In the case of Costa Rica, as a result of this workshop in 2016, the province of Guanacaste was identified as the preliminary area of action of the project; these areas were chosen founding criteria of:

Exposure to the impact of extreme phenomena (particularly droughts) linked to the climate. Vulnerability to the impact of these phenomena, which is basically determined by three types of factors:

environmental conditions, mainly deforestation and soil degradation linked to the poverty of affected households.

Economic, depending on how much the livelihoods of populations are affected.

Considering this previous work and the fact that the formulation proposal plans to work at the basin level, The Ing. Sonia Lobo, focal point of the project, proposed a pre-workshop to define the basins to be characterized in this project. This activity took place on January 10, 2019 in Cañas, Guanacaste. Eleven technicians from the Ministry of Environment and Energy participated, mostly from the province of Guanacaste. This workshop prioritized watersheds Abangares, Drinkers, Tempisque and Peninsulars of interest to this project.

Based on this, the advisory team collected basic information available from secondary sources in these basins, which is developed in paragraph 3 below.

1.3 Objectives and participants

The present workshop was held on February 12, 2019 in the city of Cañas, Guanacaste.

The objective of the workshop was (i) to present the project to key government technicians and (ii) to advance the process of characterization of the project intervention basins (Abangares, Bebedero, Peninsular and Tempisque), through the analysis of starting information and consulting experts.

Within the framework of this event and in line with its objectives, government technicians from the area were attended (see detailed list of participants in Annex 1), as well as with the focal point of the project in Costa Rica, Ing. Sonia Lobo. It was emphasized that all participating technicians were aware of the territorial dynamics, representing the conservation, agricultural sector and related to water resources.

Mr. Salvador Nieto, Executive Secretary of the Central American Commission on Environment and Development (CCAD) and Mr. Raúl Artiga, was attended by CCAD, c.-a.-regional liaison for this project. On the part of UN Environment, Dr. Ruth Martínez, Senior Specialist in Adaptation of the Regional Office of Latin America and the Caribbean, participated, with the technical support of Dr. Olman Varela and the coordinator of CUDECA, M.Sc. Jaime Valverde.

As part of the preparatory work, the profile of the participating officials was requested to meet the following requirements:

Personnel related to water management, drought, water commissioners, watershed management and/or representatives of the agricultural sector.

Personnel of protected areas, conservation and natural resources.

Personnel related to the management and territorial planning, community management of water or part of the Institutes of Rural Development.

Working methodology

The workshop was organized in three sessions (see agenda in Annex 6.1: Agenda) namely:

Introductory session: At this session, attendees were given prior information on the project proposal and processed information on the basins of interest was presented, namely:
Socio-economic information such as productive activities, demographics, poverty.
Biophysical features such as land use, wood cover, flow data.
Vulnerability information such as exposure to extreme events, water security, food security, among others.

Expert consultation session on estimated vulnerability: In a second session, three groups were worked on based on a guide that considered aspects such as: Current impact and potential of climate change, Ecosystem Degradation and Adaptive Capacity.

Expert consultation session on the relevance of the basin. 2 random working groups were formed; one group discussed a series of questions focused on representativeness,

complementarity with other initiatives, and the other group focused on the importance of financial institutions, natural resource governance, and relevant social organizations. The questions and criteria used in this session can be seen in Worksheet 2 (see Annex 6.4). The discussions initiated during the workshop can continue after the process, through bilateral meetings, if any of the experts deem it necessary, in order to further deepen the information gathered and provided.

INTRODUCTORY SESSION

To start Mr. Salvador Nieto Executive Secretary of the CCAD detailed how the project arose, he reported between 2013 and 2015 periods of drought in the Region preceded by years of heavy flooding, which led to the 2016-2017 consulted. Achieving agreements between CCAD, BCIE and UN Environment to address the challenges of climate change that resulted in the "Ecosystem-based adaptation proposal and transformational measures to increase resilience to climate change in Central American Dry Corridor and the arid areas of the Dominican Republic.

In conclusion, Lic Nieto indicates that he is at a stage to develop a more detailed proposal based on consultations in each country in the region and in which key elements such as climate change, climate action, how resilience will be implemented and how the damage and losses in countries will be dealt with.

For her part, The Ing. Sonia Lobo, national liaison of the project, welcomed the attendees. He noted the importance of this project within the framework of the Dry Corridor in Costa Rica, which encompasses an important part of Guanacaste and points out how climate change has impacts on agricultural production that aggravates food security. Likewise, the importance of coordinating with projects that are implemented in the area with an interinstitutional perspective.

Dr Ruth Martinez, Senior Specialist in Adaptation at UN-Environment, outlined the background and phase in which the project is currently located. In addition, he explained the Ecosystem-Based Adaptation (AbE) approach and how it is articulated in this project, and how it strengthens capacity building in vulnerable areas. It also emphasized the importance of this workshop and how it is part of the efforts of this regional proposal with a view to eligible for Green Climate Fund (GCF) funds through a conceptual note that has already been invited to be developed as an expanded proposal.

CHARACTERIZATION OF THE CUENCAS OF INTEREST

The next section will present a series of data aimed at characterizing the basins that were preselected, in Figure 1 you can see the geographical location of these basins.



Figure 1. Geographic Location of The Basins Belonging to the Seco Corridor
Source: Sánchez (2017).

As can be seen in Figure 1 most of the basins have a significant presence in the northern Pacific region, as well as an important presence in the province of Guanacaste.

3.1 Abangares Basin

This basin has an area of 1350.35 km², consists of the cantons of Cañas, Tilarán, San Ramón de Alajuela, Montes de Oro, Esparza and Puntarenas. The total population of the basin corresponds to 95,692 inhabitants (CIESA 2010). Within the productive activities are carried out mining, livestock (Silvopastoril), cultivation of pineapple, cane and shrimp production in ponds, as well as tourism mainly of mountain. According to the National Water Balance developed by CIESA (2010), the basin before a normal climate scenario has a water supply of 1,065.25 hm³/year.

As for forest cover, the basin consists of Dry Tropical Forest, followed by water yelg rainforest in transition to basal, tropical wet forest in transition to dry and, as the altitude increases a strip of tropical rainforest is located. Towards the highest parts of the basin are located areas of tropical wet forest transition to premontane and very humid, followed by an area of very humid premontane forest in transition to storm, until ending in the highest areas of the hills Plano, Sentinels, Banquet and Eye of Water with low montane rainforest. Some aspects of vulnerability in this basin indicate that the top shows moderate susceptibility which decreases downwards and very low towards the lower sector of the basin.

Table 1 shows the percentage ratio between basin flow and water resource use:

Table 1
Relationship between flow and use of water resources in the Abangares basin

Usage detail	Caudal (L/s)	Percentage (%)
Commercial	0,27	0,003
Tourist	9,15	0,11
Human consumption	17,96	0,21
Aqueduct	111,82	1,30
Industrial	176,75	2,05
Hydraulic force	781,00	9,06
Agroindustrial	1.265,50	14,72
Agricultural	2.230,83	25,88
Irrigation	4.023,92	46,68
Total	8.620,20	100,00

Source: Study of Costa Rica watersheds (2011).

In Table 1 it can be seen how the mode of use of irrigation covers 46.68% of the flow of the Beedero basin, which represents a very significant percentage compared to the other uses. It is noteworthy that if you add up the percentages of Irrigation, Agroindustry and Agricultural reflects how the water resource is oriented towards economic activities mainly (represents a percentage of 87.28%).

For social aspects of human development Table 2 presents the indexes with respect to the cantons of the Abangares basin:

Table 2
Relevant indicators¹⁶ in the cantons of the Abangares Basin

Main cantons that make up the basin	Area of each canton (km)	Percentage area of each canton within the basin (%)	Percentage of poor households per canton (%)	Gini Index	Integral Development Associations
Golden Mountains	232,2	17,2	22,6	45,79	8
Puntarenas	670,3	49,8	27,4	46,76	58
Abangares	433,5	32,2	37,4	50,76	13

Source: Own elaboration from INEC, MIDEPLAN and Study of Costa Rica watersheds (2011).

3.2 Tempisque Basin

This basin has an area of 3,354.83 km² and is composed of the cantons of La Cruz, Upala, Bagaces, Cañas, Carrillo, Santa Cruz and Nicoya. It has a population of 24,493 inhabitants. (CIESA, 2010) The main productive and economic activities of the area correspond to the cultivation of sugar cane, rice, grass, melon and watermelon, the latter two for export. Tourism development within the basin area has been a relevant activity over the past decade. Extensive livestock farming is very important in the area due to the topography of the basin plain.

According to the National Water Balance developed by IMTA, (2008), the basin before a normal climate scenario has a water supply of 8,052.22 hm³/year.

¹⁶ The cantons of Cañas, Tilarán, San Ramón and Esparza have been excluded from this selection, since their percentage area is very low within the Basin.

As for forest cover, the basin has low montane rainforest, as the elevation gradually decreases, becomes premontane rainforest type, then a strip of tropical rainforest is located in transition to premontane. In the middle part of the basin, the classification becomes tropical rainforest type; approximately 75% of the lower part of the basin is covered by the premontane wet forest in transition to basal, the remaining 25% is covered with dry tropical forest and in transition to wet, as well as tropical rainforest in transition to dry. Finally, in the coastal or mouth area of the Tempisque riverbed in the Gulf of Nicoya, the classification is of the premontane wet forest type in transition to basal.

Table 3 shows the percentage ratio between the flow rate and the use of the water resource for the Tempisque basin:

Table 3
Relationship between the flow rate and use of the Tempisque basin water resource.

Usage detail	Caudal (L/s)	Percentage (%)
Commercial	2,15	0,01
Tourist	131,18	0,47
Human consumption	35,47	0,13
Aqueduct	1.001,26	3,57
Industrial	45,24	0,16
Agroindustrial	4.710,00	16,78
Agricultural	278,82	0,99
Irrigation	21.869,16	77,90
Total	28.073,28	100

Source: Study of Costa Rica watersheds (2011).

As we can see in Table 3, the water resource is used for irrigation at 77.90%, which shows us the significant presence of intensive crops in the basin, which have a high consumption of water and territorial surface, which causes a strong impact at the level Environmental.

With regard to social and human development indicators, we can see the detail in Table 4:

Table 4
Relevant indicators in the cantons of the Tempisque Basin

Main cantons that make up the basin	Area of each canton (km)	Percentage area of each canton within the basin	Percentage of poor households per canton (%)	Gini Index	Integral Development Associations
Carrillo	509,1	15,1	29,8	52,9	17
Santa Cruz	650,8	19,2	26,8	52,64	49
Nicoya	435,4	12,9	31,2	52,15	55
Liberia	1337,6	39,6	22,5	51,68	18

Source: Own elaboration from information collected by secondary sources INEC, MIDEPLAN and Study of The Watersheds of Costa Rica (2011).

The table shows that cantons have high poverty rates, it is noteworthy that the Gini index in all cantons is above the national average (48.3%). Which shows a significant level of inequality.

3.3 Drinking River Basin

This basin has an area of 2,067.22 km² and there are the cantons of Upala, Guatuso, Bagaces, Cañas, Tilarán, Abangares and Puntarenas, with a population of 56,802 inhabitants (CIESA, 2010). The main productive activities are meat farming, beekeeping, aquaculture and fisheries. Among the crops that are produced are: rice, cotton, sorgo, bean, corn, sugar cane, fruits and vegetables. One of its main economic activities is tourism. In this basin is the production of geothermal energy of the country.

The basin of the Bebedero River is darened by the river of the same name, which originates at the confluence of the Blanco and Tenorio rivers. According to the document Development of water balances by watersheds and proposed modernization of networks in Costa Rica developed IMTA/MINAE/UNDP (2008), the basin in conjunction with that of the Tempisque River in the face of a climate scenario have a water supply of 8,052.22 hm³/year.

With regard to the types of forests present in the basin, these are typified in: Premontane wet forest in basal transition, dry tropical forest, tropical rainforest. The higher the height are located areas classified as premontane wet forest and very humid premontane. In the foothills of the Tenorio and Miravalles volcanoes are located areas of premontane rainforest and in the hills that make up them are classified as forests of the low prevalan rainforest type.

The northern area of the basin has collapse fracture zones as well as normal volcano-tectonic fracture zones and northwest-southwest course faults. In the southern and eastern sectors there are faults with normal northwest-southeast direction. To the east and north of the basin there are sectors of susceptibility of moderate to low, in these areas are located the sectors of higher elevation throughout the basin, being that in the flat parts of the basin the susceptibility is very low.

Table 5 provides a link between flow and water use in the Bebedero River basin:

Table 5
Relationship between flow and use of water resources in the Bebedero basin

Usage detail	Caudal (L/s)	Percentage (%)
Commercial	2,36	0,002
Tourist	83,89	0,09
Human consumption	23,56	0,02
Aqueduct	374,39	0,40
Industrial	299,26	0,32
Agroindustrial	1.514,00	1,60
Agricultural	7.036,62	7,44
Irrigation	79.245,59	83,78
Total	94.585,67	100.00

Source: Study of Costa Rica watersheds (2011).

With regard to social and human development indicators, Table 6 presents the following characterization:

Table 6
Relevant indicators in the cantons of the Drinking Basin

Main cantons that make up the basin	Area of each canton (km)	Percentage area of each canton within the basin (%)	Percentage of poor households per canton (%)	Gini Index	Integral Development Associations
Bagaces, C.	896,7	43,4	36,3	50,97	4
Rods	677,9	32,8	28,1	51,14	15
Tilarán	281,6	16,6	24,3	49,4	20
Abangares	210,2	10,2	37,4	50,76	13

Source: Own elaboration from information collected by secondary sources INEC, MIDEPLAN and Study of The Watersheds of Costa Rica (2011).

Table 6 shows that poverty levels in the Beebeder basin are above the national average (22%), in particular Cases of Abangares and Bagaces exceeding 30%, aggravated by a Gini rate that reflects levels of inequality above national average (48.3).

It can be seen in Table 6 how the water resource is concentrated in Irrigation to mean 83.78%, which shows the widespread presence in the basin of intensive crops in the use of water and large land areas, which generate impacts important environmental issues.

3.4 Peninsular Basin

This basin has an area of 4,205.38 km² and there are the cantons of La Cruz, Liberia, Carrillo, Santa Cruz, Nicoya, Hojancha, Puntarenas and Nandayure, with a total population of 89,210 inhabitants (CIESA, 2010). Within the agricultural production are the cultivation of mango and papaya as main activities. In addition, livestock, fishing, shrimp production in large ponds and obtaining common salt are developed.

According to the National Water Balance developed by CIESA (2010), the basin in accordance with its climatology and hydrology, has a water supply of 2,017.34 hm³/ year.

In the characteristic area of the peninsula explicitly in the adjoining Gulf of Nicoya the classification of the forest cover is of the premontane wet forest type in transition to basal. The following classifications are also available in this sector: tropical rainforest in transition to dry, tropical rainforest, premontane wet forest in transition to basal and tropical rainforest in transition to pre-wet. The basin in the southeast sector shows a reverse failure of northeast-south-west and east-west direction, of inferred and sinistral northeast-southwest faults. The central sector of the basin shows northeast-southwest and northwest-southeast faults. In the northern sector (St. Helena Peninsula) there are reverse east-west faults and a series of east-west and north-northeast, south-southeast folds. The basin shows in the southern sector a central part with moderate and low susceptibility, which decreases very low towards the lower elevation sectors. The central coastal part of the basin shows a susceptibility from very low to low, and finally, the sector of the Santa Elena Peninsula has a moderate to low susceptibility mainly.

Table 7 provides a link between the flow rate of the Tempisque basin and the use of the water resource:

Table 7

Relationship between flow and use of water resources in the Peninsular basin

Usage detail	Caudal (L/s)	Percentage (%)
Tourist	428,40	28,89
Human consumption	134,55	9,07
Aqueduct	463,56	32,26
Industrial	11,02	0,74
Agroindustrial	2,30	0,16
Agricultural	10,25	0,69
Irrigation	432,99	29,20
Total	1.483,083	100,00

Source: Study of Costa Rica watersheds (2011).

With regard to social and human development indicators on the Tempisque basin, Table 8 presents the following characterization:

Table 8

Relevant indicators of the cantons in the Tempisque Basin.

Main cantons that make up the basin	Area of each canton (km)	Percentage area of each canton within the basin (%)	Percentage of poor households per canton (%)	Gini Index	Integral Development Associations
The Cross	507,3	12,2	57,3	52,96	12
Is. Cruz	668,7	16,1	26,8	52,64	49
Nicoya	901,2	21,6	31,2	52,15	55
Puntarenas	1067,3	25,6	27,4	46,76	-
Nandayure	564,9	13,6	36,9	50,52	25

Source: Own elaboration from information collected by secondary sources INEC, MIDEPLAN and Study of The Watersheds of Costa Rica (2011).

The Peninsular basin has the highest levels of poverty in the basins considered, all above the national average (22%). In particular the cases of La Cruz, Nandayure and Nicoya, all exceeding 30%, as well as the Gini index which reflects significant levels of inequality

In Table 8 we can see the economic relevance for the use of the water resource since tourism (28.89%) irrigation (29.20%) concentrate more than 50% of the use. It is also striking that this Peninsular basin has more developed the use of the aqueduct compared to previous basins that do not reach significant percentages.

As a result of this characterization, Table 9 presents a comparison between the water supply and the population of each basin.

Table 9

Comparison of main characteristics of basins of interest

Basin	Area (km2)	Population Inhabitants	Water supply Hm3/year
Abangares	1350,35	95.692	1.065,25

Tempisque	3.354,83	24.493	8.052,22
Drinker	2.067,22	56.802	8.052,22
Peninsular	4.205,38	89.210	2.017,34

Source. Craftown-based study based on the Study of the Basins Costa Rica Hydrographics (MINAE-IMN, 2011).

4. INFORMATION COLLECTED BY CUENCA OF THE EXPERTS OF THE THEMES DISCUSSED IN THE WORKSHOP:

4.1 Current and potential impact of climate change

Since the last 15 years, the temporality of rainfall has been changing. Before it was known exactly when it was going to start raining in Santa Rosa National Park, now you can't quite predict it. The mountain formations of Orosi, Cacao and Rincón de la Vieja had cloud forest and due to high temperatures and increased solar radiation, this has been considerably reduced. This impacts the feeding of water reservoirs. What used to be cloud forest has been transformed, while causing species loss. This transformation has been evident, for example, at the top of volcanoes.

According to the comments of national technicians, the cloud forest ecosystem as such will disappear in 30 years. In the Tempisque River basin is where it is most evident. The flow of rivers from above has been declining. Local reservoirs, the product of rain from the dry season are drying up. The rain that feeds the reservoirs in the middle and lower is becoming scarcer. There is less rain, and less intensity, which does not allow water to infiltrate. In the basin of the Peninsula there is no cloud forest but there is no such phenomenon. High basin restoration has helped water infiltrate and not so much flooding. So far there is a real monitoring of the waters that are in the Drinking basin for example. There is another series of reservoirs in the region for which no data are available.

The salinization problems that occur in the Peninsular basin are at the level of dry forest. All available water is captured only through the rains. However, the reduction in rainfall has been affecting this uptake. It happens that there is no connection to the mountains; In addition, due to their geological formation, these are less resilient.

Also, there are populations with a high demand for tourism and in addition, it is one of the areas that have the least water supply. Work is underway with the Water Directorate on updating the issue of concessions while generating research and monitoring in the Tempisque River basin. There are some depleted aquifers and others salinizing. The regulatory plans of municipalities should be the first instrument for the good management of ecosystems and activities that are implemented within these basins. A legal transformation is required, for example in the issue of concessions.

4.2. Ecosystem degradation

The Tempisque basin is the one with a large proportion of dry forest, the most degraded by invasion of invasive species for example, typha spp., tilapia and lionfish. In the middle of the basin are the urban settlements. Climate variables should be considered, and for

example, the Tempisque basin is located in very dry areas. Many small producers have water consumption needs. It has important wetland areas with significant pollution and sedimentation problems. It is a region susceptible to wildfires. It has a biological corridor from sea level to the upper parts of the summits of volcanoes.

In the Tempisque basin there is the integration of the three conservation areas. Restoration trials are available at the Horizons Experimental Station, which in 2019 celebrates its existence in 2019.

On the other hand, the Abangares River basin is prone to forest fires; around it are experiences in the rehabilitation of mangroves. In the Peninsular basin, there is also incidence of forest fires and mangroves suffer from the impact of salt salt sainers. The Ministry of Agriculture and Livestock (MAG) is developing a Climate Change Adaptation Strategy.

This region has the largest populations of jaguars, as well as the Santa Rosa National Park and the Horizontes Experimental Station. It is a basin recognized as the provision of pollinators and biological control. There is a reforestation project with native species. In addition, they have a germplasm bank of endangered forest species.

In relation to the above, there are experiences of rehabilitating wetland ecosystems, for example, managing *Typha* spp in the bodies of water of Palo Verde National Park, and the constipation of floodgates in the Mata Redonda Wetland, to regulate the flow of water. There is a hydrological study in the Corral de Piedra Wetland (Water well sector) which includes the Garzón and Henschidero subbasins.

There is also an interesting organizational experience in the 2014-2015 drought period, when there was a stagnation of water in the Corral de Piedra wetland, causing a plague of waders that affected local communities and production Livestock. This prompted these communities to go to local authorities to seek comprehensive measures, which led to the cleaning of canals to regulate the stilt pest, through SINAC and the support of the Ministry of Labour with the attention of the Ministry of Health and MAG. This has allowed, among other things, the creation of the Healthy Wetlands Committee.

In addition, the National Meteorological Institute (IMN) is expected to release a 2015 coverage study in the coming months and, in 2019, will begin a 2017 coverage study, considering not only forest cover but also other indicators (conservation of ecosystems, availability of water, territorial governance, water capacity, vulnerability and invasive species).

4.3. Adaptive capacity

In the basins of interest, it highlights the fact that there are many organized groups but they are not strengthened. That is, organizations have two or three leaders but there is not much citizen participation.

The large owners are better organized, instead at the level of mini-funton slower levels of organization, this situation affects the adaptability, since the large owners have more resources and organizational capacity to testing adaptation alternatives such as the introduction of alternative technology.

To this end, it is appropriate, in a broader perspective, to achieve a characterization of the actors: the federations of the Associations administering the systems of Community Aqueducts and Sewers (ASADAS), the Institute Costa Rican Fisheries and Aquaculture (INCOPECA), MARVIVA and other governmental and non-governmental actors, as well as the Institute for Rural Development (INDER) which has a dimension at the territorial level.

One case of this is the project of activities for adaptation to climate change that takes place in Bijagua, where Funde-cooperation promotes alternative rural tourism initiatives as a complementary activity to the agricultural dimension, for example model farms that execute projects from an adaptation perspective.

There are practices that demonstrate some openness to organic agriculture, sustainable fishing and chaining. Also, there is a topic of adaptive capacity: organizational level – new practices that have driven – social capital – where resilience has been shown.

4.4. Financing:

Among some of the sources of financing that can be supported in the region and, for the development of different activities, we have the Sustainable Biodiversity Fund that is managed by the National Bank and Foundation of the National Bank (FUNBAN), these they raise the call for weekenders who have forest and get payment for environmental services. German Cooperation Agency (GIZ) is also involved and changes from traditional production models to alternative models. The Green Business Fund: GIZ-CRUSA-FUNBAN: It's a small fund (\$20,000.00) for small producers who want to change their production system.

The water levy is not directly accessible to the producer, but they are available funds for water management activities. There is also Fundecooperation with a program of microcredits to change productive activities. Global Conservation Standard is a voluntary environmental certification aimed at forest conservation and biodiversity. The benefits are distributed among the owners and the buffer zones (at least 40%), aim to make sustainable actions in the buffer areas.

There is also the CRUSA Foundation with funds from environmental projects. National banks such as the National Bank and the People's Bank are particularly important for supporting the development banking system.

Farmers are receiving credits from Coopeguanacaste for livestock activities in wetlands, including donations for solar panels for producers.

Another source present comes from Forest Financing (FONAFIFO) with credit lines with very favorable conditions (40% of the tax goes for credits) for the development of nurseries and forest management. In northern Costa Rica, producers of the National Union of Small Farmers (UPANACIONAL) have credits for Agroforestry Systems. Producers then access PSA (as pay-as-you-go). Also, tax incentives under forest law provide for exemption from real estate for forested farms that are registered. In the soil law, there is also something similar: 40% exemption from producers who promote land protection and tax exemption actions (100%) for farms with nascent.

4.5. Governance / Representativeness / Complementarity

Tempisque: In the Tempisque River basin there are quite a few local-level organizations, as well as instances present in the area. There is also the Inter-Agency Committee of the Tempisque River basin (private company, NGOs, public institutions). Some of them are: the Local Forestry Council, the Committee on Healthy Wetlands of the Corral de Piedra Wetland, Foundation for Sustainable Development (FUNDECODES), Fundación del Area Conservación Arenal Tempisque (FUNDACA), FEDEGUA, Asociación de pequeños Mata Redonda farmers, CB Las Morrocochas Local Council (Liberia River Subbasin Management Plan).

Other instances present in the region are PAACUME, Universidad de Costa Rica (UCR), Universidad Nacional (UNA) and its regional headquarters at Chorotega level, CE, Nicoya Municipality, ACT as well as several instances related to environmental aspects: Conservation Fund Center for Studies in Peninsular and Tempisque Waters, Sustainable Development, Costa Rica by Siempre (CxS), International Conservation (CI), Organization for Tropical Studies (OET). Some Projects that are implemented are: HURITE Project, Wetlands Project (CxS).

Drinker: In the case of Drinker the presence of PAACUME was highlighted.

Peninsular: A large number of government institutions are present in this basin. For example, MINAE: Water Management (regional management), National Conservation Area System (SINAC): on biodiversity is the National Biodiversity Management Commission (CONAGEBIO) which does not have a regional office, but but but covering at the country level.

The National Forest Fire Commission is also present, coordinating with SINAC voluntary forest fire brigades. There are institutional brigades (ICE has brigades, etc.). Incident command system.

In Peninsular are present different organizations such as FUNDECODES, ADI Matambú, PAACUME, CI, CADETI: among its thematic axes are the convention of desertification struggle.

There are many instances and initiatives present in this basin, for example: SENARA, ASADAS, AYA, INCOPECA. Own initiatives in an adaptation perspective: MAG, which has a drought unit and INTA.

In this sense, the agri-environmental agenda is effective to promote actions to change towards agricultural sustainability. Also the NAMA livestock, which involves an ordering of use of farm and adaptation actions. The Environmental Incentives Unit at the MAG is also present.

Some other instances present in the basin are:

SEPLASA (from MINAE): Secretariat of Environmental Planning (interinstitutional planning).

CENIGA: geo-environmental information center.

SIMOCUTE coordination tables: land use information system and ecosystems. (Commissioned: Rafael Monge). They work on standardization of soil-use classification methodologies, ecosystem classification.

Ministry of Labour: temporary subsidies to community actors for environmental care. Example: development association audits with ministry of labour, the project proposes the conservation area

Ban subsidies: promotes the fishermen's association.

SEVENTH: Realizan estudios de Impacto Environmental.

Environmental management management management: waste management, hazardous materials. It has a good practice manual.

National Community Development Directorate (DINADECO): channels resources for development partnerships; generally to develop infrastructure. It could be directed for green infrastructure. They have collaborated with several ASADAS to lay solar panels for water pumps.

Ecological blue flag: it is granted due to the development of sustainable practices, pollution reduction.

In addition, the experts recommended the following documents for consultation: National Adaptation Policy, National Climate Change Strategy and its sectors.

PIAAG: Integral Water Supply Program for Guanacaste. It works throughout the province. Coordinates institutional actors for a strategic line of management.

Federation of ASADAS: platform that manages resources and manages funds for territories of Cañas, Tilarán, Bagaces

Healthy Wetlands Committee in Tempisque.

Fedeagua: promote the management of microbasins in Nicoya.

Guanacasteca fraternity: NGO involved in water

Guanacaste Community Fund: Environmental-themed NGOs, funding search, grassroots organizations, etc. It's present throughout the province. More focused on the peninsula.

Communal Water League: work around the development of rural aqueduct improvements on the peninsula.

The following are instances in their capacity as generators of adaptation and water management information:

EARTH Finca La Flor: they continuously do courses for climate change in agriculture.

UNA-Nicoya CEMEDE: trainers in the region.

HIDROSEC: ONE in Liberia. He has a career in hydrological engineering.

Regional Conservation Area Committees: Includes local actors. Approves management plans and budget. Body created by biodiversity law.

Consideraciones finales

Finally, this workshop was useful to identify key players in the Tempisque, Bebedero, Peninsular and Abangares river basins, learn about the financial mechanisms available for adaptation actions, the biophysical context and their interrelationship with social conditions. The information gathered has served to fuel the feasibility study of the expanded proposal, as well as serves as the basis for next steps such as the analysis of lessons learned.

On this basis, key informants identified in this workshop will be contacted to collect specific data to be used in vulnerability analysis and feasibility studies of the Ecosystem-Based Adaptation (AbE) project Transformations to Increase Climate Change Resilience in the Dry Corridor of Central America and the Arid Zones of the Dominican Republic.

Annexes

6.1 Agenda

ADAPTATION BASED ON ECOSYSTEMS AND TRANSFORMATIONAL MEASURES TO INCREASE RESILIENCE TO CLIMATE CHANGE IN THE DRY CORREDOR OF CENTROAMERICA THE AREAS ARIDS OF THE DOMINICAN REPUBLIC

Expert consultation workshop Guanacaste, Costa Rica, 12 February 2019

WORK PROGRAMME

Agenda

8:30-9:00	INTRODUCCION	
8:30-8:45	Words of welcome Presentation of participants	
8:45 -9: 00	Presentation of workshop objectives and methodology	Ruth Martinez, UN Environment
9:00 -10:00	SESSION I: PRESENTATION OF THE INITIATIVE	
9:00-9:15	Problem of the Dry Corridor in a Central American perspective.	Raúl Artigas, CCAD
9:15-9:30	Presentation of the project	Ruth Martinez, UN Environment
9:30-9:45	Characterization of the basins	Olman Varela, UN Environment Expert
9:45-10:00	Questions	
10:00-10:20	Coffee break	
10:20-12:30	SESION II: CONSULT EXPERTS -VULNERABILITY	
10:20-10:30	Session Methodology	Ruth Martinez, UN Environment
10:30-12:00	Group work around: Current and potential impact of climate change Ecosystem degradation Adaptive capacity	Olman Varela, UN Environment Expert Jaime Valverde. UN Environment Expert Ruth Martinez, UN Environment
12.00-12:30	Plenary: presentation of results	
12:30-1:30	Food	
1:30-3:15	SESSION III: CONUSULTA TO EXPERTS - RELEVANCY	
1:30-1:40	Session Methodology	Ruth Martinez, UN Environment
1:40-2:50	Group work around: Representativeness Complementarity with other initiatives Institutional capacity at the local level/Governance	Olman Varela, UN Environment Expert Jaime Valverde. UN Environment Expert Ruth Martinez, UN Environment
2:50-3:15	Plenary: presentation of results	
3.15-3:30	Closing	

6.2 Annex. List of participants

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6.3 Annex. Worksheet 1

Expert Consultation Workshop, Ecosystem-Based Adaptation Project in the Dry Corridor.
February 12, 2012

Dimension/workgroup	Criteria	ABANGARES	TEMPISQUE	Drinker	PENINSULA	Guiding questions
1. Current and potential impact of change Climate	Availability of services ecosystems	According to the National Water Balance developed by CIESA, 2010, the basin before a normal climate scenario has a water supply of 1,065.25 hm ³ /year.	According to the Water Balance National developed by IMTA, 2008, the basin facing a normal climate scenario has a water supply of 8,052.22 hm ³ /year.	According to the National Water Balance developed by IMTA, 2008, the basin in conjunction with that of the Tempisque River before a normal climate scenario have a water supply of 8,052.22 hm ³ /year.	According to the Water Balance National developed by CIESA, 2010, the basin facing a normal climate scenario has a water supply of 2,017.34 hm ³ /year.	Drought Characterization (current and projected) What is the trend? What studies/data/evidence does it exist? What are the information gaps? What other impacts have been documented? Agricultural activities, presence of agroforestry, silvopastoral activities, etc. Trends, barriers, interest and knowledge in EbA.

6.4 Annex. Worksheet 2

Expert Consultation Workshop, Ecosystem-Based Adaptation Project in the Dry Corridor.
February 12, 2019

Dimension	Criteria	Abangares	Tempisque	Drinker	Peninsular	Key topics
1. Opportunity	National representation					Institutional diversity. Presence/diversity of livelihoods
	Complementarity with other initiatives					Existence of complementary initiatives. Existing overlapping initiatives or duplication of efforts.
2. Capacity institutional at the local level	Governance					Administrative authorities, mechanisms, processes and existing institutions, especially to manage water and other key resources for adaptation.

						Presence and strength of key players such as community organizations, ASADAS, etc.
	Financial aspects					Presence and strength of financial organizations Producers' strength to access banking for the shift to financial activities

6.5 Annex Photo Summary



Source: Own photographs (2019).

6.6 Annex. Intervention of Mr. Salvador Nieto (Executive Secretary of CCAD).

Below is a summary of presentation:

CCAD is a regional institution part of SICA. Formed by 8 ministers of the Central American Region including that of the Dominican Republic, whose purposes are the integration in environmental matters.

As a background, from a regional perspective to the current initiative under way, the years 2013-14-15 were years of heavy drought in the region preceded by years of heavy flooding so these countries were preparing to face of this kind.

In 2016-2017 consultations are held and progress is made in the region on the issue of climate change and the opportunity arises to work with the BCIE and UN Environment where different elements are addressed such as land observation, financing, information on climate change, droughts, floods. Etc. Thus, together with the Ministers, BCIE finally raises the "Proposal for adaptation based on ecosystems and transformational measures to increase resilience to climate change in the Central American Dry Corridor and the arid areas of the Dominican Republic". Where the integrator axis is the theme of Water. Whether it is due to excess or scarcity affecting the region in different ways, which complicates the Central American position at the global level. Where one of the main problems is identified is the lack of water regulation and that is why it should be raised within the proposal as a fundamental issue to be solved.

The proposal is made to the Green Climate Fund (GCF) which, unlike GEF projects, for example, which finances incremental costs or added value, the FVC seeks a paradigm shift in the management of a resource or ecosystem. That is why now the challenge for experts and governments is to prepare a strong proposal focused on climate action, including elements of resilience and adaptive capacity to climate change.

What phase are we at today? A Conceptual Note was submitted to the FVC for review setting out the objectives and expected results in this project. Including indicatives on the required budget, instruments, etc.

We are in a complex phase which is to prepare a more detailed proposal based on consultations in each country of the region and in which fundamental elements such as paradigm shift, climate action, emissions reduction, resilience and how the damage and losses in countries will be dealt with.

The detailed proposal to be submitted should be consistent and should consider the following factors:

COMPLEMENTARITY: how it connects with national, territorial actions and the resilience actions that are planned to be implemented.

FINANCING THEME: The FVC is looking for loan-based or micro-credit financing projects with a productive approach. For example, large infrastructure works can be complemented by BCIE resources.

CITIZEN AND GOVERNMENT PARTICIPATION: The FVC asks within a proposal for a rapporteurship and a detail of the consultations made to the different actors involved. It is to comply with a number of safeguards, requirements and obligations related to this topic.

CONNECT this initiative with another regional initiative such as the REGIONAL CHANGE 2 Initiative, which includes credits to smallholder farmers to tackle climate change.

Finally remember that the FVC works with accredited entities and the region has the BCIE, where countries are members and must take advantage of this advantage as this accredited entity is available for the management of large projects.

There is no doubt that Costa Rica's position with a leading position on the environmental issue and for this country, this proposal will help in its projected carbon neutrality target for 2050.

6.6 Annex. Complementary data on watershed characterization

The vulnerability of the basin in the northern sector contains collapse structures as well as sinister and normal northwest-southeast and other north-southwest failures, as well as a northwest-southeasterly tectonic depression axis which leans towards the Northeast. The south and southwest sector of the basin has faults and some folds with northwest-southeast and northeast-southwest directions. The landslide susceptibility of the basin is mostly very low, with low to moderate areas to the north and southwest of the basin.

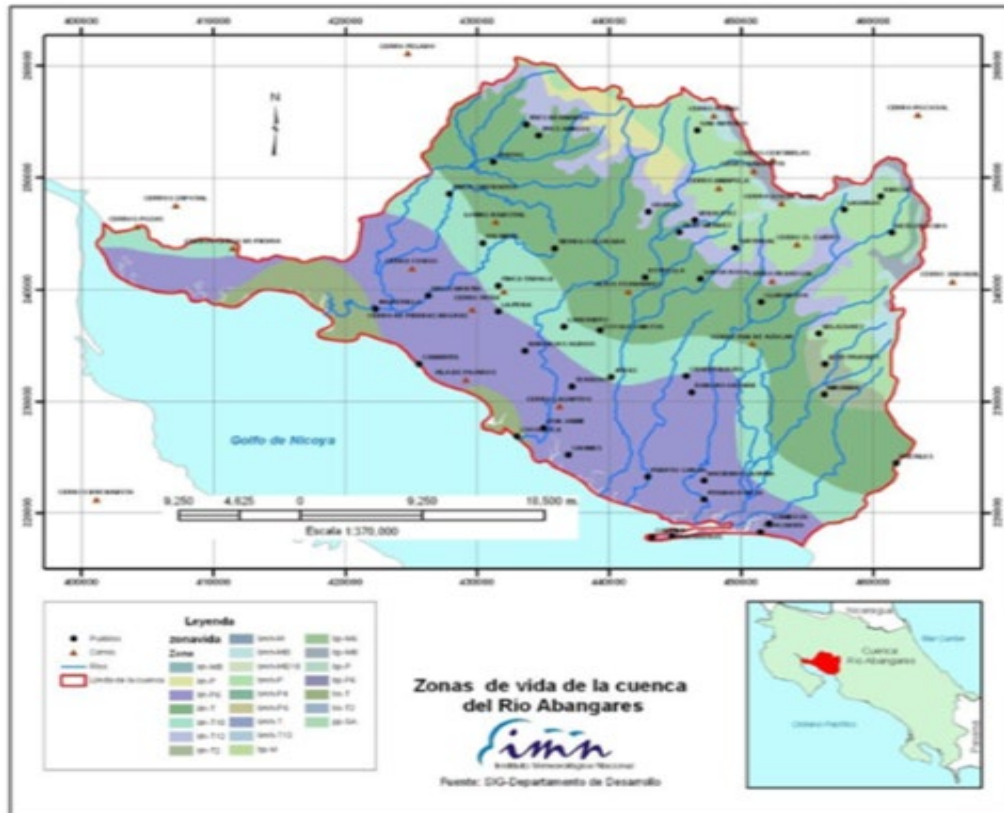


Figure 2. Map of life areas of the Abangares Basin.

Fuente: MINAE-IMN (2011).

The average annual temperature in the upper part of the basin is 22 to 24 oC, in the middle part it is 26 to 28oC and in the lower part of 28 oC, a noticeable approximate oscillation of (12oC) occurs in any month between the maximum and the minimum temperature of the Day. (Climatological Atlas, IMN, 2009).

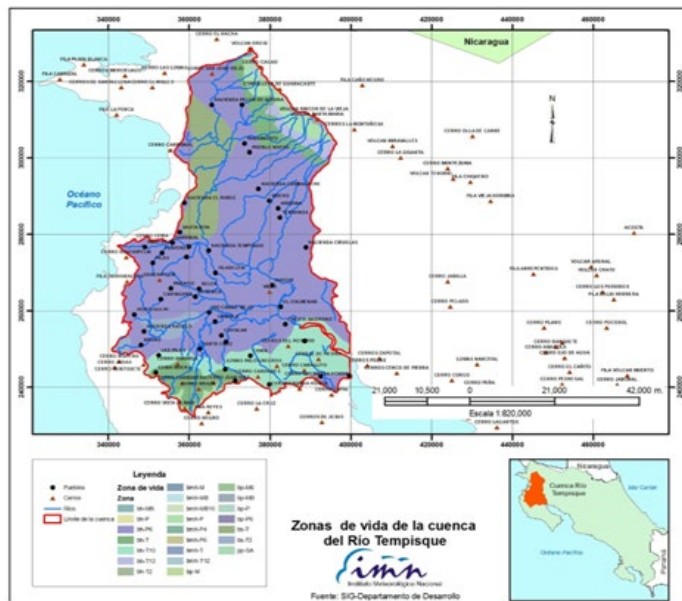


Figure 3. Map of life areas of the Tempisque River basin.
Fuente: MINAE-IMN (2011).

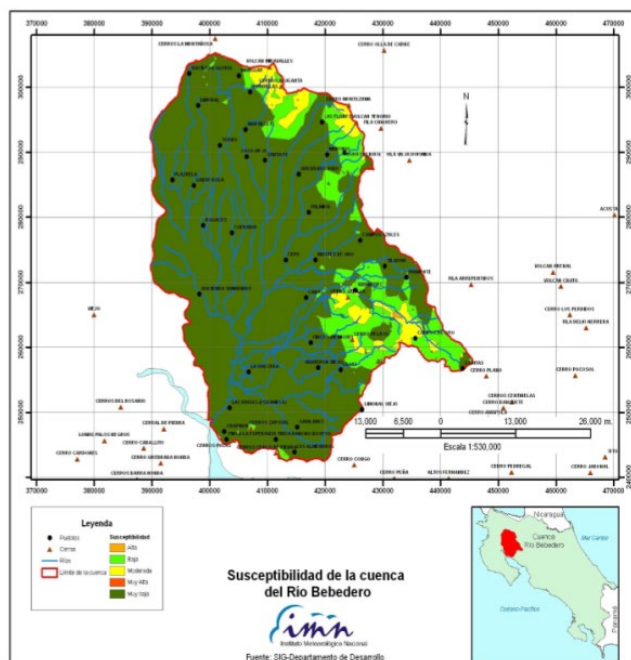


Figure 4. Map of life areas of the Bebedero River basin.
Fuente: MINAE-IMN (2011).



Figure 5. Map of life zones of the Peninsular basin.
Fuente: MINAE-IMN (2011).

Table 10
Comparison table of pollution parameters
for basins of interest

Basin	NUMBER SCOUTED	COD (Ton/year) ¹⁷	SST (Ton/Ao) ¹⁸
ABANGARES	59	64.513	73.391
TEMPISQUE	13	710.36	252.8
Drinker	15	6.735	7.200
PENINSULAR	79	23.322	40.886

Source: State of the Nation (2017).

Table 11
Comparative Table of the main cantons of the basins of interest and their use of improved drinking water sources.

Basin	Cantons	Proportion of the population using improved drinking water sources (%)	Average total per basin
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¹⁷ The Chemical Oxygen Demand (DQO) is a parameter that measures the number of substances susceptible to being oxidized by chemical means that are dissolved or suspended in a liquid sample. It is used to measure the degree of contamination and is expressed in milligrams of diatomical oxygen per liter (mg O₂(L)).

¹⁸ OSTs correspond to the amount of material (solids) that is retained after filtration of a volume of water. It is important as an indicator, because its presence decreases the passage of light through water avoiding its photosynthetic activity in currents, essential for the production of oxygen.

ABANGARES	Abangares	90,4	93,1
	Golden Mountains	94,9	
	Puntarenas	94,0	
TEMPISQUE	Liberia	96,2	91,5
	Carrillo	92,2	
	Santa Cruz	89,4	
	Nicoya	88,2	
Drinker	Bagaces, C.	88,6	90,9
	Rods	92,8	
	Tilarán	91,9	
	Abangares	90,4	
PENINSULAR	Santa Cruz	89,4	88,13
	Puntarenas	94,0	
	Nandayure	81,0	

Source: State of the Nation (2017).

Panama



Ecosystem-Based Adaptation Proposal and Transformational Measures
to increase climate change resilience in the Central American Dry Corridor
and the arid areas of the Dominican Republic.

Workshop Memory – Chitré, Panama, 26 March 2019.

Performed by:
Oscar David Calvo-Solano
Olman Varela Durán
Jaime Valverde Rojas.
UN-Environment technical support
Coordinated by Ruth Martinez, UN Environment

2019

1. INTRODUCTION

This Expert Consultation Workshop is carried out within the framework of the formulation of the project called "Ecosystem-Based Adaptation (AbE) and Transformational Measures to Increase Climate Change Resilience in the Dry Corridor of Central America and Arids of the Dominican Republic".

This project responds to the request of the Ministers of Environment of Central America and the Dominican Republic, grouped through the Central American Commission on Environment and Development (CCAD) of the Central American Integration System (SICA). The present formulation of the expanded green climate fund (GCF) proposal is being technically led by UN-Environment with the support of the Central American Bank for Economic Integration (BCIE) and the support of CCAD.

The impacts of climate change caused by rising temperatures, droughts and extreme rainfall threaten the livelihoods of vulnerable communities in the Central American Dry Corridor and in the Arid Zones of the Republic Dominican. Water supply is especially at risk.

This project proposes to address this type of impact at the landscape and home level in priority basins by promoting: (i) Ecosystem-based adaptation (AbE) through ecosystem restoration and agroforestry systems; and (ii) water-efficient technologies in communities. To this end, it is proposed: (i) capacity building for local governments, financial institutions and communities; (ii) the development of loans and microfinance for AbE activities and small green businesses; and (iii) the integration of AbE into policies and incentive creation.

1.1 Pre-coordination of the workshops

1.2

There was preparatory work before this workshop could be successfully carried out. First ly noted that this event is based on the results of workshops organized by UN Environment in 2016, where large priority geographical areas for the project were identified; in the case of Panama, as a result of this workshop in 2016, the provinces of Coclé, Herrera and Los Santos were selected as the preliminary areas of action of the project, and also identified the basins 126 (between Tonosí and La Villa), 130 (Parita) and 136 (Antón) and these zones were chosen based on criteria of:

Exposure to the impact of extreme phenomena (particularly droughts) linked to the climate.

Vulnerability to the impact of these phenomena, which is basically determined by three types of factors:

mainly deforestation and soil degradation.

linked to the poverty of affected households.

Economic, depending on how much the livelihoods of populations are affected.

The UN Environment Adaptation team in Panama had a previous meeting in February 2019, with the focal point of this project, Ing. René López and the Director of Adaptation, Ing. Mirta Benítez, to corroborate that the basins chosen in the workshop of 2016 remained of interest to the project. Based on this, the advisory team collected basic information available from secondary sources in these basins, which is developed in paragraph 3 of this report.

1.2. Objectives and participants

This workshop was held on March 26, 2019 in The city of Chitré, Panama.

The objective of the workshop was (i) to present the project to key government technicians and (ii) to advance the process of characterization of the basins preselected for the intervention of the project (basin of the Tonosí and La Villa, Parita and Antón rivers), through the analysis of starting information and consultation with national experts.

Within the framework of this event and in line with its objectives, government technicians from the area of interest were present (see detailed list of participants in Annex 7.2).

Mr. Raúl Artiga, a regional liaison for this project in CCAD, was involved. On the part of UN Environment, Dr. Ruth Martínez, Senior Specialist in Adaptation of the Regional Office of Latin America and the Caribbean, participated, with the technical support of Dr. Olman Varela and the Coordinator of Cultures and Development in Central America (CUDECA), M.Sc . Jaime Valverde.

As part of the preparatory work, the profile of the participating officials was requested to meet the following requirements:

Personnel related to water management, drought, water commissioners, watershed management and/or representatives of the agricultural sector.

Personnel of protected areas, conservation and natural resources.

Personnel related to the management and territorial planning, community management of water or part of the Institutes of Rural Development.

It was emphasized that all participating technicians had knowledge of territorial dynamics. This workshop included 21 participants, representing the environmental and agricultural sector (see Annex 7.2).

1.3. Working methodology

The workshop was organized in three sessions (see agenda in Annex 7.1) namely:

Introductory session: In this session, attendees were given prior information on the project proposal and processed information on the Tonosí and La Villa, Parita and Antón river basins was presented:

Socio-economic information such as productive activities, demographics, poverty and others.

Biophysical characteristics such as land use, wood cover, flow data;

Vulnerability information such as exposure to extreme events, water security, food security, among others.

Expert consultation session on estimated vulnerability: In a second session, three groups were worked on: Current and Potential Impact of Climate Change, Ecosystem Degradation and Adaptive Capacity. The questions and criteria used in this session can be seen in Worksheet 1.

Expert consultation session on the relevance of the basin: 2 random working groups were formed; one group discussed a series of questions focused on representativeness, complementarity with other initiatives, and another group focused on the importance of financial institutions, governance of natural resources and relevant social organizations. The questions and criteria used in this session can be seen in Worksheet 2 (see Annex 7.4).

The discussions initiated during the workshop can continue after the process, through bilateral meetings, if any of the experts deem it necessary, in order to further deepen the information gathered and provided.

2. INTRODUCTORY SESSION

Mr. Yessenia González, an official of the Ministry of Environment, provided welcome words and stressed the importance of climate change adaptation in Panama's Dry Arc area.

Mr. Raúl Artigas of CCAD initially appreciated the availability and interest of the Government of Panama for the follow-up and commitment given to this phase of project development. In addition, it made known the general context in which CCAD is involved in this proposal; it also underlined the importance of having the Central American Bank for Economic Integration (BCIE), UN Environment and CCAD for the development of the proposal. Finally, he stressed the importance of addressing the issue of adaptation to climate change and the central American dry corridor, the Panamanian dry arch and the arid areas of the Dominican Republic, in the perspective of a regional project that also tends to minimize negative impacts of extreme events that are increasingly followed in the region.

Dr. Martínez spoke of the objectives of the workshop, the need to deepen the characterization of the pre-selected basins, the dynamics of working in groups and the type of supplies that are sought for the proposal. It also referred to the proposal progress and aspects that are considered such as: how it has impacted climate change in the Dry Corridor, ecosystem-based adaptation options and project components.

3. CHARACTERIZATION OF CUENCAS

3.1. Biophysical information

The basins of interest are located in the provinces of Los Santos, Herrera and Coclé. Within these provinces are 20 districts and 156 corrections. A detail of the districts related to the basins of interest can be seen in Table 1:

Table 1

Districts within the Panamanian Dry Arch associated with the basins of interest

Basin Name and Number	Province	District	Population of the district as of 2010	District area (km2)
Rivers between El Tonosí and La Villa (126)	Los Santos	Los Santos	25.723	429
		Guararé	10.381	216
		The Tables	27.146	698
		Pocrí	3.259	280
		Pedasí	4.275	385
		Tonosí	9.787	1.294
		Macaracas	9.021	504
Parita River (130)	Herrera	Santa Maria	7.421	158
		Equal	8.885	364
		Dfrc	15.539	625
		Weighed	12.397	284
		Chitre	50.684	91
		The Wells	7.478	383
		The Mines	7.551	437
Anton River (136)	Cocle	Anton	54.362	749
		Penonome	85.737	1.700
		The Painted	25.639	1.024
		Hello	5.875	381
		Natá	18.465	608
		Aguadulce	43.360	466

Source: National Environment Authority (ANAM) (2009)

Basic data for watersheds of interest can be found in Table 2:

Table 2
Watershed Data of Interest

Basin Number	River name	Total basin area (Km2)	River Length (Km)	Main river of the basin	Province or Shire
126	Rivers between Tonosí and La Villa	2170	45	Guararé	Los Santos
130	Parita River	602.6	70	Equal	Herrera
136	Antón River	291	53	Antón River	Cocle

Source: González (2008), ANAM (2011) and Trejos Castillo (2011).

3.3. Economic activities, poverty, land use and land tenure

In the Tonosí basin and La Villa the economic activity is characterized by a 40% primary sector, 4% secondary sector, 33% tertiary sector and 17% government employment (Ministry of Presidency-CONADES, s.f.). The Parita River basin is characterized by an economic activity around the agricultural sector, for example the production of rice, watermelon, melon and sapling, but the livestock sector is also developed with beef cattle (Calvo-Solano et al., 2018). In the Antón River basin, Calvo-Solano et al. (2018) mention that beef cattle production is extremely important.

In relation to the above, Table 3 shows economic activities, information on poverty, land use and land tenure in the basins of interest:

Table 3
Economic activities, poverty, land use and land tenure in basins of interest

Basin and number	Province	Population (estimated as of 2020) ¹⁹	Percentage Poverty to 2008 ²⁰ General Extreme		Land use (based on provincial data)	Land tenure
Rivers between Tonosí and La Villa (126)	Los Santos	92.519	2,8	1.2	<ul style="list-style-type: none"> - 79% pasture - Temporary crops : 9% - Permanent crops: 2% - Rest: 4% - Forests and mountains: 4% - Other lands: 2%²¹ 	<ul style="list-style-type: none"> - 66% occupied with title of ownership - 18% without title to property - 2% under lease - 14% mixed mode²²

¹⁹ ANAM, 2010

²⁰ Ditto

²¹ Ministry of the Presidency CONADES, S.F.

²² National Institute of Statistics and Census [INEC], 2011

Basin and number	Province	Population (estimated as of 2020) ¹⁹	Percentage Poverty to 2008 ²⁰ General Extreme		Land use (based on provincial data)	Land tenure
Parita River (130)	Herrera	114.441	3,4	3.0	Stubble, crops and paddocks (Approximately 94% of the territory around) ²³	69% of the land is occupied with a title of ownership, 18% are occupied without a title of ownership and 2% under lease and about 11% under a mixed tenure regime ⁴ .
Anton River (136)	Cocle	260.717	10,9	11,0	22% agricultural 15% subsistence agriculture 27% other uses around 1% is dedicated to other uses ²⁴	57% with title to property 36% without a title to property 1% under lease 5% under another mixed mode ²⁵

Source: ANAM (2011) and Elaboration Propia (2019).

7.6.2 Access to aqueducts and water governance

To analyze water governance, information on access to aqueducts is relevant, for this reason the following table presents the main data on water coverage according to the watershed:

Table 4
Water coverage for watersheds of interest

Basin and number	Province or Shire	Total communities		No aqueduct		With aqueduct	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Rivers between Tonosí and La Villa (126)	Los Santos	604	6.32	9	1.50	595	98.5
Parita River (130)	Herrera	601	6.29	78	13.0	523	87.0
Anton River (136)	Cocle	724	7.58	42	5.80	682	94.2

Source: ANAM (2011) and Own Elaboration (2019).

²³ Velasquez, 2017

²⁴ Villarreal, 2013

²⁵ INEC, 2011.

In this way it can be seen that, although the majority of the population has access to an aqueduct, some kind of intervention is still needed for the inhabitants of the Parita River basin (130) and the Antón River (136) where a greater percentage of the population lacks this service.

In Panama there are Hydrographic Basin Committees. Villarreal (2018) indicates that by 2018, the Integrated Watershed Management Directorate (DIGICH) aimed to form 37 National Watershed Committees. By that year, there were already 14 formed Watershed Committees. The basins of interest in this characterization already had their own Hydrographic Basin Committee for the year 2018(op.cit.).

4. GROUP WORK RESULTS

4.1 Current and potential impact of climate change

In relation to the impacts of climate change, it should be noted that in Panama, droughts have increased; in addition, there is a late start of the rainy season but, there is also an early completion of it. Another element that affects is irregular precipitation between consecutive days. This aspect is particularly important because it affects agricultural production, such as maize and beancrops, given that there are high rainfall at times when the crop is more sensitive.

More specifically, the effects of climate change are felt in different aspects such as:

Water scarcity for domestic and agricultural consumption.

Loss of livestock.

Weight loss of livestock.

Change of item between livestock producers (from milking to breeding).

This means that some producers have switched from livestock activity to agriculture.

b. Main activities carried out in the selected basins:

It should be considered that in Panama 32% of the territory has an agricultural vocation and there are crops of a permanent nature.

Cuencas del Tonosí and the Villa.

The production of basic grains occurs, and in particular rice production is presented as a particularly important activity. Moreover, there is little agroforestry and no silvopastoral activity.

Parita River Basin

It is a basin where the production of basic grains is important, but there is little agroforestry activity and silvo-pastoral production is zero. It is an area of greater dairy production than of meat.

Antón River Basin

As in the Parita River Basin, there is the production of basic grains but there is little agroforestry and no silvo-pastoral activity. On the other hand, the livestock of milk and meat as well as vegetables (with artisanal irrigation) is presented.

4.2. Ecosystem Degradation

Generally speaking, in the different basins the participants indicated that there is a situation of great cultural attachment to traditional livestock. In this context, it is important to consider the need to transform the education of children and young people. Children are often studied and do not engage in agricultural work, since on the contrary, there is a great influence on construction activity (also displacing rural activities). One of the factors mentioned with a role in this trend is the lack of contextualized education to the region.

On the other hand, soil misuse in the upper parts of the basins is causing sedimentation in mangrove ecosystems. In the former way, there was production of river shrimp in the basins; however, that subsistence model disappeared because of deforestation and water stress problems associated with.

They are considered as the main causes of ecosystem degradation, illegal logging and burning that cause fires, livestock and agriculture and the intensive use of agrochemicals. Such is the case, for example, of the community of Tonosí.

Within the Protected Areas, the main threat is extensive livestock that penetrates through buffer zones, while in mangrove areas harvesting actions are allowed for the construction of community homes.

Finally, a problem detected is the increase of phosphorus in soils due to the excessive use of fertilizers in the upper parts of the basins, related to the monopoly of fertilizer companies that affects in the increase of pollution.

4.3 Conservation barriers

With regard to conservation barriers, both farmers and farmers take precautions regarding hay, dams in rivers. In addition, there is state support for the use of water wells, galleys with micro-sprinklers to regulate the temperature of milk cattle, among other measures. In addition, the Rural Aqueduct Boards (Ministry of Health - MINSA) have valuable information on the nascent ones in the basins and, by law, aqueducts cannot be used for irrigation.

Some aspects that operate as obstacles or barriers to consider are as follows:

Political aspects.

In many cases there is a problem that is the lack of knowledge and interest on the part of decision makers. In addition, those who make up the voluntary groups of territorial work committees are people with low resources and limited knowledge, which poses an objective challenge for the development of coordinated work between local groups and institutions.

Little community involvement.

The protected areas topic did not take into account the participation of members of all communities and, now, you can see the consequences with conflicts between the state and local groups.

Prevalence of political criteria at the municipal level.
Municipalities repeal agreements for the establishment of Protected Areas without technical criteria, rather the political-electoral criteria prevail.

Traditional productive practices.
Generally speaking at the level of these basins there is little trend towards reforestation.
Migration phenomenon
Given the critical situation, a migration of livestock pawns to urban areas is intensified, implying less agricultural labor available.

Adaptive capacity
Some aspects to consider in relation to adaptive capacity are as follows:

Agroforestry practices by the Ministry of Agricultural Development (MIDA) are emphasized at all sites.

The Miambiente promotes sustainable practices everywhere, for example with the Alliance for the Million project, within the framework of the Bonn Challenge, however, often the owner of the farm does not see it as a profit for your productive unit. And in any case, it is clear that more conservation actions are needed.
There are small dams and in particular small infrastructure works in the three basins. Also drip irrigation and deep wells with solar energy.

There is no rainwater harvest.

At the level of the specific basins, the following situation arises:

River basins between Tonosí and La Villa

In positive terms, there are 22 technicians from the MIDA livestock sector just for Herrera. In this sense, there is technical assistance and extension, albeit with limited economic resources.

Antón River Basin

In the Antón River Basin there are some practices of area conservation (watering), which is recent. It also presents a major influence of hospitality and mining by displacing agriculture and livestock.

MIDA: has two staff members within the Anton basin committee.
In relation to complementary initiatives or projects in the region, the following are identified:

Project of agroforestry farms of the cooperative Calabazito. It is a marketing project that has 65 hectares to compensate, financed by the Panama Canal Authority and involves 70 producers (350 direct beneficiaries).

Restoration project of the water recharge zone, which is already 9 months old and has 21 technicians to implement it.

Multipurpose study for the construction of a reservoir, within the National Water Safety Plan, led by CONAGUA. It is a reservoir for irrigation water.

Projects such as the "Environmental Volunteer Programs" and the Alliance for the Million

Finally, the Basin Restoration Program as well as the private sector compensation system (mining-Panama Canal).

4.5 Financial aspects:

In the area is present the trust of the Natura Foundation (FIDECO), which operates with funds from the World Bank. They work in watershed areas and protected areas, it provides economically for basin committees (which must be legally organized). You have to have an operational plan commensurate with your funds, a POA, basic monitoring and evaluation of the implementation of your projects. Personnel from basins and protected areas are involved by the Ministry of Environment.

There are certain conditions in this regard:

There are loans from banks, but there are no specific activities for agricultural/livestock sustainability. Loans are collateral.

The Rural Fund is benefiting greatly at low interest and fast, but it is low-scale, providing small loans of \$10,000 for small producers (with payment facilities).

Incentive for women entrepreneurs (up to \$50,000) with guarantees, for agricultural and livestock projects, of very low interest (1%).

Existence of insurance by the Agricultural Insurance Institute.

It should be noted that so far there is no mechanism such as PSA. There have been ideas about it, but they have not been realized.

On the other hand, there are communal boards at the level of Corregimiento. This enables community members to manage projects and the respective budget.

Also, within the framework of the decentralization of the Municipalities, an "Environment Commission" was created in each municipality. In this regard, each must have a project management fund (per district). It's new, it must be led by the mayor. The central government gives them funds and they distribute them.

Another option is the Law Program 25, which is a reward system for certain practices (e.g. Improved pastures, genetic improvement, equipment improvement, etc.). Also, it is important to mention that they reward spending (up to 70% on some practices, etc.). It has agroforestry regulations.

Some aspects to highlight:

There are limitations on land access (without legal certainty in this regard) and therefore access to financing.

A transformative adaptation is required that goes through a topic of institutional coordination, in which the basin committees play an important role.

There are other secondary sources of resources. For example, a fish farming project that could be piloted to climb.

Finally, with regard to the financial issue, it should be noted that banks condition work initiatives at the farm level. The great barrier to adaptation projects has been access to technical and financial resources. Another serious constraint for adaptation projects is the granting of loans in which financing for adaptation actions is not prioritized, since it mainly supports extensive livestock activities. Finally, opportunities must be generated so that it can operate a grant-based financial mechanism for changes in crop paradigms.

4.6 Governance

Basin committees are a state mandate. Its objective is to procure resources and be project managers. The members of the watershed committees are: MIDA, MiAmbiente, MISI (Ministry of Trade and Industry), Ministry of Housing Development, AMP, MINSA, IDAAN, municipalities that are within the basin, civil society and users. Municipalities, for their part, participate in basin committees covered by the decentralization law.

It should be noted that in the Province of Coclé there is a project of communal forests, with capacity for very strong community organization and a training center:(CEDESAN) where groundwater studies are carried out. With regard to the area of the Saints you have to go 800 feet deep, I suppose, since the water table is very low.

National representation

In the area there are the Basin Committees; and 7 institutions are present: IDAAN and MiAmbiente are the institutions responsible for water management. In addition, the MIDA, MINSA, apart from the municipalities. The following institutions and projects are present in the region:

Basin committees that operate by law. It's run by different organizations.

Sub-basin committees.

The Administrative Board of Rural Aqueducts (JAAR) sits on the sub-basin committees. That is, JAAR are organized through Ministries of Health; Miambientecoordinates some actions such as the collection of an annual levy. JAARs have a seat on the sub-basin committees. They work well, with current organizations.

The National Aqueduct and Sewerage Institute (IDAN) has a presence in some districts in the area.

Agricultural cooperatives. There is the association of poroteros (strong, small, national marketing); association of tomateros (strong); association of organic producers; association of agro-exporters; cucurbitaceae (associated medium producers). They receive technical support thanks to being organized.

There is also the Association of bean producers friendly with the environment (located in Chepo /minas: they made ecological farming manual, accessed training, accessed state funds, have legal persons; they cannot access loans because they are in protected areas). Some other organizations present in the basins are:

Association of irrigation users the Hato de Antón.

Vegetable cooperatives in Anton (for marketing, supply demand).

Azuero ecological group.

Association of Agro-Silvopastoral Producers of Pedasi (APASPE Pedasi).

NGOs: some in reforestation.

Association of Rice dishes of Tonosí (large producers).

Salineros Association: in Guararé.

Association of corn producers (Los Santos area).

Parita River Basin: "Friends of the Mangrove". There is a group organized for mangrove protection.

Peace Corps. It is important for the region (for example for reforestation events).

There are two environmental organizations in Anton. National Association of Cattlemen (Anagam). This is at the highest level, not regional. They are members of the National Committee on Climate Change; as well as the Association of Milk Producers of the Central Province (APREPECE).

This is the general situation. Already at the basin level the situation is as follows:

Parita River Basin

There is a basin committee that has 18 months as well as 3 related sub-basin committees. With regard to access to finance, there is a major problem because, given the limitations on access to land, farmers do not have the possibility of access to financing.

This problem requires transformative adaptation which involves institutional coordination:

Basin committees are important and community organizations are important, but they need to be strengthened.

Antón River Basin

The situation in terms of governance in the Antón River basin is as follows:

The Rio Antón basin committee is still recent.

Access to financing does not apply, as because of limitations in land access, producers do not have access to sources of financing. It is a problem that requires transformative adaptation.

An important secondary source of resources is tourism and hotels.

If there is institutional coordination expressed in the basin committees, where several institutions participate. There are also community organizations, only that need to be strengthened.

5. FINAL CONSIDERATIONS AND CONCLUSION

This workshop was useful to identify key players in the Parita, Antón, Tonosí and Villa basin.

Also, to learn about financial mechanisms available for adaptation actions, biophysical context and their interrelationship with social conditions. On this basis, we will contact key informants identified in this workshop to collect specific data to be used in vulnerability analyses and feasibility studies of the project "Adaptation Based on Ecosystems and measures increase resilience to climate change in the Dry Corridor of Central America, arid areas of the Dominican Republic." In addition, the following considerations stand out.

There is a great deal of information produced, but interinstitutional and institutional coordination is needed to access it.

Despite how complete the information is, it is at a provincial or regional level, so it requires more processing.

Finally, this workshop was useful to identify key actors and sources of information in the basins of interest of this project, to learn about the financial mechanisms available for adaptation actions, the biophysical context and their interrelationship with social conditions. The information gathered has served to fuel the feasibility study of the expanded proposal, as well as serves as the basis for next steps such as the analysis of lessons learned.

On this basis, key informants identified in this workshop will be contacted to collect specific data and information for use in the development of a vulnerability analysis and various feasibility studies of the project.

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7. ANNEXES

7.1. Agenda



Ecosystem-Based Adaptation (AbE) and Transformational Measures to Increase Climate Change Resilience in the Dry Corridor of Central America and the Arid Zones of the Dominican Republic
Expert consultation workshop
Chitré, Herrera, Panama, March 26, 2019

8:30-9:00	INTRODUCCION	
8:30-8:45	Words of welcome Presentation of participants	Ministry of Environment
8:45 -9: 00	Presentation of workshop objectives and methodology	Dr Ruth Martinez, UN Environment
9:00 -10:00	SESSION I: PRESENTATION OF THE INITIATIVE	
9:00-9:15	Problem of the Dry Corridor in a Central American perspective.	Mr. Raúl Artiga, CCAD
9:15-9:30	Presentation of the project	Dr Ruth Martinez, UN Environment
9:30-9:45	Characterization of the basins	Ings. Olman Varela, UN Environment Expert
9:45-10:00	Questions	
10:00-10:20	Coffee break	
10:20-12:30	SESION II: CONSULT EXPERTS -VULNERABILITY	
10:20-10:30	Introduction to the methodology of the session	Dr Ruth Martinez, UN Environment
10:30-12:00	Group work around: Current and potential impact of climate change Ecosystem degradation Adaptive capacity	Dr. Ruth Martinez. UN Environment Ings. Olman Varela. UN Environment Expert Msc. Jaime Valverde. UN Environment Expert
12:00-12:30	Plenary: presentation of results	
12:30-1:30	Lunch	
1:30-3:15	SESSION III: CONSULT EXPERTS - RELEVANCY	
1:30-1:40	Introduction to the methodology of the session	Dr Ruth Martinez, UN Environment
1:40-2:50	Group work around: Representativeness Complementarity with other initiatives Institutional capacity at the local level/Governance Financial aspects of the areas	Dr. Ruth Martinez. UN Environment En. Olman Varela. UN Environment Expert Msc. Jaime Valverde, UN Environment experts
2:50-3:15	Next steps	
3:15-3:30	Closing	

7.2. List of participants

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7.3 Group Worksheet 1

Dimension/workgroup	Criteria	Guiding questions	Cuencas del Tonosí and La Villa	Parita River Basin	Antón River Basin
Current and potential impact of climate change	Availability of ecosystem services	<p>Agricultural activities Presence of agroforestry Forestry activities Other</p> <p>Drought characterization (current and projected) What's the trend? What studies/data/evidence does it exist?</p> <p>What are the information gaps?</p> <p>Are there experiences in Eco-Based Adaptation?</p>			
Ecosystem degradation	<p>Remaining ecosystems.</p> <p>Degradation processes .</p> <p>Consequences of ecosystem degradation</p>	<p>What are the barriers to conservation ?</p> <ul style="list-style-type: none"> - Knowledge and understanding of the impacts of climate change among decision makers - Implementation of existing policies on climate change adaptation - Technical capacity to implement adaptation measures within local communities and institutions <p>Causes and consequences of degradation? What adaptation actions are performed in the area?</p>			

Dimension/workgroup	Criteria	Guiding questions	Cuencas del Tonosí and La Villa	Parita River Basin	Antón River Basin
Adaptive capacity	Basic needs Access to technical assistance, credits and other resources. Workforce	What types of employment predominate in the region? What is the situation regarding access in the use of water by the inhabitants? Do villagers have access to technical assistance? What percentage of crops in the territory use artificial irrigation?			

7.4 Group Worksheet 2

Dimension	Criteria	Guiding questions
Opportunity	National representation	Which institutions are present in the area, mechanisms, especially to manage water and other key resources for adaptation?
	Complementarity with other initiatives	Which local initiatives (projects, programs, etc.) have a presence in the area?.
Institutional capacity at the local level	Financial aspects	What are the main financial organizations? Financing mechanisms? (Credit Options)
	Governance	What is the level of presence and strength of key actors such as community organizations, water or basin committees, producer organizations, etc.?

7.5 Photo Summary

In this section, the photographs below show the process carried out in this workshop.





Source: Own photographs (2019).



7.6. Country-level overview

A spatial representation of the Panamanian Dry Arch within the Central American Dry Corridor can be seen below:



Figure 1. The Central American Dry Corridor (CSC).

In Panamanian territory, there are 52 watersheds where a total of 500 rivers flow (Vega, 2012). Two of the 52 basins are shared with Costa Rica and Colombia (Sixaola and Jurado, respectively). It emphasizes that the basins are referenced according to the numerical system previously established by the Central American Hydrometeorological Project (1967-1972), in which the basins of the Atlantic slope are assigned odd numbers starting basin 1 in Guatemala, until 121 in Panama and, to the basins of the Pacific slope, are equally assigned even numbers in the range of 2 to 164 (ANAM, 2011).

A representation of Panama's watersheds is shown in Figure 2:



Figure 2. Panama watersheds.
Source: ETESA (2007).

7.6.1 Forest cover

A representation of the forest cover and land use of Panama is found on the following map:

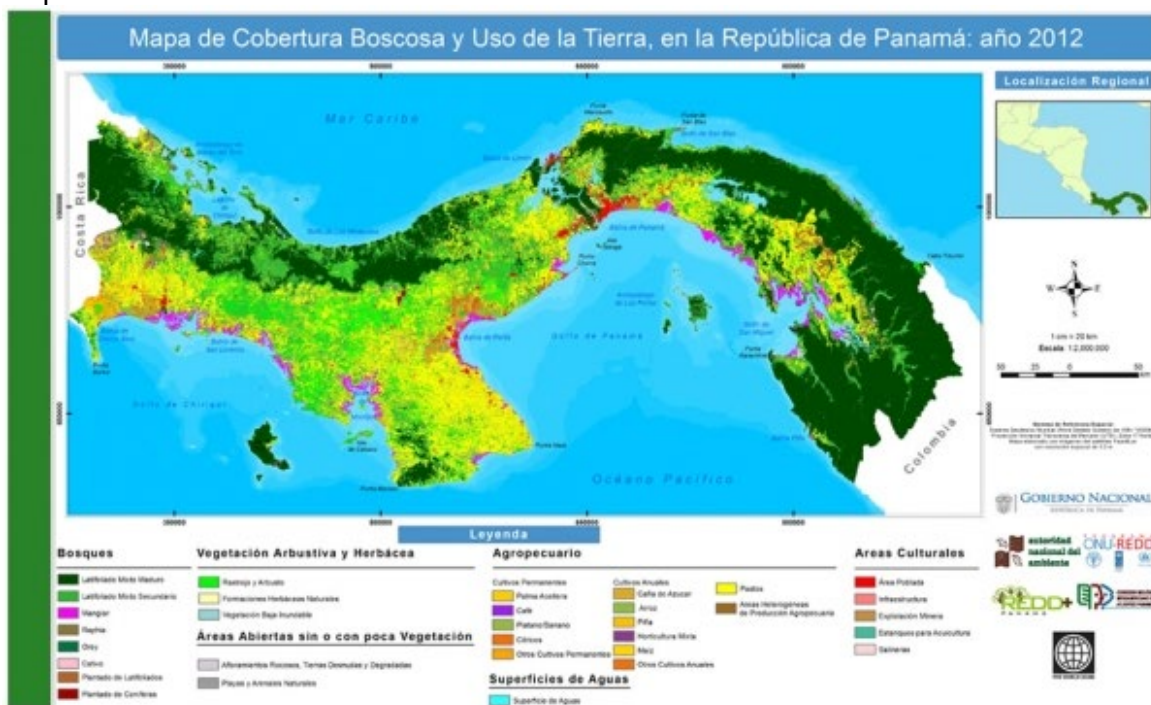


Figure 3: Map Boscosa Coverage and Land Use
Source: National Government, 2012

As can be seen on the map, forest cover is mostly located on the Atlantic coast of the country and, it becomes clear the lack of forest cover and the preponderance of agricultural activities in the region known as Arco Seco.

7.6.3 Water resource situation

Although the percentages or quantity allocated for each of the uses of the water resource are not well detailed at the basin level, ANAM (2011) indicates that the following uses of the water resource can be mentioned:

Hydroelectric use.

Navigation.

Agricultural use.

Recreation and tourism.

It is also mentioned that at the general level there are the following water resource conflicts (ANAM, 2011):

Conflicts between users.

Availability of drinking water.

Access to the water source collection site.

Affection of third parties by the construction of hydroelectric plants and development projects.

In this section, it is necessary to detail, that the Watershed Committees aim to:

"Decentralizing the responsibilities of environmental management and sustainable management of the resources of the country's watersheds". (Villarreal, 2018).

On the other hand, there are different members who must be part of the Watershed Committees in Panama. A clearer visualization of its members is below:



Figure 4. Composition of the Cuenca Committees in Panama.
Source: Vega (2012).

At this point, it is important to detail, that the Watershed Committees have the following Villarreal functions (2018):

- Promote coordination and cooperation between public actors, private actors and civil society.
- Coordinate the development of the Territorial Environmental Planning Plans (POAT) and Management Plans (PM).
- Propose the creation of technical subcommittees for case study.
- Avoid, reduce, or resolve conflicts between Water Resources users.
- Recommending the development of legal rules
- Capture resources for environmental, social and economic management.
- Promote community participation.
- Go to the Advisory Committees.
- Develop the Rules of Procedure.

On this subject, it should be emphasized that the establishment of the Watershed Committees is based on the legal order of Law 44 of 5 August 2002 which states that:

"Establishing in the country a special administrative regime for the management, protection and conservation of watersheds that allows sustainable development in the social, cultural and economic aspects, maintaining the basis of natural resources for future generations, based on the Territorial Environmental Planning Plans and the Watershed Management Plan." (Law 44 of August 5, 2002 cited by Villarreal [2018]).

Also, from a more current point of view, Executive Decree 479 of 23 April 2013 also highlights that following Law 44 of 5 August 2002 states that:

"This regulation has as its scope the management, management, protection and conservation of watersheds, also contributing to related aspects of disaster risk reduction and adaptation to climate change and, helping to the most important objectives sustainable development, social, cultural, economic and environmental aspects." (Executive Decree 479 of April 23, 2013 cited by Villarreal [2018]).

Panama has a very robust water governance and territorial management scheme at the level of Watershed Councils. It is also very useful for the efforts of this project, to have the benefit of the watersheds of interest having to their credit these Watershed Councils.

7.6.4 Vulnerability

In Panama, according to national and international statistics, the most frequent hydrometeorological events are drought, landslides and floods. These events cause damage to infrastructure, the agricultural sector and also sometimes human losses and impacts on other sectors (Mora, Ramírez, Ordaz, Acosta and Serna, 2010).

An example of this in Panama was presented in 2001, in which damage and losses to the agricultural sector (62% and 38%, respectively) amounted to approximately USD 26 million (USD) (Mora et al., 2010). In addition, in 2010, 2014 and 2016 there was considerable damage to staple grain crops, non-traditional crops and cattle farming in the departments

associated with the basins of interest due to the decrease in rainfall in the Arco Seco region (Calvo-Solano et al., 2018).

Table 5
Vulnerability in basins of interest

Basin and number	Vulnerability
Rivers between Tonosí and La Villa (126)	There is a marked vulnerability in the agricultural and aquaculture sectors as they account for more than 90% of the population's activities. Also, domestic use is affected by forming the basin part of Arco Seco (Vega, 2012).
Parita River (130)	The basin is contaminated. however, it is vulnerable to sewage contamination from mechanized dairy farms, pig projects, cleaning farms with agrochemicals, milk processing plants that, if not properly treated in the basin could be heavily polluted in the short term (Velasquez, 2017).
Anton River (136)	As part of the Arco Seco, the agricultural sector is very vulnerable, specifically rice cultivation. Also, the aquaculture, industrial and hydroelectric sectors are affected. In addition, it is an area potentially vulnerable to conflicts by the use of water for irrigation (Vega, 2012).

Source: Own elaboration (2019).

Another important aspect is that at the level of vulnerability in the Dry Arch in general, Villarreal (2013) indicates that the following situations occur:

- Misuse of natural resources.
- Tree felling.
- Burn.
- Overgrazing.
- Indiscriminate use of agrochemicals.
- There's no recovery from the aquifers.
- There is intensive exploitation of groundwater.
- Flooding.
- Mangrove elimination .
- Improper use of soils.
- High phosphorus fixation (P).
- The phenomenon of ENOS.
- Irregular rains (January-February period).

7.6.5 Food safety

With regard to food security in Panama, Morell (2006) compiled the results of the workshop "Towards the Development of an FAO Technical Assistance Strategy in Support of the Implementation of the Hunger-Free Latin America and the Caribbean initiative". In this, the food security situation in Panama was analyzed through:

- Food availability.
- Foodaccessibility.
- Biological use of food.

It was obtained that, there was a weighting of 30% for the availability of food, 40% for both the accessibility of food and also for biological use (Morell, 2006). In addition, this workshop concluded that, according to this weighting in 2006, of the total of the 75 districts analyzed, 32 of them (with approximately two million inhabitants) had high food security, 14 districts (approximately 530,000 people) had food security and 29 districts (about 433,000) people were in a food insecurity situation (op.cit.).

Morell (2006) refers that the districts under food insecurity as of 2006 were located in the indigenous counties Embrea Wounan, Kuna Yala and Ngobe B'glé, where about 90% of its inhabitants were found in a condition of extreme poverty. It is important to mention that these territories are difficult to access, have soils inappropriate for the production of pastures and temporary crops, as well as low potential for fruit and forest species; they also have low utility coverage (Morell, 2006).

It is important to mention that Panama has a National Food and Nutrition Security Plan (2017-2021) which, it is of great interest to address it in a next stage of this project.

Dominican Republic



Ecosystem-Based Adaptation Proposal and Transformational Measures
to increase climate change resilience in the Central American Dry Corridor
and the arid areas of the Dominican Republic.

Commension Memory – Santo Domingo, Dominican Republic, April30, 2019.

Performed by:
Oscar David Calvo-Solano
Olman Varela Durán
Jaime Valverde Rojas.
UN-Environment technical support
Coordinated by Ruth Martinez, UN Environment

2019

1. Introduction

This Expert Consultation Workshop is carried out within the framework of the formulation of the project called "Ecosystem-Based Adaptation (AbE) and Transformational Measures to Increase Climate Change Resilience in the Dry Corridor of Central America and Arids of the Dominican Republic".

This project responds to the request of the Ministers of Environment of Central America and the Dominican Republic, grouped through the Central American Commission on Environment and Development (CCAD) of the Central American Integration System (SICA). The present formulation of the expanded green climate fund (GCF) proposal is being technically led by UN-Environment with the support of the Central American Bank for Economic Integration (BCIE) and the support of CCAD.

The impacts of climate change caused by rising temperatures, droughts and extreme rainfall threaten the livelihoods of vulnerable communities in the Central American Dry Corridor and in the Arid Zones of the Republic Dominican. Water supply is especially at risk.

This project proposes to address this type of impact at the landscape and home level in priority basins by promoting: (i) Ecosystem-based adaptation (AbE) through ecosystem restoration and agroforestry systems; and (ii) water-efficient technologies in communities. To this end, it is proposed: (i) capacity building for local governments, financial institutions and communities; (ii) the development of loans and microfinance for AbE activities and small green businesses; and (iii) the integration of AbE into policies and incentive creation.

Pre-coordination of the workshop

There was preparatory work before this workshop could be carried out. First of all, it should be noted that this event is based on the results of the workshops organized by UN Environment in 2016, where large priority geographical areas for the project were identified. In the Dominican Republic, as a result of this workshop in 2016, the provinces of Dajabón, Monte Cristi, Santiago Rodríguez, Valverde were identified as the preliminary areas of action of the project; these zones were chosen based on criteria of:

Exposure to the impact of extreme phenomena (particularly droughts) linked to the climate. Vulnerability to the impact of these phenomena, which is basically determined by three types of factors:
environmental conditions, mainly deforestation and soil degradation
linked to the poverty of affected households.

Economic, depending on how much the livelihoods of populations are affected. Considering this previous work, and that the formulation proposal plans to work at the basin level, Ms. Rosa Otero was asked to define and communicate one or more basins of interest within the prioritized area, for the characterization work. In this case the guayubín, Mao, Masacre and San Juan basins were defined.

Based on this, the advisory team collected basic information available from secondary sources in these basins, which is developed in paragraph 3 below.

1.2. Objectives and participants

This workshop was held on April 30, 2019 in the city of Santo Domingo, Dominican Republic.

The objective of the workshop was (i) to present the project to key government technicians and (ii) to advance the process of characterization of the project intervention basin (Guayubín, Mao, Masacre and San Juan basins), through the analysis of starting information and consultation with national experts. presentation of the project to key government technicians, and to move forward with the characterization of the basins of interest.

The event was attended by 12 technicians from the Ministry of Environment and Natural Resources (see detailed list of participants in Annex 7.2). The participation of Mr. Raúl Artiga, a regional liaison for this project by CCAD, was also involved. On the part of UN Environment, Dr. Ruth Martínez, senior specialist in adaptation of the Regional Office of Latin America and the Caribbean, participated with the technical support of Dr. Olman Varela and the B.Sc. Oscar Calvo, by CUDECA.

As part of the preparatory work, the profile of the participating officials was requested to meet the following requirements:

Personnel related to water management, drought, water commissioners, watershed management and/or representatives of the agricultural sector.

Personnel of protected areas, conservation and natural resources.

Personnel related to the management and territorial planning, community management of water or part of the Institutes of Rural Development.

It was emphasized that all participating technicians had knowledge of territorial dynamics. A total of 12 participants were available in this workshop (Annex 7.2).

1.3. Working methodology

The workshop was organized in three sessions (See agenda in Annex 7.1) namely:
Introductory session: In this session, attendees were given prior information on the project proposal and processed information on the Guayubín, Mao and Masacre basins was²⁶ presented, namely:

Socio-economic information such as productive activities, migration and urbanization;
Biophysical features such as land use, wood cover, water availability;

Vulnerability information such as exposure to extreme events, water security, food security, among others.

Expert consultation session on estimated vulnerability: At a second session, plenary was worked on, taking into account the guide questions contained in Worksheet 1 (see Annex 7.3).

²⁶ Information about the San Juan River was not shared in the workshop because information was collected from a basin of the same name.

Expert consultation session on the relevance of the basin. Two random working groups were formed; one group discussed a series of questions focused on representativeness, complementarity with other initiatives, and another group focused on the importance of financial institutions, natural resource governance, and relevant social organizations. The questions and criteria used in this session can be seen in Worksheet 2 (see Annex 7.4).

The discussions initiated during the workshop will continue after the process, through bilateral meetings, if any of the experts deem it necessary, in order to further deepen the information gathered and provided.

2. Introductory session

At first, Ms. Rosa Otero welcomed the activity. He appreciated the presence of the technicians, UN-Environment and CCAD, and stressed the importance of the project on the issue of adaptation to climate change and its benefit to arid areas of the Dominican Republic.

Mr. Raúl Artiga, began commenting on the project's background and highlighted the inter-agency effort between CCAD, BCIE, FAO, UN-Environment and local authorities in each of the countries. In addition, it explained the timeline of the project and on progress after the presentation of a concept note and its formulation in an expanded proposal, thus following an iterative consultation process with country representatives. In addition, it emphasized the importance of expert workshops as a key part of the final formulation of the proposal. He also emphasized the need to hold bilateral meetings with UN-Environment consultants after the workshop.

For her part, Dr. Ruth Martinez emphasized that the Intergovernmental Panel on Climate Change (IPCC) mentioned that the region is in a critical situation of threat to economies. It commented that the conceptual note stage was already over and an invitation was received to be formulated as an extended proposal, and indicated at what stage the project was and also the importance of future bilateral meetings. He noted that in the Dominican Republic there have been impacts at the level of basic grains along with the high possibility of desertification and drought.

3. Characterization of the Mao, Guayubín and Dajabón basins

3.1. Physical description of the basins of interest

With regard to surface water resources in the country, the Food and Agriculture Organization of the United Nations (FAO) (2015) refers that the country's main rivers according to their length are the Yaque (296 km), the Yuna (209 km), Yaque (183 km), Ozama (148 km), Camú (137 km), Nizao (133 km), San Juan (121 km) and Mao (105 km). It is important to mention that, as a border with Haiti, the rivers entering from the Dominican Republic are the Rivers Massacre and Dajabón, providing a total flow of 1.015 million m³/year. The latter, in conjunction with the Artibonito and Libón rivers, are part of the Border with Haiti (FAO, 2015).

A visualization of the basins of interest in relation to the national territory can be seen below:

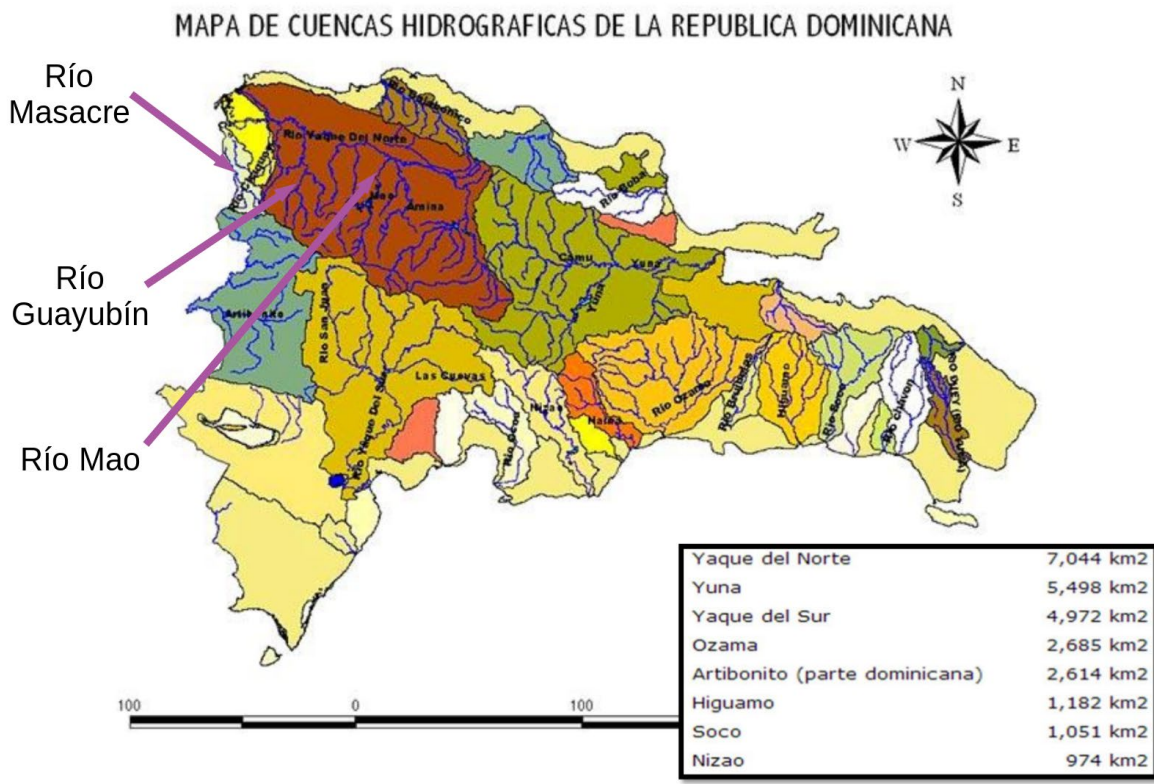


Figure 1. Map of watersheds of the Dominican Republic.
Source: Muñoz-Tapia (2017).

An approach to the physical information of the basins preselected for this project is found in Table 1 below:

Table 1
Extension of the project's basins of interest in the Dominican Republic

Basin	Associated provinces	Caudal (m ³ /s)	Length (km)	Area of influence extension of the basin (km ²)
Massacre or Dajabón	Dajabón	4,00	24	370,60
Guayubín	Dajabón	9,92	69	819,40
	Montecristi			
Mao	Santiago	20,85	105	781,30
	Valverde			
	Santiago Rodríguez			

Sources: Dilla, Oxhorn, De Jesús y Díaz (2004), European Union (EU) and Foundation for Innovation and Dominican Sustainability Compete (COMPITE) (2012), Centre for Agricultural and Forestry Development (CEDAF) (2013) and Otero (2019).

The massacre river basin originates in Dominican territory, has a border character and flows into the Bay of Manzanillo (Dilla et al. 2004). From this basin is derived a network of

agricultural canals approximately 53 km long. These channels are used by about 2,773 hectares which corresponds to about a thousand users, with a capacity of about 6,700 m³/s (Dilla et al., 2004;Oxhorn, by Jesus and Diaz 2004).

Regarding the basins of the Guayubín and Mao rivers represent two of the main subbasins of the Yaque del Norte River (Center for Agricultural and Forestry Development [CEDAF], 2013). The following figure shows in detail both sub-basins:

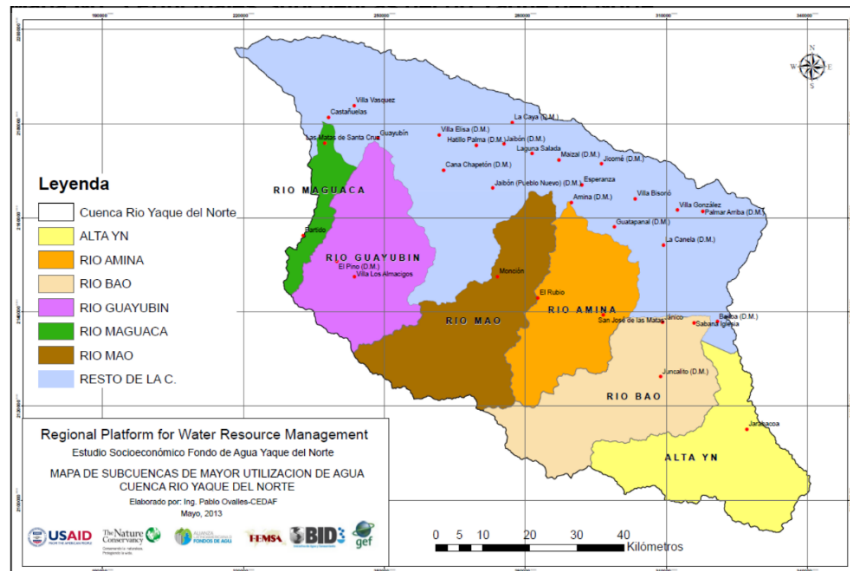


Figure 3. Basins of the Guayubín and Mao rivers, sub-basins of the riverYaquefrom the North.
Source: CEDAF (2013).

3.2 Climate change vulnerability

A visual representation of the country, in relation to its vulnerability to climate change is shown below:

Mapa 18.
República Dominicana

Índice de vulnerabilidad al cambio climático 2014

Bajo riesgo Riesgo extremo

■ Sin datos

Fuente: Maplecroft, 2014

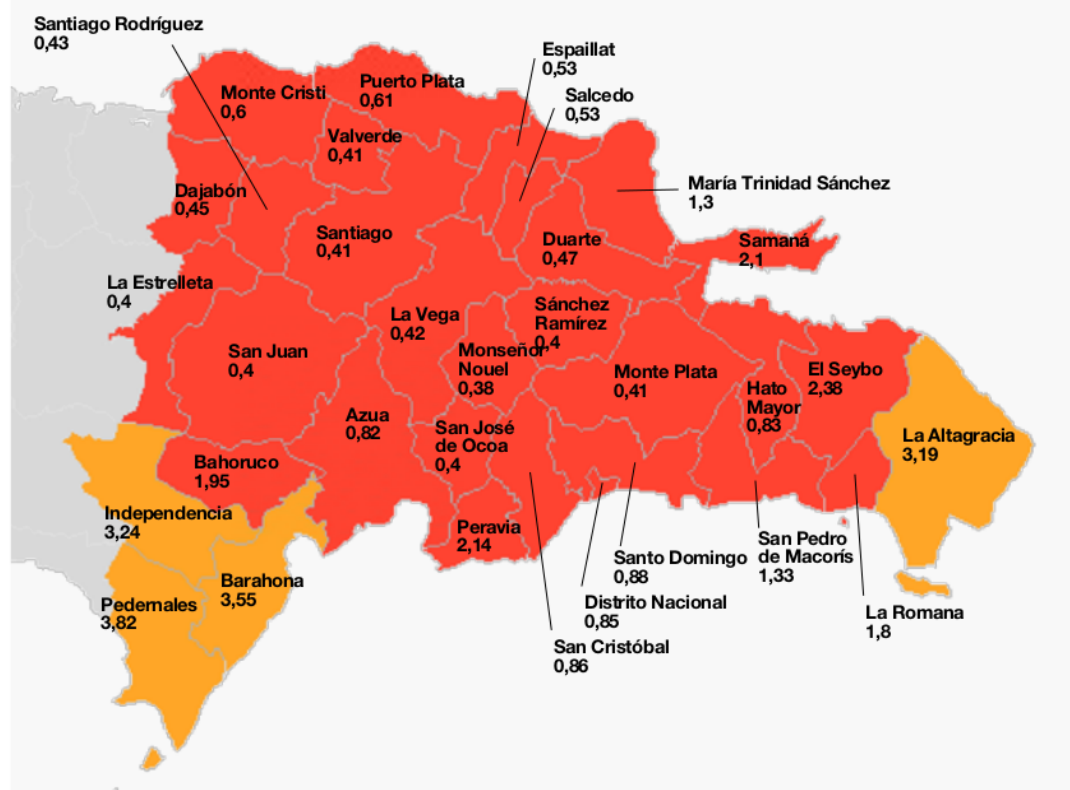


Figure 2. Index of vulnerability to climate change at the level of provinces in the Dominican Republic for the year 2014.

Source: Maplecroft (2014).

From Figure 2, it can be seen that the provinces of Dajabón, Monte Cristi, Santiago, Valverde and Santiago Rodríguez, located in the northwest of the country are in extreme risk situation in relation to their vulnerability to climate change; these are the provinces where the basins of interest are located. La Table 2, then provides the vulnerability data of the basins of interest.

Table 2

Vulnerability index per province associated with the project's stakeholders

Basin	Associated provinces	Climate Change Vulnerability Index (by province) ²⁷
Massacre or Dajabón	Dajabón	0,45
Guayubín	Dajabón	0,45
	Montecristi	0,6
Mao	Santiago	0,41
	Valverde	0,41
	Santiago Rodriguez	0,43
National territory		1,01

Source: Maplecroft 2014

From Table 2, it can be inferred that areas of the basins of interest are highly vulnerable and extremely at risk from the impacts of climate change. The province of Monte Cristi (associated with the Guayubín River) has the greatest vulnerability (0.6). On the other hand, the provinces of Santiago and Valverde (where the Mao River is located) are the ones that present a lower risk (0.41). The province of Dajabón has an intermediate risk value between these basins (0.45), all indices below the vulnerability of the national territory.

3.3. Economic activities

CEDAF (2013) states that, among the main economic activities of the Yaque del Norte basin (to which the Mao and Guayubín rivers belong) agriculture and livestock stand out at a general level; in some territories. Rice, vegetables and minor fruits (op.cit.) stand out within this sector at the agricultural level as major crops. There are other important economic activities in this area, related to the service sector. By 2011, 11% of The population of Yaque del Norte worked in the primary sector (agriculture, fishing and others), while approximately 15% worked in trade and hospitality. In addition, for that year it was mentioned that undeclared activities hovered around 40% (CEDAF, 2013). This behaviour can be seen in the following figure:

²⁷ The index considers the variables of exposure, sensitivity and adaptive capacity. The lower the Climate Change Vulnerability Index, the more likely extreme risk there is. Values between 0 and 2.50 represent an extreme risk (Maplecroft, 2014).

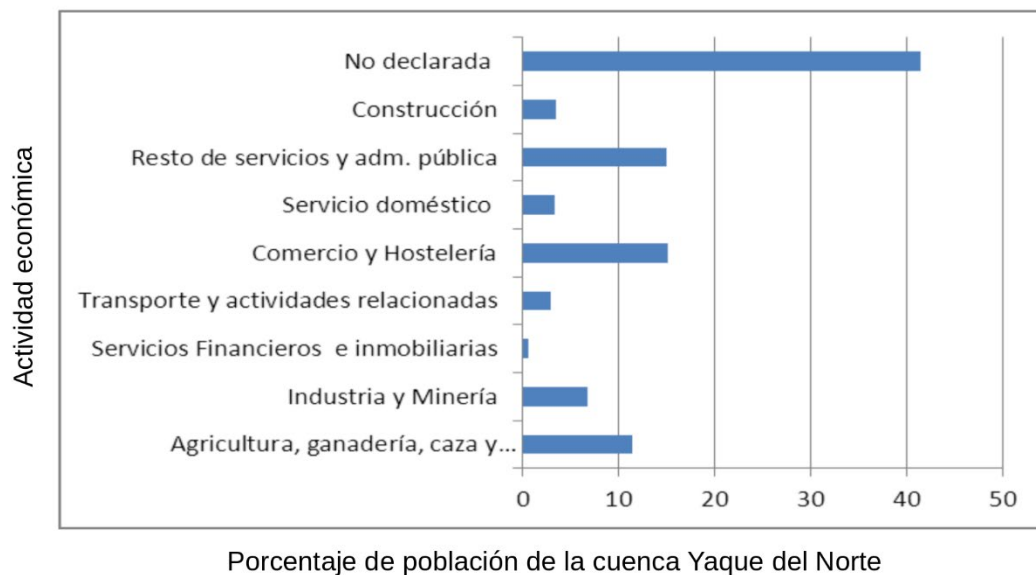


Figure 4. Percentage of population in the U.S. basin Yaque Economic activity.
Source: CEDAF (2013).

3.4. Land use, forest cover and water availability

With regard to the evolution of forest cover at the national level during the period 1996-2003 in the northwest of the country (where the provinces of Dajabón, Monte Cristi, Santiago, Valverde and Santiago Rodríguez and the basins of interest are located), there was a slight increase in This. However, it should be noted that, however, this coverage in the provinces associated with the basins of interest is minimal, compared to the rest of the Dominican territory.

As for the availability of the water resource, the Massacre or Dajabón River has channels that supply it (Dilla et al., 2004). In addition, this river has several aqueducts that provide the water resource to approximately 90% of the urban population of the province and, also to a lesser extent, to rural areas. Dilla et al. (2004) refer that the largest of these aqueducts takes water from the upper part of the Dajabón River basin, before it joins the border area. In this upper part of the basin, the waters of this river are used as irrigation channels, reducing the flow that can be used by the nearby inhabitants of Haiti (op.cit.).

With regard to the water availability of the Guayubín and Mao rivers, by 2013, it was highlighted that about 70% of the territory associated with the Yaque del Norte river basin was in a situation of water shortages and that, these periods of scarcity on average 1 to 2 months (CEDAF, 2013).

3.5. Migration and urbanization

In the area of migration, by 2013, the Dominican Republic's migration balance was negative and accounted for 28% of the population (CEDAF, 2013). However, the municipalities of Santiago and Mao (associated with the Mao River basin) had a positive migration by that year (they receive population). Other areas, such as the province of

Santiago Rodríguez (also related to the Mao River basin) had a negative migration for that year, in which 50% of its population emigrated (mostly women).

In terms of urbanization, CEDAF (2013) indicates that at the level of the Yaque del Norte basin to which the Mao and Guayubín rivers belong, the population for 2013 declined considerably. This situation is attributed to rural-urban migration and also to emigration to other countries (op.cit.). It is important to mention that in 2013 67% of the population was concentrated in the urban areas and 33% were concentrated in rural territories (CEDAF, 2013).

It should be noted that the migration and urbanization information for the territories associated with the Dajabón River basin was not accessible at the time of the preparation of this document. However, the consulting team is in a process of collecting this data.

4. Group discussion results

4.1. Current and potential impact of climate change

Participants mentioned that it is important to have information on the structures already established such as the Drought Bureaus; for example in the case of the National Institute of Water Resources (INDRHI), it provides information on flow rates. If weather information is required it can be provided by the National Bureau of Meteorology (ONAMET) and the Ministry of Environment and Natural Resources.

Here are some things to highlight:

There are few experiences on Ecosystem-Based Adaptation in the Dominican Republic. In this regard, it should be noted that information on initiatives developed with the support of the European Union can be found in the Vice-Ministry of Protected Areas and Biodiversity.

The Non-Governmental Organization (NGO) REDDOM (Rural Economic Development Dominicana) has developed reforestation projects in the Yaque del Norte basin that can be considered as adaptation measures.

The Ministry of Planning has an inventory called Project Table where you can find some initiatives on adapting to climate change.

In the Mao River sub-basin, you can find some productive activities such as those related to coffee cultivation, cocoa plantations, forest management projects with duly accredited management plans, as well as dairy livestock.

In the framework of the Drought Tables (see section of Drought Trend) important maps on aridity and drought at the national level can be accessed.

In the Dajabón River basin there is a Cuenca Council known as Chacoei and La Guaca, as part of the governance structures that address the issue of water resources and their due impact on climate change.

With regard to agricultural activities and the presence of agroforestry and agroforestry activities, there is a centre for agricultural development projects in the upper basin in the

Mao River basin. This project is developed by the Northwest Development Institute (INDENOR).

In addition, in relation to the various agricultural activities present in the basins of interest, the production of Bajamónrice, the presence of livestock in the medium basin and also agroforestry systems in coffee and cocoa were mentioned. There are many forest management projects (with accredited forest management plans); Of these the most emblematic project of the country is in the vicinity of the province of Santiago Rodríguez: La Celestina (it is a cooperative in the area of influence of the Mao river basin). Also, in the Masacre River basin there is an association of forest producers (ASODEFOREST), which develops small projects.

On the other hand, the most important land use in the private sector is through large private projects. Santiago Rodríguez is located the largest producer of milk, of which it is known that its production has been decimated by drought.

The Forest Carbon Partnership Facility (FCPF) determined that major forest producers started with the help of the Agricultural Bank, developing agroforestry projects. It is important to mention that in the country, there is still no modality of specialized loans for forestry activities.

An example of a forestry project that has a climate change adaptation component, is being developed in Monte Cristi, is called Agrofrontera, and includes small producers, helping them to generate climate resilience strategies. This project is developed with the help of an international counterparty.

Dr Michela Izzo has developed important literature on climate change in the Dominican Republic and has also developed maps of climate zones. Participants refer to the need to review their written works.

Drought Trend:

With regard to the drought trend and similar studies, workshop attendees mentioned that this topic is being worked on from the perspective of desertification. The work has been carried out from the Drought Bureaus where a small committee is formed in which the different institutions related to the subject converge: INDRHI, ONAMET, among others. It is important to mention that the work of these tables focuses on agricultural drought and seeks to develop adaptation actions from the point of view of the need to carry out strategic adaptation policies.

On the same line, Dr. Michela Izzo has been conducting similar studies. He published research on the climate trend in the Dominican Republic and the behavior of weather variables measured in seasons. In addition, a map showing the different climatic zones of the Dominican Republic will be available in the coming months, taking into account these investigations.

In addition, the Economic Commission for Latin America and the Caribbean (ECLAC) in conjunction with the University of Seville has been developing research on sea level rise in the country. They have also been working on future scenarios of sea level rise.

Ecosystem-Based Adaptation Experiences (AbE):

With regard to Experiences of Ecosystem-Based Adaptation (AbE) in the basins of interest, participants mentioned that the NGO REDDOM (Rural Economic Development Dominicana) has been working in the Yaque Basin of the North in the upper area, with agroforestry initiatives, planting fruit trees and natives. Also, the Agrofrontier project.

Also, there have been other experiences to improve resilience, especially from the Vice-Ministry of Biodiversity of the Ministry of Environment and Natural Resources, through projects in conjunction with the Global Environment Facility (GEF), but not with the EbA concept. In addition, workshop attendees mentioned that it is important to review the Ministry of Economy, Planning and Development (MEPyD) project inventory, which includes information on who finances each project and a summary of them.

4.2. Ecosystem degradation

Conservation barriers:

There is work on the analysis of emissions facilitators under the Deforestation and Degradation Emissions Reduction Programme (REDD+) led by the Ministry of Environment.

It is important to mention that it was emphasized that there is no land ordering law, and that it is currently very necessary for the country on climate change and development.

There is a strong importance of protected areas in border areas that serve the maintenance of ecosystem services.

There is a mixture of factors that affect the degradation of natural resources. ASODEFOREST and La Celestina, in conjunction with groups of producers are implementing Agroforestry Systems (SAF) that can be replicated. They have been technified to increase the sustainability of successful cases. The Ministry of Environment and Natural Resources and the Ministry of Agriculture (MAG) have worked on the activation of the national soil and water system.

As far as socio-economic barriers are in terms of socio-economic barriers, it has not been possible to generate conservation processes due to the poverty that brings great constraints to the country.

Understanding decision-makers about climate change:

With regard to this point, those present at the workshop detailed that significant efforts have been made at the Ministry of Environment and Natural Resources level, but that long-term sustainability is needed. At the local level, however, the topic is not dealt with in sufficient depth.

In addition, it was noted that local governments focus heavily on urban areas, and do not carry out adaptation actions, as they believe that their environmental work is limited to one-off actions, such as solid waste collection. Workshop attendees indicated that it is necessary to develop a holistic vision, as any intervention in ecosystems has repercussions; Decision-makers also need to integrate into the various sectors and facilitate access to resources for climate change mitigation.

Causes and consequences of watershed-level degradation:

With regard to the causes and consequences of watershed-level degradation, those present at the workshop discussed the following points:

In recent years, a mixture of subsistence agriculture has been given along with commercial agriculture.

Despite the efforts made by the various institutions, there is still some lack of knowledge about the impacts of climate change.

There is a need for a change in many areas regarding the demand for tourism developments and lotifications such as lack of land use plans.

Better coordination between institutions is needed for the channelling of public funds and cooperation.

On the other hand, the dynamics with agroforestry systems of avocado and export handle is significantly affecting land use. Cocoa and shaded coffee SAFs are friendlier today.

4.3. Adaptive Capacity

With regard to adaptive capacity, the workshop mentioned that the MAG has now been providing technical cooperation in relation to rice production. Also, they emphasized that in the case of banana production, a partnership has been given between public and private actors.

In addition, there are associations that have been working on the issue of adaptive capacity, among which they highlight:

Development Foundation of the province of Dajabón (FUNDEPRODA).

Border solidarity.

Chacuey-Maguaca Council (On the Massacre River).

4.4. Financial aspects of the areas

With regard to the main financial aspects of the areas, the workshop attendees detailed the following:

At the forest production level, funding is very limited. There are financial institutions such as Banco de Reserva, Banco Popular and Banco Agrícola (government entity).

In addition, there are savings and credit unions. The sector analyses according to its return capacity. There are no special products for the medium or long term. Formal banking is not sensitized for loans concerning adaptation.

Agricultural insurance: They provide them mainly in the Agricultural Bank and in private entities; it depends on the size and type of crop. It provides assurance against impacts due to extreme winds and flooding, mostly in banana projects. For drought there is no product available.

Banco ADEMI: Focuses on small and medium-sized enterprises; they are present in the province Dajabón.

There is a presence of lenders and informal methods of access to credit in rural areas.

Agricultural Bank: Focuses on medium and large producers. Small people do not have access to credit due to lack of guarantees (land tenure).

FEDA (Specialized Agricultural Development Fund): They lend to legal associations of some seniority. Mainly to women's and youth associations.

There are credits for agrochemicals from commercial houses. In addition, they provide technical follow-up.

Cooperatives:

In Mao: There is the Cooperative Sabaneta Novillo (COOPSANO), which is 50 years old. In addition, there is the MAMONCITO Cooperative.

San José Cooperative: It is a cooperative of coffee producers.

COOPATA: Cooperative Tobacco Producers.

COOPABANA: It is a large-scale cooperative.

These cooperatives lend to their constitution.

Banana producers are large-scale but, there are also associations that bring together small producers to be able to market.

Agroforestry Program: It is a one-year incentive for a loan until it begins to be produced. It is managed by the Central Government (Special Presidency Programs). It is focused on the southwest part of the country line.

The Rural Electrification Unit (UERS) did studies of water and the biophysical part of the different areas of the country to install micro-hydroelectric plants. They have flow information, etc. INDRHI also has information.

Payment for Environmental Services: There are but have certain limitations. They require a title to property; therefore, only the medium and large producers are the ones who are having access. It's supposed to work all over the country.

Project BAN: These are measures to accompany banana production with funds from the European Union (EU), for all producer scales. This accompaniment includes donations for cultivation with the aim of changing the use of certain practices.

CODOCAF and Bee projects: They provide donations.

Aqueduct and Sewerage Corporation (CAS): He has sent water trucks to ranchers and farmers during the drought; he has also supported with fodder. This has been done as an emergency measure, due to the most drastic drought that occurred recently.

In Santiago (YaqueBasin) there are Water Funds (this is a pilot plan).

There is much support in the Mao River basin, in the Board of Regantes, through the Inter-American Development Bank's (IDB) Water Fund project.

International Fund for Agricultural Development (IFDA)-Peasant Forum: Provide loans for agricultural activities.

United States Agency for International Development (USAID): Through the government, they have financed projects (both loans and donations) in the following areas: machinery, infrastructure and value added.

Only homeowners are eligible for the loan.

Legal tenants have access to financing (if in order); this happens only between medium and large producers.

Types of land tenure:

There are people on legal land loans.

Leased (sometimes without contract or verbal contract; other times a contract is made).
Without owning and without any legal recourse.
Community property (some titled and some not).
There is a Land Title Plan.

Presence and strength of key actors such as community organizations, water or basin committees, producer organizations, among others:

Regulatorboards: They are composed of producers and are supervised by state institutions, particularly INDRHI.

Aqueduct and SewerAge Corporations(CORAs): They work provincially.

National Institute of Drinking Water (INAPA).

INDRHI: Delegates actions to the Board of Directors, annual fees are levied and management actions are carried out.

Reforestation Brigades: They are related to the National Quisqueya Verde Plan.²⁸

Sailing Company: Makes contributions in environmental aspects.

The Ministry of Environment and Natural Resources is the rector in the water sector, through the Vice-Ministry of Soils and Waters.

INDRHI is responsible for water infrastructure.

CORAs: They are responsible for the distribution of drinking water.

4.5. Governance

With regard to the issue of governance, the dialogue was conducted at a beginning around the criterion of representativeness at the local level. At this point, the idea was to talk about which institutions are present in the area of interest of the project and what mechanisms exist to manage water and other key resources for adaptation. On this subject, workshop attendees stated the following:

In the basin of the Mao and Guayubín river there is a Board of Regantes, which is responsible for irrigation aspects.

INDRHI sponsors the Board of Directors. In addition, the institution manages dams, infrastructure, maintenance and cleaning of canals, among others.

There is a section called Basin Management, it is located in the Environmental Management Directorate of INDRHI.

INAPA is responsible for bringing drinking water to all territories associated with the basins. They have a territorial presence, through offices in the town halls. Also, there are community aqueducts.

In the basins of the Dajabón, Mao and Guayubín rivers there are NGOs that provide support: for example World Vision, Foundation for Community Development (FUDECO), Iglesias, FUNDEPRODA, Center for Nature Education (In the Mao River basin, they have projects in the basin Institute for Northwest Development (INDENOR) is also located in Mao, Santiago, Montecristi and Dajabón. There is also the presence of the Ministry of Environment and Natural Resources, the MAG, the Agricultural Bank, INAPA, INDRHI, and the Ministry of Public Health.

Border Solidarity in Dajabón, is an NGO that works with the Church in the River Massacre basin; there is also FUNDEPRODA, theChacuey-Mahuaca Basin Council (which has reforestation and awareness projects in 31 communities to which drinking water carries); in

²⁸ It is a social investment project implemented by the Ministry of Environment and Natural Resources aimed at alleviating extreme poverty through reforestation and recovery of green areas.

addition, there is a presence of German cooperation through Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

Regarding the presence of private companies: There are those that sell water in trucks, for example COLA REAL, which is a company that has an incentive to work in the border area. However, they had a 41% production loss because of the water problem. It should be noted that they have permissions to use the resource.

With regard to governance issues, there was a little conversitous approach to which local initiatives are present in the area, for which the workshop attendees indicated:

There is a presence of cooperation: There is the Rio Mao basin project sponsored by the Nature Center. This is an associative and agro-ecological project. There are also the BANELINO and ADOBANANO associations working in Organic Bananaina in the Northwest. This last instance brings together all banana producers in the northwest of the country.

In the Dajabón River basin, aSODEFOREST is located. It has an impact in the upper river basin and handles several data series. In addition, the Sierra Plan, the Yaque Plan(Yaque del Norte) and the Water Fund are present.

At the national level is the Quisqueya Verde reforestation project of the Ministry of Environment and Natural Resources, which has 22 brigades in Dajabón alone. This project has nurseries that produce the plants to reforest.

The ministry also gives seedlings to private actors.

Rural aqueducts were made and administered by PROLINO (Initiatives for communities that had trouble carrying water, extraction wells were built). Also, in the Dam of Monción (Mao – Santiago Rodríguez), there is a Council of Presa that manages its management and has reforestation actions.

In addition, the PROPAGAS Foundation has been implementing reforestation and adaptation projects in the basins of interest.

5. Final considerations and conclusion

With regard to the development of the workshop focused on the pre-selected basins, the following final considerations are raised:

There is a significant obstacle around the scales of information. Much of the necessary information is only found at the country or province level, not the basin.

Information from the San Juan River basin available online is minimal. Further further research is needed and whether studies are available around this basin. Consultants will be conducting bilateral contacts with key informants for this purpose.

Although there are examples of civil associations such as the territories associated with the Dajabón River basin, more needs to be investigated about organizations in the other basins of interest, which may be of great use for the development of Climate Change Adaptation Strategies.

This workshop was useful to identify key players in the Dajabón, Mao and Guayubín basins, to learn about the biophysical context and its interrelationship with social conditions.

On this basis, key informants identified in this workshop will be contacted to expand the information and specific data to be used in vulnerability analysis and feasibility studies in the next stages of this project.

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7. Annexes

7.1. Agenda



Ecosystem-Based Adaptation (AbE) and Transformational Measures to Increase Climate Change Resilience in the Dry Corridor of Central America and the Arid Zones of the Dominican Republic
Expert consultation workshop
Santo Domingo, Tuesday, April 30, 2019.
Agenda

8:30-9:00	INTRODUCCION	
8:30-8:45	Words of welcome Presentation of participants	Ministry of Environment
8:45 -9: 00	Presentation of workshop objectives and methodology	Dr Ruth Martinez, UN Environment
9:00 -10:00	SESSION I: PRESENTATION OF THE INITIATIVE	
9:00-9:15	Problem of the Dry Corridor in a Central American perspective.	Mr. Raúl Artiga, CCAD
9:15-9:30	Presentation of the project	Dr Ruth Martinez, UN Environment
9:30-10:00	Characterization of the basins	Engineer. Olman Varela, UN Environment Expert
10:00-10:10	Questions	
10:10-10:30	Coffee break	
10:30-12:30	SESION II: CONSULT EXPERTS -VULNERABILITY	
10:30-10:40	Introduction to the methodology of the session	Dr Ruth Martinez, UN Environment
10:40-12:00	Group work around: Current and potential impact of climate change Ecosystem degradation Adaptive capacity	Engineer. Olman Varela, UN Environment Expert
12:00-12:30	Plenary: presentation of results	
12:30-1:30	Lunch	
1:30-3:15	SESSION III: CONSULT EXPERTS - RELEVANCY	
1:30-1:40	Introduction to the methodology of the session	Dr Ruth Martinez, UN Environment
1:40-2:40	Group work around: Representativeness Complementarity with other initiatives Institutional capacity at the local level/Governance Financial aspects of the areas	Ing. Olman Varela, B.Sc. Oscar Calvo UN Environment experts
2:40-3:10	Plenary presentation of Working Results in Groups	
3:10-3:30	Next Steps and Closing	
3:30-3:45	Coffee	

7.2. List of participants

The list below includes the details of the participants who attended the expert consultation workshop:

República Dominicana 30 April 2019	Laura Virginia Díaz Rosario	MIMARENA	lauradiazv86@gmail.com
	Dominga Polanco	MIMARENA	dominaga.blanco@ambiente.gob.do
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	Emilio Osario Fernández	Ministry of Environment-Santiago	emilio050@icloud.com
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	Professional staff from institutions involved in this proposal		
	Oscar Calvo Solano	CUDECA	oscar.calvosolano@gmail.com
	Olman Varela Durán	CUDECA	olman.varelad@gmail.com
	Ruth Martínez	UNEP	ruth.martinez@un.org

7.3. Group Worksheet 1

Dimension/ working group	Criteria	Guiding questions	Massacre River Basin (or Dajabón)	Guayubín River Basin	Mao River Basin	San Juan River Basin
Current and potential impact of climate change	Availability of ecosystem services	<p>Agricultural activities Presence of agroforestry Forestry activities Other</p> <p>Drought characterization (current and projected)</p> <p>What's the trend?</p> <p>What studies/data/evidence does it exist?</p> <p>What are the information gaps?</p> <p>Are there experiences in Ecosystem-Based Adaptation ?</p>				
Ecosystem degradation	<p>Remaining ecosystems.</p> <p>Degradation processes .</p> <p>Consequences of ecosystem degradation</p>	<p>What are the barriers to conservation ?</p> <p>-Knowledge and understanding of the impacts of climate change among decision makers</p> <p>-Implementation of existing policies on climate change adaptation</p> <p>-Technical capacity to implement adaptation measures within local communities and institutions</p> <p>Causes and consequences of degradation?</p> <p>What adaptation actions are performed in the area?</p>				

Dimension/ working group	Criteria	Guiding questions	Massacre River Basin (or Dajabón)	Guayubín River Basin	Mao River Basin	San Juan River Basin
Adaptive capacity	<p>Basic needs</p> <p>Access to technical assistance, credits and other resources.</p> <p>Workforce</p>	<p>What types of employment predominate in the region?</p> <p>Do villagers have access to technical assistance?</p> <p>.</p> <p>What percentage of crops in the territory use artificial irrigation?</p>				

7.4. Group Worksheet 2

Dimension	Criteria	Guiding questions
Opportunity	National representation	
	Complementarity with other initiatives	
Institutional capacity at the local level	Financial aspects	What are the main financial organizations? Financing mechanisms? (Credit Options)
	Governance	What is the level of presence and strength of key actors such as community organizations, water or basin committees, producer organizations, etc.?

7.5. Photo Summary

In this section, the photographs below show the process carried out in this workshop.



Source: Own photographs (2019).

7.6. Country-level overview

7.6.1. Poverty:

With regard to poverty, at a general level in the Dominican Republic, in 2011 the country was in the low-middle income category, with GDP per capita being about USD 3,550²⁹ (Ovalles, 2011). In that year, the unemployment rate was considerable (16%) and also had 36% of its population under the poverty line, ranking 20 and 22 out of 126 countries on inequality and greater social gaps respectively (op.cit.).

7.6.2. Economic activities:

With regard to economic activities in the Dominican Republic, Maplecroft (2014) when profiling the country, shows for the year 2013, the breakdown of economic activities in the Dominican Republic:

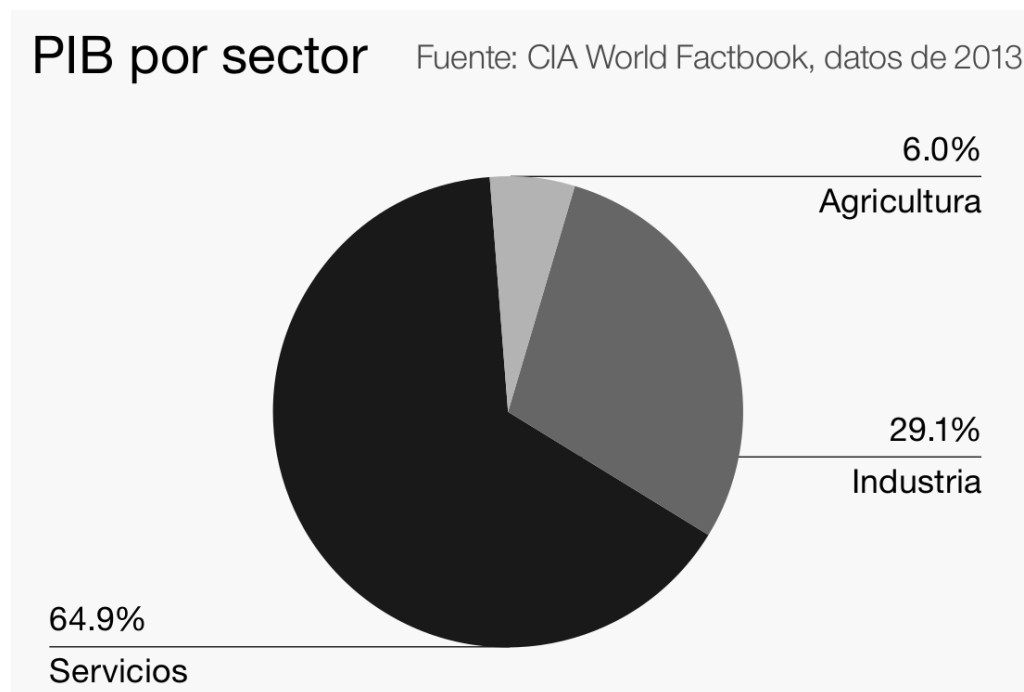


Figure 5. Gross Domestic Product (GDP) by sector in the Dominican Republic.
Source: Maplecroft (2014).

It is important to mention that by 2013, the country has been showing a trend towards the service-oriented economy, representing around 70% of GDP by sector (Maplecroft, 2014).

7.6.3. Population:

²⁹ More up-to-date information on the poverty situation at the country level is provided by the World Bank. By 2017, approximately 30% of the population lived below the poverty line and 2% of the population lives on only USD 2 per day. This information is available at the following link: https://databank.worldbank.org/data/views/reports/reportwidget.aspx?Report_Name=CountryProfile&Id=b450fd57&tbar=y&dd=y&inf=n&zm=n&country=DOM

In terms of population, Ovalles (2011) indicates that by 2011, the Dominican Republic had a population of about 9,378,81930. (CEDAF, 2013). Since the beginning of the second decade of the 21st century, the country has been in a period of demographic transition that, by 2011, had an average annual population growth rate of 1.4% and a population density of approximately 197 inhabitants per kilometer square (Ovalles, 2011).

A display of the population ratio in some of the listed departments can be found in the following figure:

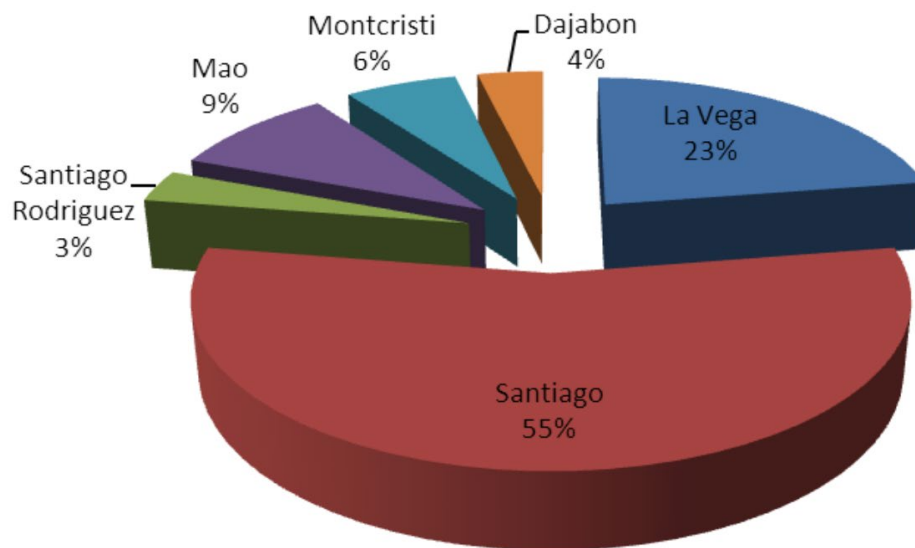


Figure 6. Distribution of the population in some provinces of the pre-selected basins.
Source: CEDAF (2013).

7.6.4. Land use:

With regard to land use, at the agricultural level, by 2015 it was estimated that in the Dominican Republic there was an arable area of about 2.52 million hectares (United Nations Food and Agriculture Organization [FAO, for its 2015]). It was also mentioned that by 2012, there were around 1.3 million hectares cultivated of which 0.8 million corresponded to annual crops and 0.5 million to permanent crops (Op.cit.).

7.6.5. Land tenure:

According to land tenure, Ovalles (2011) indicates that in the Dominican Republic most producers on the slopes do not have legal titles of the land. Therefore, because they do not have a sense of belonging, they do not invest in production; so, this is a factor that decreases investment in the long run.

³⁰ According to the World Bank, by 2017, the Dominican Republic had a population of approximately 10.77 million. Information available at: https://databank.worldbank.org/data/views/reports/reportwidget.aspx?Report_Name=CountryProfile&Id=b450fd57&tbar=y&dd=y&inf=n&zm=n&country=DOM

A similar situation occurs at the tree level with the forest resource. In the country, there are laws establishing as state heritage all trees and forests on both private and public lands (Law 627, of May 28, 1977) (Ovalles, 2011). Therefore, because both the land and the trees belong to the State, the population, mostly rural, lacks any motivation to engage in forest management, since usufruct will not be for their benefit(Op.cit.).

Moreover, in making a deeper description of land tenure in the country, Ovalles (2011) refers that in the Dominican Republic, the land is very concentrated in the hands of few people. This behavior can be seen in the following points (Ovalles, 2011):

50% of the rural population has access to land.

40% of them have less than 1.2 hectares.

74% of them own less than 3.1 hectares.

700 producers control approximately 15% of the territories.

50 large producers have control of more than 1,000 hectares each.

200 families are in control of 600,000 hectares (approximately 50% of arable land).

By 2011, only 40% of private land was qualified.

7.6.6. Water safety:

Ovalles (2011) states that in the Dominican territory at the beginning of this decade there was pressure around the deterioration of water resources reserves and, therefore, increased the cost of water resource and multiplied conflicts. This situation caused the water supply to be uninsured in different regions, specifically in regions where there was a water resource deficit and drought presence.

This low availability of water resources caused human health, reduced ecosystem biological productivity and impaired flows (Ovalles, 2011). There was also a marked deforestation that significantly affected irrigation agriculture, the availability of water and energy, a fact that could be seen from the rivers that began to dry out and, from the decrease in the country's water flows.

With regard to the management of water resources, Maplecroft (2014) refers that at the central level, the following institutions are responsible for this function in the Dominican Republic:

Ministry of Environment.

National Committee on Climate Change and the Model for Clean Development (CDM).

Secretariat of Environment and Natural Resources.

Dominican Corporation of State Energy Companies.

In addition, and, as far as water governance is concerned, at the general level of the country, the Dominican Republic has the following legal instruments to ensure it (Maplecroft, 2014):

National Constitution.

National Action Adaptation Plan.

National Development Strategy 2010-2030.

Climate Compatible Development Plan.

7.6.7. Vulnerabilidad:

With regard to the climate, the Dominican Republic is defined as a tropical climate, with an average temperature ranging from 23o to 33o C. At the general level of the country, precipitation is plentiful; its average annual value is 1,410 mm (FAO, 2015). This represents nationally an annual volume of water of approximately 68,620 million m3. FAO (2015) states that the average rainfall in the Dominican Republic ranges from 350 mm in the Hoya basin of Enriquillo, to 2,743 mm per year in the Cordillera Oriental.

In addition, it is important to mention that its rainy season runs from May to November and the dry season runs from December to March, this being the driest month of the year (FAO, 2015). It also highlights the fact that, in the dry season, the Intertropical Convergence Zone (ZCIT) is the main determinant of weather conditions.

The country is prone to hurricanes and tropical storms (three a year on average), which can cause flooding in vulnerable territories(op.cit).

In addition, the Dominican Republic is one of the countries most vulnerable to extreme hydrometeorological events, including floods and droughts. This vulnerability comes to be understood as the degree of exposure to a risk, to the proximity of a threat either by its geographical location or by the context that brings a certain territory to perceive an event as a threat; It is also associated with aspects such as sensitivity and adaptive capacity (Pérez-Briceño, Alfaro, Hidalgo and Jiménez, 2016).

In relation to the above, for 2014, the Dominican Republic showed the following values around vulnerability:

Table 2
Dominican Republic Climate Change Vulnerability Indexes for 2014

Index	Value	Position in the Latin American and Caribbean region
Climate Change Vulnerability Index	1,01	5
Exhibition	2,28	6
Sensitivity	0,76	2
Adaptive Capacity	2,31	9

Source: Maplecroft (2014).

In addition to the table above, it highlights the fact that by 2014, the country was in the top ten at extreme risk.

7.6.8. Food safety:

On food security, FAO and the Pan American Health Organization (PAHO) (2017) indicate that by 2014, 13.5% of the population in the Dominican Republic had undernourished conditions, which was then equivalent to approximately 1.4 million people.

It is important to mention that institutions such as FAO and PAHO have conducted studies on Food Security in the Dominican Republic. However, it is necessary to delve deeper into aspects such as nutrition, food availability, proportion of food, among others.

7.6.9. Wood cover and land use:

With regard to the Massacre River, according to Dilla et al. (2004) a representation of land uses associated with the territories of the province of Dajabón (traveled by the Masacre River), is as follows:

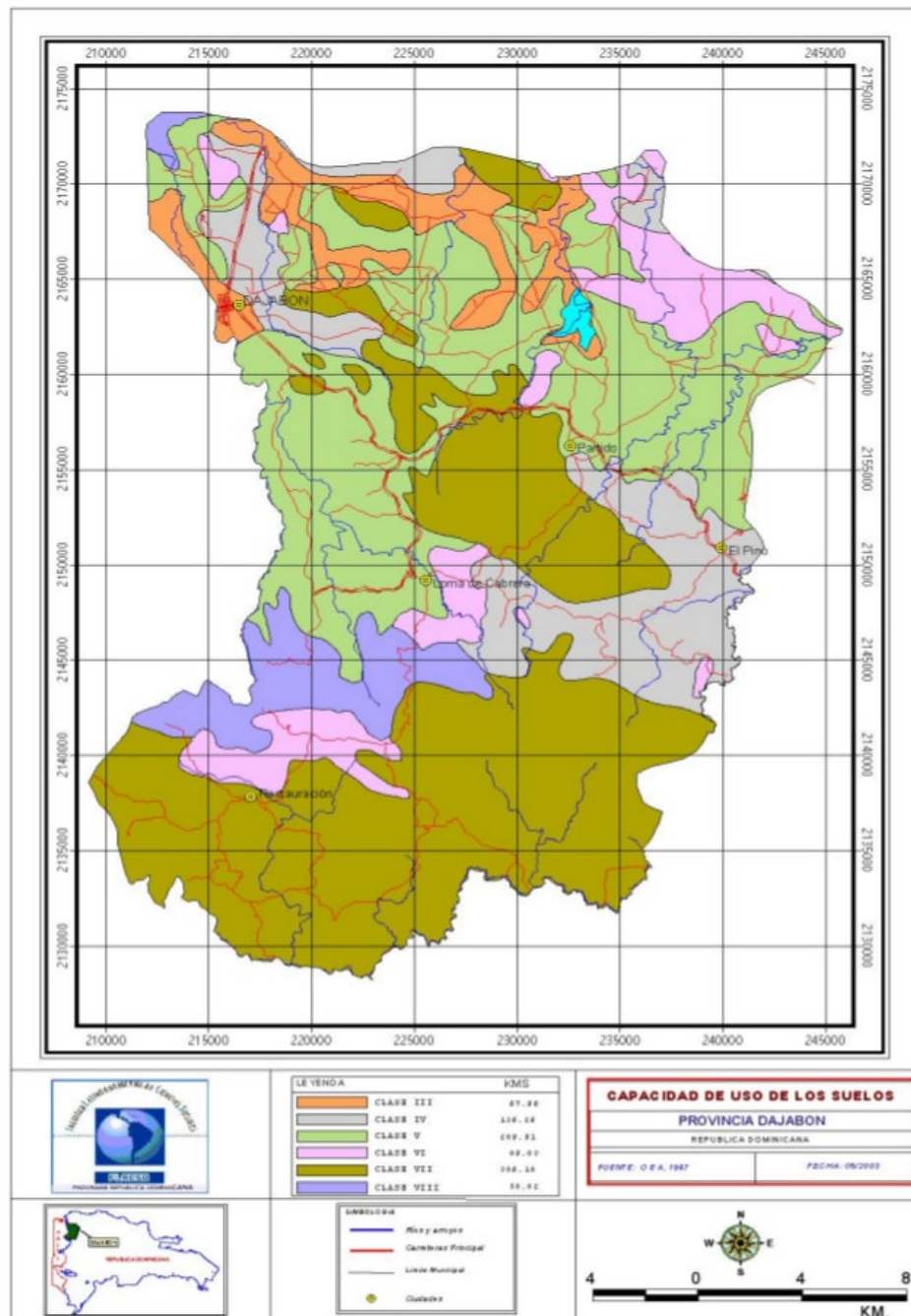


Figure 7. Land use in the province of Dajabón.
 Source: Dilla et al. (2004).

From Figure 7, it can be seen that most of the territory of the province of Dajabón, is located within Class VII (represented in dark green); this means that it presents a very high risk of erosion and is not suitable for agricultural use. It also has limitations for the development of pastures, low forest or logging.

Secondly, it also highlights the high presence of Class V soils (represented in light green), which have a risk of high to non-elevated erosion, are unsuitable for agricultural use but have few limitations in terms of pasture and exploitation of scrubland or forestry. A behavior a little more accentuated but with less presence in the territory of the River Massacre basin, is represented those territories of class VI, represented in lilac color.

Finally, it stands out in the province of Dajabón, the Class III soils, represented in orange in Figure 7, which have accentuated limitations and a high risk of erosion. They are for agricultural use little extensive.

On the other hand, the area intended for the different uses of land and its proportion in the Mao and Guayubín rivers, is shown in the following table:

Table 3
Soil coverage (area and proportion) on the Mao and Guayubín rivers

Soil Coverage	Mao River		Guayubín River	
	Area (has)	Percentage (%)	Area (has)	Percentage
Water	789	0,94	65	0,09
Cloud Forest	7.762	9,29	604	0,79
Conifer Forest	22.287	26,67	3.520	4,59
Wet Forest	19.482	23,31	14.847	19,38
Semi-Wet Forest	4040	4,83	2.920	3,81
Coffee	674	0,81	576	0,75
Dry Forest	11.397	13,64	6.815	8,89
Latifoliado matorral	2.275	2,72	3.834	5
Dry scrub	2.003	2,4	2.517	3,29
meal	3.881	4,64	9.934	12,97
Agriculture	6.543	7,83	20.049	26,17
Scarce Vegetation	1.240	1,48	9.123	11,91
No Vegetation	224	0,27	1.366	1,78
Populated Zone	973	1,16	445	0,58
Total	83.570	100	76616	100

Source: CEDAF (2013).

From Table 3, it can be seen that for the territories associated with the Mao River, most of these are covered by coniferous forests, followed by wet forest and dry forest. It also highlights the minimal presence of water bodies, coffee plantations and land without vegetation (CEDAF, 2013).

Similarly, as far as the Guayubín River is concerned, the territories associated with this basin are mainly covered by farms, wet forest, pastures and land with little vegetation. In addition, a minimum presence of water bodies and coffee plantations(op.cit.)standsout. It is important to mention that Table 2 shows that the territories associated with each of the basins are minimally populated (CEDAF, 2013).

By 2013, the Yaque del Norte River basin (to which the Mao and Guayubín rivers belong) had a conflict of interest in land use on approximately 38% of its area, as about 14% was considered over-used and close to or n 24% was valued as underutilized (CEDAF, 2013). The upper part of the basin was more overused. CEDAF (2013) refers that within these territories were the areas associated with the basins of interest of Mao and Guayubín, which had values close to 11% each. It also emphasizes that the basin of the Guayubín River also has about 35% underutilized area, however, this behavior occurs in the lower part of the basin(op.cit.). A representation of land-use conflicts in the Yaque del Norte basin is as follows:

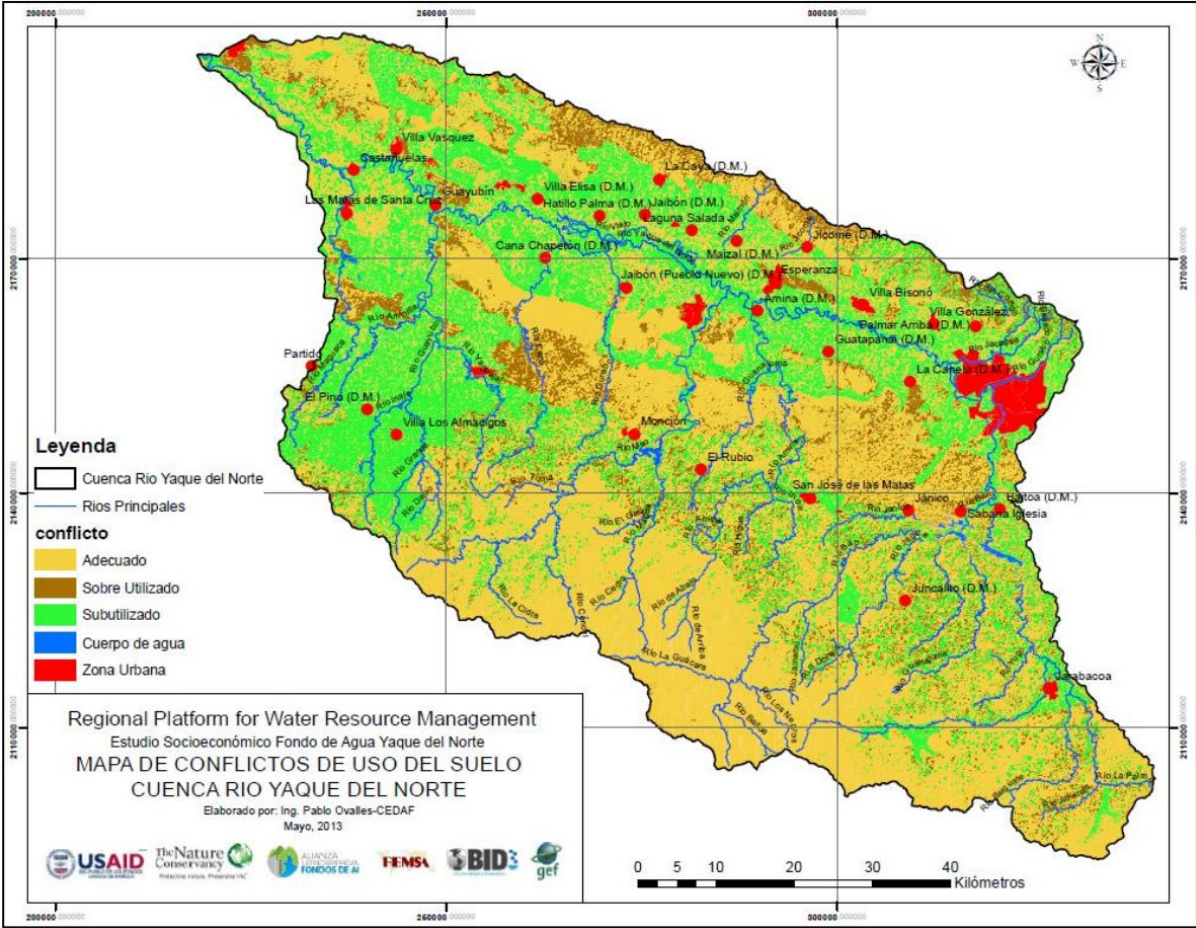


Figure 8. Land use conflicts in the watershedYaquefrom the North.
Source: CEDAF (2013).

The breakdown of the conflicts described above is shown in the following table:

Table 4

Percentage of area with respect to land use conflicts in the Mao and Guayubín rivers

Land use	Mao River	Guayubín River
	Area Percentage (%)	Area Percentage (%)
Suitable	77,5	53,5
Doesn't apply	0,9	0,1
Sobreutilizado	11,3	11,2
Underutilized	9,1	34,6
Urban Area	1,2	0,6
Total	100	100

Source: CEDAF (2013).

It is important to mention that, this type of conflict arises when the current use of the soil does not correspond to the potential use of the same, that is, that the requirements of the established plant cover are different from the natural capacity offered by the soil. In this regard, in Table 4, the basin of the Guayubín River stands out, with approximately 35% of its underutilized soil (CEDAF, 2013).

It is also key to note that, in the Basin of the Yaque del Norte River, the sub-basin containing the largest forest cover is that of the Mao River, with approximately 78% (CEDAF, 2013) and the subbasin of the Guayubín River is the one that is in the fourth place of wood cover, as it has about 37%(op.cit.).

S2. Community Consultation Workshops

Guatemala

LOCAL CONSULTATION WORKSHOP Results report

1. General data

Date	22-10-2019
Country	Guatemala
Workshop location (*)	Hotel Gumarkaaaj, Santa Cruz del Quiché, Quiché
Number of participants (**)	Total 29 → Women 01; Men 28
Municipalities represented	Chicaman, Uspantán, San Andrés Sajcabajá, Zacualpa and Canillá came only one representative.
Organizations/groups represented	44.8% of public institutions such as MARN and MAGA 27.6% of municipalities 27.6% of Community participation through Community Development Councils (COCODE)

(*) Annex 1: photographs of the workshop

(**) Annex 2: list of participants

2. Land use

A Land use in selected municipalities

Ecosystem/agro-ecosystem identified	Comments / Specifications (e.g., main mentioned characteristics or indicated crops/species)
Conifer forest	<p>Found in the municipalities of Zacualpa, Canillá, San Andrés Sajcabajá and southern part of Chicamán and Uspantán.</p> <p>In Zacualpa: mixed forest with species of male pine (<i>Pinus montezumae</i>), red pine or ocote (<i>Pinus oocarpa</i>) and oak or oak (<i>Quercus peduncularis</i>).</p> <p>In Canillá: the forest has been affected for several years by the plague of the pine weevil (<i>Dendroctonus</i> spp.).</p> <p>In San Andrés S. in the upper part of the municipality there are mixed forests with species such as Aliso, oak and pine. In other areas of the municipality there are ixcanal, cactus and ceiba.</p> <p>According to the INAB species register, the most common species in this municipality are: Male Pine (<i>Pinus montezumae</i>), Encino (<i>Quercus peduncularis</i>), Red pine/ocote (<i>Pinus oocarpa</i> ()), Aliso (<i>Alnus acuminata</i>), Naked Indian (<i>Arbutus xalapensis</i>), Palo de Nenes (<i>Erythrina berteroana</i>), Acacia (<i>Acacia mangium</i>)</p>
Latifoliado forest	<p>In the central and northern region of the municipalities of Chicaman and Uspantán there are latifoliated forests. Most common timber species: Cedar (<i>Cedrela odorata</i>), Chalum (<i>Inga vera</i>), Chaperno (<i>Lonchocarpus santarosanus</i>), Guarumo (<i>Cecropia peltata</i>), Granadillo (<i>Platymiscium yucatanum</i>), Inga (<i>Inga</i> spp.), Liquidambar (<i>Liquidambar styraciflua</i>) , Palo Moco (<i>Saurauia oreophila</i>), Pito Stick (<i>Erythrina berteroana</i>), Paterna (<i>Paterna Inga</i>), Santa Maria (<i>Calophyllum brasiliense</i>) and Zapotillo (<i>Pouteria izabalensis</i>).</p>

Ecosystem/agro-ecosystem identified	Comments / Specifications (e.g., main mentioned characteristics or indicated crops/species)
	Non-timber species: Chupte (<i>Cyathea arborea</i>) and Xate (<i>Chamaedorea oblongata</i>).
Subsistence agriculture	Planting of corn and beans in all communities. In recent years they have lost part of the harvests and this year the losses exceed 80%. Within this agro-ecosystem is also located the production of coffee, family orchards in winter season and native plants, all for family consumption.
Commercial agriculture	Only 2 of the 5 municipalities reported having commercial agriculture: - <u>Zacualpa</u> (tomato in greenhouses and open air). - <u>San Andrés Sajcabajá</u> : <ul style="list-style-type: none"> Sweet cane (formerly produced panela, now only for local cane consumption), Peanut is planted in two communities and is marketed in the municipality of Sacapulas Tomate is produced where there are irrigation systems such as in Tolonaquiqué and Tiquillá villages (for local market and surrounding municipalities) Potato and cabbage (commercial use and family consumption). Cibaque: <i>Cyperus canus</i> JS., to make petates, hats and basketry (crafts)
Agriculture for export	In two municipalities, the planting of crops for export was reported: - <u>Zacualpa</u> : In the middle part of the municipality, in villages Chichás, La Vega and Calcal you can find the cultivation of French greenish (<i>Phaseolus vulgaris</i> L.). They have 3 collection centers where AGEXPORT collects the product. Rejection is sold in the local market. - <u>Chicaman and Uspantán</u> : In the northern part of the municipalities there is a cardamom producing area for export that if it generates economic income (cardamom/canxan association).
Agroforestería	- <u>San Andrés Sajcabajá</u> : agroforestry crops of avocado and peach - <u>Chicaman and Uspantán</u> : the cultivation of cardamom is carried out in an agroforestry partner with canxan trees, plantains and bananas.
Livestock System	A fairly strong agro-ecosystem in Canillá is the vaccine livestock for meat and milk production, it is marketed locally and in surrounding municipalities. Most are natural, although in some areas they already grow improved pastures and there are living fences with dual purposes. They have a pasture irrigation system. There is no deliberate agrosilvopastoral system ^{*31} .
Irrigation system / Rivers	In Canillá they identified a mini irrigation system, which dates back many years and has deficiencies in the operation, but which serves mainly for the irrigation of grass and in some areas basic grains. In Chicaman and Uspantán they have a range of rivers with potential for gravity irrigation, fish production and human consumption.
Family farming	Most families in the countryside have a goat or a cow. When a baby is born, milk is sold and consumed in the family. The practice of selling what is born has kept stability.

³¹ In Guatemala, the national strategy of sustainable Bovine livestock with low emissions was published in February 2018 to develop the National Bovine Livestock Policy (MAGA, 2013), which together make up the nationally appropriate mitigation action (NAMA) of sustainable livestock. The implementation of the strategy has a horizon of 15 years, the first period of 10 years prioritizes the territories of southern Petén, Izabal and high Verapaz, and over the next 5 years the implementation would be expanded to the East, South-East and south west of the country.

Ecosystem/agro-ecosystem identified	Comments / Specifications (e.g., main mentioned characteristics or indicated crops/species)
Yard birds	Production of poultry such as hens, ducks, chuntos (chompipes or turkey), for family consumption. Facilitates the consumption of protein (meat and eggs).

B Benefits perceived by the local population

Ecosystem/agro-ecosystem identified	Perceived benefits and uses
Conifer forest	<ul style="list-style-type: none"> - Municipal shipyard from where they extract firewood and wood for family consumption - Conservation incentives by INAB - Municipal Nursery gives away plants to repopulate the Shipyard - Family consumption - Protecting water sources
Latifoliado forest	<ul style="list-style-type: none"> - Firewood - Wood - Nursery - Native seeds - Soil conservation - Water recharge - Oxygen production
Subsistence agriculture	<ul style="list-style-type: none"> - Foodsafety/family consumption and job creation when maize and beans were harvested - Coffee for family consumption - Medicinal plants - Family orchards in winter season - Jocote
Commercial agriculture	<ul style="list-style-type: none"> - Trade and economic benefit - Family trade and consumption
Agriculture for export	<ul style="list-style-type: none"> - Generating economic income - Job creation - AGEXPORT collection centres
Agroforestry	<ul style="list-style-type: none"> - Have products such as plantains and bananas for family consumption and local sales - Generating economic income - Job creation
Livestock System	<ul style="list-style-type: none"> - Local sale and surrounding municipalities - Cows, meat and milk - Grass production for local animal consumption
Irrigation system / Rivers	<ul style="list-style-type: none"> - Irrigation - Fishing - Electric power - Water purification - Water consumption
Family farming	Family consumption and marketing
Yard birds	Family consumption and marketing

3. Local perception of climate change

a) Perceived changes in the climate

Changes in precipitation (intensity, frequency)	<ul style="list-style-type: none"> - It no longer rains normally between May and October (first it started to drop little water and instead it started in May, the first rains ran until July). - Expansion of the canicle (previously thought of a 15-day canicle, now it is like a summer of 2 or 3 months) - Reduction of rainfall
Changes in temperature	Sudden temperature changes (warmer and colder)
How long have these changes been observed?	For several years (between 3 in Chicaman-Uspantán to 7 years in San Andrés Sajcabajá)
Are (agro) climate phenomena mentioned? Eg. El Niño	They didn't mention it in any group.
Other climate changes mentioned	Increased strong winds

b) Perceived impacts on ecosystems/agro-ecosystems

Ecosystem /agro-ecosystem	Impact of climate changes
	(Try specifics, not just agroclimatic generalities)
Agriculture in general	<ul style="list-style-type: none"> - Low yields of all crops, especially in maize and beans - Total crop loss - Increased pests in crops (cogollero worm) and in the forest (pine weevil) - Increase in diseases - Increased strong winds causes loss of commodity grain crops and productive infrastructure - Less use of agrochemicals due to the increase in the value of the same
Forests	<ul style="list-style-type: none"> - Increased pests such as pine weevil - Deforestation - Increase of forest fires, no longer only from November to March, but now there is between June and August - Increased strong winds causes loss of trees in forests - Increased agricultural border by high deforestation (they now grow basic grains on 45-degree slopes)
Water	<ul style="list-style-type: none"> - Births are drying out - Loss/reduction of river flow and other bodies of water (wells and births)
Soil	<ul style="list-style-type: none"> - Soil loss - Deslaves for heavy rains

c) Perceived impacts on the population

	In the lives of men	In women's lives
Impacts on household chores		Increased household chores (previously there was immediate water availability to homes, now it takes 2 hours to bring it from rivers)
	Exploitation of children, as parents migrate, girls now have to do household chores or some other sales activities (attention to the public), to generate income for the family.	
Impacts on agricultural/labor work	Men migrate to: <ul style="list-style-type: none"> - coffee and sugar farms, - to other countries (the US mainly) to support the family 	Increased participation of women in agricultural tasks (clean, planting, incorporation of inputs).

Economic impacts	- Economic losses from crop loss Economic losses from the purchase of pipewater (tanks) or bottled water.
Health impacts	- Increased chronic malnutrition - Increased Food Insecurity (INSAN) - increase in diseases in children and adults due to sudden changes in temperature
Other impacts	- Increasing poverty - Road obstruction by landslide - Economic loss from drinking water purchase - Exploitation of children

d) Proposed adaptation measures

Proposed adaptation measure	Justification (impact of climate change that the measure seeks to address)
Restoration of forest cover	Drought/slipping/strong winds
Rainwater harvesting/harvesting	Drought / canicle enlargement / precipitation reduction
Sustainable forest management in primary and secondary forests	Drought/slipping/strong winds
Forest Fire Management (Fire)	Deforestation due to forest fires
Silvopastoral systems <ul style="list-style-type: none"> - Trees scattered in grasslands - Live fences 	Landslides and drought Strong winds Strong winds
Improved or efficient stoves	Deforestation by consumption of firewood / Expansion of the canicle / reduction of precipitation
Water reservoirs	Improving human consumption
Drip irrigation systems	Increase the productivity and yield of agricultural crops and livestock pasture
Soil conservation practices	Soil loss / canicle enlargement / precipitation reduction
Training on climate change adaptation	Expanding the canicle / reducing precipitation
Agroforestry systems <ul style="list-style-type: none"> - Coffee renovation 	Expanding the canicle / reducing precipitation
Mixed nurseries	Drought/slipping/strong winds

4. Previous examples of adaptation in the area

Adaptation strategy/measure implemented	Impacts of measurement on ecosystems/agro-ecosystems	Impacts of measurement on the lives of men and women
Reforestation	Very recent to evaluate, apparently it was unsuccessful. The Catholic Church, cooperatives and the municipality participated	
Rainwater harvesting/harvesting	In San Andrés S., it has only been carried out in three cases with the MAGA. It's not representative to evaluate. In Chicaman and Uspantán, rain harvests have been carried out on roofs, cisterns and reservoirs with a	Improves access to water in housing Improves production and economic income Increases consumption

	municipal budget. ³² It's been a very successful project. If water is available for irrigation, production is more stable.	
Sustainable forest management in primary and secondary forests	Municipal nurseries helped reforest areas	Reduction in family consumption of firewood
Soil Conservation	Live and dead barriers have been made through MAGA and Municipality trainings. Initially it was an FAO project that introduced the subject through workshops and trainings. These measures help reduce soil erosion and loss of fertility.	Improvement in production and therefore in the family economic income. Reduction of costs in the purchase of fertilizers.
Coffee renovation	It has been made in Chicaman and Uspantán at the level of private estates (individuals), but is not widespread for its high cost.	
Mixed nurseries	It has been done through the Municipality and involves more reforested area	Increase in forest mass that is used as firewood for family consumption
Silvopastoral systems -Living fences	It has been done to delimit plots and livestock feed	
Improved or efficient stoves	Reduction in wood consumption	Avoid respiratory diseases

5. Project sustainability

a) Perception of components and activities

Component activities	General appreciation of effectiveness/feasibility
1. <i>Financial mechanism:</i> financial products and services established and operational to finance <i>EbA investments, including access to funds and lending mechanisms.</i>	<p><u>Large-scale interventions in publicly owned areas:</u></p> <ul style="list-style-type: none"> - The PROBOSQUE³³ law aims to increase forest coverage through forest incentives for the establishment, recovery, restoration, management, production and protection of forests in Guatemala. - Local community or municipal reforestation experiences in water recharge zones, called "payments for environmental services" where users of water systems pay a fee for the purchase of plants to forest the water recharge zones. Exercise in the municipality of Santa Cruz del Quiché, 71,000 trees of wood species (75%) were planted 25% fruit trees. The project emerged as an initiative of the Water Unit of the municipality. This model is being replicated in San Andrés Sajcabajá, Chicamán and Zacualpa, each municipality schedules annually the production of nursery plants to repopulate water recharge areas. - A participant in the workshop raised the idea of carbon bonds, for which it was possible to identify the areas with forest and start working them so that in the future carbon capture can be sold as an environmental service within the framework of the project.

³² It is important to note that according to recently published population census 2018 information, the main source of water for consumption in Chicaman comes from the collection of rainwater, which corresponds to 30% of the population (2,265 households) of the total reported households of 7,451. Second, homes that are supplied with water through pipes appear in the home (29%) and another 26% do so through pipes outside the home.

³³ "Law on the Establishment, Recovery, Restoration, Management, Production and Protection of Forests in Guatemala - PROBOSQUE-" (Decree 2-2015 of the Congress of the Republic).

	<p>The general appreciation of the use of PROBOSQUE as a mechanism for sustainable forest management is entirely feasible, provided that the project supports training processes and elaboration of management plans for the areas identified.</p> <p><u>Interventions at the farm or farm/livestock level, what are the financial mechanisms they commonly use?</u></p> <ul style="list-style-type: none"> - The PINPEP³⁴ Act: forest incentive program for holders of small tracts of land of forest or agroforestry vocation, aimed at people who own land less than 15 hectares, paying them to plant trees or give manage natural forests. - All municipalities agreed that most productive experiences or projects carried out at the farm level are done with municipal budgets (social investment projects) or with a government budget of the MAGA. - With cooperatives that exist in municipalities it is more difficult for people to have access to credits, because they ask for requirements that they cannot meet, such as the tenure of land ownership (they have public deeds that have not been registered in the Register General of the Property). In San Andrés Sajcabajá there is a very strong cooperative, but it only works in productive communities (those that have access to irrigation and produce commercial and export crops). - Loans to the word (without any guarantee or requirement) to 10% monthly interest, in some cases, 10% at 22 days. It is not a bank, nor cooperative, nor association, they are private individuals who are offering the loans (loan sharks). - With banks it is very complicated and many requirements, it takes up to 3 months to authorize a credit. - In most cases, people sell some animals so they can buy the minimum supplies for production. - In Zacualpa the municipality subsidizes fertilizer at a low price, to improve the crops. - In Chajul (outside the 5 priorities) the Ministry of economy donated funds for a medium-scale, community-managed, community-management hen project and the benefit is equitable for all. Some attendees indicated that this model could be applied in the 5 prioritized municipalities, through women's organizations that are better managers and others indicated that these global projects generate a lot of nonconformity in communities and prefer that projects be individual. - In San Andrés Sajcabajá there is a women's organization that has access to credits to make handicrafts, where they recover the capital and have a little profit for the family. - In Uspantán, the Municipal Women's Office and INTECAP have trained various groups of women in the production of shampoo, odor soap, ball soap and in the use of new molds to renew the basketry to which they were dedicated with cibaque (now plastic baskets). In this project they did not have access to credits, only municipal support. Courses are also offered on handicrafts, crafts, pastries, clothing, etc. - CARE worked with communal banks and it was a success to give loans to women because the late payment rate in this population was zero. While working with men the late payment rate was high. - The opinion of the participants in the workshop is that Quiché in past years, for political reasons, has always been subsidized and would have to change that situation. If this project brings any benefit, let the community also work and feel the taste of what they are earning, such as the topic of food for work. If this project is going to provide some equipment, we must condition the support that reaches the communities so that they can be productive and that at the moment the project closes in 7 years, they are strengthened and no longer dependent on any institution.
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³⁴ Forest Incentives Act for holders of small tracts of land of forestry or agroforestry vocation (PINPEP- (Decree No. 51-2010 of the Congress of the Republic).

	<ul style="list-style-type: none"> - Chicaman made a proposal to establish tripartite models of cooperation (municipality, communities and project), since this figure is effective, people fall in love with what they are doing, it is not the same as giving things, instead when it has cost them has a value-added and put more effort into it.
<p>2. <u>Strengthening technical capacity:</u> local governments, farmers and rural communities to implement EbA and other adaptation measures.</p>	<ul style="list-style-type: none"> - Technical training is very limited. In Chicaman the agricultural training is carried out by the MAGA with 1 extensionist and the municipal Agroforestry Unit with 3 technicians. So 4 people must serve 86 communities. There is no capacity to attend to them all, a technician can serve up to 10 organized community groups. - Currently, the issue of efficient stoves, is handled through the Brigades of the PeaceCorps. - There is no training in business generation, forest management, sustainable wood and wood production, water management, fire management, or in general environmental issues.
<p>3. <u>Information on climate change adaptation</u> and its funding disseminated throughout the region and incorporated into local and national policies.</p>	<p>The regional theme on how information on what is happening in each of the 7 countries participating in the project will be addressed at the ministry level.</p>
<p>4. <u>Implementation of adaptation actions</u> (which we have been discussing this morning): large-scale adaptation interventions implemented in seven basins in the Dry Corridor.</p>	<p>This component will also be worked bilaterally with the participating countries, it needs to be defined in more detail.</p>

b) Perceived barriers and mitigation strategies

Component activities	Existing barriers or difficulties that could arise	Strategies for tackling barriers
Sustainable forest management in primary and secondary forests for sustainable production	Lack of knowledge and technical support for forest management	<ul style="list-style-type: none"> - Training municipal staff and communities in sustainable forest management. - Access the PROBOSQUE Forest Incentives Program
Forest fire management / wildfires	<ul style="list-style-type: none"> - There are no forest fire brigades, no budget. But the main barrier is training. - There is no full identification of sacred sites in natural forests, including in water-loading areas, so the firewall measure and its actions cannot be applied because it depends on the local Indigenous Authorities 	<p>Create municipal fire brigade with municipal budget.</p> <p>Develop a joint forest management strategy that respects the culture and identity of peoples</p>
Coffee renovation	Rust disease is a problem nationwide and particularly in the municipalities of Uspantán and Chicaman	The only way out is the renovation of coffee plantations with rust-resistant species
Banks of ancestral seeds and improved seeds for adaptation	In basic grains we use only Creole or native seed already worn and with low yields	<ul style="list-style-type: none"> - Selection of the maíz cultivation of Semillas³⁵ - Crop diversification

³⁵ Low-cost maize breeding method used for the maintenance of Creole varieties.

Component activities	Existing barriers or difficulties that could arise	Strategies for tackling barriers
Establishing agroforestry systems	<p>In the application of agroforestry systems in water refill areas, the main difficulty is that in the upper part sometimes the soil is rocky and it is not so easily the trees adapt to that type of soil.</p> <p>In trees scattered in grasslands, the main difficulty is the acceptance of people. They're going to say they're not going to have that much land to put my animals to graze anymore.</p> <p>The dry corridor is affecting the lower parts of our regions</p>	<p>Investigate which species of trees adapt to areas (mountainous/rocky soils).</p> <p>To make an awareness campaign for the farmers of Canillá mainly, so that they accept the introduction of trees scattered in their plots.</p> <p>Use fruit trees to diversify income</p>
Installation of photovoltaic water pumping systems	Because of the drought, the amount and frequency of precipitation has decreased and there is no water available for crops	<p>It is thought of a tripartite system, in which the Municipality, the project and the population participate.</p> <p>Where the project provides pumping systems, the Municipality provides equipment, pipeline and catchment tanks and the population provides the labor with some food figure for work. This arrangement to be able with several irrigation stations in the municipality.</p>
Drip irrigation	Because of the drought, the amount and frequency of precipitation has decreased and there is no water available for crops	Install drip irrigation systems for crops.
Ecotourism	In Canillá, Uspantán and Chicamán there are protected areas: private, public and community, the latter two do not have the proper infrastructure, nor are there management and administration projects, which can lead to loss of natural resources	Offer existing ecosystem services to visitors, for local tourism in natural ecosystems
Protected agriculture	Commercial crops such as open-field tomato are more susceptible to crop losses due to pests and diseases that develop at high temperatures	Implement the installation and use of "Mesh Houses" (metal structure covered with plastic mesh, which allows water to enter the interior), or greenhouses that adapt to the place where they are to be built, the main problem of greenhouses is that they lack a ventilation system.
Reforestation	People continue to deforest forests, mainly for the use of firewood (the region's main energy source).	Establishment of plantations of species that provide firewood (native species)
Water collection systems for irrigation	Because of the drought, the amount and frequency of precipitation has decreased and there is no water available for crops	Expansion of water collection systems: in our communities some people already collect rainwater but for consumption, but if we expand these collection tanks we can already use it for irrigation for agricultural uses.
Efficient biomass stoves	- Continue to use traditional open stoves, will increase the deforestation of forests by the high consumption of firewood.	Implement the use of improved stoves

Component activities	Existing barriers or difficulties that could arise	Strategies for tackling barriers
	- The main difficulty is obtaining resources to cover installation costs.	Resource management to implement this measure
Soil conservation practices	Soil conservation practices are hard work and we look at it as a difficulty that there is no incentive or payment for communities to do this work.	To implement soil conservation practices, a fund should be created to incentivize people and such practices.

c) Sustainability Actors

- Describe the actors that the population considers should be involved in the components/activities to ensure the sustainability of the project.

Access to the forest incentive programme for the sustainable forest management of the region's natural forests requires the active participation of the Municipalities, indigenous mayors of each municipality, INAB, and communities that they use the forest as a source of wood and firewood, and those that live in them.

In the case of communities, it would be necessary to make a thorough mapping of the type of organization to which they belong, because in the workshop it was not very clear whether they are organized as associations or if they only participate in the System of Development like COCODES.

They also identified local Catholic churches as a reliable source for training (has the infrastructure and provides other training services).

For the rest of the activities, municipalities play a keyrole, government institutions such as MAGA (through rural extensionists and the creation of Learning Centers for Rural Development (CADER), INAB (as the one who provides the licences for sustainable forest management and implements the forest incentive programme), MARN and NGOs with a local presence in municipalities.

d) Key policies

- Describe local development policies or plans related to project components/activities.

This was not discussed in the workshop.

6. Financial mechanisms

Describe the financial mechanisms that are normally used in the area. What kind of financial institutions are present? What could be interesting to participate in the project?

The various most frequently used financial mechanisms were developed in Chapter 5, literally (a) and (b).

7. Other

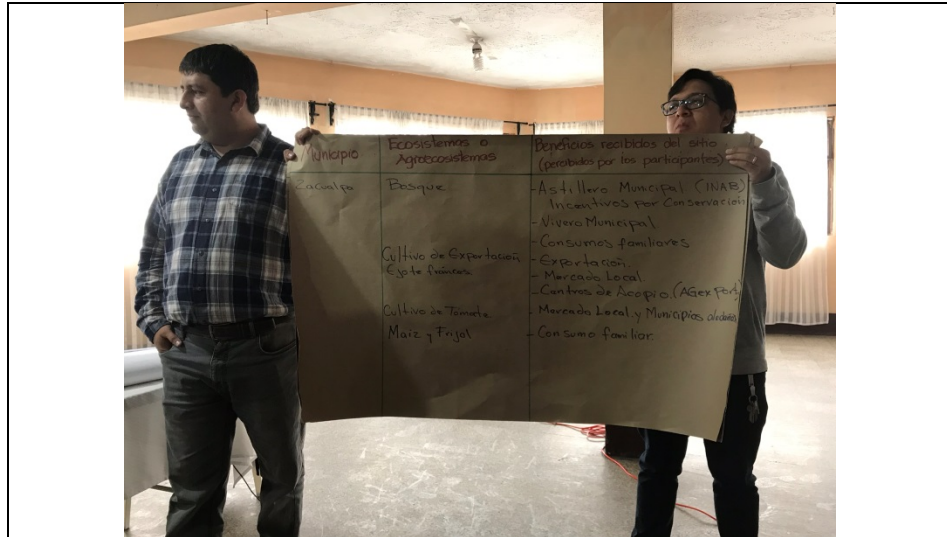
Describe other topics of interest or concern of participants in the context of the projector

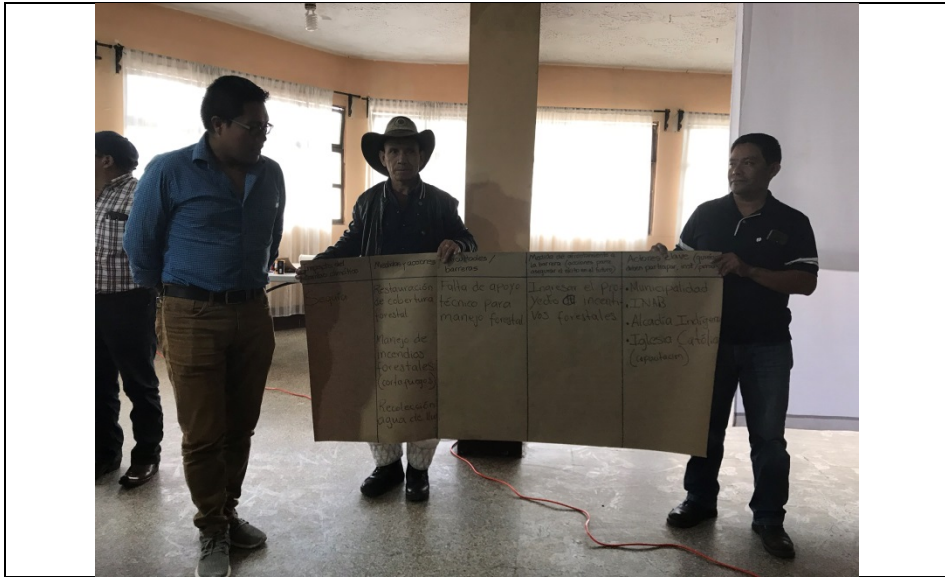
The chicaman's municipal representative proposes that a study be done within the framework of the project to delimit the border of the Dry Corridor, because year after year it is expanded. It makes the reference that 3 years ago they had 17 communities within the corridor and now there are 23.

Annex 1

Photographs from the workshop



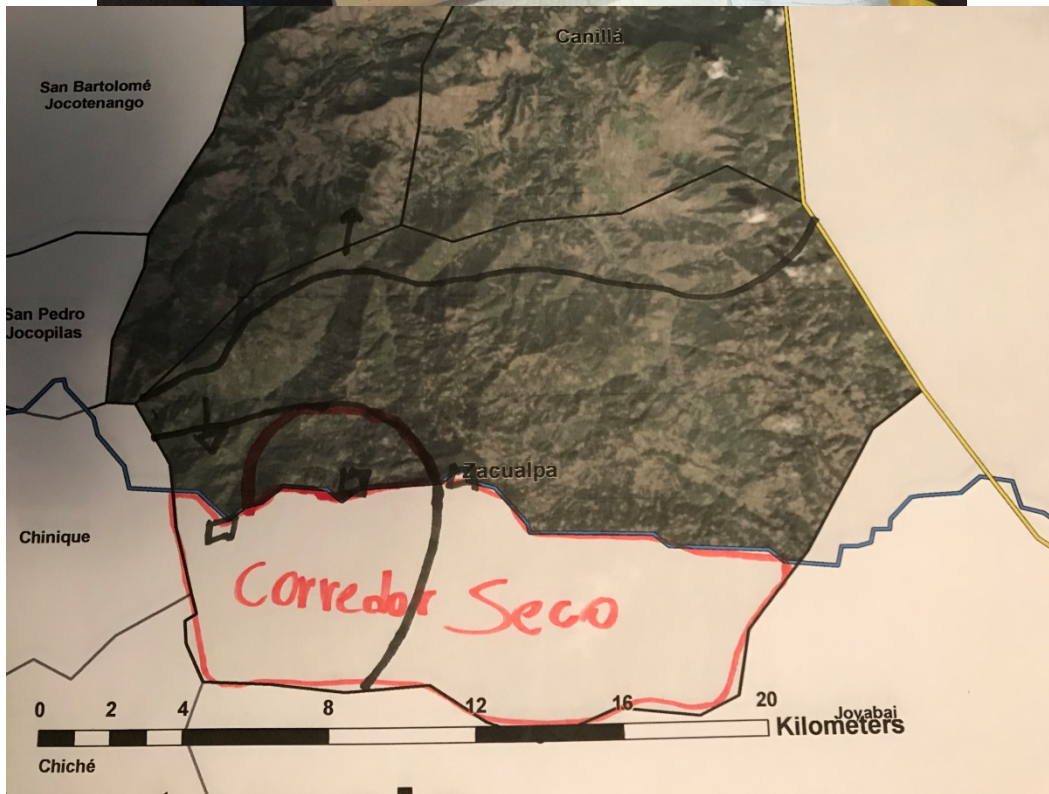




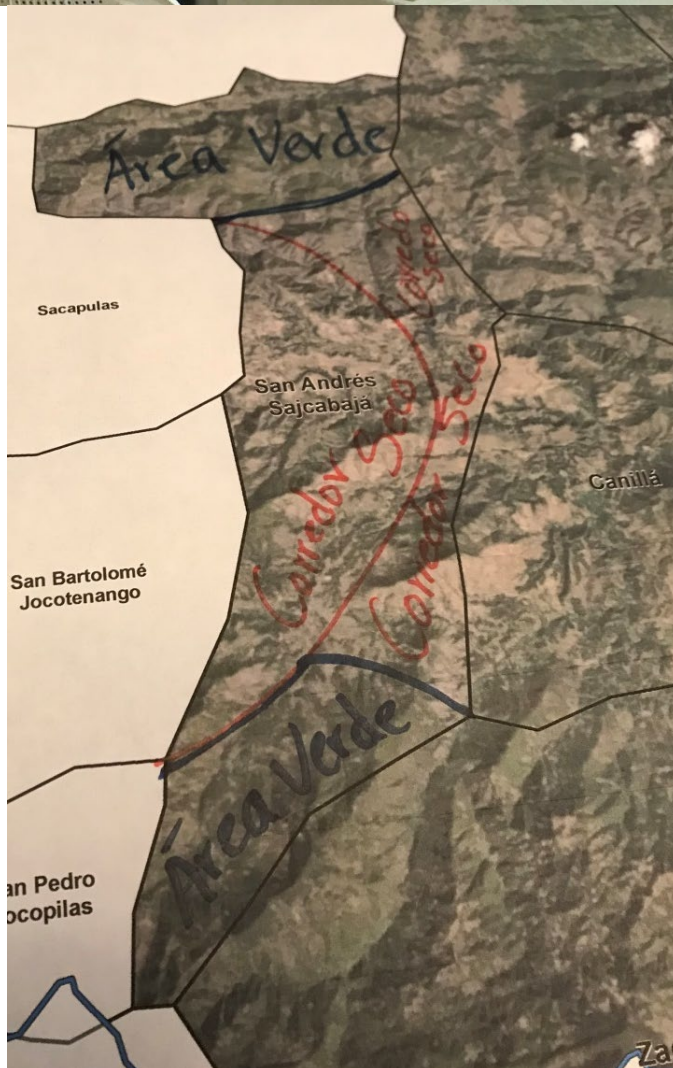
1st exercise

Identify ecosystems and agro-ecosystems (where there are forests, rivers, pastures, crops)

Group No. 1: Canillá and Zacualpa

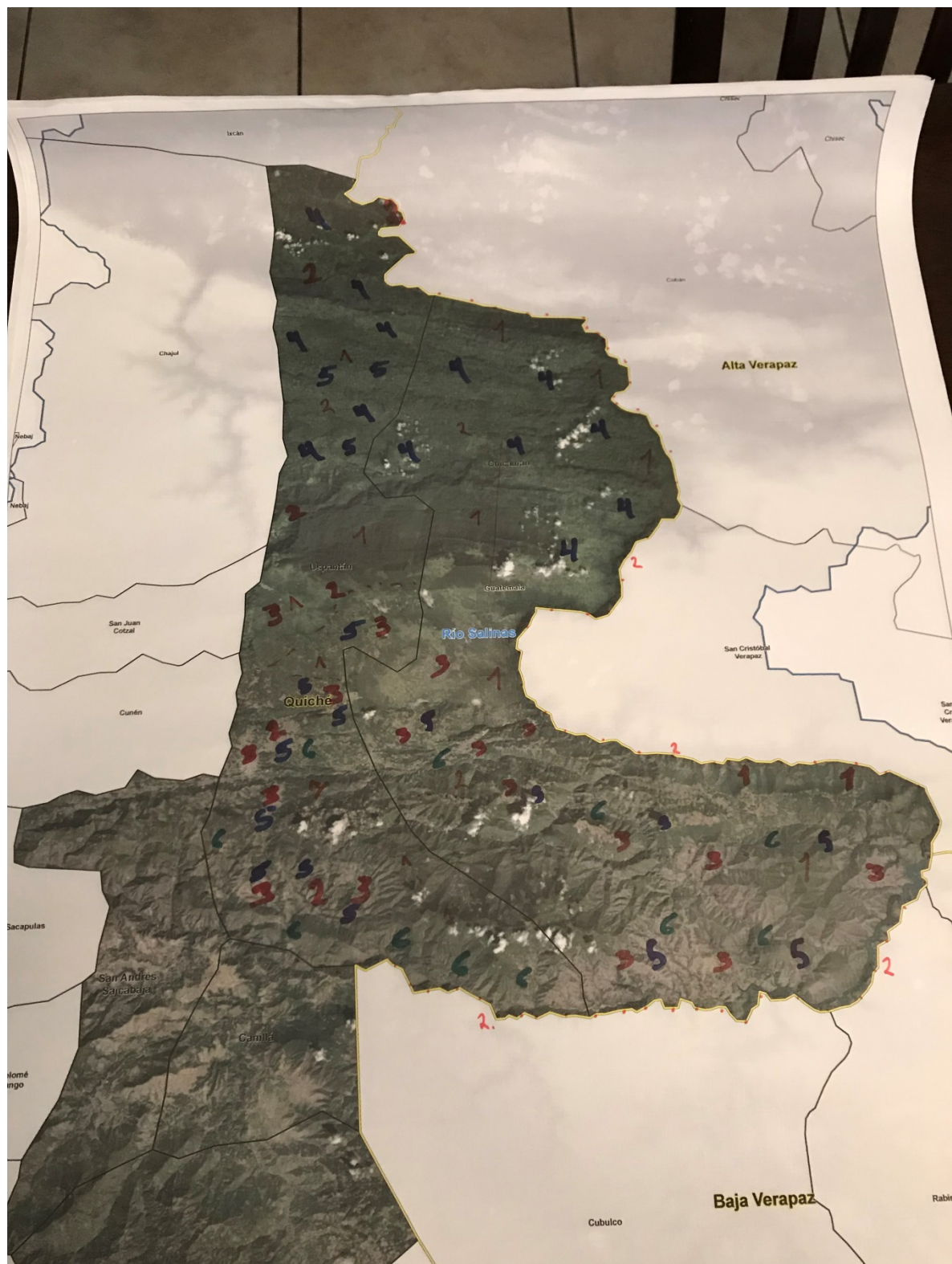


Grupo No. 2. San Andrés Sajcabajá



Group No. 3: Chicaman and Uspantan





Annex 2

List of participants

Guatemala 22 October 2019	Izabel de León Pérez	San Andrés Sajcabaja COCODE	
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Honduras

Honduras LOCAL CONSULTATION WORKSHOP Results report

8. General data

Date	October 14, 2019
Country	Honduras
Workshop location (*)	Hotel El Jicaral, Choluteca
Number of participants (**)	Total 33 → Women 8; Men 25 (plus two facilitators)
Municipalities represented	Choluteca, Marcovia, Duyure, Morolica, Apacilagua and Orocuina
Organizations/groups represented	Municipalities, through the Municipal Environmental Units. Water management projects (Water Governance) Water boards Country Vision Nation Plan Office MiAmbiente (Ministry of Environment) Choluteca Waters Duyure Board of Trustees

(*) Attach photos of the workshop as an annex

(**) Attach list of participants as an annex

9. Land use

C Land use in selected municipalities

Ecosystem/agro-ecosystem identified	Comments / Specifications (e.g., main mentioned characteristics or indicated crops/species)
Forests (broadleaf, coniferous, mixed (all municipalities))	Among the species mentioned in the different groups, the following are notable: pines, timber trees, lemon, mango, marañón, mahogany, cedar, ceiba, guanacaste, carreto, achote, jícara, almond, avocado, tamarind, fig, cablote, cipria, leucana. They are currently being misused. There are many species that are endangered.
Basic grains, agriculture, corn and beans, maicillo (in all municipalities)	The production of basic grains is characterized by being a migratory agriculture. Burning is still in this type of production. In the highlands they take advantage of the places that have been deformed by the debarking weevil of the pine, burn these lands and there implement subsistence agriculture, for about 3 years. After these lands are used for livestock and farmers migrate to new land.

	In the case of the maicillo (Creole sorgo) it is a crop that has lost much relevance. In the past it was used as a "safe" crop; it is sown in partnership with maize and when there are losses of the maize crop by extreme droughts, the sorgo guarantees a livelihood for families, as it is more tolerant to intense summers. Data collected in subsequent interviews indicated that in the early 1990s around one million quintals were produced in the Choluteca department. Currently the production does not exceed 50 thousand quintals. This reduction in production is due to the concentration of pests in the few existing plantations.
Livestock	Extensive, Creole cattle, mixture between brown, Brahman, and in some cases Holstein. Most livestock farming is extensive. Farmers have large tracts of land, where livestock grow scatteredly. Unlike agriculture, very few people are used in livestock farming to manage it, so the income it generates is more concentrated.
High value crops: diverse in 4 of the municipalities as follows: Apacilagua: okra, lemon, watermelon, vegetables (chile, tomato) melon. Choluteca: okra, melon, melon, cane Marcovia: cañiculture, melon, okra Oroculine: okra, pineapple, lemon, mango	Export crops, highly demanding in irrigation and agrochemicals. Drip irrigation systems are used and water is extracted in many cases from wells.
Shrimp, salt production	In Choluteca and Marcovia. In some maps they identify this as "agribusiness", due to the manufacturing process that carries, mainly shrimp. In Choluteca, tilapia hatcheries were also identified.
Mangroves (wetlands)	Mainly in Marcovia. Very little in Choluteca

D Benefits perceived by the local population

Ecosystem/agro-ecosystem identified	Perceived benefits and uses
Forests (latifoliated, coniferous, mixed)	Water production, oxygen production, soil retention, wood production, flora, fauna, climate regulation, nutrient recycling. It also generates employment.
Basic grains, agriculture, corn and beans	Food security, nutrition, income generation. There is production of basic subsistence grains. Improves quality of life.
Livestock	Food security, income-generating nutrition
High value crops: Melon, okra, lemon, mango, cane, pineapple	Economic sustainability, through the generation of jobs and the generation of foreign exchange because these are sent out of the country.
Artisan fishing	To improve consumption or to generate income.
Shrimp, salt production	Economic sustainability, job creation and foreign exchange generation, because products are exported outside the country. In the case of

	shrimp, the people who work in the crop themselves are men, while in manufacturing women work (90% of the manufacture is made by women).
Mangroves (wetlands)	Protection of storm surges, habitat for marine fauna, coverage, oxygen generation. Diversity of marine life (shrimps, curiles – molluscs-, snakes),also provides a CATCH of CO2.

10. Local perception of climate change

e) Perceived changes in the climate

Changes in precipitation (intensity, frequency)	The rains have become intense and concentrated, so the drought has become more widespread, delaying the entry of the rainy season. More storms and hurricanes. Climate variability, especially since 2001. In 2016 and 2018, the Choluteca river dried up.
Changes in temperature	It has increased the temperature in recent years, there is a greater evapotranspiration. Currently they reach up to 42 degrees, which 10 years ago were not given. The increase in temperature is also related to forest loss, logging and forest burning.
How long have these changes been observed?	Since 2001 and 2014, periods of dry years intense.
Are climate (agro) mentioned? Eg. El Niño	Yes. It refers to intense periods of drought such as 2001 and 2014.
Other climate changes mentioned	Changes in tides, have risen (tides), were also noticed from 2001, after Hurricane MITCH in 1998.

f) Perceived impacts on ecosystems/agro-ecosystems

Ecosystem /agro-ecosystem	Impact of climate changes
Forests (broadleaf, coniferous, mixed)	More diseases and pests (debarking weevil). Landslides and landslides. Less infiltration. Biodiversity loss. Massive deforestation. As an example it was mentioned that a change in the color of the oak leaves is being observed; in response to water stress it turns a deep red color, which was not observed before. Increased logging, deforestation.
Water sources	A reduction in the flow of sources has been seen. Water is a vital resource. By its affectation there is loss of flora and fauna, loss of crops and also negatively impacts livestock.
Basic grains, agriculture, corn and beans	Change in flowering periods. Proliferation of pests and diseases, which causes a low production.

	<p>Having production, farmers no longer have access to the Creole seed they own. They have to go buy seed from the agricultural, they depend on the outside. It wasn't like that before.</p> <p>Agricultural burnings for small milpas, causes soil degradation.</p> <p>Summer extension.</p> <p>If there was good production, migration was not necessary and poverty could be tackled.</p>
Livestock	<p>Decrease in pasture quality and decrease in quantity, it has even been observed until cattle die. There is also increased diseases in livestock, increased stress and is reflected in a poor yield of milk and meat.</p>
High value crops: Melon, okra, lemon, mango, cane, pineapple	<p>Reduction in water supply for production.</p> <p>Increased presence of pests and diseases, and in response greater use of agrochemicals that come to pollute the environment.</p> <p>Summer extension.</p> <p>Less currency is generated, because there is less water to produce, less quality and less export.</p>
Artisan fishing	<p>Reduction in the supply of fish in rivers. This activity has no regulation, there is no ban for fishing.</p>
Shrimp, salt production	<p>Increased salinity of seawater, which reduces shrimp growth.</p>
Mangroves (wetlands)	<p>Tidal changes</p>
General comments of the plenary	<p>One situation that has been appreciated is that some animals have felt invaded in their habitat, which makes them flee and even reach the populated centers (cities), looking for spaces to live.</p>

g) Perceived impacts on the population

	In the lives of men	In women's lives
Impacts on household chores	n/a	<p>Increased water supply.</p> <p>Lack of water for consumption.</p> <p>A water wagon over long distances. Limited care of the home, because women will have to try to go and carry water.</p> <p>Changes have intensified in recent years.</p>
Impacts on agricultural/labor work	<p>Pest proliferation.</p> <p>Increased use of agrochemicals</p> <p>Reduction in water supply for production.</p>	<p>More work for women in agricultural paid work (okra, for example)</p>
Economic impacts	<p>Reduced yields</p> <p>Migration in search of other opportunities to generate revenue.</p> <p>Increased diseases and soil contamination.</p> <p>Poverty is increasing.</p>	<p>Decreased availability of nutritious food for the home.</p> <p>Increase in the price of dairy products, because it is more expensive and difficult to produce livestock, which causes</p>

	Unemployment and migration.	a low consumption of these foods due to lack of resources. For women, the reduction in the production of basic grains causes men to send women to work to generate income. Today for there to be livelihoods in the home, you have to work away from home, both of you. When high-value crops are affected, job supply is reduced.
Health impacts	One phenomenon that is occurring in recent years is what people refer to as "sunstroke" which is the feeling of higher temperature in the body, due to the increase in temperature. There's a stronger impact on people. This is thought to cause dehydration and hypertension and skin diseases, so it is recommended that there be no exposure to the sun in half-day hours and sunstroke. Vector diseases, such as "Zika"	Increased presence of vector illness By the mayor care for elderly children sick (by dengue or Zika), other household chores are neglected.
Other impacts	Water conflicts. Wars over water are feared if measures are not taken. A situation in the region is the "chocolated rivers" that will flow into the gulf, which is reflected in pollution on the coast, and increased sedimentation. Family disintegration. Displacement: For example, in the case of Duyure, some completas that were adjacent to the river were flooded with Hurricane Mitch in 1998, so they had to move, to the lose your community	Family disintegration. Other ways have to be used to meet water demand, such as well drilling and over long distances. Major collapse, disasters and flooding from forest loss.

h) Proposed adaptation measures (Those with SI have already been implemented)

Municipalities	Proposed adaptation measure	Justification
Orocuina	Restoration and protection of forests / forest cover (pines, mother, lemon, mango, marañón, caoba, cedar, ceiba, guanacaste, carreto, achiote, jícara, almond tree, avocado, tamarind, fig, cabochon, cipria, leucaena)	With climate change a lot of wood cover has been lost and with it, there has been decreased flows from water sources. The forest has been lost either by the hand of man or by the attack of the weevil.

	Rainwater collection - small reservoirs	They can be good alternatives in the municipality.
	Restoration of forest cover in water recharging areas and springs (coal, crack, cachito)	Especially in the upper area. Check the logging. Counter illegal logging and marketing.
	Banks of ancestral seeds and improved seeds for adaptation	Genetic diversity has been lost because people buy certified seed in some cases even transgenic and have lost their Creole seeds. So farmers won't have to pay to buy seed.
	Proper handling of agrochemicals	Progress has been made on this. Protection is now used, but there is a need to improve.
Apacilagua	Environmental education	It takes a lot of environmental education at all levels so that we can solve the problems we are experiencing. Promoting the conservation of the environment, flora and fauna. The population needs to be aware.
	Restoration of forest cover in water refill areas and springs	To have more water flow, with this we would not suffer from droughts.
	Rainwater collection - small reservoirs	Use of the water that is collected, obtain the benefit of the resource.
	Establishment of forest plantations for sustainable harvesting of wood and non-wood forest products.	Attempt to conserve, not fell.
	Other agricultural practices / adoption of sustainable practices for crop production (holding walls, infiltration ditches, living and deadbarriers, agrosilvopastoral systems)	To change the traditional practices that are based on migration agriculture, which only leaves degraded soils in its path and are used for a maximum of 3 years, by sustainable practices for production. Living barriers can be used to zacate lemon for example as a medicinal. Ensuring production
Choluteca	Environmental education	There are no formal classes on environmental education in schools and colleges. This is key to sustainability.
	Rainwater collection - small reservoirs	Have more availability of water resources. You can make the most of it. Sometimes it rains a lot, but it doesn't take advantage.
	Water reservoirs	Wildlife conservation Water resource storage sustainability of nearby flora. Irrigation. There are many problems with drought, but when there is rain, it is not profitable
	Forest restoration through enrichment	Increase wooded coverage. It complements the next one.
	Establishment of plantations of species that provide firewood (acacia, leucaraena, carboncillo, tiguiscanal, tyguilote)	So that the population has a place where they can obtain firewood in a sustainable way. This also has to be incorporated into the association of wood cutters. Currently only the

		<p>extraction of firewood is done, but no one does for sowing rboles for this purpose. Leucanea only as forage, Acacia can be used as firewood, although until now it has only been used as an ornamental or for shade. When people are going to cut, they completely cut down the tree. Instead they can do it in parts, the first time some branches, in the next other branches or other trees to achieve regeneration and recovery. Whatwill be achievedwith environmental education. Choluteca is the only one of the 6 municipalities that has municipal nurseries.</p>
Duyure	Restoration and protection of forests / forest cover	<p>Especially focus in the highlands of the municipality and the impact will also be felt in the lower parts,which is where the downloads aremade. Focused on the conservation of native plants, as better impact is achieved in the environment. More oxygen production.</p>
	Agrosilvopastoral systems	<p>This alternative helps to slow the advance of the livestockborder, which has deformed areas of the municipality. The farmer has largely deforested because he does not allow a farmer to spend more time working on the same land.</p>
	Other agricultural practices / adoption of sustainable practices for crop production	<p>It is suggested to incorporate associated crops of basic grains (corn and beans) with fruit trees and wood, citrus.</p>
	Water reservoirs	<p>Avoid runoff It serves both for man for food production, but also for maintaining wildlife (spits, fish).</p>
	Ecotourism	<p>They consider that the municipality has many natural beauties that can be appreciated, without damaging them. This can attract people from outside the municipality to see how natural resources are cared for in the municipality.</p>
Marcovia	Proper handling of agrochemicals	<p>In the municipality there is export agriculture such as pipes and melons, which make significant use of agrochemicals. The Municipal Environmental Unit constantly monitors to ensure that use is not indiscriminate and thus water and soil are not contaminated.</p>
	Sustainable management of the shrimp industry (small producers)	<p>Sustainable exploitation, not compromising marine fauna, such as the golf turtle or mangrove. The problem is when agricultural activity licenses are</p>

		<p>given at the Tegucigalpa level and all they can do is make sure that the farm does not advance beyond the extended permits. Sustainable shrimp management means taking care of the mangrove, not giving expansion permits to shrimp in protected areas.</p> <p>One strategy the industry uses is that it tells wood cutters (cocheros) to cut the mangrove, to move slowly and after it has been deforested, they advance and appropriate the deforested.</p>
	Restoration of forest cover in mangrove areas	<p>Increased spawning of species</p> <p>Increased production in artisanal fishing</p> <p>Marine species development</p> <p>It is necessary to acquire knowledge for the protection of mangroves.</p> <p>The mangrove is used to build champagnes on the beach, so they also perform monitoring so that it does not abuse the mangrove short for this purpose.</p>
	Ecotourism (green and conservation of the golf turtle)	<p>Losing mangroves to climate change, you lose the fauna, the hosts, there are fewer fish, tides, because there is no protection.</p> <p>For that is requested for the rotation of the species, especially the ban of the turtle.</p> <p>Better ecosystems/food payments per egg collection. It is necessary to seek sources of funding, support from private enterprise, NGOs. The investment allows to improve tourism options for the population and is a source of income for the municipality.</p>
	Establishing plantations that provide firewood	To give an alternative for people who need firewood and do not need to deforest. It could be coal.
Morolica	Restoration of forest cover in water recharge areas and springs	To increase water production, more oxygen.
	Water reservoirs	Increase the water supply. At some point small gaps were implemented with EMPRENDESUR, but they did not work. This due to the production
	Drip irrigation installation	<p>Increase the production of grains and diversify with fruit (marañón, mango, oranges, lemons) and others, has not been implemented.</p> <p>Revenue generation</p>
	Wildfire management	It has been done empirically, but support is needed in this area. This allows forest protection and prevents pollution from smoke.

	Rotation of paddocks	The municipality is of a livestock vocation, with this helps to avoid erosion and compaction and prevent the advance of the livestock border, which each goes with more ground and they are deforesting more. Improves milk production and income generation.
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11. Previous examples of adaptation in the area

Adaptation strategy/measure implemented	Impacts measured by the measure on ecosystems/agro-ecosystems	Impacts that measured men's and women's lives
Rainwater collection - small reservoirs	Protecting water recharge zones	Increased availability of water for crops and community water systems.
Proper handling of agrochemicals	Reducing pollution to the ecosystem.	Avoid risks of disease. Today people take more care, they acquire protective equipment, there is more awareness about the damage that agrochemicals cause to people.
Other agricultural practices / adoption of sustainable practices for crop production (holding walls, infiltration ditches, living and dead barriers, agrosilvopastoral systems)	Soil resource conservation. Better use of water. Wildlife conservation Non-use of contaminants	Production of healthy foods
Water reservoirs	Wildlife conservation Water resource storage Sustainability of nearby flora Irrigation	Improving quality of life Better agricultural production A livelihood through fish harvesting
Sustainable management of the shrimp industry (small producers)	Sustainable use of natural resources, mangroves Conservation of flora and fauna Protection of the golf turtles thanks to payment for conserving eggs (government incentive system)	

12. Project sustainability

e) Perception of components and activities

Component or activities	General appreciation of effectiveness/feasibility
Technical assistance to implement EbA	It is necessary. Although before the lack of technical capacity, the problems occur in the area of land tenure and lack of territorial order, which hinders conservation. In addition, if there are trees in a lot, it can be considered state property, then it is preferred to cut.
Financial mechanisms	Necessary for the implementation of the project and ensure sustainability. Currently, financial

	mechanisms benefit agriculture rather than afforestation. There are no loans to plant trees, but there are loans to others that promote deforestation.
EbA incorporation and knowledge management	Very important. But governance issues (land ownership, agricultural incentives/deforestation) must be resolved for the project to continue over time.

f) Perceived barriers and mitigation strategies

Component or activities	Existing barriers or difficulties that could arise	Strategies for tackling barriers
Technical assistance to implement EbA	Bureaucracy to advise credits No efficient use of financial resources High interest rates of loans Collateral or mortgage guarantees Bureaucracy Lack of incentives Inequity in the use of funds	Process simplification Technical assistance Decentralization of administrative processes Signing of agreements Management of the fund by means of rural boxes, municipalities Subsidies. Clear credit policies
Financial mechanisms	No technical assistance Sources of funding. Lack of interest or trained staff Time availability	Management of technical and financial resources Train technical staff Encourage the population with new proposals of interest that adapt to their time.
EbA incorporation and knowledge management	Lack of political will Political gaps Lack of interinstitutional coordination Financing Lack of organization	Improving the political will to generate interinstitutional coordination spaces Resource management Promote community organizations Conduct studies according to the needs of each situation.

g) Sustainability Actors

- Describe the actors that the population considers should be involved in the components/activities to ensure the sustainability of the project.
 - Municipalities:** It is important to consider the municipal environmental municipalities, which are responsible for ensuring the protection of natural resources in the municipal perimeter.
 - Commonwealths:** These instances converge the municipalities and integrate to work in an organized way. They manage projects, government transfers and are strengthened locally. In this territory: Duyure, Morolica, Orocuina and Apacilagua belong to the MAMBOUCARE commonwealth (Mancomunidad del Cerro de la Botija and Guanacaure), while Choluteca and Marcovia belong to NASMAR (Community of Southern Municipalities).
 - Savings and credit unions.** Although there is no physical presence in all municipalities, the people of Morolica, Apacilagua and Orocuina are

registered to the offices in the municipality of Choluteca in order to use this benefit. In Duyure and Marcovia there are physical cooperatives.

- **Rural cash institutions:** in many rural communities there are these bodies, supported by various institutions.
- **NGOs** working for water, forest protection and adaptation to climate change.
- **Civil society:** trustees
- **Waterboards:** the community-level bodies responsible for ensuring the basins and water projects that supply each community.
- **Forest Conservation Institute:** They are responsible for issuing exploitation permits and on more than one occasion it has been appreciated that they do not perform it responsibly. More of the "disasters" that are seen in the municipalities are given by the operating permits that have been granted by this instance.

h) Key policies

- Describe local development policies or plans related to project components/activities.
 - Strategic municipal development plans
 - Territorial planning plans
 - Climate change adaptation plans
 - Water governance plans (crosses several municipalities)
 - Decree 98 – 2007; Forest law, protected areas and wildlife.
 - Decree 181 - 2009 General Water Law

13. Financial mechanisms

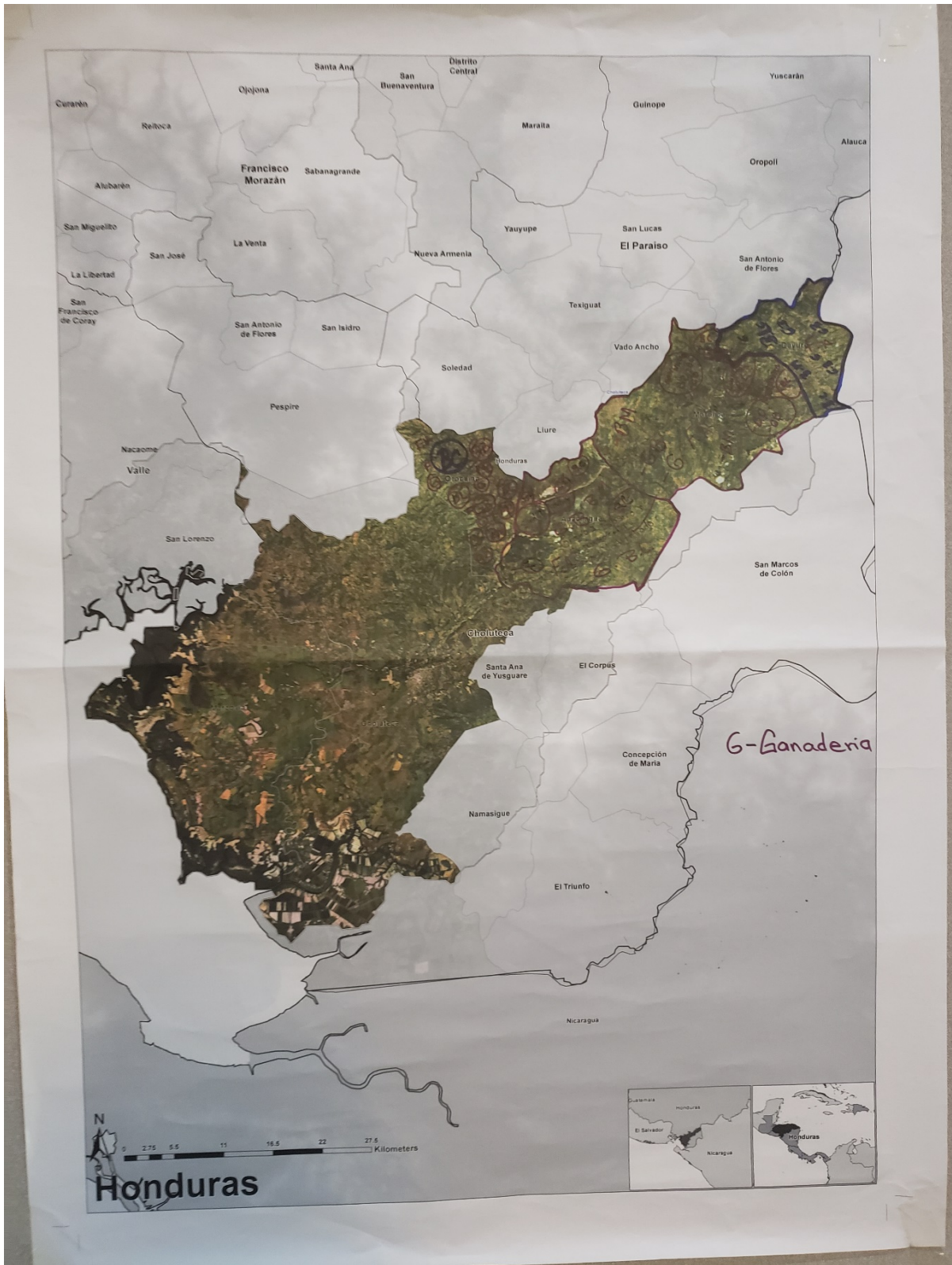
- Describe the financial mechanisms that are normally used in the area. What kind of financial institutions are present? What could be interesting to participate in the project?
 - In the territory they are very common rural cash institutions, which are financing mechanisms at Community level. In all municipalities there are established rural boxes.
 - There are also savings and credit cooperatives, a higher ceiling and different mechanisms to provide credit to their partners.
 - Banks are options for medium and large producers who have mortgage guarantees.

14. Other

- Describe other topics of interest or concern of the participants in the context of the project.
 - On several occasions they mentioned the conflict that has been generated between the Institute of Forest Conservation (ICF) and the Municipal Environmental Units (UMA). As mentioned by the representatives of the UMAs, there have been occasions when forestry permits have been issued

- by the ICF in reloading areas. However, UMAs are left without action when permission has been given from Tegucigalpa.
- It is necessary to strengthen the UMAs of the municipalities, technically, logistically and financially. They are usually small units, with little staff, limited operational capacity and large responsibilities in the municipality.
 - They agree about the importance of forest protection as a key factor for the generation of water for the territory. There is a commitment to sustainable development, and they recommend that strategic municipal development plans be reviewed, where what you need and want from communities has already been compiled, as well as a field tour to assess the problems and needs of municipalities in the countryside.
 - Participants said they expect funds to be invested in municipalities, which actually contribute to improving resilience. Green funds have been successfully implemented in other areas of the country, such as Comayagua, so it is expected that in this case it will also be done.
 - They ask to avoid creating false expectations in the population. Projects have to be realistic and really explain what they will bring, so as not to generate a sense of frustration in people.
 - A representative of MiAmbiente stated that watershed management and water production issues rather than a technical problem is a matter of political decision-making. Ing. Gonzáles explained his theory based on the example of the Guacerique basin that supplies the capital city, Tegucigalpa. In the upper parts there has to be forest. The problem is the advance of the agricultural border in this area of the basin (the reloading zones, the highest points). In these places people have government-issued property titles and even though they are declared as "protected areas", people use them to produce, because there is no incentive to conserve the forest. You would have to recognize the value of the land that is producing water and pay the value of the water, to the land owners. Water has a cost, in order to take it to a level of purification, suitable for consumption, so he believes that a price should be put on the water.

Annex: Land-use maps
Group 1 - Women



Nomenclatura de, Apacilagua,
Morolica, Dujure:

1*G.B = Granos Básicos

2*G = Ganaderia

3*B.L = Bosque Latifoliado

4*B.C = Bosque Coníferas

5*B.M = Bosque Mixto

6*C.V = Cultivos de Valor

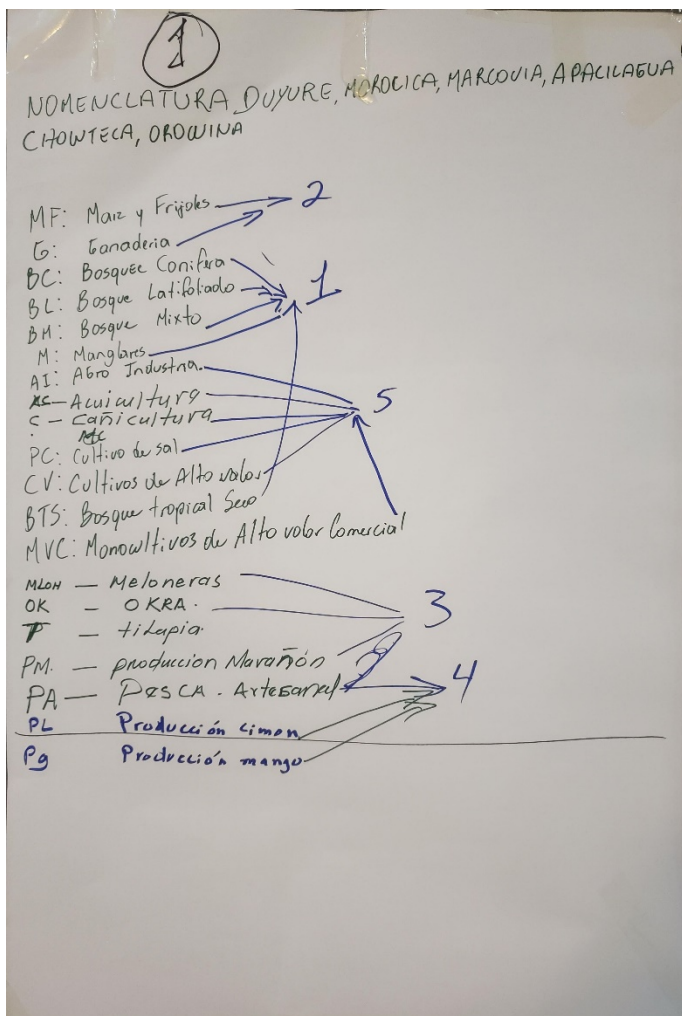
7*FA = Fuentes de Agua

8*C = Cadus.

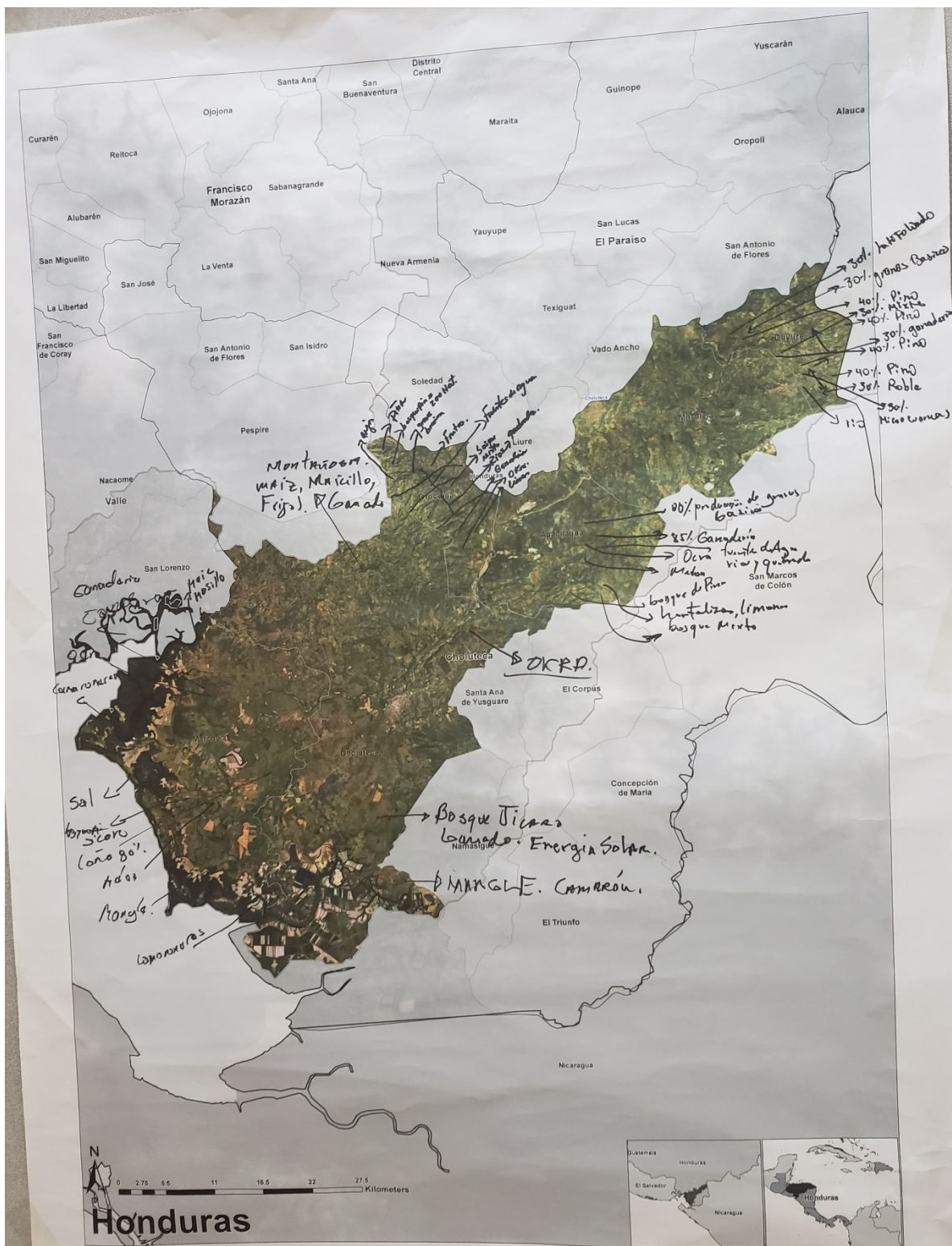
9*M.C = Monocultivos de alto
Valor Comercial

Group 2 - Men





Group 3 - Men



Annex: Photographs of the workshop



Group of participants in Consultation Workshop. Choluteca, Choluteca October 14, 2019



Participants women in group work. Consultation Workshop. Choluteca, Choluteca October 14, 2019



Group Jobs. Consultation Workshop. Choluteca, Choluteca October 14, 2019



Group Jobs. Consultation Workshop. Choluteca, Choluteca October 14, 2019

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El Salvador

LOCAL CONSULTATION WORKSHOP - El Salvador

Report of results of the project consultation workshop "Adaptation based on ecosystems and transformational measures to increase resilience to climate change in the dry corridor of Central America and the arid areas of the Dominican Republic".

1. General data

Date	Wednesday, October 16, 2019
Country	El Salvador
Workshop location (*)	Hotel Trópico Inn, San Miguel
Number of participants (**)	Total 30 – (Women 9; Men 21)
Municipalities represented	San Miguel, El Tránsito, Concepción Batres, El Carmen and Jucuarán
Organizations/groups represented	Environmental Units of the Municipalities (San Miguel, El Tránsito, Concepción Batres, El Carmen Jucuarán), President RAMSAR ASIBAHIA, ASIBAHIA, OIKOS Solidarity, CCAD, MARN, UN Environment ASPRO Jocotal, GTCHA, Scout Group 33 Lencas, El Pital canton La Puerta, Association ACAMAV Water Board Municipality of Brazo San Miguel.

(*) See photos of the annex workshop

(**) See list of annex participants

2. Land use

a) Land use in selected municipalities

Ecosystem/agro-ecosystem identified	Remarks / Specifications (e.g., main characteristics mentioned or indicated crops/species)
Cañal	Economic benefit to the pipes On exploitation of water resources
Gallery Forests	Sale of firewood (Volcano Forest) Construction of houses Animal breeding- Pigs Livestock food Food Negatives: They are cut down for agriculture and brick production Challenge: Firewood to production systems
Agricultural crops (corn, maicillo, bean)	Subsistence crops, traditionally grown with agrochemicals. They are crops that are often made on land with steep slopes, that is to say on hillside terrain, causing soil particle slupling when it rains and if there is a temporary risk of collapse is high, and lives and crops may lose life.
Laguna El Jocotal (Ramsar Site)	Men fish Sales women Sowing (corn, cane) Hunting for ducks and reptiles

	<p>Lagoon water is also used for household trades: laundry, cleaning dishes, etc.</p> <p>Tourism:</p> <ul style="list-style-type: none"> - Bath in the lagoon, by tourists and by the locals. - and food stalls especially women, - taking photos for queens (fashion trend).
Olomega Lagoon (Ramsar site)	<p>Migratory birds are coming</p> <p>These are tourist areas</p> <p>Food production (fishing)</p> <p>Wildlife (fauna and flora)</p> <p>They are water retaining bodies</p> <p>They are water filtrators</p> <p>They are disaster reducers</p>
San Juan Lagoon	<p>San Juan has no tourism for insecurity</p> <p>Dominance of cane workers</p> <p>Need for cadastral planning</p> <p>ISTA (Salvadoran Institute of Agricultural Transformation) is responsible for the distribution of land</p>
Laguna Montecristo and Gallery Forest Aramuaca Lagoon	<p>Migratory birds are coming</p> <p>These are tourist areas</p> <p>Food production (fishing)</p> <p>Wildlife (fauna and flora)</p> <p>Water retainers</p> <p>They're water filtrators</p> <p>They're disaster reducers</p>
El Espino beach, southeastern beaches of Jucuarán, Arcos del Espino beach.	<p>Floods</p> <p>Salt intrusion into wells</p>
Mangroves	<p>Serves as a natural barrier to weather phenomena</p> <p>Power supply</p> <p>Wood extraction</p> <p>Tourism</p> <p>Fishing</p> <p>Habitat of birds and other species</p> <p>Mollusks (consumption and trade)</p> <p>There are shrimp cooperatives</p>
Silvopastoril	Soil and water conservation works.
Agroforestry	<p>Higher oxygen production</p> <p>Higher water production</p> <p>Erosion Reduction</p> <p>CO₂ capture</p>
Annual crops	<p>Marañón, mango, teak, cocoa, coffee in abandonment (barriers are being restored, refinanced and provide technical assistance).</p> <p>There are environmental programs</p>
Coffee cacao	<p>Food production</p> <p>Income</p> <p>Water recharge</p> <p>Soil enhancer</p>
Chaparrastique Volcano	<p>Extraction of soil and stones</p> <p>Increased wildfires</p> <p>Migration/change of species habitats</p> <p>Landslides</p>

	Floods
La Pedrera	Natural filter, over-exploited. Removing the volcanic slab and at the same time is used as an open-pit dump of solid waste, polluting the underground aquifer mantle that will give the el Jocotal lagoon
El Pital Forest	The Scout group is currently present and part of the forest has been reforested. However, people with other interests put the cattle in so that they eat the plants and start the ones that are not enough to eat the cattle, because they do not want the forest, but they want the area as paddocks.
Water births "El Tuno" and "La Nicha", Municipality El Carmen.	Water reservoirs.
Plain in Concepción Batres	Crop production under irrigation Water recharge (river birth) Highly productive soils Oversaturation of soils that prevent flooding Wind barrier Wild animal habits
Livestock	Food production Sources of employment. About grazing and soil tamping Forest destruction Invasion of areas such as mangroves.

b) Benefits perceived by the local population

Ecosystem/agro-ecosystem identified	Perceived benefits and uses
Cañal	Economic benefit to the pipes Maturing and Harmful Agrochemicals On exploitation of water resources
Gallery Forests	Sale of firewood (Volcano Forest) Construction of houses with wood extracted from the Gallery Forest Breeding of animals - Pigs Livestock food Food for human consumption
Agricultural crops (corn, maicillo, bean)	Men normally grow it Family group participation Food safety for the family group Income. Maicillo, corn, Agroforestry Systems
Laguna El Jocotal (Ramsar Site) Olomega Lagoon (Ramsar site)	Fishing, irrigation, water collection, water access, tourism
San Juan Lagoon	It is currently being exploited by farmers, with tourism potential, but is being azolgone because it is in abandonment.
Laguna Montecristo and Gallery Forest Aramuaca Lagoon	Fishing, irrigation, tourism
El Espino beach, southeastern beaches of Jucuarán, Arcos del Espino beach.	Local tourism Generating jobs for locals Income from families.
Mangroves	Molluscs (consumption and trade)

	There are shrimp cooperatives More women's participation around these economic activities Fishing only men (tilapias) Wood
Rio Grande De San Miguel	Water for crop irrigation Wastewater drainage and purifier Wildlife Livestock Extraction of firewood Fishing.
Silvopastoril	Increased water infiltration into the soil Increased flora Increased CO ₂ uptake Higher production of O ₂ Protection and mitigation of the Soil and Water Resource
Agroforestry	There are positive impacts with these practices, but it must be applied on a larger scale to all municipalities of the Rio Grande basin of San Miguel. Habitat, Fruit, Oxygen. Wood, poles Soil conservation CO ₂ capture Crop diversification
Annual crops	Income. Job creation.
Coffee cacao	Income Wildlife habitat.
Chaparrastique Volcano	Habitat, Fruit, Oxygen. Wood, poles
La Pedrera	Natural filter, water uptake
El Pital Forest	Oxygen generation
Water births "El Tuno" and "La Nicha", Municipality El Carmen.	Water supply to some communities.
Plain in Concepción Batres	Water recharge (river birth) Income
Livestock	Silvopastoril Systems

3. Local perception of climate change

a) Perceived changes in the climate

Changes in precipitation (intensity, frequency)	Heavy rains occur in a short time and sometimes very long canicles or droughts occur to the extent that no crops survive.
Changes in temperature	Rising temperatures
How long have these changes been observed?	For about a decade (10 years)
Are climate (agro) mentioned? Eg. El Niño	1988 Lots of rain 1999 Heavy and storm MITCH
Other climate changes mentioned	Changing precipitation profiles 2015 severe drought. Loss of Biodiversity.

b) Perceived impacts on ecosystems/agro-ecosystems

Ecosystem /agro-ecosystem	Impact of climate changes (Try specifics, not just agroclimatic generalities)
Cañal	On exploitation of water resources
Gallery Forests	Brick production is cut down for agriculture Increasingly arid areas with less productivity
Agricultural crops (corn, maicillo, bean)	Less production and crop losses, therefore less economic income for families
Laguna El Jocotal (Ramsar Site) Olomega Lagoon (Ramsar site)	Declining fishing Water decrease Sun's work Decreases fry Deforestation, rising temperatures, and droughts, which are increasingly present, affect the flora, fauna and biodiversity in the areas.
San Juan Lagoon	Rising temperatures and neglect are causing the death of the lagoon and its biodiversity.
Laguna Montecristo and Gallery Forest Aramuaca Lagoon	Crop and livestock losses, poultry Loss of human life Infrastructure damage Respiratory diseases, diarrhea, eyes, skin fungi
El Espino beach, southeastern beaches of Jucuarán, Arcos del Espino beach.	Sea level rise Floods Salt intrusion into wells
Mangroves	Decrease in species production in mangroves Diseases Mortality (molluscs)
Rio Grande De San Miguel	Fewer wildlife spaces. Increased vectors Water stress Less water in dry season, for the benefit of the population More water in rainy season that causes overflows and flooding
Silvopastoril	Increased water infiltration into the soil Increased flora Increased CO2 uptake Higher Production of O2 Protection and mitigation of the Soil and Water Resource
Agroforestry	Soil conservation CO2 capture Diversification of crops, therefore, greater biological controllers.
Annual crops	Some crops such as marañón are very resistant to high temperatures and droughts, however, what may change could be the advancement of low production flowering.
Coffee cacao	Water resource scarcity Increased likelihood of fires Increased pests
Chaparrastique Volcano	Increased wildfires Migration/change of species habitats Landslides Floods
La Pedrera	Affects the quality of water that leaks Higher temperature.

	More diseases.
El Pital Forest	High temperatures.
Water births "El Tuno" and "La Nicha", Municipality El Carmen.	Birth with decreased water.
Plain in Concepción Batres	Oversaturation of soils Floods Reducing the water table
Livestock	Grass loss Floods
Groundwater in El Carmen municipality	Wells dry out Grasslands dry out Crop losses Cattle death.

c) Perceived impacts on the population

	In the lives of men	In women's lives
Impacts on household chores	There is no perceived	Bathroom, laundry and food stalls especially women, Take pictures for queens. (lagoons, especially El Jocotal)
Impacts on agricultural/labor work	Fishing men Sowing (corn, cane) Hunting for ducks and reptiles	Molluscs (consumption and trade) More women's participation Women market the products.
Economic impacts	Crop loss Low income Decrease in fish and this causes economic income impact	Increased basic basket cost and increased cost of living in general Food shortages Lost production of single women
Health impacts	Diseases such as diarrhea, skin fungus, sick eyes, airways	Water pollution Diseases
Other impacts.		

d) Proposed adaptation measures

Proposed adaptation measure	Justification (impact of climate change that the measure seeks to address)
Resilient sustainable production training	For Food Safety For the protection and conservation of the natural resources of the site, always in search of sustainable and sustainable development.
Water uptake	Measures against drought, which could also maintain the water resource in times of increasing water stress present in the municipalities of El Corredor Seco in El Salvador, causing losses for different economic and household activities.
Financial management	To support farmers in crop losses as a result of droughts or floods as a result of climate change
Entrepreneurship	As an alternative to ensure the survivals of men and women in their communities, when effects such as dry temperatures or high temperatures produce economic losses in agricultural or livestock activities. Work alternative for women

Diagnosing gender gaps	Some women are less likely to access and control the means of production, such as land, funding, training or information, will be more vulnerable to the effects of climate change. This means that they will lose their livelihoods more easily and will have less ease to find alternative means to meet their needs and those of their families. In other words, we must know what the inequality gaps between men and women are in order to seek solutions to implement equality and equity among human genders.
1-3 Restoration in recharging areas through agroforestry systems	<ul style="list-style-type: none"> a) It is an important aid in the control of erosion. b) It allows the producer to obtain several agricultural products on the same plot. c) Reduces the incidence of pests. d) High-end crops can protect low-yield crops from wind. e) They recover degraded soils and incorporate them into production. f) Dense crops retain sediments from runoff and can form terraces.
Curile production pens (mangrove invasion)	<p>Decrease in species production in mangroves</p> <p>Mortality (molluscs)</p>
Strengthening Environmental and Gender Units on Environmental Issues	Decrease gender inequalities in sectors to work and empower people to protect and conserve natural resources.
Territorial planning plans (From basin)	Protection and conservation of water and soil, flora and fauna
Fire management	No to fires (human causes, cane cleaning)
Training with farmers	Make good use of herbicides and other agrochemicals,
Organic methods	Find other production alternatives that are more resource-friendly in the areas
Environmental permits	Where environmental permits are granted to carry out activities, works or projects, it must be ensured that the mitigation measures proposed by the holder are environmentally friendly to the site, as well as be vigilant that this is met on the part MARN, The City Councils and the general population
Agroforestry	<p>It has been implemented in some places of the dry corridor, but there is much to be done in the area.</p> <p>Soil conservation</p> <p>CO2 capture</p> <p>Crop diversification</p>
Silvopastoril	<p>It has been implemented in some places of the dry corridor, but there is much to be done in the area.</p> <p>Increased water infiltration into the soil</p> <p>Increased flora</p> <p>Increased CO2 uptake</p> <p>Higher Production of O2</p> <p>Protection and mitigation of the Soil and Water Resource</p>
5.2 Firewall Gaps	Decrease the increase in temperature by forest fires (in 5 municipalities)
5.4 Fire campaigns	To make the population aware of the serious damage caused by fires to biodiversity and the quality of life of the inhabitants.

Environmental Education	Knowledge of the inhabitants of their ecosystems and their benefits, to create an environmental awareness and they are the ones who protect and preserve the environment.
Nursery and reforest establishments	Have species of trees native to the site, forestry and fruit trees to reforest area degraded by any circumstance caused by humans or nature.
Good agricultural practices	Decrease soil, air and food water pollution.
Soil conservation works	In deforested areas and on slopes.
Comprehensive management of solid waste	The process of decomposition of organic solid waste emits a series of greenhouse gases (GHGs), especially methane (although also some nitrous oxides and carbon dioxide, on a smaller scale). So composting processes are proposed to decrease GHG and at the same time obtain a product called compost that is a soil enhancer and can be used as a substrate for the cultivation of organic vegetables. At the same time recover the materials that can be recovered and marketed for recycling, thus supporting the least amount of waste that is given final disposal in a landfill extending the life of these for a long time
Water reservoirs	For water in dry season and when long canicles occur.
14.1 Local tourism	It generates economic income for the people of the communities.
16. family orchards	Generates economic income Contribution to the SAN (If contributing to the SAN (Food and Nutrition Security))
1.Sowing fry	Increase in fish population for feeding and marketing.
1.2 Hydrological flow recovery	Natural mangrove regeneration and recovery of hydrological flow
1.1 Cattle fence: Silvopastoral systems	Tree cover, improvement of livestock fodder, by rotating livestock
4.9 Live fences	avoid water erosion and infiltration
10.1 Rainwater collection	To avoid water shortages in household, agricultural and livestock activities.
2.1 Wood-fired plantations	Avoid deforestation of wooded areas, as well as for the use of tree cover Pollination, foliage and use of firewood in bricks and home. This is always with proper management of the plantations.
Promotion of green saffron	Incorporation of stubble, does not burn the crop and in this way avoid heating, send more CO ₂ to the atmosphere

4. Previous examples of adaptation in the area

Adaptation strategy/measure implemented	Impacts of measurement on ecosystems/agro-ecosystems	Impacts of measurement on the lives of men and women
Curile (mollusc) production corral (mangrove invasion)	More organisms (curiles) through this method for marketing, however, should be implemented management program for the exploitation of these organisms within the mangrove.	Greater purchasing power of the people who are in these processes .

Strengthening Environmental and Gender Units on Environmental Issues	Strengthen the technical capacities of environmental and gender personnel, for the protection and conservation of the ecosystems of the place.	Empowering people to protect and conserve their ecosystem resources
Territorial planning plans (From basin)	For the physical development of the territories. A TEP is defined as the set of objectives, guidelines, policies, strategies, goals, programmes, actions and standards adopted to guide and manage the physical development of territories and the use of their natural resources.	Sustainable and sustainable development.
Create a municipal basin system for the Rio Grande de San Miguel	There is no such thing as	There is no such thing as
Fire management	Allow the fire not to spread.	Difficulty: lack of community awareness
Agroforestry	There are positive impacts with these practices, but it must be applied on a larger scale to all municipalities of the Rio Grande basin of San Miguel.	There are positive impacts with these practices, but it must be applied on a larger scale to all municipalities of the Rio Grande basin of San Miguel.
Silvopastoril	Increased meat and milk production Soil and water conservation works.	Increased water infiltration into the soil Increased flora Increased CO2 uptake Higher Production of O2 Protection and mitigation of the Soil and Water Resource
5.2 Firewall Gaps	It avoided the advance of fire and helped regeneration of the forest	The water source was kept
5.4 Fire campaigns	Protection and conservation of the biotic and abiotic systems of ecosystems The number of fires caused by humans is reduced, so there is less damage to ecosystems Less air pollution by CO2, as a result less global warming.	In order for people to assess the importance of natural resources and acquire habits of care when starting a fire for weed control in crop or forest areas, dissemination and information campaigns provoke people with knowledge to understand the serious harm they do to the nature and quality of life of human beings.
Environmental Education	It is a process for changing people's attitudes towards the environment, to create awareness and to seek alternatives to implement	Pollution to the water resource. Infrastructure damage. Floods. Slippage in high-risk areas. Impacts on food safety. Health affectation.

	strategies that will lead us to sustainable development.	Affectations on human development Flooding and long canicles Losses on agricultural crops Loss of tropical forests Loss of fauna
Nursery and reforest establishments	Having native, fruity and forest tree species to reforest degrading areas is a positive impact for temperature reduction in municipalities, as well as on biodiversity preservation.	Less evapotranspiration of water to the atmosphere Temperature regulation in municipalities Fewer diseases Trees are CO2 catchers, Trees are producers of oxygen and food.
Good agricultural practices	Silvopastoriles and agroforestry projects have been implemented and the following results have been obtained: Decreased erosion More water infiltration into underground aquifers CO2 capture (therefore, site heating is decreased) Better Food Production Fewer landslides Less pressure to resource water	Grass savings Increased food Increased production Economic increase Better quality of life Better ecosystem balance Fewer diseases
Soil conservation works	Avoid the drag of soil particles by rainwater or wind into the lagoons and rivers that pollute them and accelerate the azovalation and eutrophication of lagoons	Conservation of fertile soil therefore more productive crops, generating economic income for families and a food security
Water reservoirs	Maintains the hydrological cycle in nature.	Water harvest More water for livestock
14.1 Local tourism	Curile nurseries were created and blue crab and sea turtle protection There's Environmental Education	Generates economic income If contributing to the SAN and income
16. family orchards	If you increase tree cover.	Generates economic income
Nursing of juvenile fishes	Increase in fish population	Generates economic income.
1.2 Hydrological flow recovery	Natural mangrove regeneration and recovery of hydrological flow	If it generates revenue Yes, access to communication channels.
1.1 Cattle fence: Silvopastoral systems	Tree cover, improvement of livestock fodder, by rotating livestock	Establishment of protein bank with improved and managed paddocks

4.9 Live fences	Prevents water erosion and infiltration	Soil improvement.
10.1 Rainwater collection	Water uptake	For personal consumption and productive activities
2.1 Wood-fired plantations	Increased plant cover	For the use of drills and household consumption, as well as foliage to lower temperatures, and for water uptake rains to blankets of water
Promotion of green saffron	Incorporation of stubble, the crop does not burn	Fewer respiratory diseases.

5. Project sustainability

a) Perception of components and activities

Component or activities	General appreciation of effectiveness/feasibility
Silvopastoril Agroforestry	<p>Silvopastoriles and agroforestry projects have been implemented and the following results have been obtained:</p> <p>Decreased or prevent erosion More water infiltration into underground aquifers CO2 capture (therefore, site heating is decreased) Better and higher food production Fewer landslides Less pressure to resource water</p> <p>Grass savings Increased production Economic increase Better quality of life Better ecosystem balance Water harvest Fewer diseases More water for livestock Home orchards</p>
Comprehensive management of solid waste	Construction of yard or composting plants and with the separation of solid waste from the origin, implementing the technique of the 3 Rs (Reduce, Reuse, Recycle) all through municipal programs of integral management of the solid waste
Environmental education	Environmental awareness programs for knowledge of the interactions of the natural ecosystems of the sites and their importance to humans. It can be influenced for the protection and conservation of different types of natural resources, as well as their empowerment by the community, so that it is the same people in the community who protect and preserve the natural wealth they possess.
Entrepreneurship	As an alternative to take the pressure of the population on the exploitation of the natural resources of the different ecosystems present in the sites, because having another means of economic income would reduce and the restoration of biodiversity of the sites. As well as ensuring a better quality of life for the population of the communities.
Local tourism	Sustainable and sustainability. Carrying out programmes for the exploitation of natural resources with the least impact on biodiversity and the other abiotic elements of the sites, carrying out local tourism

Nursery establishment and reforestation	Nurseries with native species of the site for later reforestation of areas that have been deforested, impacted by fires or natural disasters.
Fry planting	Repopulate water bodies such as lagoons with fish species for feeding and marketing, always maintaining the natural balance that exist in these bodies of water, because it must take care of the native species of the sites.
Support for cooperative companies that already exist	Supported by funding and technical assistance

b) Perceived barriers and mitigation strategies

It was not developed in the workshop, however, I will investigate it with people who attended the workshop.

c) Partners for sustainability

Partners that the population believes should be involved in the components/activities to ensure the sustainability of the project:

- Municipalities
- Ministry of the Environment
- Ministry of Agriculture and Livestock
- Ministry of Health.
- PNC environment
- Sugarcane
- Fishing cooperatives
- Coffee cooperatives
- Agricultural cooperatives
- Shrimp cooperatives
- Ngo
- ADESCOS

Key policies

Local policies or development plans related to project components/activities:

- This information was not obtained in the workshop.

6. Financial mechanisms

Financial mechanisms normally used in the area

State:

- Banco de Fomento agropecuario
- Banco Hipotecario
- Non-State
- Credicampo. Agencia financiera*, Reforestación con frutales
- Enlace Integral
- Caja de Créditos
- Muchas cooperativas.
- Cooperativa de Jucuarán -----

7. Other

Annex 1 - Results of tablework.

This chart is made on the paper, the name of the most important ecosystems (which participants identify) is placed, and the benefits that people perceive. (the papergraph has only the headers).

Session 1 Exercise 1 (preparing on paper) Women

Municipality	Ecosystems or agro-ecosystems	Benefits received from the site (perceived by participants)
5 municipalities (Concepción Batres, Jucuarán, El Carmen, El Transito and San Miguel)	Cane Crops	Economic benefit to the pipes Impact of land use change Maturing and Harmful Agrochemicals On exploitation of water resources
5 municipalities (Concepción Batres, Jucuarán, El Carmen, El Transito and San Miguel)	Forests	Sale of firewood (Volcano Forest) Construction of houses Animal breeding- Pigs Livestock food Food Negatives They are cut down for agriculture For brick production Challenge Firewood to productive systems
	Corn, corn, beans	Concepción Batres 50% women/ men in houses (vegetables). Men normally grow Participation of the family group.
	Lagoons	Fishing men Women sale Sowing (corn, cane) Hunting for ducks and reptiles Tourism (El Jocotal) (Bath, laundry and food stalls especially women, Take pictures for queens. San Juan has no tourism for insecurity Dominance of pipes Need for cadastral sorting ISTA is responsible for the distribution of land-
San Miguel	San Juan Lagoon	The lagoon was handed over to the scouts and they have made reforestation

		Accompanied by the Prosecutor Lots of cattle (cows), small and large owners
Batres Conception	Mangroves	Molluscs (consumption and trade) There are shrimp cooperatives More women's participation Fishing only men (tilapias)
El Carmen	Annual crops	Maraño, water mango, teak, cocoa, coffee in abandonment (barriers are being restored, re-financed and provided technical assistance. *Have environmental programs State: Agricultural Development Bank Mortgage Bank Credicampo. Financial agency Link el integrante, la integrante Credit Fund Lots of co-ops.
San Miguel	Volcano	Extraction of soil and stones

Session 1, Exercise 2. (prepared in paperwork) (continuation of previous papergraph, are two papers glued, you work first the above)

Women

Municipality	Ecosystems or agro-ecosystems	Observed changes in the weather How long ago?	Impact of climate change on ecosystems/agro-ecosystems	Impact of climate change on their livelihoods as men/women.
5 municipalities	Crops	Changing precipitation profiles 2015 severe dry.	Drier More flooding Loss of infiltration capacity.	Health problems Craft wells Use of herbicides Production loss More disasters Loss of water storage systems Deforestation for maize crops
Jucuarán	Jucuarán Hills	Temperature rise	Loss of Biodiversity.	Deforestation for maize crops
Jucuarán and Concepción Batres	Mangroves	Pollution Deforestation <ul style="list-style-type: none"> • By wood • By crop planting • By invasion for housing Dusting Solid waste.	Sedimentation	Lack of composters

Session 2 exercises 1 (Can be done on two glued paperwork)

Women

Impact of Climate Change	Measurement (copied from the printed list, and others that arise)	Has this measure been made before (in other projects/or people do them with their resources)? *	How did these measures help ecosystems?	How did these measures help the needs of men/women?
Power Lost production of single women	Resilient sustainable production training Water uptake Financial management Entrepreneurship Diagnosing gender gaps	Live barriers with ditches	Women's participation Crop losses	
Mangroves	Curile production pens Community laundry Reproductive sexual health (mangrove invasion) Strengthening Environmental and Gender Units on Environmental Issues		Decrease in species production in mangroves Diseases Mortality (molluscs)	
Concepción Batres and Jucuaran Cane fields	Water Resource Ordinance Agricultural Use Ordinance		There is a manual of good practices for growing cane	*Land ownership Land rental for monoculture use.
	Create a municipal basin system for the Rio Grande de San Miguel	There is a municipal association		
	Ecotourism development			
	Payment for environmental services	There are examples at another level.		

	Territorial planning plans (From basin)	It exists for Concepción Batres and Jucuaran	Link with environmental law Only with the guidelines	ASIBAHIA Municipal association of the municipalities of the Bay of Jiquilisco.
	Fire management	Table of Fire 2017 burns presfire Fire Control Brigade (6 committees)	Encourages the fire not to spread	Difficulty lack of community awareness.
	Fire prevention training	Scouts.		
Fires (Human Causes, Cane Cleans)				
Use of herbicides	Training with farmers Organic methods Environmental permits	Borbollón, Morazán Good examples		
	Ramsar Site Protection Figures	Yes, sustainable development plan	Reservation limits must be extended	
	Wetlands and mangroves	Yes, in wetlands (Scout) No, Government FIAES	Wetland restoration	
	Environmental Education	FONAES FIAES Environmental Units		
	Monitoring good agricultural practices	The surveillance system and capabilities need to be strengthened.		

Women

Existing Initiatives

Name	Description
APA 07	Agro-ecological production. (In Berlin)
Oikos	Transit
PDLS	It exists for 6 municipalities and 10 municipalities of the Biosphere Reserve (mangrove)
REM Technique	Mangrove Restoration, Surveillance Committees
Environmental Governance	Biosphere Committee, RAMSAR, Fire Management, Need for Fire
Ministry of Agriculture and Livestock	Representation in Morazán
Help in action	Commitment to social transformation to combat food insecurity arising, in many cases, from climate change.
ASIBAHIA	Sweet forest restoration Sugarcane impact diagnosis by 4 municipalities Forest and fruit tree nursery
Youth networks - GAT	Youth awareness initiatives
Water Recharge (FIAES)	El Salvador Environmental Investment Fund Silvopastoriles Farm Plans and Systems
Jucuarán Cooperative	Clean fishing
CREDICAMPO	Reforestation with fruit trees
San Dionicio	example of sanction to Cane workers
UNAMBAHI	Strengthening regional environmental units Use of environmental window
Water	Organized by communities, request drinking water, pipes (demand to two cantons)

Sesion 1 Exercise 1 (preparing in paperwork) Men Group 1

Municipality	Ecosystems or agro-ecosystems	Benefits received from the site (perceived by participants)
The Transit	Laguna El Jocotal Annual crops Permanent crops Chaparrastique Volcano Rio Grande de San Miguel Agriculture Livestock Fishing	Fishing, irrigation, water collection, water access, tourism Cane fields ANP Las Moritas Fishing Corn, Bean Agroforestry Systems (SAF) Silvopastoral Systems (SSP)
San Miguel	La Pedrera Laguna El Jocotal Rio Grande de San Miguel Forest of the Rio Grande de San Miguel San Juan Lagoon Chaparrastique Volcano Agriculture Livestock Annual crops Permanent crops Forest the Pital Olomega F Lagoon	Natural filter Fishing, irrigation, water collection, water access, tourism, firewood Fishing Agroforestry systems, corn, beans SSP (Silvopastoral Systems) Cane fields Ausoles.
El Carmen	Olomega Lagoon Agriculture Livestock Water nascent, The Tuno and the nicha Gallery Forest The Monkey frontón El Carmen St. Peter's Small Batteries Cerro La Garrocha Los Almendros River	Fishing, irrigation, tourism Maicillo, corn, Agroforestry Systems Silvopastoral Systems Water supply Wood, Habitat, Fruit, Oxygen. Wood, poles

Session 1, Exercise 2. (prepared in paperwork)
Men Group 1

Municipality	Ecosystems or agro-ecosystems	Observed changes in the weather How long ago?	Impact of climate change on ecosystems/agro-ecosystems	Impact of climate change on their livelihoods as men/women.
El Tránsito El Carmen	Laguna El Jocotal Olomega Lagoon	Rising temperatures About 10 years ago.	Declining fishing Water decrease Dusting Decreases fry Affects flora and fauna	Reduction of predators of the pig duck.
El Tránsito San Miguel	Volcanic Lava.	Rising temperatures About 10 years ago.	Reducing the volume of the stone Affects the quality of water that leaks Used as an open-pit garbage dump.	Population receives contaminated water Increased number of houses therefore feces and urine contamination More solid waste

San Miguel	The Great River of San Miguel	Less water in dry season, for the benefit of the population More water in rainy season that causes overflows and flooding More pollution from trade, housing and industrial wastewater. More solid waste pollution from more vulnerable areas in the city of San Miguel	Pollution Fewer wildlife spaces. Increased vectors Water stress Floods and overflows	Pollution diseases (diarrhea, IRA. Low food production Dengue, Sika, Chikunguya. Reducing natural resources Affects crops Loss of human life Material losses Low quality of life for the inhabitants Water contamination.
El Carmen	Groundwater Agricultural	Drought for about 10 years.	Wells dry out Grasslands Crop losses Cattle death.	Water deficiency For human consumption Low food production Economic losses Increased poverty.
El Tránsito El Carmen Concepción Batres	Silvopastoril (agriculture)	Positive shift to traditional livestock management	Increased meat and milk production Soil and water conservation works.	Increased water infiltration into the soil Increased flora Increased CO2 uptake Higher Production of O2 Protection and mitigation of the Soil and Water Resource
	Agroforestry (agriculture)	Higher oxygen production Higher water production Erosion Reduction CO2 capture	There are positive impacts with these practices, but it must be applied on a larger scale to all municipalities of the Rio Grande basin of San Miguel.	Soil conservation CO2 capture Crop diversification.
Municipality of El Brazo in San Miguel	Laguna El Jocotal	Rising temperatures About 10 years ago.	Declining fishing Water decrease Dusting Decreases fry Affects flora and fauna Pollution of the lagoon.	In this place you will find country poultry Biogas Herds Reedbeds Growing vegetables.

Session 2 Exercises 1 Men Group 1

Impact of Climate Change	Measurement (copied from the printed list, and others that arise)	This measure has been made before (in other projects/or people do them with their resources)?*	How did these measures help ecosystems?	How did these measures help the needs of men/women?
Raising the temperature from wildfires (The 5 municipalities)	Firewall gap Environmental Education Nursery and reforest establishments Enforcement of environmental legislation	Yes By low-scale sectors More central government and municipal government interest is needed More organization is needed More technical training.	Yes, but on a low scale	Yes, to families involved in collecting solid waste for commercialization
Soil water, air and food contamination.	Good agricultural practices Soil conservation works Comprehensive management of solid waste Enforcement of environmental legislation Water reservoirs	Yes By low-scale sectors More central government and municipal government interest is needed More organization is needed More technical training. With regard to reservoirs if they have been made, but it is not followed.	Silvopastoriles and agroforestry projects have been implemented and the following results have been obtained: Decreased erosion More water infiltration into underground aquifers CO2 capture (therefore, site heating is decreased) Better Food Production Fewer landslides Less pressure to resource water	Grass savings Increased food Increased production Economic increase Better quality of life Better ecosystem balance Water harvest Fewer diseases More water for livestock Home orchards It would prevent erosion.

Recommendations for El Jocotal lagoon, Olomega lagoon and San Juan lagoon

Investment costs

Studies already exist

More investment in:

- Level Guard Walls
- Dredge
- Management of Rural Areas

Session 1 Exercise 1

Men Group 2

Municipality	Ecosystems or agro-	Benefits received from the site (perceived by participants)
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San Miguel	Laguna El Jocotal (Ramsar Site) Laguna San Juan (Ramsar Site) Olomega Lagoon (Ramsar Site) Laguna Montecristo and Gallery Forest Aramuaca Lagoon	Migratory birds are coming These are tourist areas Food production (fishing) Wildlife (fauna and flora) Generate oxygen - aquatic plants They are water retaining bodies They're water filtrators They're disaster reducers.
	Chaparrastique Volcano	Water recharge Fertile soils Wildlife Protection from weather events (such as hurricanes) Tourism Serves as a beacon for migratory birds Crop diversity Provides stone materials Provides oxygen The forest prevents erosion caused by rains Climate regulator.
	San Miguel's Rio Grande	Water for crop irrigation Wastewater drainage and purifier Wildlife Livestock Extraction of firewood Fishing.
San Miguel	Agroecosystems Basic grains: corn, beans, corn Vegetables Sugar cane Coffee cacao	Food production Income Water recharge Soil enhancer
Jucuarán	Mangroves	Serves as a natural barrier to weather phenomena Power supply Wood extraction Tourism Fishing Habitat of birds and other species.
	Agroecosystems Coffee cacao Basic grains	Food production Income Water recharge
Concepción Batres	Plain	Crop production under irrigation Water recharge (river birth) Highly productive soils Soil oversaturation that prevents flooding Wind barrier Wild animal habits
	Livestock.	Food production Sources of employment.

Session 1, Exercise 2. (prepared in paperwork) Men Group 2

Municipality	Ecosystems or agro-ecosystems	Observed changes in the weather How long ago?	Impact of climate change on ecosystems/agro-ecosystems	Impact of climate change on their livelihoods as men/women.
San Miguel	Laguna El Jocotal (Ramsar Site) Laguna San Juan (Ramsar Site) Olomega Lagoon (Ramsar Site) Laguna Montecristo and Gallery Forest Aramuaca Lagoon	1, 988 Lots of rain 1,999 heavy-up MITCH rain	Dusting Floods	Crop and livestock losses, poultry Loss of life Infrastructure damage Respiratory diseases, diarrhea, eyes, skin fungi
		For 5 years the canicula have been longer	Temperature increase	Crop losses Reduction of the lagoon water mirror. Affecting aquatic life. Reduction of the water table.
	Chaparrastique Volcano	Prolonged canicula Lots of rain	Increased wildfires Migration/change of species habitats Landslides Floods	Crop losses Economic losses Material damage Victims.
	Rio Grande de San Miguel	Lots of rain	Floods Dusting Changing channels forest collapses/deterioration Wildlife loss Change of species habit Contamination by solid waste.	Fish reduction Losses of nurseries Affecting the access roads.
		Canicula	Reduced flow Water pollution from wastewater discharges	Crop and livestock losses Water stress
Jucuarán	Mangroves	Lots of rain	Dusting Changing the relationship between fresh water and salt water, they dry out Solid waste pollution	Reduction of fish and molluscs Reduction in economic income
		Canicula	Unbalance in mangrove growth	Removing the mangrove
	Beach	Lots of rain	Sea level rise Floods Salt intrusion into wells	Decreased fish Affecting economic income
Jucuarán		Canicula		Decreased fish Affecting economic income
Concepción Batres	Plain	Heavy rains	Oversaturation of soils Floods	Crop losses Obstruction of access roads
		Canicula	Reducing the water table	Crop losses Water rationing

San Miguel Jucuarán Concepción Batres	Agroecosystems	Heavy rains	Floods Landslides Azolvamientos	Crop losses Obstruction of access roads
		Canicula	Water resource scarcity Increased likelihood of fires Increased pests	Crop loss Increasing the cost of the basic basket
Concepción Batres	Livestock	Canicula	Grass loss	Lost income
		Heavy rains	Floods	Illnesses and livestock losses

Session 2 exercises 1

Men Group 2

Impact of Climate Change	Measurement (copied from the printed list, and others that arise)	This measure has been made before (in other projects/or people do them with their resources)?*	How did these measures help ecosystems?	How did these measures help the needs of men/women?
Drought	5.2 Firewall Gaps	Yes, in the lagoon El Jocotal In a community in Jucuarán in Las Moritas	Yes, it prevented the advance of fire and helped regenerate the forest	Yes, there's the water fountain
	5.4 Fire campaigns	Yes in Jucuarán	Yes, it avoid burning and bad practice	Yes.
	1-3 Restoration in recharging areas through agroforestry systems	Yes in Jucuarán Yes, in the lower area of the volcano, pacha stone, callen new and Olomega lagoon	Yes, it have a tree cover with fruit trees Combined with basic grains and vegetables	Yes If it generates revenue
	14.1 Local tourism	If in the lagoon El Jocotal, Olomega, El Espino Beach, Arcos del Espino beach and southeastern beaches of Jucuar'n, mangrove, Xiracantique	Yes, environmental awareness Curile nurseries were created and blue crab and sea turtle protection There's Environmental Education	Yes Generates economic income If contributing to the SAN and income
	16. family orchards	Yes, in pacha stone and El Transito	If you increase tree cover.	Yes Generates economic income

	1.Sowing fry	Yes, in the lagoon El Jocotal and Laguna Olomega	Yes, fish increase	Yes Generates economic income.
	1.2 Hydrological flow recovery	Yes, in Concepción Batres and Jucuarán.	Yes. Natural mangrove regeneration and recovery of hydrological flow	If it generates revenue Yes, access to communication channels.
	1.1 Cattle fence: Silvopastoral systems	Yes (new street, transit, pacha stone, El Carmen)	Yes, tree cover, improvement of livestock fodder, by rotating livestock	Yes, establishment of protein bank with improved and managed paddocks
	4.9 Live fences	Yes, (The Borbollón, Pacha Stone, New Street)	Yes, avoid erosion and water infiltration	Yes, soil improvement.
	9.1 Water reservoir	Yes, La Morita, Jucuarán, new street, Piedra Pacha, El Borbollón	Yes, catching rainwater for fires	Yes, for irrigation
	10.1 Rainwater collection	Yes (El Jocotal, El Pital)	Yes, water uptake	Yes, for personal consumption
	2.1 Wood-fired plantations	Yes, mother cocoa at Piedra Pacha and Calle Nueva	Yes, tree cover Pollination	Yes, for foliage
	Promotion of green saffron	If in jute	Yes. Incorporation of stubble, the crop does not burn	Yes

Annex 2

16 October 2019

Attendance List, El Salvador

José Armando Cisneros Cruz	Municipality of El Tránsito	armandoc64@hotmail.com
Benedieto Romero M.	UMA, Municipality of San Miguel	bene_more@yahoo.cs
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Rudys López	Cooperative	
Enrique Mendoza	Ramsar Jocotal, chairperson	
Saúl Guzmán	ASPRO Jocotal	
Daniel Eduardo Mas	OIKOS	oikosoudoridad99@gmail.com educrd_46@hotmail.com
José Guillermo Rivera	OIKOS Solidaridad	josepanchimalco@hotmail.com
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José Biamonte	Municipality of El Tránsito	
Santana Rivera Pérez	Municipality of Jucuarán	js_rivera@hotmail.com
José Angel Bustos B.	Municipality of El Tránsito, Ramsar Committee of El Jocotal	jabbcc@gmail.com
José Martín Bonilla	Cantola Puerta, El Pital	
Felicitó Ortiz	Cantola Puerta, El Pital	
Ana Raquel Conde de Pineda	ACAMAY Association, Water Board of El Brazo	conde.2607@gmail.com
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Xiomara Aquino	MARN/DEV	xhenriquev@marn.gob.sv
María Elena Rivas de Palacios	Ramsar ASIBAHIA, chairperson	mariaelena_riva@hotmail.com
Dora Elizabeth Nieto	ASIBAHIA	dorasnieto@gmail.com
Professional staff from institutions		
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Alba Margarita Meléndez	Local Consultant	mmelendez1517@yahoo.com
Alba Verónica Paniagua	Assistant of the Local Consultant	veronica.panmel@gmail.com
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Marta Moneo	UNEP	marta.moneo@un.org

Annex 3
Photographs.



Representative of the Central American Commission on Environment and Development welcoming



UN Environmental Representative Marta Moneo, exposing the project to the participants.



Participation and facilitation of Local Consultant in the workshop of consultation to the 5 municipalities of the Rio Grande basin of San Miguel, El Salvador prioritized in the dry corridor.



I work as a table in the consultation workshop of the project "**Adaptation** based on ecosystems and transformational measures to increase resilience to climate change in the dry corridor of Central America and the arid areas of the Dominican Republic."



Participants in plenary, setting out the results of the working tables



Group photo of participants to the ES consultation workshop of the project **"Adaptation based on ecosystems and transformational measures to increase resilience to climate change in the dry corridor of Central America the arid areas of the republic Dominican "**

Nicaragua

**NICARAGUA
LOCAL CONSULTATION WORKSHOP
Report**

15. General information

Date	October 14, 2019
Country	Nicaragua
Workshop location	Somoto
Number of participants	Total: 29→ Women:13; Men: 16
Municipalities represented	Somoto, Yalaguina, Palacaguina, Telpaneca, El Jícaro.
Organizations/groups represented	City council representatives from each Municipality, Delegation from the Ministry of Environment and Natural Resources (MARENA), Community Leaders from the five municipalities.

16. Land use

c) Land use in municipalities

Identified ecosystem/agro-ecosystem	Comments (e.g., main characteristics or species)
• Municipalities of Telpaneca, Somoto and Jícaro.	
Intervened seasonal evergreen tropical forest of submontane pine	<ul style="list-style-type: none"> • Conifer forest.
• Municipalities of Somoto, Yalaguina, Palacaguina, Telpaneca, El Jícaro	
Very intervened broadleaf forest	<ul style="list-style-type: none"> • <i>Byrsonima crassifolia</i> • <i>Quercus</i> spp • <i>Liquidambar styraciflua</i> • <i>Piscidia grandifolia</i> • <i>Myrica cerifera</i> • <i>Acacia pennatula</i> • <i>Psidium guajaba</i> • <i>Cecropia peltata</i> • <i>Brahea salvadorensis</i>
• Municipalities of Somoto, Yalaguina, Palacaguina, Telpaneca, El Jícaro	
Permanent Crops	<ul style="list-style-type: none"> • Coffee • Grape
Annual Crops	<ul style="list-style-type: none"> • Tobacco
Basic Grains and Vegetables. (Mainly for self-consumption and in case there are surpluses are made in the local market)	<ul style="list-style-type: none"> • Beans • Corn. • <i>Sorghum</i> sp • Tomatoes. • Onions. • Carrot. • Peppers ("chiltomas"). • Potatoes.
Main Livestock (extensive and small scale)	<ul style="list-style-type: none"> • Beef cattle. • Milk cattle

d) Benefits perceived by the local population

Identified ecosystem/agro-ecosystem	Perceived benefits and uses
<ul style="list-style-type: none"> Conifer Forest. 	<p>Men</p> <ul style="list-style-type: none"> Carbon capture Oxygen. Wood and water sources protection. Production, wildlife refuge. Protection of soils and forest cover. Resin production. Production of handicrafts. <p>Women.</p> <ul style="list-style-type: none"> Wood (Economic income) Ocote (tree species to light fire). Turpentine pitch.
<ul style="list-style-type: none"> Very intervened broadleaf forest 	<p>Men</p> <ul style="list-style-type: none"> Increased organic layer. Handicrafts. Biodiversity protection. Strengthened soil texture and erosion prevention. <p>Women.</p> <ul style="list-style-type: none"> Firewood for domestic consumption. Food and shade for livestock. Medicine (<i>Ceiba</i> sp)
<ul style="list-style-type: none"> "Tacotales" (secondary succession after livestock grazing) 	<p>Men</p> <ul style="list-style-type: none"> Energy use. Water production. Strengthens soil texture to prevent erosion. <p>Women</p> <ul style="list-style-type: none"> Wood for use and sale. Wood. Medicinal. Small fruits that provide food security (e.g. nance - <i>Byrsonima crassifolia</i>)
<ul style="list-style-type: none"> Permanent Crops 	<p>Men</p> <ul style="list-style-type: none"> Energize local economy. <p>Women</p> <ul style="list-style-type: none"> Grape. Wine, fruit consumption, marketing, family sustenance, sources of employment. Coffee. Consumption, trade, source of employment, by combining of crops with with shade trees, you get diversity of crops and animal habitats.
<ul style="list-style-type: none"> Annual Crops 	<p>Men</p> <ul style="list-style-type: none"> Food and seed production. Family food security. Nitrogen fixation. Production of corn derivatives (donuts, traditional food) <p>Women.</p> <ul style="list-style-type: none"> Self-consumption. Marketing and contribution to family income, Stubble incorporation. Healthy eating and there's a greater diversification for family snacks.
<ul style="list-style-type: none"> Livestock. (Extensive and Small Scale) 	<p>Men</p> <ul style="list-style-type: none"> Production of dairy products and meat. Food security.

	<ul style="list-style-type: none"> • Source of employment. • Handicrafts. • Pork derivatives. • Biogas. • Production of organic fertilizers.
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17. Local perception of climate change

i) Perceived changes in the climate

Changes in precipitation (intensity, frequency)	<ul style="list-style-type: none"> • Decreased precipitation volumes. • Extended dry periods. • Variation of monthly and annual precipitation distribution. • Increased uncertainty in weather forecasts.
Changes in temperature	<ul style="list-style-type: none"> • Increased temperature averages.
How long have these changes been observed?	<ul style="list-style-type: none"> • The El Niño phenomenon and Hurricane Mitch were mentioned in the group of men as an important reference in climate variability.
Are agroclimatic phenomena mentioned? Eg. El Niño	
Other changes mentioned	<ul style="list-style-type: none"> • Soil erosion. • Extreme events (cyclones, hurricane winds). • Heavy rains • Thunderstorms

j) Perceived impacts on ecosystems/agro-ecosystems

Ecosystem /agro-ecosystem	Impact of change in climate
<ul style="list-style-type: none"> • Conifer Forest. 	<ul style="list-style-type: none"> • More pests and diseases. • Increased wildfires. • Loss of forest cover. • Loss of flora and fauna. • Deepening of the phreatic level. • Change of land use. • Increased soil erosion. • Deepening of aquifer mantle
<ul style="list-style-type: none"> • Very intervened broadleaf forests. 	<ul style="list-style-type: none"> • Forests loss. • Fewer resources for production (firewood, wood for furniture, etc.). • Loss of flora and fauna. • Deepening of the phreatic mantle. • Change of land use. • Increased soil erosion. • Increased wildfires.
<ul style="list-style-type: none"> • “Tacotales” (secondary succession after livestock grazing) 	<ul style="list-style-type: none"> • Biodiversity loss • Increased soil wind erosion. • Increased wildfires. • Acidification and soils compaction.
<ul style="list-style-type: none"> • Permanent Crops 	<ul style="list-style-type: none"> • Harvest losses. • Decreased yields. • Biodiversity loss. • Increased pests and diseases such as coffee rust • Degradation of soil quality
<ul style="list-style-type: none"> • Annual Crops and Livestock 	<ul style="list-style-type: none"> • Loss and decline of the harvest. • Increased pests and diseases in crops. • Decreased milk and meat production. • Increased mortality and morbidity in livestock.

	<ul style="list-style-type: none"> • Food scarcity for cattle. • Less water sources for livestock
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k) Perceived impacts on the population

Impacts	In men's lives	In women's lives
Impacts on household chores		<ul style="list-style-type: none"> • Water has to be carried over longer distances. • Women waste more time on domestic work. • No firewood availability
Impacts on agricultural work		
Economic impacts	<ul style="list-style-type: none"> • Emigration in search of opportunities. • Less economic income. • Livelihoods are affected. • Decrease in job opportunities 	<ul style="list-style-type: none"> • Less entrepreneurship. • Less household income and migration. • Goods and services are more expensive. • We do not meet basic needs such as food, medicines, school needs such as: clothing, footwear, etc. • Migration of women looking for work outside the community. • Women were left with fewer resources or savings. • Loss of family wealth.
Health impacts	<ul style="list-style-type: none"> • Increased respiratory and kidney diseases. • More heart and hypertension diseased. • Increased emotional stress. • Increased risks in physical and intellectual development in children under the age of five. 	<ul style="list-style-type: none"> • Increased risk of malnutrition. • More diseases. • Emotional stress.
Other impacts	<ul style="list-style-type: none"> • Less opportunities for youth personal fulfillment. • Increased social risk and for youth. • Loss of social hope. • Destabilization of the family nucleus. 	<ul style="list-style-type: none"> • Diet and daily ration imbalances. • Increased food insecurity. • Less school attendance. • Family disintegration. • Loss of scenic beauty.

l) Proposed adaptation measures

Proposed adaptation measure	Justification
Men	
Restoration of forest cover/water resources.	<ul style="list-style-type: none"> • Forest sustainability. • Water retention and distribution. • Improves microclimates. • Restoration of degraded areas.
Sustainable production of wood and firewood	<ul style="list-style-type: none"> • Better exploitation of the natural forest. • Decreases pressure on forest cover. • Protection and conservation of natural habitats.
Rainwater collection	<ul style="list-style-type: none"> • Water availability / Irrigation season. • Increases water infiltration / Aquifer Mantle.

	<ul style="list-style-type: none"> • Decreases flooding / lower basin.
Efficient irrigation technology.	<ul style="list-style-type: none"> • Water availability / Irrigation season. • Increases water infiltration / Aquifer Mantle. • Decreases flooding / lower basin.
Implementation of agrosilvopasture systems.	<ul style="list-style-type: none"> • Decreases livestock stress. • Greater volume of food. • Increases productivity. • Carbon sink.
Environmental Education. Environmental values	<ul style="list-style-type: none"> • Increases environmental responsibility. • Use of environmentally friendly techniques.
Implementation of home adaptation resources (kitchens, ovens)	<ul style="list-style-type: none"> • Reduction of wood consumption. • CO₂ emission Reduction. • Environmental ethics.
<ul style="list-style-type: none"> • Women. 	
Agroforestry systems.	<ul style="list-style-type: none"> • Improves soil as a natural soil amendment. • Less erosion. • Keep soil moisture. • Cooler climates.
Restoration of areas with forest cover in recharge areas.	<ul style="list-style-type: none"> • There is more water, pure oxygen, lower temperatures, diversification of fauna. • Soil improvement.
Water reservoir.	<ul style="list-style-type: none"> • Reduces river pollution. • It helps to improve conditions for flora and fauna (migratory birds have settled on the area and animals can have water to live in). • It creates a pleasant microclimate, the temperature is reduced.
Banks of improved and ancestral seeds for climate Adaptation (Drought Resistant)	<ul style="list-style-type: none"> • Increases soil fertility through the elimination of agrochemicals. • Ecosystem balance because there are fewer pests.

18. Examples of adaptation previous experiences in the area

Adaptation strategy/measure implemented	Impacts of measure on ecosystems/agro-ecosystems	Impacts of measure on the lives of men and women
Restoration of forest cover/water resource.	Men <ul style="list-style-type: none"> • Forest sustainability. • Water retention and distribution. • Improves the microclimate. • Restoration of degraded areas. Women. <ul style="list-style-type: none"> • There's more water, pure oxygen. • Lower temperature. • Diversification of fauna. • Soil improvement. 	Men <ul style="list-style-type: none"> • Access to water resources. • Generation of employment opportunities. • Opportunities for productive economic development. Women. <ul style="list-style-type: none"> • Improves family health (clean air and water) • When there is more water, it saves times to women.
Sustainable production of wood and firewood	Men. <ul style="list-style-type: none"> • Better exploitation of natural forests. • Decreased pressure on forest cover. • Protection and conservation of natural habitats. 	Men. <ul style="list-style-type: none"> • Opportunity to improve income. • Increased job opportunity. • Improves family life.
Rainwater collection	Men.	Men.

	<ul style="list-style-type: none"> • Water availability / irrigation season. • Increased water infiltration into aquifer mantle. • Decreased flooding / lower basin. 	<ul style="list-style-type: none"> • Local economy dynamization. • Generation of jobs / dry season.
Efficient irrigation technology.	Men <ul style="list-style-type: none"> • Increased water supply. • Positive in water balance. • Increased productivity/productive cycle. Women. <ul style="list-style-type: none"> • Prevents soil erosion. • Saves water, plants get only what it needs. • It saves fuel. • The environment is protected. 	Men. <ul style="list-style-type: none"> • Food security. • Availability of resources for other investments. Women. <ul style="list-style-type: none"> • Time saving, physical effort and economic savings.
Implementation of agrosilvopasture systems.	Men. <ul style="list-style-type: none"> • Decreases livestock stress. • Higher volume of food. • Increased productivity. • Carbon sink. 	Men. <ul style="list-style-type: none"> • More time available for the family. • Less migration.
Implementation of agroforestry systems.	Women. <ul style="list-style-type: none"> • Improves soil as a natural soil amendment • Less erosion • Keeps soil moisture • Cooler climates. 	Women. <ul style="list-style-type: none"> • Shaded crops improve food security and can be sold. • Healthy environment (shade and temperature) during the agricultural day.
Improved Ancestral Seed and Seed Banks for Adaptation (Drought Resistant)	Women. <ul style="list-style-type: none"> • Increases soil fertility through the elimination of agrochemicals. • Balanced ecosystem because there are fewer pests. 	Women. <ul style="list-style-type: none"> • Reduced production costs, access to buy other type of family food, to cover other family needs. • Improves food/nutritional safety.
Environmental Education. Formation of values.	Men. <ul style="list-style-type: none"> • Increased environmental responsibility. • Use of environmentally friendly techniques. 	Men. <ul style="list-style-type: none"> • Raise the educational level. • Increased commitment and environmental awareness.
Implementation of home adaptation resources (kitchens, ovens)	Men <ul style="list-style-type: none"> • Reduction of wood consumption. • CO Emission Reduction₂. • Responsible environmental ethics. 	Men. <ul style="list-style-type: none"> • Decreased workload. • Economic savings.

19. Project sustainability

i) Perception of components and activities

Component or activities	Urgency of component or activity	General appreciation of effectiveness/feasibility
Ecosystem-Based Adaptation: •Payment for Environmental Services. •Water Fund •Fund for grants.	<ul style="list-style-type: none"> • ☆☆☆ (Men) • ☆ (Women) 	In general, participants recognize the effectiveness of the components and their activities although they recognize its implementation on the ground face barriers, mentioned in the table below
Loans for ecosystem adaptation.	• ☆☆☆ (Women)	
Loans for adaptation in farms	• ☆☆☆ (Women)	
Adaptation training	• ☆☆ (Women)	
Provide technical assistance	• ☆☆ (Men)	
Dissemination of Information	It wasn't prioritized.	

Implementation of EbA interventions in rural communities.	<ul style="list-style-type: none"> ☆☆☆ (Men) 	
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j) Perceived barriers and mitigation strategies

Component or activities	Existing barriers or difficulties that could arise	Strategies for tackling barriers
Ecosystem-Based Adaptation: •Payment for Environmental Services •Water Fund •Fund for grants.	<ul style="list-style-type: none"> Legal issues related to land ownership. Certification and/or legal entity of cooperatives. Limitations on the financial management systems of community organizations, cooperatives and NGOs. Payment for environmental services is a right recognized by the law, but it isn't applied. Does not apply to small producers under 10 ha. 	<ul style="list-style-type: none"> Develop municipal programs to facilitate the legalization of property cooperatives and community organizations. Coordinate with the relevant institutions, the streamlining of the legalization of relevant documents. Training beneficiaries in financial management. Organization of small forest owners. Improve the information system at the technical and producer level (requirement).
<ul style="list-style-type: none"> Provide technical assistance to farmers for the development of enterprises based on natural resources. 	<ul style="list-style-type: none"> Lack of interest in some farmers because of technical assistance. Lack of follow-up which would facilitate the sustainability of projects and programs. 	<ul style="list-style-type: none"> Follow-up by municipal authorities and agencies with local incidence.
<ul style="list-style-type: none"> Loans for adaptation in farms. 	<ul style="list-style-type: none"> Requirement to apply Interest rates and payment deadlines Lack of information 	<ul style="list-style-type: none"> Flexibility of technical tenure requirements. Interest under considerable long-term terms Accompaniment of financial, agricultural and livestock technique.
<ul style="list-style-type: none"> Implementation of EbA interventions in rural communities. 	<ul style="list-style-type: none"> Deficits in coordination, communication and articulation between all actors. 	<ul style="list-style-type: none"> Strengthen the organization and communication of all the actors in the project. Disclosure and project information.
<ul style="list-style-type: none"> Adaptation training. 	<ul style="list-style-type: none"> [...] communication between institutions [...] Lack of funds for the logistics of training programs. Lack of interest from producers. Lack of youth involvement in adaptation-related issues. 	<ul style="list-style-type: none"> Coordination at the higher level (Delegate) or more staff. Availability of resources. Awareness campaigns for producers. Incorporation of environmental issues in education at educational levels. Encourage new leadership strategies for young people.

k) Actors to ensure sustainability

- Describe the actors that the population consider should be involved in the components/activities to ensure the sustainability of the project.

Component or activities	Actors who should be involved.
Ecosystem-Based Adaptation. •Payment for Environmental Services. •Water Fund. •Fund for grants.	<ul style="list-style-type: none"> City Council; UMAS (Municipal Units for a Sustainable Environment) CAPS (Committees for Potable Water and Health) Cooperatives (Producers) Land property intendancy, Ministry of the Interior - (MIGOB)

	<ul style="list-style-type: none"> • National Assembly (AN) • Ministry of Labour - MITRAB.
<ul style="list-style-type: none"> • Provide technical assistance to farmers for the development of enterprises based on natural resources. 	<ul style="list-style-type: none"> • Community Leaders • Producers (Individual or in Cooperatives) • Beneficiary families.
<ul style="list-style-type: none"> • Loans for adaptation in farms 	<ul style="list-style-type: none"> • National Forestry Institute – INAFOR. • Cooperatives (Producers) • Small and medium-sized enterprises (MiPymes Nicaragua), existing and operating
<ul style="list-style-type: none"> • Implementation of EbA interventions in rural communities 	<ul style="list-style-type: none"> • Ministry of Environment and Natural Resources MARENA. • City council. • Community organizations. • Ministry of Agriculture (MAG). • National Forestry Institute- INAFOR, • Financial institutions. • APRODEIN
<ul style="list-style-type: none"> • Adaptation training. 	<ul style="list-style-type: none"> • City Council; UMAS (Municipal Units for a Sustainable Environment) • CAPS (Committees for Potable Water and Health) • Producers (Individual or in cooperatives) • Beneficiary families.

I) Key policies

- Describe local development policies or plans related to project components/activities.
 - National Development Plan.
 - National Climate Change Policy.
 - General Law on the Environment.
 - General Law of COOPERATIVES.
 - Law No. 765, Law on the Promotion of Agroecology or Organic Production.
 - Law No. 693. Sovereignty and Food and Nutrition Security Act.
 - Municipal Development Plan
 - Municipal Environmental Management Plan.
 - Municipal Drought Plan.
 - Risk Management Municipal Plan.
 - Forest Management Plan

20. Financial mechanisms

- Describe the financial mechanisms that are normally used in the area. What kind of financial institutions are present? Which could be part of the project?

Participants mentioned the case of special loans in the context of rust epidemics; they were well received, and were channeled through financial institutions that received the funds and lent directly to the producers during this emergency. They also mentioned a government funding that is channeled through the MEFFCA (Ministry of Family, Community, Cooperative and Associative Economics), for entrepreneurship in cooperatives. Among the actions financed are some of related to ecosystem-based adaptation and water technologies.

Annex 1. Pictures.



Group photo after the workshop in Somoto-Nicaragua 14-Oct 2019



Men's group



Mixed group

Annex 2. List of Participants - Somoto-Nicaragua Workshop, 14 October 2019.

Nicaragua 14 October 2019	Edixon A. Carro Cruz	Municipality of Yalagüina	edixon.carro@yahoo.es
	María Santos López	Municipality of Yalagüina	
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	Veronica Antonia Aguirre	GFCY	
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	Caridad Vanegas Suárez	CAPS	
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	Edgard Huete Acevedo	Municipality	edgardhuete@yahoo.com
	Juan Carlos Sepera		
	Professional staff from institutions involved in this proposal		
	German Quesada	Consultant	germanquesada@gmail.com
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Costa Rica

COSTA RICA LOCAL CONSULTATION WORKSHOP
Results report
Nicoya, Guanacaste 18/10/19

Introduction

This report reflects the concerns of governmental employees from public institutions such as MINAE, SENARA, Ministry of Planning, civil society represented by various groups from the municipalities of Liberia, Santa Cruz, Carrillo, Nicoya and Bagaces that gathered for the elaboration of the proposal "Ecosystem-based adaptation to increase resilience in the Central American Dry Corridor and Arid Zones of the Dominican Republic" to provide feedback and elements from a more territorial perspective.

Important aspects to consider are the concerns participants have regarding relatively successful project experiences in the area. As well as historical land-use transitions mainly with extensive livestock and its impact on deforestation, riverbed sedimentation, wetland damage among others. As well as the effects of annual melon and watermelon monocultures among others, in addition to cane production, which somehow have direct impacts on ecosystems.

At the same time, this workshop includes the different governmental and civil society initiatives to reverse these adverse situations. Forest cover recovery data are an example of these efforts that are the sum of conservation actions, productive conversion, environmental education, participation of local organizations, municipalities among others.

This workshop draws on the experience, knowledge and local vision of many people committed to adaptation efforts in a part of Costa Rica's dry corridor and at the same time comes to determine that coordination interinstitutional and other similar projects is essential to avoid repeated actions in a relatively small region but with diverse ecosystems and needs.

21. General data

Date	18 October 2019
Country	Costa Rica
Workshop location(see photos in Annex1)	Nicoya, Guanacaste
Number of participants (See list of participants in Annex 2)	Total 35→ Women 11; Men 24
Municipalities represented	Liberia, Santa Cruz, Nicoya, Bagaces and Carrillo
Organizations/groups represented	Institutional Sector (Ministry of Environment, SENARA, Civil Society, Ministry of Planning)

22. Land use

E Land use in selected municipalities

WORKING GROUP 1 (men) and 3 (women)

Ecosystem/agro-ecosystem identified	Comments / Specifications (e.g., main mentioned characteristics or indicated crops/species)
Bosque dry	It is the ecosystem that is located in the 5 cantons and considered the most important as it is the only remnant in the country
Gallery Forest	It is a riparian forest (on the banks of the rivers) and serves an important function as buffer areas. In all municipalities can be observed.
Mangroves	Mangroves are considered by participants (along with wetlands) as the most threatened ecosystems and because of their vulnerability require immediate attention
Wetlands	They also have a high presence in the dry corridor and are considered a priority in their care and conservation
Grass (Wooded Sheets)	These are ecosystems with grasses representative of the area as jaragüa with remnants of trees such as the Guanacaste and that were formerly referred to as wooded savannahs
Pastures	It differs from the previous one in that they are induced pastures for livestock in large expanses and form characteristic agro-ecosystems of the dry corridor, present in all municipalities
Wet and premontane forest	Present mainly in the hills of Nicoya and Liberia in the foothills of the Rincon de la Vieja Volcano, they constitute important sources of headwater and forest cover of secondary forest.

WORKING GROUP 2 (men)

Ecosystem/agro-ecosystem identified	Comments / Specifications (e.g., main mentioned characteristics or indicated crops/species)
Wooded Potrerros	Meat and milk market, Beekeeping, Forest products
Annual and permanent crops	Agro-industry and markets
Pmontan wet forest	Recharge areas, Coffee crops, orange,
Dry And Deciduous Forest	Wood products, Pastoril (Ramoneo)
Tacotales/Restlands	Crops bean and corn

F Benefits perceived by the local population

WORKING GROUP 1 GROUP OF MEN

Ecosystem/agro-ecosystem identified	Perceived benefits and uses
Dry forest	Animal and human protein bank Wood supply Biological Corridors Germplasm bank Agricultural production Clean energy Beekeeping Landscape beauty (tourism) Biodiversity reservoir
Gallery Forest	Germplasm bank Landscape beauty (tourism)
Mangroves	Biodiversity reservoir Landscape beauty (tourism) Fishing
Wetlands	Germplasm bank fauna and flora

	Landscape beauty (tourism) Reservoirs Water and oxygen purifiers Resilience Mechanism of defense against extreme natural events
Grass (Wooded Sheets)	Agricultural production
Pastures	Agricultural production
Wet forest	Landscape beauty (tourism) Biological Corridors Germplasm bank Water production

WORKING GROUP 2 GROUP OF MEN

Ecosystem/agro-ecosystem identified	Perceived benefits and uses
Wooded Potrerros	• Climate regulation, • Improve connectivity, • Seed dispersal, • Wildlife feed, • Forage, • Wood products, • Scenic beauty, • Natural medicine, • Beekeeping, • Meat and milk market
Annual and permanent crops	• Employment, Economic Income, • Promoting other services, • Food security, • Agribusiness development and markets, • Increased exports
Premontane wet forest	• Water, • Tourism, • Climate, • Biodiversity, • Climate Shelters, • Recharge Areas, • Higher Cultural Offer
Dry And Deciduous Forest	• Wood, • Biodiversity, • Climate Regulation, • Scenic Beauty, • Pastoril (Ramoneo), • Phytogenic Resource
Tacotalas/Restlands	• Bean-corn crop areas, • Fertility regenerators soils

WORKING GROUP 3

Women

Ecosystem/agro-ecosystem identified	Perceived benefits and uses
Wetlands	Food (clams), fishing, tourism, habitat (birds), species recovery, carbon capture, agricultural production, recreation (mental health), research area (Jabirú).
Dry Forest	Habitat, biodiversity, carbon capture, culturally seasoned fruits, tourism, timber, bee habitat (dispersers and pollinators), supply and regulation of wood water.
Annual crops (beans and corn)	Food, tourism (economic income by blue zones), cultural rescue, soil conservation, agrobiodiversity, other crops of the environment (creole cucumber, legumes).
Short pastures (floor grass) and livestock (beef, sheep, goats and hens)	Dairy, economic income, cultural services (tradition, bulls), tourism, meat, food security, silvopastoral shadow.

23. Local perception of climate change

m) Perceived changes in the climate

WORKING GROUP 1 GROUP OF MEN

Changes in precipitation (intensity, frequency)	Longer dry periods Heavy rains in shorter periods and territorially located
Changes in temperature	In dry season there is an increase in temperature and in longer periods Variation in temperature gradients
How long have these changes been observed?	They are more frequently since 15 years ago

Are climate (agro) mentioned? Eg. El Niño	If they are mentioned associated with decreases of production in crops (bean, corn) and others such as watermelons and melons.
Other climate changes mentioned	Sudden tidal changes: increased coastlines that alter mollusc populations in wetlands

WORKING GROUP 2 GROUP OF MEN

Changes in precipitation (intensity, frequency)	Irregular distribution of rains
Changes in temperature	Rise in temperature
How long have these changes been observed?	Since the 1970s and 1980s, some have not seen any changes
Are climate (agro) mentioned? Eg. El Niño	• Temperature increase, • Irregular rainfall distribution, • Decreased aquifers, • Headwater drought
Other climate changes mentioned	

WORKING GROUP 3 WOMEN'S GROUP

Changes in precipitation (intensity, frequency)	Uncertainty of rains, floods, heaviest rains, irregular rains (day and year)
Changes in temperature	More heat (started 1982), drought (1997, 1998, 2015)
How long have these changes been observed?	
Are climate (agro) mentioned? Eg. El Niño	soil loss (this loss affects soil and wetland quality)
Other climate changes mentioned	burning (fires)

n) Perceived impacts on ecosystems/agro-ecosystems

WORKING GROUP 1 Men

Ecosystem /agro-ecosystem	Impact of climate changes
Dry forest	Flowering changes for some plants Moving snakes and bees to more protected areas Systematic death of forest species such as oak Effects on nesting of some birds (out of season) Reduction cloudy days
Gallery Forest	Decreased river flow Alteration in size and quantity of molluscs in rivers (Tempisque) Effects on nesting of some birds (out of season) Reduction cloudy days
Mangroves	Sedimentation (associated with deforestation) Reef disappearance Effects on nesting of some birds (out of season) Reduction cloudy days
Wetlands	Loss of biodiversity and ecosystem services Effects on nesting of some birds (out of season) Reduction cloudy days
Grass (Wooded Sheets)	Effects on nesting of some birds (out of season) Reduction cloudy days
Pastures	Effects on nesting of some birds (out of season) Reduction cloudy days
Wet forest	Increased presence of birds in non-common ecosystems (crows)

WORKING GROUP 2**Men**

Ecosystem /agro-ecosystem	Impact of climate changes (Try specifics, not just agroclimatic generalities)
Wooded Potrerros	• Affects pollinators, • Forest and agricultural crops, •Over exploitation of land and marine resources
Annual and permanent crops	• More water pressure and soil, •Proliferation pests/disease
Pmontan wet forest	• Droughts affect crops (coffee, orange) and milk production, • Species migration, • More impact pressure of use
Dry And Deciduous Forest	• Degradation of forests and ecosystems, • Soil loss and water resource, • Biodiversity loss
Tacotales/Restlands	• Use fire preparation terrain, • Increase temperature, •Health and fauna affectation, • Landscape-soil recovery

WORKING GROUP 3**Women**

Ecosystem/agro-ecosystem identified	Perceived benefits and uses
Wetlands	Food (clams), fishing, tourism, habitat (birds), species recovery, carbon capture, agricultural production, recreation (mental health), research area (Jabirú).
Dry Forest	Habitat, biodiversity, carbon capture, culturally seasoned fruits, tourism, timber, bee habitat (dispersers and pollinators), water supply and regulation (water eye?), firewood.
Annual crops (beans and corn)	Food, tourism (economic income by blue zones), cultural rescue, soil conservation, agrobiodiversity, other crops of the environment (creole cucumber, legumes).
Short pastures (floor grass) and livestock (beef, sheep, goats and hens)	Dairy, economic income, cultural services (tradition, bulls), tourism, meat, food security, silvopastoral shadow.

o) Perceived impacts on the population

WORKING GROUP 1**Men**

	In the lives of men	In women's lives
Impacts on household chores		
Impacts on agricultural/labor work	Agricultural production impacts that mean more time in the field Increased drought fires Decreased water for irrigation	
Economic impacts	Higher economic costs to serve crops and animals	
Health impacts	Health effects mean more attention to families and higher economic spending Increased kidney disease due to water contamination (low flow in wells)	
Other impacts	Slight changes can be seen in moving people to cooler areas Visitation changes in tourism. In dry times they stop visiting Nicoya and go more to the rivers of Bagaces for example Greater conflicts between humans and wildlife are seen over the movement of animals in search of water and food.	

WORKING GROUP 2**Men**

	In the lives of men and women*
Impacts on household chores	Highsecurity, economic income, family integration, less employment
Impacts on agricultural/labor work	New generations have no agricultural culture, dispatch farmers for land purchase, high pressure of land, temporary displacement of labor, high impact small producer, loss culture cover beans
Economic impacts	Need for more capital or more investment, less employment
Health impacts	Health, food safety
Other impacts	Access to credit, decision-making, more risk, loss or weakening of producer infrastructure, use/legal framework limitations, cultural practice hunting affectation, expanding forest coverage with limitation of use, loss of roots and acculturation

*Participants stated that there is no clear differentiation by gender

WORKING GROUP 3

Women

	In the lives of men	In women's lives
Impacts on household chores		<ul style="list-style-type: none"> Decrease in the water makes household chores difficult. Drought water cuts add more work to women (water collection). At extreme events there is no food/water for children. The role of women in the home is recharged.
Impacts on agricultural/labor work		<ul style="list-style-type: none"> Less possibility of selling typical products that sell/cook women (tamales and tanelas). More work in floods (pulling cattle). More work on building lost infrastructure (fences and corral).
Economic impacts		<ul style="list-style-type: none"> Economic loss for the family. They lower household income from corn and bean sales. Less shifts, less revenue. Losses for women clams and fishermen of livestock production (less income).
Health impacts		<ul style="list-style-type: none"> Change in diet for lack of dairy and protein? Need to replace food (dairy). Hunger (food security violated). Change in diet because of crop uncertainty. Diseases at home (stills), recharges in the role of care of women (mites, viruses), skin diseases.
Other impacts		<ul style="list-style-type: none"> Heat causes fatigue for work away from home. It is necessary to replace foods that were previously produced well.

p) Proposed adaptation measures

WORKING GROUP 1

Mixed group

Proposed adaptation measure	Justification (impact of climate change that the measure seeks to address)
Water harvest	A relatively low-cost measure that already has low-scale experience
Reforestation	The country experience of the model of payment for environmental services and producer organizations in the territory is taken advantage of

Restoring the landscape	Guanacaste has extensive experience in catering from paddocks to secondary forest and taking advantage of the national restoration plan
Fire management	The incidence of fire due to the longer exposure time of dry seasons is an urgent and constant measure. In addition, there is experience of community and inter-agency work to address it
Improved water intakes	The limited reservoirs of water in the upper parts of the basins provide water to communities in dry corridor areas
Control of invasive species	One of the biggest problems in wetlands (the typife) or some species of fish in mangroves affect biodiversity and local economies
Best agricultural practices	The largest economic activity in the region agriculture and livestock, and it requires changes to improve ecosystems

WORKING GROUP 2

Mixed group

Proposed adaptation measure	Justification (impact of climate change that the measure seeks to address)
• Restructuring and rehabilitation of ecosystems and agro-ecosystems, • More regulations, • Ecological monitoring, • Fire management, • PSA/RBA	Biodiversity loss from climate change
• Promotion of local production/tourism, • Productive chains, • Social/environmental welfare speech, • Water recovery and management	Rural population migration by climate change
• Fire control, • Education campaigns and sense of belonging, • Recovering areas and promoting biological corridors, • Generate added value to the forest	Forest cover loss
• Public and preventive campaigns, • Ecological monitoring, • Improved institutional response capacity (more or less), • Technical studies	Proliferation of climate-related pests and diseases

WORKING GROUP 3

Mixed group

Proposed adaptation measure	Justification (impact of climate change that the measure seeks to address)
PSA	Biodiversity loss Forest cover loss
Environmental Education/Adaptation to CC	Rural population migration due to climate change
Operating non-refundable funds	Restoration of the landscape, promotion of forest cover to facilitate adaptation
Credits	Restoration of the landscape, promotion of forest cover to facilitate adaptation
Dissemination of information (component 3)	Multiple impacts, information to foster adaptation

24. Previous examples of adaptation in the area

WORKING GROUP 1

Group of men

Adaptation strategy/measure implemented	Impacts of measurement on ecosystems/agro-ecosystems	Impacts of measurement on the lives of men and women
Water harvest	Increased water availability in vulnerable communities	Access to drinking water and irrigation. In addition to improved quality of life
Reforestation	Improvement of biological runners Increased biodiversity	Economic opportunities for plantation work

	Decreased sedimentation in rivers and wetlands	
Restoring the landscape	Improving biological corridors Increased biodiversity Decreased sedimentation in rivers and wetlands Decreases pressure on Natural Resources	Greater economic opportunities Improvement in health and quality of life Increased options for tourism Changes in the attitude of local populations (increased awareness)
Fire management	Biodiversity recovery Decreased threats to villages	Improvement in health and quality of life
Improved water intakes	Increased water availability in vulnerable communities	Access to drinking water and irrigation. In addition to improved quality of life
Control of invasive species	Increased biodiversity Landscape recovery	Improvement in quality of life with greater job choices
Best agricultural practices	Soil improvement Landscape recovery	Increased productivity Improving quality of life

WORKING GROUP 2

Group of men

Adaptation strategy/measure implemented	Impacts of measurement on ecosystems/agro-ecosystems	Impacts of measurement on the lives of men and women
1. Restructuring and rehabilitation of ecosystems and agro-ecosystems, 2. More regulations, 3. Ecological monitoring, 4. Fire management, 5. PSA/RBA	1. Significant increase coverage (Fourth World, More Country), 2. Biodiversity recovery, 3. Water resource recovery in some basins, 4. More citizen participation mechanisms, 5. Agricultural policies articulated to conservation, 6. Recovery varieties and Creole breeds	• More awareness of participation, organization and environment, • More security decision-making, • More tourism and other economic and social activities
1. Promotion of local production/tourism, 2. Productive chains, 3. Social/Environmental Welfare Speech, 4. Water recovery and management	1. Promoting the rooting and well-being of communities, 2. Decreased migration	• Decreases family outlay, • Improving family income
1. Fire control, 2. Education campaigns and sense of belonging, 3. Recovery areas and promotion biological corridors, 4. Generate added value to the forest	1. Water resource recovery, 2. Biodiversity, 3. Most Sustainable Landscapes, 4. Lower risk	• Scenic beauty, • Greetings, • Land price rating, • Employment, • Better income, • Access new incentives
1. Public and preventive campaigns, 2. Ecological monitoring, 3. Improved institutional responsiveness (more or less), 4. Technical studies	1. Recovery varieties, 2. Reduction vulnerability, 3. Development of more tolerant varieties and more production	• Health, • Productivity, • Risk, • More employment

WORKING GROUP 3

WOMEN'S GROUP

Adaptation strategy/measure implemented	Impacts of measurement on ecosystems/agro-ecosystems	Impacts of measurement on women's lives
• Fire management, • Provide preventive information, a) Early warning system, b) Dual-track information (campaigns), c)	• Low flow, • Loss of trees, • Loss of forests, • Loss of animal feed All this generates • Impact on	• Less respiratory diseases, • Better distribution of your time, • Less heat, • Cleaner air, • More scenic beauty, • Less distress, •

MAG/MINAE permits, d) brigades (voluntary), e) Round preparation, f) Monitoring preventive actions, g) Early warning system	the ecosystem, • Increased risk of forest fires	Disseminating information and preventing more fires
Awareness and environmental education	On all impacts	• Help anticipate to prepare for extreme events, • Gives tools to participate more in forums and decision-making
Restoration of forest cover in water and springs refill areas	Water decrease (decreased flow rates)	• Stress reduction, • Scenic beauty, • Health improves, • Redistribution of household chores (less time wasted in water)
Harvesting rainwater and small reservoirs (agricultural production reservoirs)	Decreased flow rates	• Simplified household work, • Less time-sharing stress, • More economy (less silver in water receipt), • Improved environment
• Strengthen strategies of biological corridors identified in integral farms, • Training in good agricultural practices	All impacts	• Encourages the participation of more actors, • Improves food security, • Improves water safety

25. Project sustainability

m) Perception of components and activities: mema table for the 3 groups

Component or activities	General appreciation of effectiveness/feasibility
Financial services	It is necessary, as long as the credit portfolio parameters of the banking system are not used. In Guanacaste is the experience of the Banks that has a greater impact on communities with development projects
Strengthening the technical capacity of local governments, producers and communities to implement AbE and other adaptation measures.	It is important and very useful to strengthen the environmental units of the municipalities and train the technical staff, but it requires lowering the levels of understanding of the concepts of climate change and working with organizational bases and not individually
Information on climate change adaptation and its funding spread across the region and incorporation into policy	Dissemination of information should be done by taking advantage of local leaders and in agreement with state institutions
Implement large-scale adaptation interventions	Adaptation measures should be framed in territorial development strategies in soils, water, conservation and agricultural production

n) Perceived barriers and mitigation strategies

WORKING GROUP 1 MIXED GROUP MEN AND WOMEN

Component or activities	Existing barriers or difficulties that could arise	Strategies for tackling barriers
Water safety	The intervention approach is different depending on the projects (Cantonal, basins, ecorrelons) Lack of knowledge of the hydrological cycle by decision makers and villagers in general	Comprehensive and regional training to expand the range of action Broader approaches, with ecosystem vision

	Weak legal framework (obsolete water law) Lack of appropriate technology Incipient water management plans	
Food security	The focus of intervention is different depending on the projects (municipal, basins, ecorregions) Weak legal framework Agro-export model Lack of articulation in the agricultural sector	Improving education and training Activate crop insurance program Inclusion of technologies and greater work with young people
Financial mechanisms	The focus of intervention is different depending on the projects (Municipal, basins, ecorregions) Lack of agricultural appropriations Uncertain Land Tenure	Strengthen and build communal financing mechanisms (Bancomunales) Improving insurance mechanisms Development of eco-finance cd mechanisms
Interinstitutional strategic linkage	The intervention approach is different depending on the projects (Municipal, basins, ecorregions) Lack of linkage and coordination between projects	Promoting strategic vision at the community level Take advantage of platforms such as the Chorotega Wholesale Regional Market Strengthen cantonal councils for interinstitutional coordination
Restoration	The intervention focus is different depending on the projects (Municipal, basins, ecorregions) The timing of initiatives (short-term)	Create strategies for land-use compensation
Infrastructure	The focus of intervention is different depending on the projects (Municipal, basins, ecorregions)	Development of public infrastructure improvement projects but with strategic development approach
Basin management	The focus of intervention is different depending on the projects (Municipal, basins, ecorregions) No landlord compensation mechanisms in water-refill zones	Developing compensation mechanisms

WORKING GROUP 2

MIXED GROUP, MEN AND WOMEN

Component or activities	Existing barriers or difficulties that could arise	Strategies for tackling barriers
• (Analysis of existing mechanisms), • Design and implement financial mechanisms that include the analysis of existing ones, which are impactable, accessible and sustainable	• Excess formalities and requirements that limit access, • Land tenure (ownership), • Mechanisms do not respond to regional reality	• Know the diagnostics, existing plans, • Innovate implementation models, • Development of partnerships
• Develop specialized research, • Having technology, • Training of staff in EbA, • Technical and methodological training of producers in EbA	Interinstitutional articulation difficulties, • Uninformed producers, • All instruments and platforms are not articulated	• Include municipalities (incorporate them), • Channel information to producers through regional platforms, territorial councils, INDER, COSEDES,

		local conservation councils, ASADAS
• Biological-biodiversity monitoring (social, economic, environmental and ecological indicators)	• (Lack of information), • Integrated systems for the analysis and dissemination of information for decision-making	• Lack of a comprehensive information platform, • Unawareness of existing information tools, • Identification of indicators and protocols for your systematization
• Identify and implement pilot projects considering local experiences, restoration, water harvesting, management of integral farms, • Strengthen the implementation of existing instruments, instruments at the level of biological corridors, areas protected areas and rural areas (INDER)	• Lack of capacity in the design and implementation of adaptation measures, • There is no popular conceptualization of the effects of CC in the region, • Non-integrated management tools for region planning	• Develop a communication strategy or campaign for CC effects and adaptation measures, • Identify and prioritize pilot sites, • Design of adaptation measures, • Development of a guide for adaptation measures

WORKING GROUP 3

(mixed men and women group)

Component or activities	Existing barriers or difficulties that could arise	Strategies for tackling barriers
Payment for Environmental Services (PSA)	<ol style="list-style-type: none"> 1. Excludes areas (in the traditional CR PSA). 2. Requirements (not all potential beneficiaries have all requirements required by law). 3. Change of use (Cannot make use change while PSA is in place). 	<ul style="list-style-type: none"> • Talk about Payment for Ecosystem Services. • Requirements adjusted to the reality of the basin (legal issues).
Environmental Education - Adapting to Climate Change	It is not explicit in the project and is considered necessary. It's usually very macro. Interinstitutional coordination.	<ul style="list-style-type: none"> • Adjust it to the reality of the basin. • More friendly information for teachers and girls. • More participatory and inclusive methodologies (Bimodal lessons [practical], teachers, parents, children and public alliances). • Accessible technology for children and young people. • Use different tools (map and systematize).
How Non-Refundable Funds Work	<ol style="list-style-type: none"> 1. Resources are not typically available to manage the fund and to track when the project ends. 2. Clarity in operational structure to manage funds. 3. Do not use the word "donation". 	<ul style="list-style-type: none"> • Monitoring of actions and resources. • Trust for grassroots organizations: rules, terms, various disbursements, • Funds for administrative costs of organizations. • Sustainability of follow-up. • Avoid dispersion of resources and mechanisms?
Credits	<ol style="list-style-type: none"> 1. Competition with current conditions. 	<ul style="list-style-type: none"> • Model of ecological loans (Nectandra Foundation).

	2. Accessibility: requirements/guarantees/paperwork. 3. Resource destination. 4. The Cajas Rurales model is not given.	<ul style="list-style-type: none"> • Model INDER. • Model Fundecooperación. • Monitor resource usage. • Strengthening financial management capabilities (both administrative and user). • It is not recommended to invest in private banking training. • Find a model that reduces administrative costs. • Option: Work with multiple local organizations.
Dissemination of information (component 3)	1. Unambitious (You must go beyond reporting). 2. Focus more on knowledge management.	<ul style="list-style-type: none"> • Monitor project results. • Translate/download existing information for decision makers (governmental and non-governmental).

o) Sustainability Actors

- Describe the actors that the population considers should be involved in the components/activities to ensure the sustainability of the project.

WORKING GROUP 1

Mixed group

In all components: municipalities, MINAE-SINAC, MAG, producer organizations, Development Associations-DINADECO, Cantonal Councils of Interinstitutional Coordination.

In the topic Financial: Bancomunales, INS (crop insurance)

In capacity building: Universities, research centres (OET), local organizations.

In climate change information: universities, National Emergency Commission, ASADAS, Ay A, electricity operators

In implementation of adaptation measures: municipalities, MINAE-SINAC, MAG, producer organizations, Development Associations-DINADECO

WORKING GROUPS 2 AND 3

Mixed group

- academia
- Public-private partnerships
- ASADAS (Community Water Boards)
- Local Development Associations
- Rural Development Associations and Associations
- BAC Communes (institutional support)
- Farmers'houses, business and tourism
- CCCI (Cantonal Council for Interinstitutional Coordination)
- Ceniga
- Cantonal Agricultural Centers.
- Environmental Commission of Santa Cruz.
- Regional Development Council
- Regional Development Council
- Local Biological Corridor Council
- Local and Regional Conservation Councils
- Territorial Councils for Rural Development

- Cooperatives
- COSEDES
- FONAFIFO – Supplies for the model.
- Guanacaste Community Fund
- Community Fund for Guanacaste.
- Green funds
- Forativo
- Biodiversity Forum
- Foundations
- FUNDECODES.
- MELTCON.
- FUNDECOOPERACION
- Guanacaste Dry Forest Conservation Fund.
- IMI
- IMN
- INDER (they already have a model).
- MAG
- MEP
- MINAE/DCC.
- Municipalities
- NICOYAGUA.
- ONAMEC
- NGOs (including Forest NGOs)
- Producers.
- BioAlfa Project.
- Guardians of Nature Project.
- SIGETEN
- SIMOCUTE (Earth Coverage and Use Monitoring System and Ecosystems)
- SINAC – environmental managers.
- SNITTPR
- Tourism (private sector).
- UNAFOR Chorotega.
- Municipal Unions
- Universities/CEMEDE.

p) Key policies

- Describe local development policies or plans related to project components/activities.

WORKING GROUP 1

Mixed group

For all components it is important to take into account the strategic plans of the municipalities, the watershed management plans, the local development plans (INDER)

WORKING GROUP 2

Mixed group

- Global Conservation Standard
- Primer redeems debt
- PSA
- Regional Development Plan
- Territorial rural development plans
- Planes of municipal human development

- Comprehensive Water Supply Plan for Guanacaste (PIAG)
- National Forest Development Plan
- National CC Adaptation Strategy
- Agro-environmental agenda

WORKING GROUP 3

Mixed group

- Management plans in ASP and Farms
- Regulatory plans.
- Decree regulating Ecosystem Services (Search for No.).
- MEP curriculum.
- Education Plan.
- There are no municipal plans but there are supported initiatives (Santa Cruz and Tempisque).
- Biological Corridors (Local Committees).
- Implementation and planning of Local Development Associations and Environmental Organizations.
- National Adaptation Policy.

26. Financial mechanisms

- Describe the financial mechanisms that are normally used in the area. What kind of financial institutions are present? What could be interesting to participate in the project?

The financial mechanism that was most mentioned is the experience of The Banks, a mechanism of funds managed directly by local groups for community development projects. And in contrast, they distrust the financing mechanisms and portfolios of traditional banks.

27. Other

- Describe other topics of interest or concern of the participants in the context of the project.
 - Funding lines for monitoring and monitoring are required in such a project. Both monitoring the behaviour of emblematic species and the health of ecosystems. This topic was recurrent in group work.
 - They also have concerns about the levels of participation of SINAC's regional offices as well as the role that municipalities would play in the context of the project. And in this line local organizations like FEDEGUA want to know about their spaces of participation in the project if it is approved.
 - They mentioned the territorial scales of intervention in the project, since at the beginning the scale was mentioned at the watershed level and now cantons are mentioned. They consider that the scales of work in the dry corridor based on eco-regions should be assessed where the ecosystem approach defines the actions of the institutions.
 - Interinstitutional coordination is mentioned and with other similar projects it is vital to avoid duplication of actions in a region where communication channels often fail and projects end badly.

Annexes

Lists of participants

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Workshop activities





Panama

LOCAL CONSULTATION WORKSHOP

Results report

28. General data

Date	October 18, 2019
Country	Panama
Workshop location (*)	Library of Pedasi
Number of participants (**)	Total 30→ Women 12; Men 18
Municipalities represented	Pedasi, Macaracas, Tonosí, Guararé, Pocrí
Organizations/groups represented	Agricultural producers/instituciones that manage programs, MIDA, MiAMBIENTE, Municipality of Pedasi, NGOs

(*) Attach photos of the workshop as an annex

(**) Attach list of participants as an annex

29. Land use

a Land use in selected municipalities

Ecosystem/agro-ecosystem identified	Comments / Specifications (e.g., main mentioned characteristics or indicated crops/species)
Agricultural use Agriculture and Livestock (Small/Subsistence and Medium Scale)	In general for the 5 districts, this agro-ecosystem predominates, characterized by the use of agrochemicals that pollute water sources. This agro-ecosystem has been impacted due to decreased yields in production, lack of pawns and low wages offered. It should be noted that the defendant payments by pawns have increased from \$5 to \$20/30 per day per pawn in the last 10-15 years.
Mangrove Forests- Coastal Marine System- Pedasi, Tonosí, Pocrí and Guararé. Estuaries (Pablo Arturo Barrios Wildlife Refuge)	It is an ecosystem that is quite pressured by issues of tourism, fishing, timber extraction for subsistence. Management plan in the process of approval (Pablo Arturo Barrios Wildlife Refuge).
Bosquand Mixed Secondary (The Colmon)	This ecosystem is intervened because it counts within its limits the municipal garbage dump, which impacts the biodiversity and natural processes of the ecosystem.
Infrastructure	There is no land management plan and this applies to all land uses, including poor waste management.
Shrimpra in Tonosí	Large company that competes with other activities, although this is only for export.

b Benefits perceived by the local population

Ecosystem/agro-ecosystem identified	Perceived benefits and uses
Agricultural use Agriculture and Livestock (Small/Subsistence and Medium Scale)	<ul style="list-style-type: none"> - Economic benefits (subsistence) - Improving livelihoods - Job creation - Tax contributions to local governments and national government (public works financing)

	<ul style="list-style-type: none"> - Cultural heritage (traditional subsistence practices of the region) -Agrotourism in small farms
Mangrove Forests- Coastal Marine System- Pedasi, Tonosí, Pocrí and Guararé	<ul style="list-style-type: none"> - Economic benefits (fishing activities, seafood harvesting – black shell, clams - and other seafood) - Landscape/Beauty - Biodiversity protection - Tourism - Carbon dioxide capture - Protection from rising sea levels - Ecotourism (sighting of whales, turtles and other marine species)-Pedasi - Recreational activities-Pedasi - Scientific research-Pedasi Fishing activity – Pocrí, Tonosí
Protected areas (secondary, coastal forests)	<ul style="list-style-type: none"> - Tourist activity - Protecting water sources - Ecosystem services (conservation of flora and fauna biodiversity) - Provision of raw materials (In the past this reserve was used for the production of wood for the construction of community and family infrastructures in the area – housing, etc.) - Scientific research - Carbon dioxide capture Protecting the population from landfill pollution
Shrimpra in Tonosí	A large extension is managed
Infrastructure	Population growth competes with agricultural activities and this activity affects the health of the population.

30. Local perception of climate change

c Perceived changes in the climate

Changes in precipitation (intensity, frequency)	<ol style="list-style-type: none"> 1. Unpredictable climate system 2. Dry season extension: less rain at the start of the year 3. The rains are more intense, short-lived, therefore, increased runoff, little soil absorption. 4. Pests and diseases in agricultural crops, 5. Sedimentation of water sources, 6. Loss of biodiversity, 7. Pollution, 8. Water problems at the water level, by intensity and short periods of time. 9. Increase of temperature / more perception of heat 10. Changing seasonal patterns
Changes in temperature	<ol style="list-style-type: none"> 1. Reduced production 2. Decreased water sources, 3. Soil compaction, 4. Allergies in the population, 5. Pests and diseases, 6. Calorie stress in animals (livestock).
How long have these changes been observed?	Changes have been seen since about 10-15 years
Are (agro) climate phenomena mentioned? Eg. El Niño	El Niño and La Niña phenomena were mentioned. There is awareness of the vinc problemswith

	climate change, they comment of La Niña that before it is every 4-6 years and now every 2.
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d Perceived impacts on ecosystems/agro-ecosystems

Ecosystem /agro-ecosystem	Impact of climate changes (impacts of climate changes on agro-ecosystems/ecosystems)
Agricultural systems (Agriculture and livestock) number one in priority.	<ol style="list-style-type: none"> 1. Lower yield on agricultural and livestock production, 2. Decreased water in the dry season in water sources, rivers, quebradas, wells, 3. Soil compaction, 4. Allergies in people, 5. Calorie stress in animals, 6. Decreased grass, 7. Pests and diseases therefore increase the production costs and profitability of the activity, mention of orange and mango. 8. Change in crop production behavior (The absence of fruits such as Marañon was reported in 2018) 9. Soil sedimentation in water sources
Mangrove Forests- Coastal Marine System	<ol style="list-style-type: none"> 1. Soil erosion, 2. Sedimentation of water sources, 3. Reduced water availability during the dry season, 4. Decrease in the extent of the ecosystem (droughts and burnings and extraction of wood for subsistence). 5. Decreasing ecosystem biodiversity 6. Decreased reproduction of marine-coastal species.
Protected areas (secondary, coastal forests)	They are affected by wildfires in the dry season. It is observed that climate change affects the phenology of species, this affects the reproduction of some important species. In trees affects biodiversity and regeneration of important species.
Shrimps in Tonosí	The heat affects the shrimp
Infrastructure	Burnings affect the population's respiratory system.

e Perceived impacts on the population

	In the lives of men	In women's lives
Impacts on household chores	Men are engaged in field work (agriculture and livestock)	Women are the ones who are supporting husbands in farm labors and they are mothers.
Impacts on agricultural/labor work	<ul style="list-style-type: none"> - Decrease in economic income - Increasing inequality - Reduction of fishing activity 	Drought problems bring with them many problems, since irrigation systems are required for production in the summer season, problems in soil preparation due to compaction.
Economic impacts	<ul style="list-style-type: none"> - Reduction in quality and quantity of jobs - Decrease in productive activity options - Reduction in ecotourism potential 	If there is loss in production, there is a loss in household income. Those engaged in subsistence farming grow only for self-consumption.
Health impacts	-Reduction in the availability of species that are food/subsistence sources for villagers in the project's advocacy areas.	There are more disease problems in the population, due to the indiscriminate use of agrochemicals associated with the presence of pests and

		diseases that have increased as a result of climate change.
Other impacts	Reduction in public revenue for infrastructure works and social works	It was commented that as a result of the low production and low income it generates, young people are moving to cities by new careers/professions and are leaving the fields.

f Proposed adaptation measures

Proposed adaptation measure	Justification
1) Reforestation through: natural and assisted regeneration (conservation of patches or green areas of farms), silvopastoral systems (living fences, windbreaking curtains), agroforestry systems (coffee with associated fruit trees and woods), agrosilvopastoral systems, reforestation and protection of gallery forests.	To cope with droughts. There is a reduction of food production and the loss of biodiversity. You are more agroforestry coffee are not a commercial activity in these territories, however, it is said that people have it on farms for self-consumption, per tanto diversification can be used as a future measure that contributes to income generation in families.
2) Crop diversification	To cope with reduced food production during droughts.
3) Water reservoirs (wells, watering towers, lakes) review successful cases in the region.	To cope with droughts.
4) Drip Irrigation Systems, Water Harvesting Systems	For the decrease in water availability due to droughts
5) Integrated pest management	Climate change has led to the increase in pests and diseases so this measure is recommended. This point refers to the overuse of agrochemicals and this should change to a more sustainable use through natural products, crop diversification.
6) Specific plantations for the production of firewood.	As a measure to address the increase of ecological stoves in this region (activity analyzed by women). It was mentioned that the United States Peace Corps with its volunteering is promoting in the region the use of ecological stoves, but that this will require raw materials (wood) and could be obtained from through the proposed plantations. That is why this measure is proposed.
7) Mixed nurseries, important species and as raw material for handicrafts, domestic use etc. Specifically the species mentioned are: Pumpkin (<i>Crescentia cujete</i>), Jobo (<i>Spondias mombin</i>), Stropajo (<i>Luffa sp. cucurbitaceae</i>), Chumico (American <i>Curatella</i>), Jacaranda, Cabulla and reed (manufacture of hats), Bamboo.	To cope with droughts, loss of biodiversity, changing phenology of trees. The species mentioned are of importance and it would be very good to rescue and repopulate (activity mentioned by women).
8) Creating seed banks of native varieties	To cope with droughts and changes in phenology
9) Restoration of water sources and degraded areas, with native species	To cope with water availability
10) Establishment of irrigation channels and flow cleaning	To cope with water availability
11) Continuous, practical and strengthened training process (theoretical and practical components and on the subject of pest and disease management, and on the ecosystem benefits provided by mangrove forests)	To know how to cope with the increasing temperature and changes in seasonal patterns

12) Erosion control by means of living natural barriers (vetiver)	To cope with sedimentation of the ground
13) Strengthening legal and institutional mechanisms for the provision of practical solutions	To cope with sedimentation of the ground
14) Use of more pest-resistant and climate-resistant varieties	To cope with the spread of pests and diseases (in rice, maize, and cattle flies)
15) Study of effective cases such as COPEG (Panama Commission United States for the Eradication and Prevention of The Cattle Sweeping Worm)	To cope with the spread of pests and diseases (in rice, maize, and cattle flies)
16) Official delimitation of mangrove areas, including buffer zones	To address the risk for biodiversity (of marine resources – fishing, shellfish)
17) Establishment of trails and other activities with ecotourism, conservation and scientific potential	To address the risk for biodiversity (of marine resources – fishing, shellfish)

31. Previous examples of adaptation in the area

Adaptation strategy/measure implemented	Impacts of measurement on ecosystems/agro-ecosystems	Impacts of measurement on the lives of men and women
1) PRORURAL Project (MIDA) -Reforestation -Seed capital projects for agricultural activities to capitalize.	<ul style="list-style-type: none"> Regeneration of biodiversity in the area. 	The project trained men and women on the use of best practices for production through silvopastoral systems
<ul style="list-style-type: none"> PANAJURU Project (MIDA) Various types of projects aimed at young people. 	<ul style="list-style-type: none"> Increase in agricultural production 	It had a good impact on youth at the community level. Rescue of young people for agricultural activities.
<ul style="list-style-type: none"> Small Donation Program (PPD), Projects silvopastoriles in the dry arc 	<ul style="list-style-type: none"> Regeneration of biodiversity in the area. 	From this project are born APASPE (Pedasí) and Asociación 1 de Mayo (Guararé) where men as women participate in the work carried out as an association, agricultural activities are carried out by both, in livestock is distributed as follows: management of livestock by men and manufacture of cheese by women.
<ul style="list-style-type: none"> SEVIN, a nursery project located in the Bongo Macaracas (but it is disappearing). 	<ul style="list-style-type: none"> Biodiversity protection and conservation 	This project, achieved the empowerment of women in this activity, in turn allowed them to generate incomes, be more organized, however it is being lost for the reason already mentioned.
<ul style="list-style-type: none"> Alliance for the Million Hectares (MiAMBIENTE), agencies have nursery for reforestation in degraded and deforested areas of the region (currently continuous) 	<ul style="list-style-type: none"> Regeneration of biodiversity in the area. 	The advantage of this project is that the seedlings for reforestation are given away, the detail is the follow-up once established in the field. This project affects a group of people (nurseries).

<ul style="list-style-type: none"> Local Investment Program (PROINLO) somewater harvesting systems were installed. 	<ul style="list-style-type: none"> Protection of water sources. 	Support for local production, because of the problem of droughts, Revenue generation
<ul style="list-style-type: none"> Water Harvest: In Pocrí there are water harvesting lagoons since the 70s that supplement a significant number of farms in the area. 	<ul style="list-style-type: none"> Water for agricultural activities 	The lack of water in the region for the dry season, at the time there was no talk of climate change.
<ul style="list-style-type: none"> Irrigation: Great project in the area of Tonosí. 	<ul style="list-style-type: none"> Water for preparation in dry season 	It improves the productivity and quality of life of the population.
<ul style="list-style-type: none"> Training 	<ul style="list-style-type: none"> If the population is trained there is greater protection of ecosystems. 	Needs to strengthen, to build nation capacities in ministries, "Learning by Doing" was commented. The skills are usually not continuous or practical, leaving producers and villagers without the basic knowledge to implement the necessary measures

Note (1): It was commented that nurseries in the region are disappearing as a result of the Ministry of Environment's project, Alliance for the Million and Pro-Cuencas where the plantists are given away and the nurseries are no longer this workforce was generally women who are engaged in this activity.

The projects that have been developed are not part of a plan to adapt and mitigate climate change, since the Ministry of Environment is the institution that leads these issues through the Climate Change Directorate, however, the actions that are developed at the time are associated with the loss of wood cover in the region and the effects of climate change.

Note (2): The lack of planning and monitoring has caused the failure of the measures implemented in the area. Similarly, the lack of communication and transmission of knowledge in a simple and easy-to-digest language for producers and villagers has impeded the progress of the measures.

32. Project sustainability

q) Perception of components and activities

Component or activities	General appreciation of effectiveness/feasibility
Component 1. Landscape-level financing (large extensions/multiple producers/people involved), Individual funding	It may be attractive, however, it is said that it should be equal to the loans of the local bank (1-2% interest rate).
Component 2. Capacity building	In the area there is no trust of producers to the technicians of the institutions that you have competences in the sector, so it is necessary for the people who train to have the necessary experience.
Component 3. Dissemination of information	It was agreed in non-technical language, media dissemination.

r) Perceived barriers and mitigation strategies

Component or activities	Existing barriers or difficulties that could arise	Strategies for tackling barriers
Component 1. Landscape-level financing (large extensions/multiple producers/people involved)	<ul style="list-style-type: none"> -To access loans there is a lot of bureaucracy, formalities and requirements - Lack of continuous technical support - Equitable distribution of impacts and benefits - Establishment, strengthening and monitoring of prior agreements - Possible corruption that can undermine the project's vision - Developing risk analysis - Land tenure - Infrastructure maintenance - Compliance with environmental impact studies - Interinstitutional coordination - Effective communication 	<ul style="list-style-type: none"> -Make the requirements more flexible, allowing access to resources, that there is a way for those who do not have a title of ownership. -To find a way to include small producers from 0.5 hectares up - Leveling the terms/homologation of concepts between public and financial institutions - To find a way to include small producers from 0.5 hectares up - Cost/benefit identification - Extensive community consultations - Community monitoring mechanisms (committees) organizations - Continued and strengthened environmental and climate change education
Funding at the individual level	<ul style="list-style-type: none"> - Training in project management and management - Training and assistance in the formulation of project ideas, under the schemes developed by the macro project - Legal status - Feasibility studies - Land prices have increased - Livestock prices have fallen - Prices of agricultural items have fallen - Agricultural active is generally becoming unprofitable - Guarantees/guaranteers - Insurance fees - High costs of paperwork - Waiting period and performance of silvopastoral systems <p>Lack of coordination between banks and government entities.</p>	<ul style="list-style-type: none"> - Establish project coordination and governance mechanisms with beneficiaries and stakeholders - Explore options for legal and institutional arrangements that can cushion sharp changes in the production and sale prices of agricultural inputs and pipelines - Processes and policies to reduce the power of intermediaries.
Component 2. Capacity building	<ul style="list-style-type: none"> - Lack of communication - Lack of technical knowledge - Very technical language - Lack of financial resources for this purpose. - Lack of knowledge or practical activities. 	<ul style="list-style-type: none"> - Training suitable staff - Funding required for these activities - Recurrence and action planning
Component 3. Dissemination of information	The information has a very technical language that is not understood by the actors and the ideas are lost or	<ol style="list-style-type: none"> 1- Radio 2- Ask for courtesy of room in the municipalities of each district

	contributions that they can make to any activity.	3- Simpler language (manual) 4- Judges of Peace.
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s) Sustainability Actors

- Describe the actors that the population considers should be involved in the components/activities to ensure the sustainability of the project.

Component 1. Landscape-level financing (large extensions/multiple producers/people involved), Financing at the individual level

The main actors that should be involved are:

1. Banks (BDA, BN, Financial, Cooperative)
2. Producers and peasants
3. Institutions (MIDA, MiAMBIENTE)
4. Civil Society
5. National Land Authority
6. PROECO Azuero
7. APASPE
8. Tortugas Pedasi
9. Albatros
10. APAIS
11. CIMA
12. Coop. Sta. Catherine
13. Coop. Gladys B. From Ycaza
14. Avance R.L.
15. COESAN
16. JAARC - Health Committees
17. Local authorities
18. Settlement May 1
19. Savin Group
20. Tonosí Agroecological Farm

Component 2. Capacity building

1. PROECO Azuero
2. Settlement May 1
3. Savin Group
4. Tonosí Agroecological Farm
5. APASPE
6. Producers and producers of the selected districts.

t) Key policies

- Describe local development policies or plans related to project components/activities.
 1. Forest Incentives Act
 2. Alliance for the Million Hectares
 3. Environmental Superfund

33. Financial mechanisms

- u) Describe the financial mechanisms that are normally used in the area. What kind of financial institutions are present? What could be interesting to participate in the project?

In general for different districts, the mechanisms present are loans to the agricultural sector, personal banking for the acquisition of homes, personal loans for car purchases.

The entities present are:

- National Bank of Panama,
- Agricultural Development Bank,
- Agricultural Insurance Institute
- Microserfin
- Cooperatives
- Companies that sell agricultural inputs.

34. Other

- v) Describe other topics of interest or concern of the participants in the context of the project.
 - The project is very attractive to the participants, however, there is a bit of concern as many projects have passed and are not tracked on the investment that is made; mentioned the theme of the Alliance for millions of hectares (Private Public Alliance, led by MiAMBIENTE), they comment that many of the trees that are planted do not survive in the summer, there is no proper planning and follow-up.
 - As for the wells, it is said to be worrying, since it has been drilled between 120 and 180 feet deep and there is no water.
 - The main problem and the main action is linked to water, that's where efforts should be focused.
 - Prefeasibility studies should be done for the subject of reservoirs.
 - It was commented that among the Ministries that have competences in the agricultural sector, there are no agreements as there are incentives that promote deforestation and changes in land use, so it is necessary for institutions to maintain a good know what is done in each of the districts where the future Agriculture B-Roasted Project is developed in Ecosistemas.
 - It should be written that, if the project is initiated, once completed, follow-up, monitoring and evaluation of the actions that are implemented must be given, this is something that is not done at the level of the projects that are developed in a general way in the country.

Annexes:
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Annex 2. Workshop photos (participants)



Dominican Republic



"ADAPTATION BASED ON ECOSYSTEMS AND TRANSFORMATIONAL MEASURES TO INCREASE RESILIENCE TO CLIMATIC CHANGE IN THE DRY CORREDOR OF CENTROAMERICA THE ARIDAS AREAS OF THE DOMINICAN REPUBLIC"

**LOCAL CONSULTATION WORKSHOP DOMINICAN REPUBLIC
SABANETA, SANTIAGO DE RODRIGUEZ
RESTLATED REPORT**

35. General data

Date	October 22, 2019
Country	Dominican Republic
Workshop location (*)	San Ignacio de Sabaneta, Prov. Santiago Rodríguez
Number of participants (**)	Total 22 → Women 8; Men 14
Municipalities represented	4
Organizations/groups represented	13

(*) Attach photos of the workshop as an annex

(**) Attach list of participants as an annex

36. Land use**g Land use in selected municipalities**

Municipality	Ecosystem/agro-ecosystem identified	Comments / Specifications (e.g., main mentioned characteristics or indicated crops/species)
Monción	Coniferous forest	
	Dry Forest	
	Secondary Broadleaf forest	
	Livestock System	
	Riparian Forest	
	Intensive Cultivation	yuca, gandul fishing, etc.
	Subsistence cultivation	
V. Los Almácigos	Coniferous forest	
	Secondary Broadleaf forest	
	Mature forest	
	Livestock System	
	Riparian Forest	
	Agroforestry System	
	Silvopastoral System	
Sabaneta	Subsistence cultivation	
	Coniferous forest	
	Secondary Broadleaf forest	
	Mature forest	
	Dry Forest	
	Riparian Forest	
	Livestock System	
	Agroforestry System	
	Intensive Cultivation	

	Subsistence cultivation	
	Grass with cane and guano scattered	
The Pine	Coniferous forest	
	Secondary broadleaf forest	
	Riparian Forest	
	Livestock System	
	Silvopastoral system	
	Agroforestry System	
	Intensive Cultivation	Mani
	Subsistence cultivation	
Party	Coniferous forest	
	Secondary Broadleaf forest	
	Riparian Forest	
	Intensive Cultivation	
	Subsistence cultivation	mango, cassava, corn, sweet potato, gandul, avocado, fruit, honey, etc.
	Livestock System	
	Silvopastoral system	
	Grass with cane and guano scattered	

h Benefits perceived by the local population

Men

Ecosystem/agro-ecosystem identified	Perceived benefits and uses
coniferous forest	production of wood, resin,
Secondary Broadleaf forest	wood, water production, soil conservation, biodiversity
Subsistence cultivation	food production
Livestock System	milk and meat
Agroforestry System	wood, resin, wood, coffee, fruit (citrus, mango, soursop, nisperos, etc.)
silvopastoral system	dairy product, milk, meat, Soil erosion reduction

Women

Ecosystem/agro-ecosystem identified	Perceived benefits and uses
Coniferous forest	generation jobs, wealth and logger, furniture, water production, keeps soil moisture, temperature balance, soil conservation, prevents erosion
Intensive cultivation	food security, animal feed, wealth generation, jobs
Subsistence cultivation	food security (yuca, auyama (squash), sweet potato, gandul, yautía (root))
Livestock System	generation job, food security
silvopastoral system	food security
Ribereño Forest	protection of water sources and production, protection of the ecosystem (flora and fauna), environmental balance and temperature, oxygen production and CO2 uptake, improved water quality, recreation sites

37. Local perception of climate change

q) Perceived changes in the climate

Men

Changes in precipitation (intensity, frequency)	Changes in rainfall
Changes in temperature	Rising temperatures
How long have these changes been observed?	
Are climate (agro) mentioned? Eg. El Niño	No
Other climate changes mentioned	Loss of moisture in the soil

Women

Changes in precipitation (intensity, frequency)	Less rain
Changes in temperature	Rising temperatures
How long have these changes been observed?	For 10 years
Are (agro) climate phenomena mentioned? Eg. El Niño	No
Other climate changes mentioned	Increased thermal sensation

r) Perceived impacts on ecosystems/agro-ecosystems

Men

Ecosystem /agro-ecosystem	Impact of climate changes
	(Try specifics, not just agroclimatic generalities)
Coniferous forest	Reduced moisture, soil degradation, increased pests, risks of wildfires
secondary Broadleaf forest	Reduced moisture, soil degradation
Subsistence cultivation	Soil erosion, reduced production
Livestock System	Reduction of pasture area, soil erosion
Agroforestry System	Increased pests and diseases, reduced production
silvopastoral system	Reduction of pasture area, soil erosion

Women

Ecosystem /agro-ecosystem	Impact of climate changes
	(Try specifics, not just agroclimatic generalities)
Coniferous forest	Increased number of wildfires, disappearance of streams, glens, rivers, fish death, decreased water quality plus diseases and pests, weevils
Intensive cultivation	Increased water requirement decreases production, crops dry out, more pests (6 years ago Whitefly from China, more presence of worms, cassava, corn and guandul, decreased yield, more expensive
Subsistence cultivation	Increased water requirement decreases production, crops dry out, more worm presence
Livestock System	Desertification, soil erosion, cow death, lower milk production, malnutrition of livestock, reduced availability of pasture, higher expenditure for the purchase of processed food
silvopastoral system	Animal death and increased diseases (diarrhea), contaminated water
Riparian Forest	Loss of biodiversity (fish, jaiba), decreased water quality, decreased forest coverage by safe and deforestation (indirect), landslide and erosion, decrease in land quality -decrease in water sources, decrease in flow (loss of recreational services)

s) Perceived impacts on the population

	In the lives of men	In women's lives
Impacts on household chores		Greater diseases (lack of hygiene), increased proliferation of disease-transmitting vectors by water storage, less water available, going further to collect water

Impacts on agricultural/labor work		job loss, longer working time in the field
Economic impacts	Reduction in quality and an over-production of wood, low milk and meat production, loss of livestock	More expensive products, food insecurity, food shortages, change in diet and reduction of the family basket, women must contribute to the economy (spend more hours working or employed in various tasks), buy water plus economic expenses, decrease in the availability of firewood, alternatives should be purchased, prices fluctuate
Health impacts	Low quality of life	emotional stress (causing intrafamily conflicts), poor nutrition in children, use of contaminated water
Other impacts		Spend less time with children, household migration

t) Proposed Adaptation Measures (Part A)

Men

Proposed adaptation measure	Justification (impact of climate change that the measure seeks to address)
1. Forest protection and restoration	Decreased supply and water quality
2. Fire control	Rise in wildfires
3. Silvopastoral system	Soil degradation
4. Proper soil conservation practice	change in rainy seasons
5. Localized risk	
6. Crop rotation	increases in pests and diseases
7. Apiary	Decreased production and productivity
8. Mountain ecotourism	
9. Adding value to production systems	
10. Establish energy farm of wood and wood	Forest degradation and reduction
11. Improving forest management	
12. Water treatment for consumption	Human diseases, decreased labour, population migration

Women

Proposed adaptation measure	Justification (impact of climate change that the measure seeks to address)
1. Reforestation of watersheds (upper part) water recharge zone	Drought and water stress during dry period
2. Education (young inclusion) (more rational use of water and environmental protection)	
3. Conservation of native forests	
4. Water reservoirs (lagoons and dams), use of geomembrane and vats to conserve water	
5. Water harvest (rainwater collection)	
6. reforestation monitoring programmes (to ensure that both reforestation and restoration efforts are effective)	
7. strengthening the audit and supervision by relevant organizations (in relation to both reforestation and restoration efforts)	
8. Installation of community-level production systems, households, family gardens, community gardens, home-level animal rearing	Food Safety

9. Use of organic materials for the production of fertilizer and pesticides (monocultures, i.e shells and other organic material not used in the processing of the final product)	
10. Enforcement of laws and the regime of consequences	Wildfires

a) Proposed adaptation measures (Part B, continuation of the table above by number sequence)

Men

Adaptation strategy/measure implemented	Impacts of measurement on ecosystems/agro-ecosystems	Impacts of measurement on the lives of men and women
1. As a project and with own and state resources	increase in total coverage	Increased revenue from payment for environmental service
2. State (resources)	reducing environmental impacts	Reducing respiratory diseases
3. Personal	Improvement the breeding of livestock hatchlings	Less effort in livestock management
4. With projects and own resources	Nothing was included	reducing fertilizer application
5. Own resources	Efficiency in water use	reducing the workforce
6. Own Projects and Resources	Nothing was included	Reducing pesticide use reducing work day
7. Own Projects and Resources	diversification of biodiversity	Improves the feeding and entry of personal resources
8. Private and associative projects	increased interest in protecting the ecosystem	Improved access roads and with them easier to get there
9. Projects and personal		
10. Projects and state	conservation of the native forest	Reduced spending and effort in fuel collection
11. Personal	improving forest quality and ecosystem services	
12. Private and personal state project	better water quality	Decreased disease, reduced purchase of bottled water

Women

Adaptation strategy/measure implemented	Impacts of measurement on ecosystems/agro-ecosystems	Impacts of measurement on the lives of men and women
1 and 2. Cerro Chacuey have been made: international cooperation government, private sector (sierra plan), INDENOR, NATURE (org.), san miguel industry, MEGAPLAS, FEDEGANO, community participation	They help but not enough. Conferences have not been so extensive, there is no monitoring of seedlings, prevention of slippage	Community participation plus family awareness, greater relationship of women more empowerment
3. Protected area (government) law 202, 2004. Armando Bermudez, Nalga de Naco, Gurabo	Water provision regulation of mass presence of biodiversity (high endemism), soil conservation and reactivation of nutrients	Water supply
4. Yes, for livestock	Additional water supply	more rational use of water, more awareness, more storage capacity, more water availability
5. Yes, for livestock	Additional water supply	More household economy if water leaks, more availability to drink
6. They are not made		

7. Lack of capacity for its implementation	Environmental protection, (organic carbon)	
8. If they have been done: NATURE, Government, own resources (production, organic fertilizer, manure)		Guarantee, food security, food diversification improves the economy, family integration, marketing (women), market share generates knowledge and awareness (food and land use)
9. It has been done on a low scale (very nice)	Environmental protection enriches soil (more fertile)	Source of employment, improves health (disease), do not have to invest in pesticides, recycling nutrients in the soil
10. Lack of ability to enforce the law	Avoiding wildfires	More job creation

38. Project sustainability

w) Perception of components and activities (men and women)

Component or activities	General appreciation of effectiveness/feasibility
Disseminating information	**
Implement AbE measures at different scales	***
PSA implementation	***
Micro sprinklers submersible pumps drip irrigation	***
AbE training	***

x) Perceived barriers and mitigation strategies (men and women)

Component or activities	Existing barriers or difficulties that could arise	Strategies for tackling barriers
Disseminating information	Communication cost policy-making, material development and publication, poor educational programs	Media, including adaptation to the school curriculum, training of facilitators, spaces for participation to encourage interest, development of indicators
Implement EbA measures at different scales	Costs, training, lack of information, culture change, resistance to the field, lack of technology/adapt, lack of knowledge about EbA, land tenure	Generation of demonstrative plots, strengthen the social and ability to replicate, share information, MxE program (Monitoring and evaluation-indicators of progress)
PSA implementation	Land tenure, - definition financial mechanism, water bill approval, land order law, training and socialization on PSA, PSA law passed, no regulations	Qualification program, clear funding scheme, political approval, campaigns and training
Micro sprinklers submersible pumps drip irrigation	Financing, training, monitoring, non-economic water recovery, water availability, connection to an irrigation system	Provide financing and training. availability of water, definition of financial mechanism, insuring market for irrigation products
EbA training	Lack of resources, training day, strengthening municipal structures, environmental management unit, lack of	Project visibility, pilot EbA project installation, training and assignment of responsibilities, implementation by NGOs

	knowledge and systematization of actions	
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y) Actors for Sustainability (Men and Women)

- Describe the actors that the population considers should be involved in the components/activities to ensure the sustainability of the project.

Components	Actors
DISSEMINATING INFORMATION	EDUCATIONAL INSTITUTIONS -NGOS -COMMUNITIES -FINANCIAL INSTITUTIONS -MINISTRY OF EDUCATION -COMMUNICATION MEASURES (RADIAL, TV) -PUBLIC HEALTH (DISEASE)
IMPLEMENT ABE TO DIFFERENT SCALES	PRODUCERS, ASSOCIATIONS, INSTITUTIONS NGO, NATIONAL AND LOCAL GOVERNMENT
Psa	-NGOS -REAL ESTATE JURISDICTIONS -BENEFICIARIES OF SERVICES -BOARD OF IRRIGATORS -WATER MANAGEMENT INSTITUTIONS (INAPA, INDRHI) -MEDIA OF COMMUNICATION
MICROAPRESORS SUMERGIBLE PUMPS GOTEIO IRRIGATION	-PRODUCER ASSOCIATIONS -FINANCIAL INSTITUTIONS -WATER MANAGEMENT INSTITUTIONS -MEDIUM and SMALL PRODUCERS
ABE TRAINING	-MUNICIPAL AUTHORITIES -REGION NGOS -PRODUCTORS -INDENOR -NATURE

z) Key policies

- Describe local development policies or plans related to project components/activities.

No Local Development plans that fit the actions of the project were identified, at the national level there are some related strategies and plans, such as the National Hydrological Plan 2012, the Water Sector Adaptation Plan, Law 6400, on the environment Natural Resources, and the National Development Strategy.

39. Financial mechanisms

- Describe the financial mechanisms that are normally used in the area. What kind of financial institutions are present? What could be interesting to participate in the project?

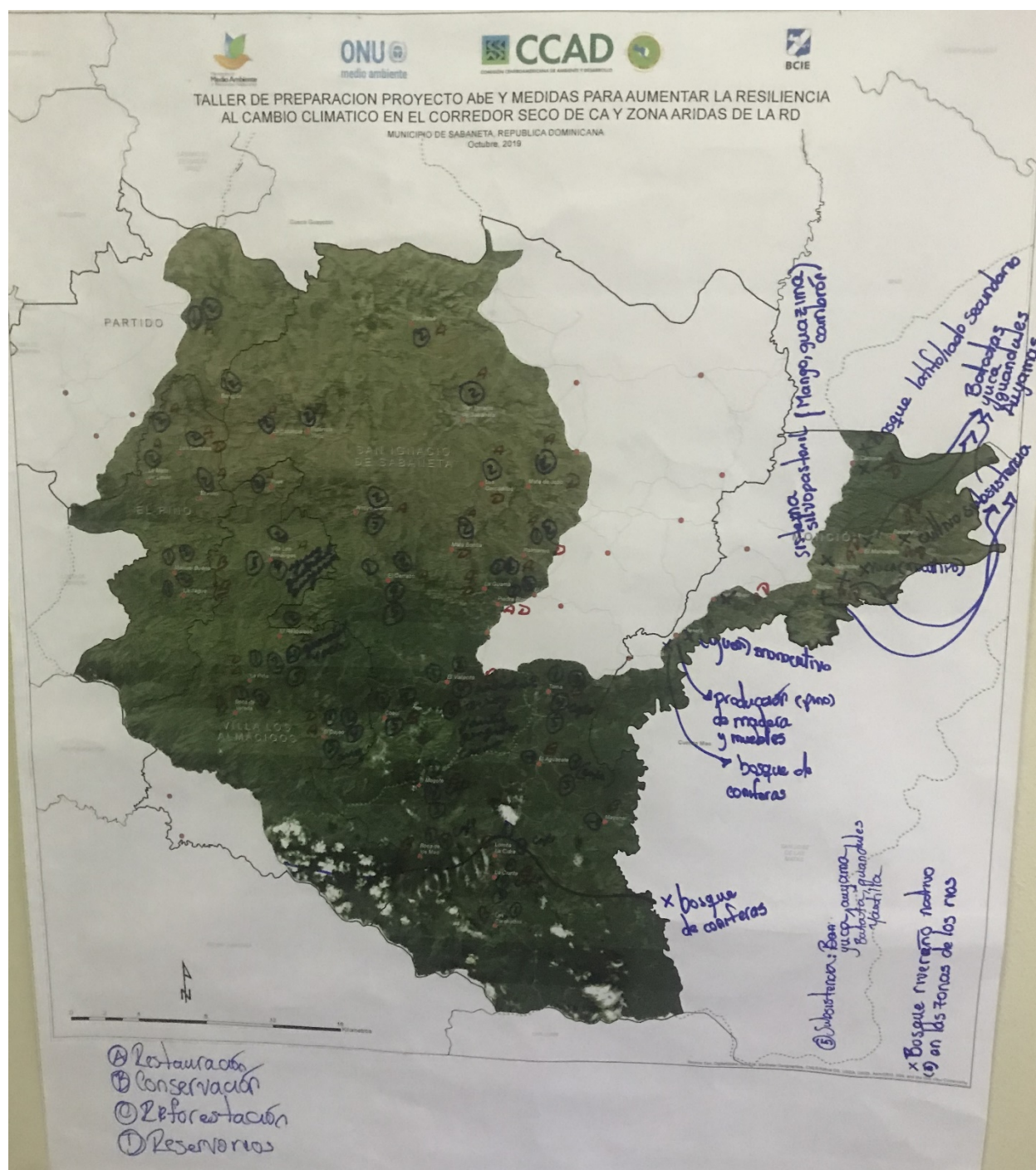
Some lending mechanisms for the Agricultural Sector were identified, such as COOPSANO, COOPBUENO, ADEMI, COOPGLOBAL, FONDAGRO. There are other contributions such as donations from the Dominican State, INDOCAFE and the POPULAR BANK, for reforestation and improvement activities of the Agroforestry (Coffee) system.

40. Other

- Describe other topics of interest or concern of the participants in the context of the project.

A-TWO PROJECTS WITH SIMILAR FOCUS:
- CARIBBEAN BIOLOGICAL CORREDOR PROJECT
- IKI PROJECT, MAO CUENCA, PRESIDENCIA AGROFORESTRY PROGRAM, SIERRA PLAN, NDEOR (OWN INITIATIVE), GREEN POLICY PLAN
B-PARTICIPATIVE NATIONAL BUDGET (APPROVED BY LAW)
- DOES NOT APPLY TO THE LEVEL THAT IS NEEDED, MUNICIPAL DEVELOPMENT PLANS

MAN GROUP SOIL USE WORK MAP



WORKING MAP LAND-USE GROUP WOMEN

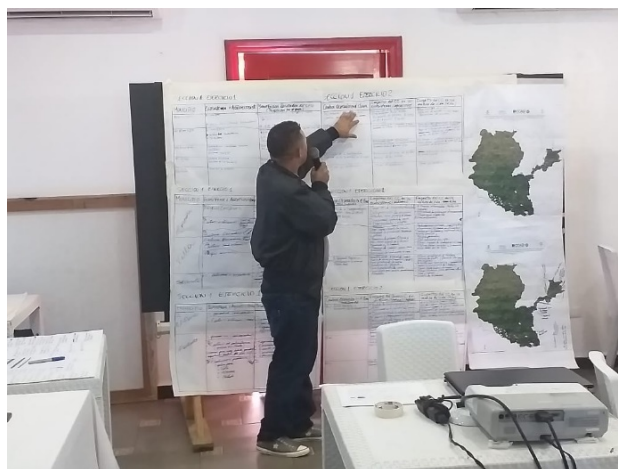
NUMBER OR LETTER	TYPE OF ECOSYSTEM/AGROECOSYSTEM/ADAPTATION MEASURE
1	Conifer forest
2	Secondary Broadleaf forest
3	Riparian forest
4	Intensive Cultivation/Monoculture
5	Subsistence cultivation
A	Restoration

B	Conservation
C	Reforestation
D	Water reservoirs

ANNEX 2. Attendance list.

Panama 18 October 2019	Yadira Campos	Stakeholder	
	Nilvia Hernandez	Miambiente	nhernandez@miambiente.gob.pa
	Manuel Mendieta Barrios	MIDA	m
	Bolivar Dominguez	Miambiente	bdominguez@miambiente.gob.pa
	Belgis B. Madrigal	Stakeholder	Belgismd30@gmail.com
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	Miguel Batista	Miambiente	Wvicha0479@hotmail.com
	Raul Castro Rodríguez	Miambiente	rcastro@miambiente-gob.pa
	Danilo Cárdenas	Stakeholder	
	Danilo Bustamente	Stakeholder	
	Israel Vergara	Miambiente	Isaraelvn20@hotmail.com
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	Lorenzo Cuervo	Stakeholder	
	Robert Shartverdians	PEDASI	Tortugas@pedasi.org
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	Edilda Melgar	Municipality of Tonosí	eldildamelgar@gmail.com
	Orelys Barahona	Municipality of Tonosí	Orelys1991@gmail.com
	Jonathan Cineda	Municipality of Tonosí	
	Esperanza Solís		
	Adriana Gutierrez		
	José Córdoba		
	Librada Pinto	University student, Economy	
	Jairo Batista B.		
	José Cárdenas	Miambiente	jcardenas@miambiente.gob.pa
	Jackeline Cardenas	Miambiente	
	Ednadeliz Flores	Miambiente	eflores@miambiente.gob.pa
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	José Fernández	Miambiente	
	Professional staff from institutions involved in this proposal		
	Juan Carlos Monterrey	UNEP	juan.monterrey3@gmail.com
	Yuriza Guerrero	CUDECA	yguerrero@catie.ac.cr

ANNEX 3. Photos of the event.





Regional Workshop with CCAD Focal Points for Contribution and Feedback to the Project:
Ecosystem-based adaptation to increase climate resilience in the Central American Dry
Corridor and the Arid Zones of the Dominican Republic

June 20-21, 2019

Panama City

WORKSHOP REPORT

1. Workshop Objectives

The workshop had the following objectives:

- Socialize the project's Concept Note of with the Focal Points of the Central American Commission for Environment and Development (CCAD for its Spanish acronym)
- Receive feedback on good practices and lessons learned from the experience of similar interventions in the countries
- Strengthen the regional focus of the proposal
- Share the proposed work schedule for the preparation of the final version of the proposal.

2. Participants

Country representatives (focal points) from the seven participating countries, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama and the Dominican Republic, as well as the Central American Bank for Economic Integration (CABEI) participated in the workshop. UN Environment and Cultures and Development in Central America (CUDECA for its Spanish acronym) were in charge of facilitating the workshop.

The list of participants is shown in Annex 1.

3. Summary of activities

The workshop consisted of a series of presentations and group discussion sessions.

On the first day, June 20, the first session consisted of the presentation of the initiative and the proposal of the Concept Note submitted to the Green Climate Fund (GCF). CCAD presented the project background, UN Environment presented the Concept Note, CUDECA made a summary of the information collected and existing gaps, and UN Environment presented the feedback provided by the GCF.

In the second session, the country representatives worked in groups to deepen the analysis of barriers identified in the Concept Note. In the third session, led by UN Environment, the lessons learned from each country were analyzed. The day closed with a discussion about co-financing.

On the second day, June 21, UN Environment led the fourth session, which consisted of an additional exercise of lessons learned with the country links. It continued with a presentation of milestones in the process of preparation, review, approval from the Council of Ministers of the CCAD, and the re-submission of the project to GCF. The workshop finalized with a series of bilateral meetings, and a session for questions and comments. The main inputs obtained from the workshop were the Barriers Analysis and Lessons Learned Analysis for the seven participating countries. A synthesis of both can be found in Annexes 2 and 3 respectively.

ANNEX 1.**LIST OF PARTICIPANTS TO THE REGIONAL WORKSHOP**

Country	Name	Institution	E-mail
Guatemala	Juan Carlos Díaz	Ministry of Environment and Natural Resources	jcdiaz@marn.gob.gt
Guatemala	César Chacón	Ministry of Environment	chechacone29@gmail.com
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Professional staff from institutions involved in this proposal			
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ANNEX 2.**BARRIERS ANALYSIS**



Regional Workshop with CCAD Focal Points for Contribution and Feedback to the Project:
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Barriers Analysis

A group discussion was carried out on June 20, 2019 to analyze the barriers identified in the Theory of Change of the proposal, divided into three main topics:

- Limited knowledge and awareness of climate change and adaptation options.
- Limited technical capacity within governments and local communities to implement Ecosystem-based Adaptation (EbA) interventions at the policy level.
- Limited development of economic incentives for investment in EbA practices.

Representatives of the Dry Corridor countries and the arid zones of Dominican Republic who participated in the Regional Workshop presented their views on each topic, gathered and presented in this summary.

1. Limited knowledge and awareness of climate change and adaptation options

The first barrier was divided into two sub-themes: the limited understanding of the impacts of climate change and the limited understanding of EbA, other adaptation measures and water and energy efficient technologies.

For the discussion, it was stated that the largest knowledge gaps in decision makers regarding the impacts of climate change on smallholder farmers were: i) water availability; ii) areas vulnerable to extreme weather events; iii) location of small farmers; iv) predicted changes in temperature and precipitation; v) expected impacts on crop yields; and vi) adaptation strategies. It was also noted that there is limited access to information and a

limited understanding of the value of ecosystem services and the costs and benefits of ecosystem restoration, due to the large scales at which many ecosystem services are generated. Therefore, there is not a sufficient understanding of the alternatives for climate change ecosystem based adaptation and complementary technologies for water and energy efficiency.

In this regard, the representatives of the participating countries noted:

a) Guatemala

The knowledge about climate change is limited among the population. Decision makers focus mainly on responding to climatic events/disasters with immediate consequences. One of the main barriers for the country is not having enough information and proposals that are relevant to local contexts, both culturally (rural communities, indigenous groups, etc) and technically (specific local issues). Climate adaptation proposals should consider the participatory identification of needs and problems at the local level. Developing monitoring systems would also contribute to a more informed decision making.

Both Guatemala and El Salvador considered that the language used in EbA is another barrier, because it is not inclusive of agriculture. In addition, just as more technical information is needed (for example, on soils), it is also necessary to include local knowledge and practices that are already sustainable in adaptation proposals.

b) Honduras

The main barrier is not a knowledge gap, but a limited management that doesn't allow an articulation of environmental policies and practices at local and national levels. Climate change should not be seen as a problematic with which only agricultural or environmental institutions should deal; the urgency of climate action should be evident and effective in all sectors. Evidence of the transversal relevance of adaptation to climate change must be generated (for example, in the health sector or in law, maintaining an updated environmental legislation).

The lack of dissemination of information is another barrier. Decision makers should receive key information in appropriate formats. For example, the Inter-Institutional Technical Committee on Climate Change or (CTICC for its Spanish acronym) could provide information for ministerial meetings, or newsletters could be disseminated through social

networks such as the Ministry of Agriculture and Livestock does (SAG of its Spanish acronym).

It is also necessary to develop stronger synergies with universities, so that the research carried out is relevant for adaptation to climate change in local contexts, and better financing mechanisms can be created for them.

c) Panama

The greatest barrier is the lack of prioritization of climate change in the country. On the one hand, the urgency of taking action against climate change must be internalized. It is necessary to go beyond talking about the global consequences of climate change, and contextualize the narrative to local realities. More clarity on what climate change implies in local contexts and how to deal with it, as well as a better connection between rural communities (already experiencing climate change) and decision makers would help. There is a need for more alignment of objectives and plans at the national and local levels that allows working from in climate change thorough multiple sectors.

d) Nicaragua

There is knowledge about climate change within the decision-makers. The dissemination of information works well through established and articulated platforms in the country. Generally, only those linked to agriculture, environment, production, education and external relations are involved in environmental initiatives. More sectors need to work together on climate action. It is necessary to make an analysis of stakeholders in other sectors and develop strategies to have them involved. The “Capacity Building for Transparency” project can contribute to this.

e) Dominican Republic

It is necessary that knowledge is disseminated and developed with equal and inclusive participation of decision makers, communities and researchers. Not having the feedback and participation of the local community to propose solutions is a barrier. The contextualized and specific formulation of proposals must consider, among other aspects, social phenomena, such as migration or climate displacement.

It is also necessary to see climate change and adaptation as regional issues (similar/connected ecosystems), not as unilateral issues. For example, Haitian students are trained in adaptive capacity in the Dominican Republic, so that a joint commitment is generated in the whole island to work in adaptation.

In the technical aspect, it is necessary to disseminate information on species for reforestation and restoration among decision makers. On the other hand, although there are efficient technologies for irrigation use (micro hydro, irrigation systems), it lacks better management.

f) El Salvador

One of the knowledge barriers is the lack of information and technology to face increasingly variable and extreme climatic events. The creation of climate insurance for crops in case of disasters could contribute to that point.

El Salvador and Guatemala agree that in order to promote good practices in natural resources management, cost-benefit analysis should be done to show its profitability. It is also necessary to make inter-institutional synergies, instead of making scattered efforts with less impact.

g) Costa Rica

A barrier at the knowledge level is the lack of financial or economic evidence of the cost of not doing adaptation. On the other hand, it is necessary to work on risk management. With the existing information on the incidence of natural disasters, adaptation at the municipal level could be promoted by generating risk management plans at the local level.

2. Limited technical capacity within governments and local communities to implement EbA interventions at the policy level

The second barrier focuses on the insufficient implementation and integration of existing policies on climate change adaptation, caused by a limited technical capacity, both in governments and communities, to implement EbA interventions.

Climate change adaptation is a priority in the NDCs of the seven participating countries. All the countries in the region have managed to make significant progress in its climate change policies at the national level, which indirectly supports EbA. For example, conservation policies, and the need to restore, conserve and sustainably manage the forests, wetlands and agroforestry systems of the Dry Corridor and the Arid Zone are widely recognized. However, institutions at both national and local levels have insufficient knowledge and technical capacity to implement existing policies. This prevents policies from achieving the necessary impacts.

In this regard, the representatives of the participating countries noted:

a) Guatemala

Key policies in the country include:

- The National Plan for Adaptation to Climate Change
- The National Policy for Climate Change
- The regional and country-level commitment (CABEI)

These policies are in being implemented, but they are limited by the lack of regulations and the low involvement of more sectors. There are even some policies that contradict or duplicate internally for environmental issues. This leads to organisms avoiding to work on the subject so as not to intervene with the work of other agencies or having role conflicts.

b) Honduras

In Honduras, key policies include:

- National Climate Change Strategy
- Climate Change Law
- National Adaptation Plan
- Strategic program for climate resilience, water resource management, agriculture and food security
- Adaptation funds and technologies (Phase II)
- Agroforestry Strategy (EbA)
- Food Security Strategy
- Forest, Soil and Water Plan

Although these policies are being implemented and there has been some progress, one of the barriers is the financial part, which ensures that the adaptation projects that are implemented are sustainable in the long term.

Policies do not contradict each other, but there is a certain duplicity of functions that could be avoided to achieve greater efficiency.

c) Panama

Key policies in the country include:

- Law 38, chapter 11 on adaptation and mitigation
- 2007 climate change policy that will be modified
- Climate change committees in 27 institutions
- Climate Change Strategy (June 18)
- REDD strategy

- Biodiversity Strategy
- National Cooperation Plan
- Alliance for one million hectares (of fruit trees)
- National Risk Adaptation Plan
- Desertification Strategies

There is technical capacity for policy implementation, but inter-institutional coordination could be improved to align those policies with the relevant international conventions and treaties. In this way, the execution could be promoted and projects wouldn't stay at the formulation level.

d) Nicaragua

In Nicaragua, key policies include:

- National Climate Change Mitigation Policy
- Climate Change Strategy (approved in February)
- The National Climate Change Response System (it is integrated through the strategy, led by MARENA, INETER and INAFOR)
- Alliance for the Dry Corridor (USAID, PROSASUR, CONRURAL)
- Water Harvest Program and Access to Agricultural Credit
- Dry Corridor Governance Program

So far, the implementation has advanced as expected. The projects in execution respond to these policies and the system is working without major inconveniences.

e) Dominican Republic

Key policies in the country include:

- National Development Law, N1, 2002
- National Climate Change Adaptation Plan
- National Council on Climate Change

The National Development Law is expected to be effective by 2030, so the efforts are focusing on that goal. The technical capacity for implementation is limited. In addition, it is necessary to strengthen inter-institutional coordination to avoid duplication of functions, and make management more efficient.

f) El Salvador

Key policies in the country include:

- National Climate Change Plan

- Policies in agriculture, resilient agriculture, forestry, aquaculture and fisheries
- National Program of Restoration of Ecosystems and Landscapes (EbA)

It is necessary to develop instruments to facilitate the implementation of policies. There are no local instruments, so climate action is not internalized at the ministerial level. In addition, climate action is not within the government priorities. A more coordinated collaboration at the inter-institutional level would help achieve an integrated and collaborative implementation. It is also necessary to articulate the private sector.

g) Costa Rica

In Costa Rica, key policies include:

- National Climate Change Adaptation Policy
- National Strategy for Climate Change Adaptation and its Action Plan
- Biodiversity Law
- Biodiversity Strategy

Policy implementation occurs only in some sectors. There is great technical capacity, but a guideline that leads inter-institutional coordination is needed. Some adaptation projects in different organizations could be articulated, so that work is not duplicated and that the institutions involved follow the same path. In fact, there is a project to ensure that policies are not contradicted. It is necessary to socialize the available information on adaptation, as sometimes some available resources aren't used because not many know about them.

3. Limited development of economic incentives for investment in EbA practices

The fourth barrier was divided into three sub-themes: the limited financial access for the implementation of EbA and water-efficient technologies in the private sector, the limited access to credits for adaptation measures among vulnerable populations, and absence or limited development of economic incentives for investment in sustainable management and EbA.

On the one hand, private sector investors, credit agencies and financial institutions have limited evidence of the benefits of EbA and other adaptation measures. Their valuations do not take into account the important long-term benefits of EbA. Therefore, these institutions assess the commercial viability of EbA approaches and companies based on natural resources with a limited method. On the other hand, small farmers and rural

households require credit to cover the initial costs of EbA implementation and efficient water use technologies. However, the high risk of such credit for financial institutions limits the availability of credit for vulnerable communities. Although there are some water funds and plans for the payment for ecosystem services (PES) in the participating countries, most of these funds and plans operate at local and limited scales. Barriers to the implementation of such economic incentives include the lack of strategic, legal and institutional frameworks and the lack of transparent monitoring agreements.

In this regard, the representatives of the participating countries noted:

a) Guatemala

Some of the financing experiences in the country are:

- Pinfor Fund, PINPEP, FONABOSQUE (forestry incentives)
- Debt swap for climate change adaptation
- Dry corridor (KFW project) in Jalapa, Zacapa and El Progreso and Baja Verapaz
- Guatecarbón / REDD + / Probosque
- Climate adaptation, IDB and national resources Model Project / Food security / water security in the dry corridor

The lack of land property is a barrier for funding organizations in Guatemala, because it is only given individually. Financing options are generally limited by the lack of guarantees from farmers and local producers.

b) Honduras

Some financing experiences in the country are:

- Protected Areas Fund
- PES in Siguatepeque

The environmental licenses that are required may represent an opportunity to incorporate adaptation measures into projects and encourage investment in that area.

c) Panama

In Panama, some financing mechanisms are:

- Climate adaptation fund
- REDD project
- Small Donations Program (GEF)
- National Adaptation Plan
- Capacity-building Initiative for Transparency Project / Transparency Platform

- National banks financing solar heaters
- Banco General supports initiatives for credit lines to establish heaters
- Agricultural Development Bank
- Euroclima: Risk Management Project

The payment for ecosystem services (PES) is not institutionalized. There are certain legal loopholes that prevent the development of norms. There is a need for greater dissemination of existing environmental laws, as well as environmental issues in general.

d) Nicaragua

Some financing experiences in the country are:

- Forest adaptation fund (finances a forest pest management program through the IADB)
- 8 projects in execution

e) Dominican Republic

In the country, some financial institutions do not consider environmental investment as profitable. The Ministry of Environment and Natural Resources must give its authorization for financing. It is necessary to develop elements that allow greater clarity for investment, such as land planning plans, financial studies, among others. The technical staff of banks and other similar institutions need to be trained in environmental investment issues. It is also necessary to develop legislation that promotes environmental financing initiatives and to finalize their respective regulations, so that they can be implemented faster.

f) El Salvador

In El Salvador, some of the existing financing mechanisms are:

- Environmental Compensation Fund / FIADES / FONAES, environmental funds
- Forest Bonus
- Agricultural package conditioned to the adoption of good practices
- EbA project with IUCN

Financing models are limited in the country, especially in the logic of payments for ecosystem services. It is necessary to review the financing alternatives locally and nationally for farmers and producers.

g) Costa Rica

Some financing experiences in the country are:

- Jicaral: carbon conservation with NGO on mangrove ecosystems. The company certifies and compensates.
- Euroclima: water harvest in Guanacaste / triangular cooperation with Peru.
- Green Development Fund (GIZ - CCAD).
- Landscape Restoration / regional / Bonn Challenge

The limited knowledge of tools to calculate environmental risk is one of the barriers to financing. Financial institutions do not invest in risky areas, such as coasts and arid areas. It is necessary to have environmental professionals in banks and other financial institutions.

ANNEX 3.

LESSONS LEARNED



Regional Workshop with CCAD Focal Points for Contribution and Feedback to the Project:
Ecosystem-based adaptation to increase climate resilience in the Central American Dry
Corridor and the Arid Zones of the Dominican Republic

June 20-21, 2019

Panama City

Lessons Learned

On June 20th and 21st, 2019 workshop participants were divided in groups to analyze the lessons learned at three levels:

- Governance
- Knowledge management
- Technical

Representatives of the countries of the Dry Corridor of Central America and the arid zones of the Dominican Republic that participated in the Regional Workshop presented their experiences and lessons learned, compiled in this synthesis.

1. At the governance level

- The “Commission for Land Use and Management of the Upper Basin of the Reventazón River” (COMCURE) in Costa Rica showed the importance of good inter-institutional coordination for this type of initiatives. Since local watershed management involves the articulation of various local institutions and agencies, it is necessary to maintain fluid communication to achieve an integral management.
- The correct administration of small funds and donations was key to the management of the project for the Jesus Maria river basin in Costa Rica. Small-scale projects that depend on various sources should clearly define their financial scheme and develop resource management methodologies.
- The “Community Systems” (ASADAS) in Costa Rica show the benefits of incorporating communities into water management. Having a minimum governance structure (ASADA, water board) and mechanisms to carry out “Water Safety Plans” (PSA) would allow for the work of units such as ASADAS to go beyond water management (e.g., sewage), making the connection with the ecosystem and landscape management for water collection.
- The Marine Management Area of Santa Elena Bay in Costa Rica depends on the joint management of various actors / agencies that have negotiated regulations and restrictions accepted by all those involved. Promoting dialogue processes helps the involved parties reach agreements and establish actions.
- Participatory landscape management allowed multiple environmental benefits to be achieved through the “Sustainable Productive Landscapes” project in Honduras. Although similar objectives are shared at the level of municipal councils and livestock associations, it is necessary to take into account the different perspectives and approaches of the different actors involved (e.g., indigenous communities).
- The Basin Councils, as part of the “Territorial Water Governance” program in the Region 13 Gulf of Fonseca in Honduras, achieved greater legitimacy and acceptance as the number of actors involved increased. The implementation of similar councils in other countries, which consider the participation of civil society, could contribute to successful processes.

- Citizen inclusion in the processes and elaboration of regulations contributed to the good development of the “Zero Burning” regulation in Honduras. Encouraging the active participation of civil society in local government initiatives could promote positive changes.
- Fostering institutional synergies in the joint project of adaptation to climate change in Chiriquí Viejo and Darién in Panama allowed the strengthening and complementation of their own capacities and the execution of more complex proposed activities.
- The organization and participation of local groups in the climate change action plan in the San Pablo and Chiriquí Viejo river basins allowed a greater community strengthening and capacity building for watershed management in Panama.

2. At the knowledge management level

- The “Junior Park Rangers” project in Osa, Costa Rica has helped creating a link between conservation and the community. Continuing to encourage the participation of the youngest population in environmental issues, as well as trying to involve more actors (Natural Resources Surveillance Committees, Ministry of Environment and NGOs), would allow for this type of initiatives to be sustainable.
- The restoration of the Jesus Maria river basin in Costa Rica was achieved by replicating best practices in the area (less use of fertilizers, agrochemicals, etc.). Disseminating good practices among producers contributes to the restoration and conservation of ecosystems.
- The good level of organization that was maintained in the “Local Climate Change Adaptation Strategy” (ELACC) project in the Guacerique River basin in Honduras proved to be beneficial for basin management. The elaboration of a methodological guide that systematizes the experiences of the project could contribute to improve the design of similar processes.
- The dissemination of information about replicable technologies (use of living fences, agroforestry, etc.) in field schools and in livestock forums in Choluteca and Valle in Honduras, allowed the widespread use of these practices as part of the “Sustainable Productive Landscapes” project. Promoting exchange spaces for

producers could contribute to greater feedback and the application of practices that improve the value chain of silvopasture systems.

- The structure of municipal associations as a form of municipal cooperation in the project “Recovery of the Natural Capital of the Dry Corridor and Climate Adaptation of its Population” (Guatemala) has allowed the development of a methodology and approach strategy that, along with an adequate socialization, would allow replication in similar contexts.
- The “National Prize for Cleaner Production” in the Dominican Republic recognizes and rewards good business practices. These types of initiatives would encourage the use of good practices and their dissemination.
- The absence of metrics and measurement at baselines in El Salvador hinders the technical and scientific diagnosis of the real situation of natural resources, impeding the recognition of the true dimension of climate issues. Because of this, a pre-investment framework is necessary to guarantee interventions with a scientific basis, as well as a baseline in the area.
- The methodology for participation and the action plan of the ENDE-REDD+ project in Nicaragua allowed the identification of problems, opportunities and solutions on REDD + issues. The systematization of the intervention methodology could guide new projects and processes.

3. At the technical level

- The project “Strengthening the climatic resilience of rural communities and ecosystems in the south of Ahuachapán, El Salvador” highlighted the importance of having a baseline, identifying actors involved, and considering their representativeness and cultural differences. This would reduce negative externalities and allow for a comprehensive ecosystem vision.
- The use of the “Sustainability Index for Restoration” in El Salvador promotes the measurement of biophysical (e.g. carbon emissions, soil quality) and socioeconomic (e.g., income, livelihoods) landscape sustainability. Using this type of index allows us to show the state of an ecosystem, both in terms of adaptation and mitigation.

- Integrating multiple indicators into reforestation programs in the Dominican Republic would allow prioritizing sites of interest with greater efficiency, guaranteeing the supply of water in the areas most sensitive to climate change.
- The “Sustainable Productive Landscapes” project in Honduras achieved a balance between technical assistance and adaptation to local contexts, through facilitation agreements with rural banks that use alternative guarantees for local producers (e.g. letter of commitment instead of title).
- Poultry raising (“gallinas pelucas”) and other complementary practices (use of eco-filters or production of concentrated food) as part of the project “Recovery of the Natural Capital of the Dry Corridor and Climate Adaptation its population” in Guatemala show the importance of considering both productive and adaptation issues in technical proposals.