

# Engineers Without Borders (EWB) Research Triangle Professional (RTP) Chapter:



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## Chipozo Alta Verapaz Guatemala Water Supply Project

Fundraising Site: <https://support.ewb-usa.org/waterforchipozo>

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<http://ewb-usa.org>  
<http://rtpewb.com>

# Objectives of this brief

- Introduce Engineers Without Borders (EWB)
  - EWB Mission, Core Values and Impact
  - Our professional chapter in Raleigh NC
- Describe the EWB RTP water supply improvement project in the community of Caserio Chipozo in Alta Verapaz, Guatemala
  - Objective: Improve water supply for 95 families (615 people) who are without dependable clean water





# EWB USA

## Building a Better World



### Vision

EWB-USA's vision is a world in which every community has the capacity to sustainably meet their basic human needs.

### Mission

EWB-USA builds a better world through engineering projects that empower communities to meet their basic human needs and equip leaders to solve the world's most pressing challenges.

We are **Impactful**

### 651 Projects Underway



**384**

WATER  
PROJECTS



**77**

STRUCTURES  
PROJECTS



**40**

ENERGY  
PROJECTS



**77**

SANITATION  
PROJECTS



**44**

AGRICULTURE  
PROJECTS



**25**

CIVIL WORKS  
PROJECTS



**3**

INFORMATION SYSTEM  
PROJECTS



**1**

DISASTER RECOVERY  
PROJECT

*Engineers Without Borders USA is a 501c(3) tax-exempt organization*



### Core Values

#### SERVICE FIRST

EWB-USA commits to harnessing the skills of its volunteers to fulfill communities' basic human needs. We provide the services that meet these needs without consideration of race, religion, gender or political affiliation.

#### TRUSTED PARTNERSHIPS

Trust forms the foundation of EWB-USA partnerships, which are achieved through transparency, integrity and respect for the contributions and capabilities of all parties.

#### SUSTAINABLE SOLUTIONS

Sustainability drives EWB-USA's programs. We commit to community-driven projects. We equip our partner communities to maintain each project so it remains functional long after our commitment is fulfilled.

#### GROWTH & LEARNING

EWB-USA fosters an environment of learning so our volunteers, community members and staff have the tools, training and passion to address the world's most pressing challenges. We strive for our work to inspire others to learn more, do more, and become more.

#### CONDUCT & PRACTICES

EWB-USA holds paramount safety, security and ethical conduct. The volunteers and staff of EWB-USA are bound by the Member Code of Conduct and the engineers' Code of Ethics.

#### STRONGER TOGETHER

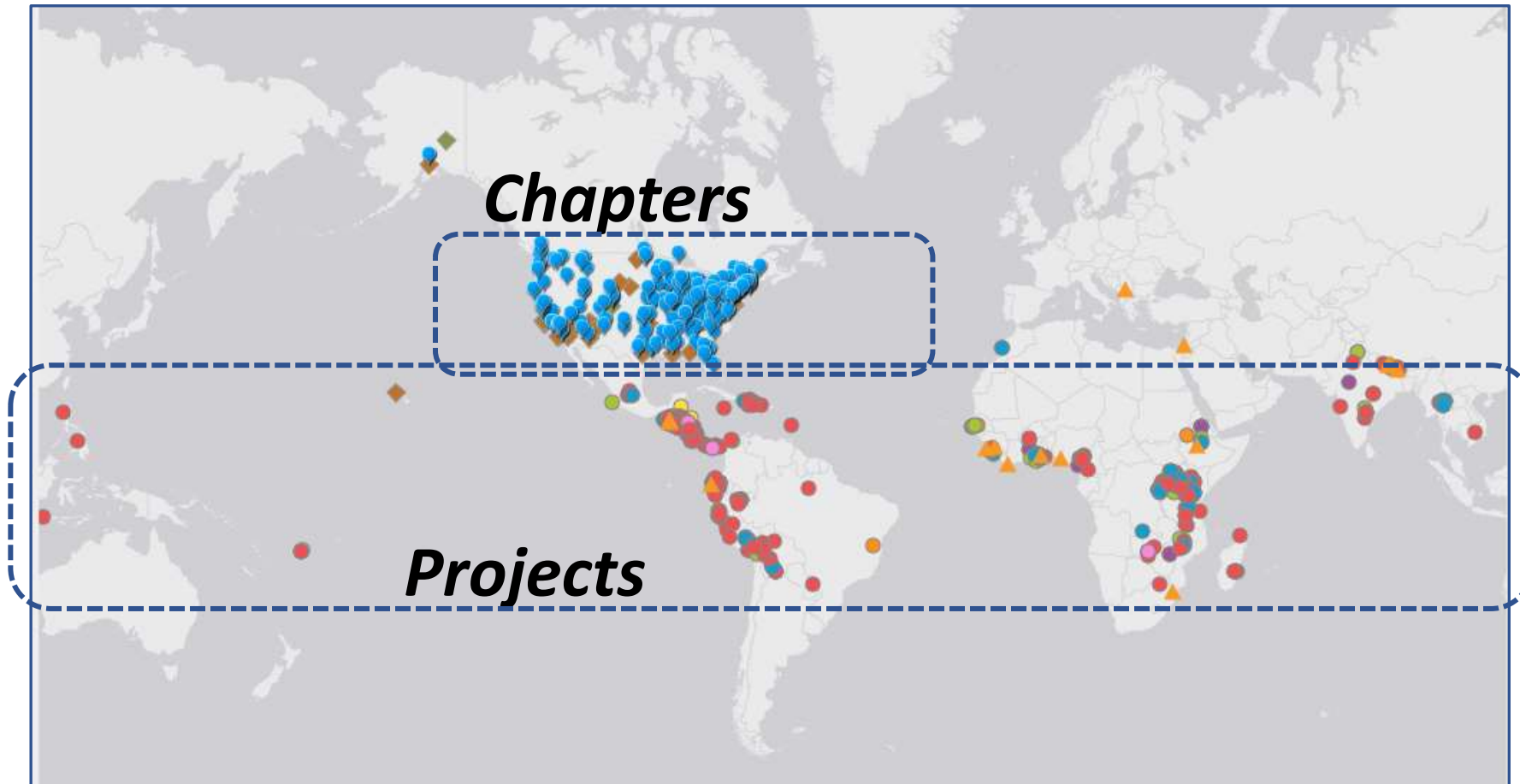
The EWB-USA family is comprised of community members, students, professionals, universities, headquarters staff and a host of other supporters. We thrive off diversity and the collaborative pathways it provides. But most importantly, we pursue EWB-USA's mission as one, with aligned goals and purpose.

*For more info, please visit:*  
<https://www.ewb-usa.org/>

# EWB USA

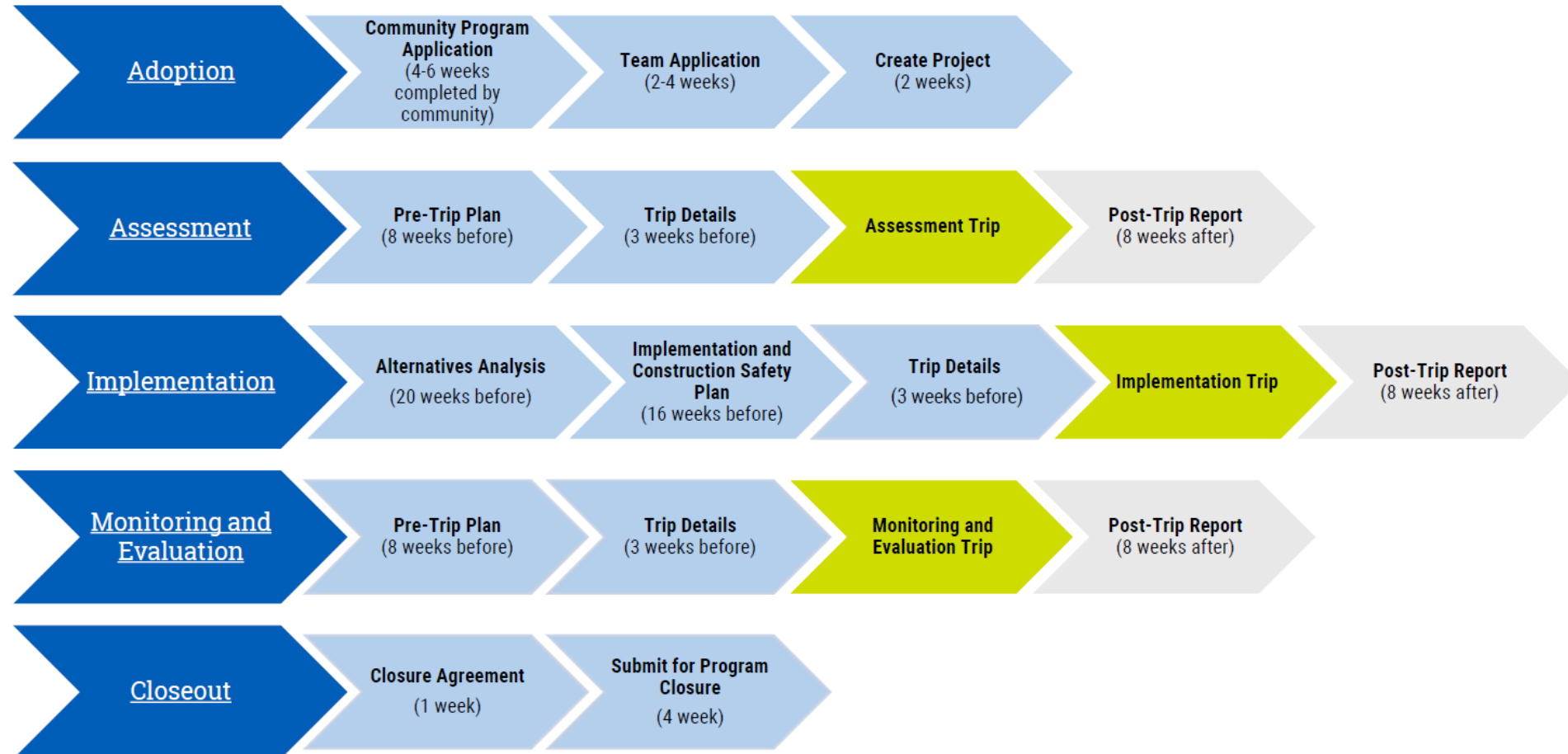
## Building a Better World

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Visit <https://www.ewb-usa.org/our-work/where-we-work/>  
to learn more about the worldwide efforts of the EWB Professional and Student chapters

### EWB-USA PROJECT PROCESS: Focused on sustainable solutions





# Chipozo Water Supply Project -

Coordinates:  
15.42085°,  
-90.59399°

## Chipozo Project: Where is it?

Chipozo  
(EWB RTP  
Project)

Panhux  
(EWB NCSU project)

Distance from CECEP  
To Chipozo ~ 18km by road

San Cristobal Alta Verapaz  
CECEP (Museo Katinamit)

San Cristobal Verapaz

Distance to Guatemala City  
203km (four hours)

Area shown

Guatemala



# Overview of the EWB RTP Water Supply Improvement Project in Chipozo Guatemala

- **Problem**: The 95 families in the Mayan (Pokomchi) village of Chipozo do not have a dependable clean water source
  - Current sources are largely unimproved springs which are not clean or are water catchment on houses which do not supply water in the dry season
- **Opportunity**: The community has identified a spring in a remote area which can support sufficient and clean water flow all year
  - But is a rugged and steep path of over 1km in distance and 150meters elevation change
- **Solution**: Build a sustainable solar-powered water distribution system from the spring to the community
- **Current Partners** in the project are:
  - Community-Based Organization (CBO): Chipozo COCODE
  - Non-Governmental Organization (NGO): CECEP (<http://www.cecep.cosmosmaya.info/>)
  - EWB Guatemala



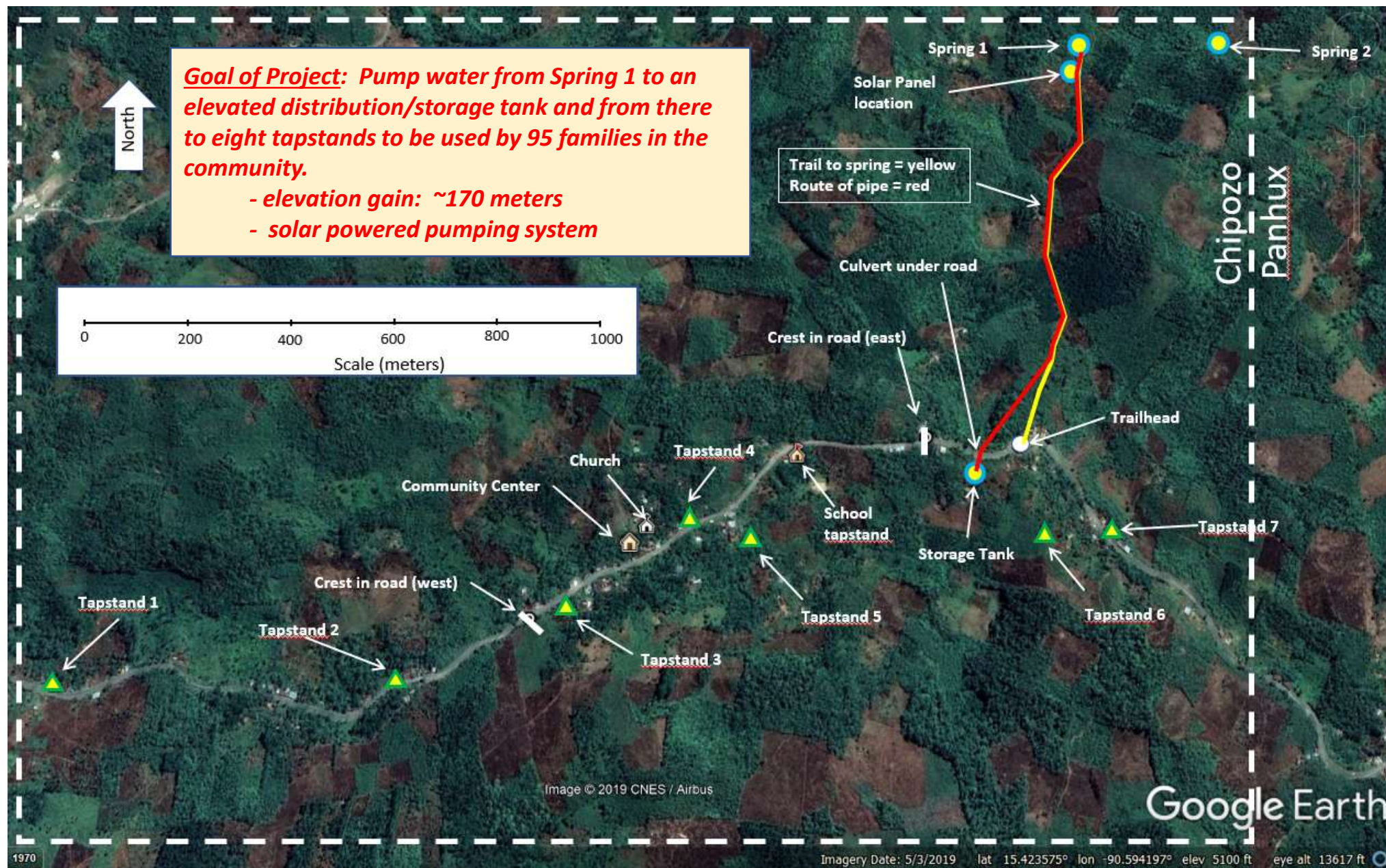
*Typical unimproved springs*



*The people we want to help*

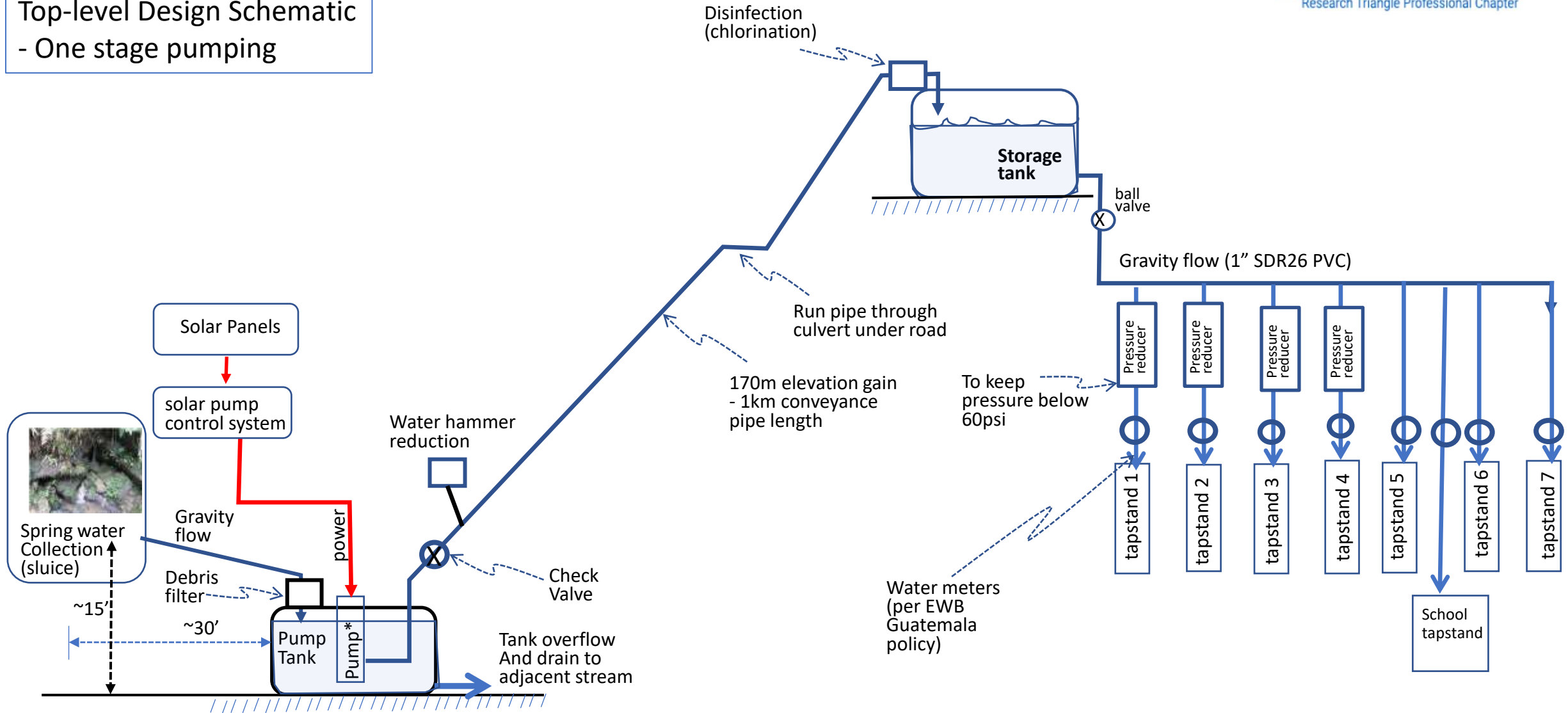
Read about the Guatemalan Civil War here: [https://en.wikipedia.org/wiki/Guatemalan\\_Civil\\_War](https://en.wikipedia.org/wiki/Guatemalan_Civil_War)







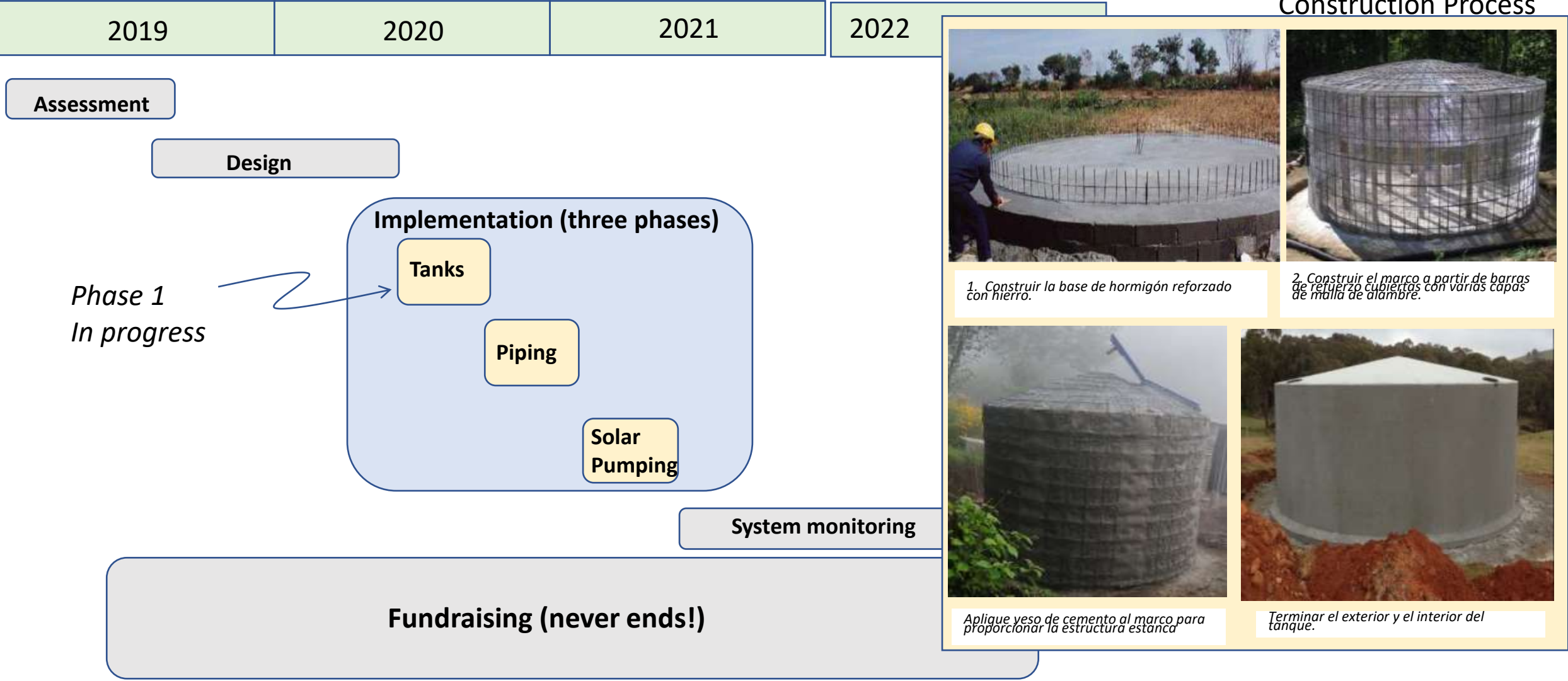
# Chipozo Water Supply Top-level Design Schematic - One stage pumping



\* tank/pipe configuration will support either internal (submersible) or external pump

# Chipozo Water Supply: Overall Project Schedule

## Typical Tank Construction Process





1. Construir la base de hormigón reforzado con hierro.



2. Construir el marco a partir de barras de refuerzo cubiertos con varias capas de malla de alambre.



Aplique yeso de cemento al marco para proporcionar la estructura estanca



Terminar el exterior y el interior del tanque.



# Work Breakdown Structure, Cost Estimate and Project Implementation Responsibilities

WBS #	WBS Item	materials(\$)	Labor(\$)	Total Cost (\$)
<b>1</b>	<b>Pump subsystem</b>			
1.1	Spring flow capture	180	150	300
1.1.1	sluice design			
1.2	Pipe from spring to pump tank	200	310	510
1.3	pump tank (concrete)	1100	800	1900
1.4	tank overflow to stream			
1.5	solar pump	5100	0	5100
1.5.1	solar pump vendor installation and testing		5000	5000
<b>2</b>	<b>Solar Power subsystem</b>			
2.1	solar panels	12000	300	12400
2.2	solar panel mounting structure	900	400	3200
2.3	power control unit	750	0	750
2.4	electric connection to pump			
2.4.1	cable	85	0	85
<b>3</b>	<b>Elevated tank subsystem</b>			
3.1	tank structure (concrete)	2800	1100	3100
3.2	sanitization	550	100	650
3.3	Elevated tank water level control system	160	50	210
<b>4</b>	<b>Pila Subsystem (seven pilas)</b>			
4.1	tapstands	120 each	40each	1120
4.2	wash stations (concrete)	400 each	350each	5250
4.3	water meters	15 each	0	105
4.4	roof structure	180 each	210each	2730
4.5	pila drain	30 each	20each	350
<b>5</b>	<b>Conveyance subsystem (water distribution)</b>			
5.1	pipe from pump tank to elevated tank	7800	600	8400
5.1.1	pipe fittings	400	0	400
5.2	elevated tank to pilas	10000	500	10500
				<b>62,060</b>

Project Task	Responsibility
<b>Design system</b>	EWB RTP
Appove system design	community
Fundraising	EWB RTP
<b>Prepare for Implementation</b>	
Logistics of material purchasing	NGO (CECEP)
Transport of materials to Chipozo	NGO (CECEP)
Transport of materials to community sites	Community
Prepare construction sites	Community
<b>Build Tanks and Piping</b>	
Build Pump tank and storage tank	Mason (with help from community)
Dig trenches and assemble piping between tanks	community
<b>Install/configure Solar Power subsystem</b>	
solar panels	
Build solar panel mounting structure	EWB RTP, with help from community
Install solar panels	EWB RTP
install power control unit and pump	solar pump vendor
<b>Build Pila Subsystem and water distribution</b>	
Connect water lines to storage tank	EWB (with help from community)
Dig trenches and run water lines to pila locations	community
construct concrete pilas and drain	Mason (with help from community)
install water meters	EWB RTP
Build roof structure	community
<b>Training and operations</b>	
Prepare operations materials	EWB RTP
Conduct Training	CECEP (with EWB)
Operate and maintain system	Community

*A team effort  
with the  
community  
and NGO!*

# About CECEP (our NGO partner)-

[http://www.cecep.cosmosmaya.info/menu\\_02.htm](http://www.cecep.cosmosmaya.info/menu_02.htm)

<https://www.facebook.com/museo.katinamit>



Centro Educativo Comunitario Pokomchi (CECEP) was founded in 1993 through the united efforts of local and international people with the objective of exposing and strengthening the Pokomchi culture.

For this purpose we work in translation (pocomchi-spanish), alphabetization, exhibition of our culture, promotion and distribution of Pokomchi literature and cultural strengthening. Furthermore we work with national and international associations supporting and reinforcing our community through our projects. We manage a community tourism alliance, educational workshops, volunteers, tours around the town, a store of handicrafts made by local artisans, and a school for the languages Spanish and Pokomchi.

With Museo Katinamit (opened in 2001) we offer the unique exhibition of Pokomchi culture, presenting our lifestyle which is considered among one of the oldest in the world and still living.



Sucy Ical Lem





# Chipozo Water Supply Improvement Project:

## *Conclusion*

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- Summary: The goal of this project is to improve the quality and quantity of the water supply for the Mayan community of Chipozo in Alta Verapaz Guatemala
- The EWB RTP team is partnered with the community as well as with local NGO CECEP to ensure the long-range success of the project
  - Following the EWB USA engineering and project management discipline
  - Focusing on implementation of a sustainable and affordable design
  - Ensuing maintainability by the community
- Next Steps:
  - *Continue the current implementation*
  - Fundraising (<https://support.ewb-usa.org/waterforchipozo>)



From this



to this



*Questions?*



**ENGINEERS WITHOUT BORDERS USA**  
Research Triangle Professional Chapter

*Thank you for your support!*

*Please contact me for more information:*  
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# EWB RTP: What we did during the April assessment trip

- Met with the community to establish a common understanding of their needs and to identify the objectives to achieve during the trip
- Visited and surveyed all of the key proposed sites and routes associated with the water supply project (spring, tanks, pipe routes, and seven community water stations (pilas))
- Measured water flow of spring and conducted water quality tests
- Conducted house-to-house surveys of 82 out of 95 homes to baseline current water usage as well as health impacts of current water situation ~
- Met with candidate “abanil” (construction lead)
- Developed and signed the Community Partnership Agreement

