TUI'K RUCH' LEW

ANNUAL REPORT
FOR 2019

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A LETTER FROM THE DIRECTOR

As the decade comes to a close, we witness the effects of climate change in Guatemala at Lake Atitlán. I feel frightened by what I am observing in Nature. There is the constant presence of murky, green algae in water that was crystalline when I arrived at Lake Atitlán. Huge, wild avocado trees are dying from a lack of rain in a community that depends on the yearly harvest and sale of millions of avocados. Coffee trees are withered and covered with dried, black berries because, due to the drought, no bean developed. Fields of stunted corn lie dry and abandoned with no hope for a crop to make into tortillas. These changes, heartbreaking to see in a once verdant landscape, are devastating enough by themselves; but consider the human suffering caused by the drastic reduction in economic reality brought about by climate change. One can see the increase in poverty as people scramble to find options in the only other economic opportunity available -- tourism. How long will Lake Atitlán remain a tourist destination under these circumstances?

My optimism survives from the effects of Tuik Ruch Lew's (TRL) work. Protecting the forests on the mountains surrounding Lake Atitlán by teaching people to use an ONIL stove -- instead of cooking over an open fire -- saves hundreds of thousands of trees from being cut for firewood. Those standing trees function as part of what used to be called the "Third Lung" of the Earth, Central America's tropical forests. Trees sequester carbon dioxide in what scientists claim is the simplest and most efficient way to combat global warming: preserving and increasing tree cover.

In 2019, TRL made great strides in reaching other important objectives. Our Improved Cookstove project has been accepted by VERRA (a standards development organization) for independent verification and validation, the final step towards selling TRL carbon units (VCUs) in the global market for carbon offsets. Through the sale of VCUs, our stove project will become self-sustaining. We now have an office in the heart of Santiago Atitlán, visible to Maya families who need ONIL stoves and their replacement parts, Berkefeld brand water filters, and LED light bulbs to replace their incandescents...changes that add up to saving money while helping the Earth. The office also serves as a place to train groups interested in replicating TRL's successes -- part of the increased environmental awareness TRL promotes within our community.

We end 2019 on a surge of optimism,

Candis E. Krummel

CANDIS KRUMMEL
Founder and Innovation Director

CURRENT STATE OF THE LAKE ATITLÁN BASIN

Lake Atitlán, one of the most stunning lakes in the world, is located in the Sololá Department, situated to the west of Guatemala City, at an altitude of 1,562 meters. A volcanic caldera surrounded by volcanoes San Pedro, Atitlán, and Tolimán, the basin possesses lush forests -- home to the Maya culture's sacred Resplendent Quetzal bird.

The territory surrounding the lake is also prime forest for wood cutters -- a primary deforestation driver given the fact that 84% of the population of the Sololá Department uses wood as their energy source for cooking. Most residents still prepare meals using a traditional three-stone hearth and consume 5.3 tonnes of wood per year on average. From 2001 to 2018, Sololá lost 2,480 hectares of tree cover, equivalent to a 3.1% decrease in tree cover since 2000, and 909,000 tonnes of CO_2 emissions. With increasing population and rising demand for wood fuel, the forests on the mountains around Lake Atitlán are in extreme danger.

The lake itself still serves as the primary source of drinking water for more than 70,000 inhabitants of the department. Due to high levels of fecal contamination, cyanobacteria and persistent organic pollutants in the lake, water from Lake Atitlán is no longer safe to drink. People with means purchase bottled water, but when 5 gallon bottles of commercial filtered water are not available, people resort to drinking from plastic bags or small bottles. These single-use plastics litter the landscape, threatening Lake Atitlán and its wildlife.

TRL envisions a thriving Lake Atitlán basin free of excessive pollution and supportive of biodiverse forests with communities empowered to live sustainable, healthy, and prosperous lives.

HEALTH AND ECONOMY IN OUR COMMUNITY

The department of Sololá is home to 421,583 inhabitants, 96% of whom are indigenous Maya. Indigenous groups in Guatemala disproportionately face the negative impacts of poverty and inequality -- an above-country average of 77.5% of the local population lives below the poverty line. Moreover, indigenous livelihoods are most affected by climate change. The Tz'utujil-speaking Maya population already suffers from the increasingly erratic planting seasons. Santiago Atitlán—the main site of TRL's operations—possesses the highest extreme rural poverty rate of the department. Poverty is one compelling reason that people still depend on wood fuel to cook.

Each morning, a layer of haze from wood smoke covers Santiago Atitlán; the poor ambient air quality is directly visible. Open cooking fires generate household air pollution (HAP), causing elevated levels of indoor exposure that can reach 10-20 times above safe limits. Trapped in concrete homes with tin roofs, lacking sufficient air circulation, these hazardous fumes can cause acute lower respiratory infections and long-term complications. Individuals suffer from chronic pulmonary obstructive disease and cataracts, and infants are at higher risk of pneumonia. Because Tz'utujil women spend so much time in the kitchen with their children, they are most vulnerable.

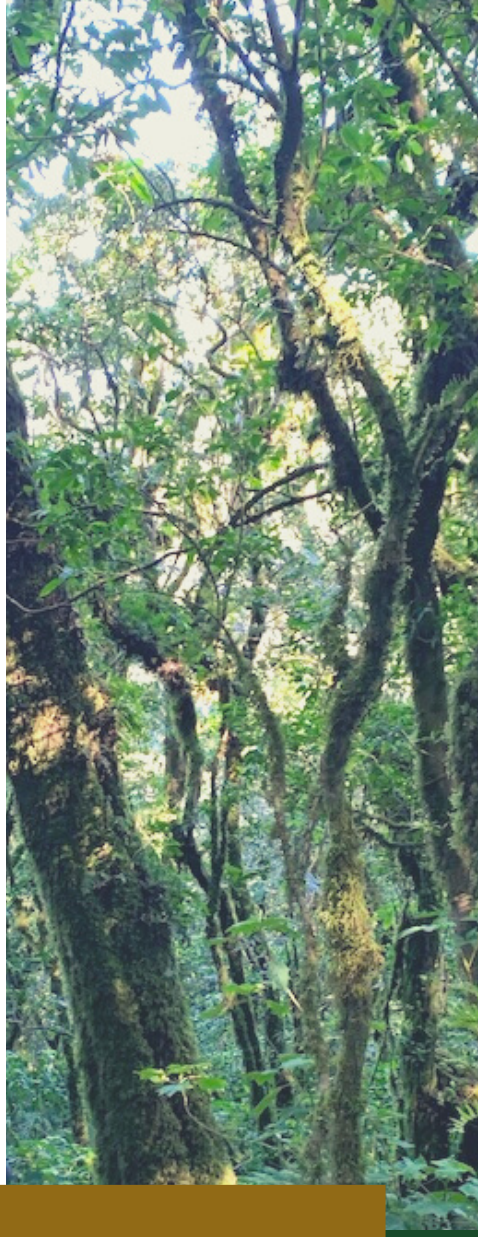
HOUSEHOLD AIR POLLUTION IN GUATEMALA

84% of homes in the Sololá Department use wood as the primary energy source for cooking.

Across Guatemala, HAP contributes to nearly **4,500 deaths every year.**

12% of deaths among children under 5 are associated with respiratory infections.

OUR RESPONSE



Rather than viewing climate change, deforestation, respiratory health hazards, and poverty rates as separate issues with separate solutions, TRL strives to identify the complex, root causes of these issues. Thus, we use one unique solution to effect positive environmental, developmental, and health changes, protecting the livelihood of the indigenous Tz'utujil Maya people living in the Lake Atitlán basin.

SUSTAINABLE TECHNOLOGY

TRL promotes (1) introduction of high-efficiency, biomass-fired ONIL stoves to replace open cooking fires; (2) provision of British Berkefeld water filters; and (3) replacement of incandescent light bulbs with LEDs. ONIL stoves slow deforestation; nearly eliminate household air pollution (HAP), which leads to respiratory issues; and improve family economies through substantial savings on firewood. TRL uses Improved Cookstove (ICS) technology that complies with all relevant UNFCC requirements for the Clean Development Mechanism. We bring positive, multi-faceted change with a simple technological intervention.

EMPOWER PEOPLE

At TRL, we recognize that these environmental challenges are intersectional issues. As part of the global response to the current climate crisis, we believe it is unfair to ask the poorest, most vulnerable members of our community to prioritize the health of the planet above their families' immediate needs. That is why we tackle environmental challenges with solutions that empower our beneficiaries to save money and improve their health, all the while leading local conservation efforts. Education on local environmental threats and global climate action is central to our mission.

SUSTAINABLE TECHNOLOGY

ONIL STOVES, UTZ JA' WATER FILTERS, LED LIGHT BULBS

120
COMMERCIAL FIREWOOD TREES SAVED

27.1
AVERAGE TONNES OF CO_2 EMISSIONS AVOIDED

99%
LESS HAP THAN A 3-STONE FIRE

70%
LESS FIREWOOD USED

*CALCULATED PER STOVE, OVER ITS 10-YEAR LIFE SPAN

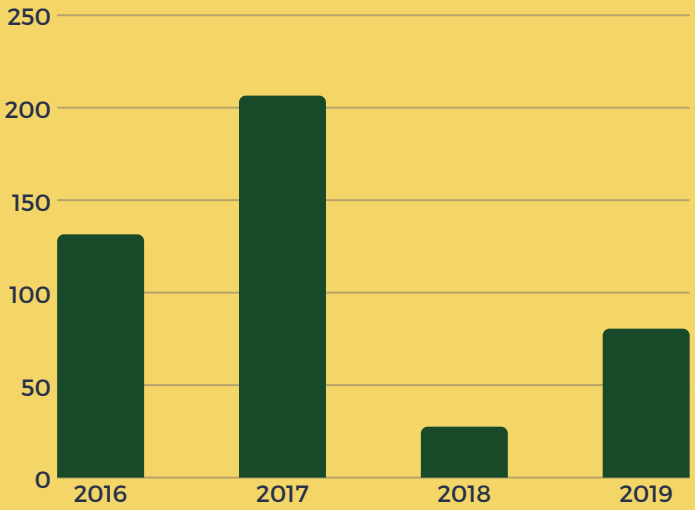
$ 3.33
MONTHLY COST FOR A FAMILY TO HAVE ACCESS TO SAFE DRINKING WATER

93 KWH
IN ANNUAL ENERGY SAVINGS PER BULB REPLACED

IMPROVED COOKSTOVES

BY THE NUMBERS

STOVES INSTALLED PER YEAR



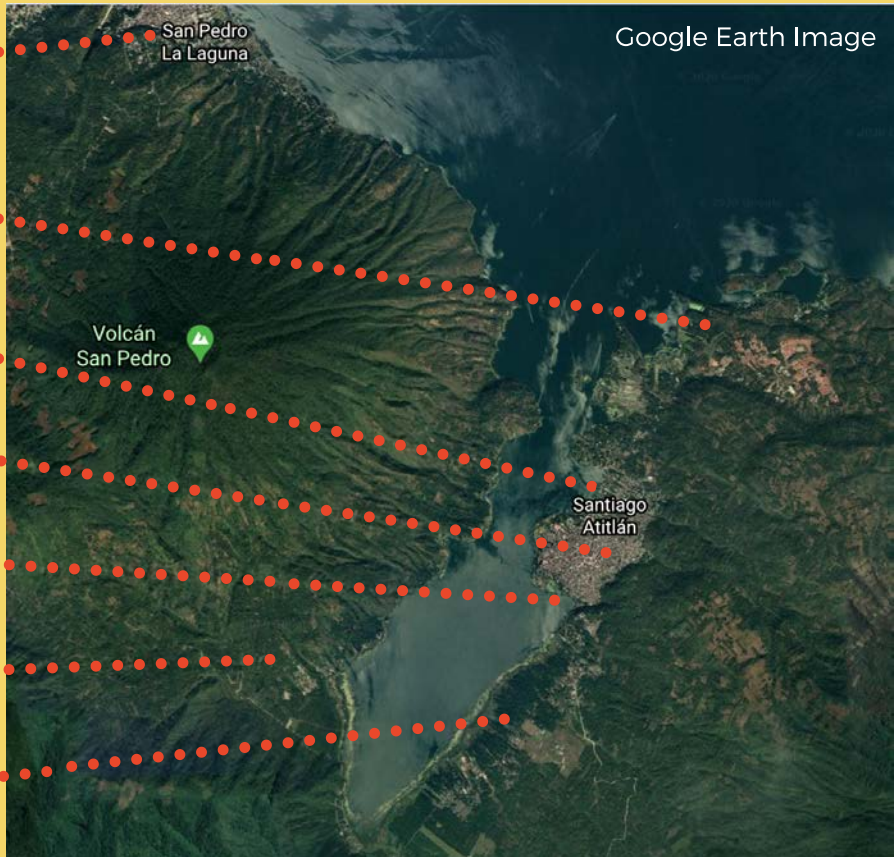
*Note: TRL continues to maintain over 2000 stoves previously installed under the Cojolya Association of Maya Women Weavers

After an impressive rise in installations in 2017 due to the availability of grant funds for the ICS Project, TRL spent 2018 and 2019 building organizational capacity. At the current, subsidized price of Q350, demand for stoves in the community has outpaced funding. Our waiting list is growing along with maintenance visits for previously installed stoves. We now look forward to installing a minimum of 120 ONIL stoves each year.

STOVES ARE STILL FUNCTIONING CORRECTLY AFTER MORE THAN 10 YEARS OF USE

NEIGHBORHOOD INSTALLATIONS 2019

- **San Pedro: 8**
- **Chuk Muk: 14**
- **Pachichaj, Tzanjuyu: 15**
- **Xechivoy, Panul: 19**
- **Panaj, Panabaj: 5**
- **Chacaya: 10**
- **Tzanchaj: 9**



Our Process

Site Visit

VISIT 01

In 2019, our team was able to gather information about **87 potential installations sites.**

Installation

In 2019 TRL provided **80 new ONIL stoves** to families in need. Goodbye Household Air Pollution!

1 Week Follow-up

VISIT 02

One week after installation, it's time to check in and see how new clients are adjusting.

3 Month Check-in

VISIT 03

Stoves might need maintenance. That's why we visit beneficiaries three months after installation.

1 Year Check-in

VISIT 04

Happy first birthday, ONIL stove! You get a check up as a present. We also are curious, how much wood do you save your owner?

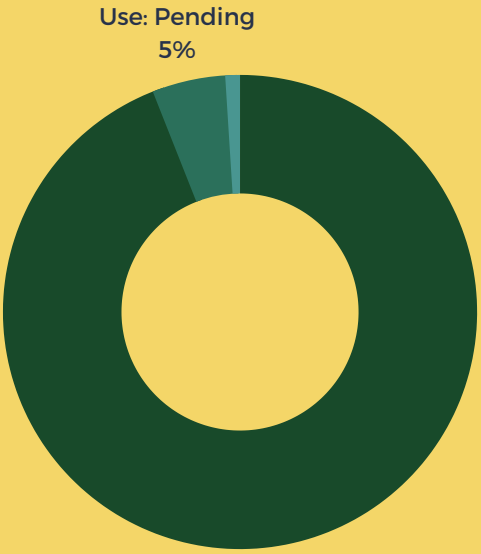
Ongoing

VISIT 05

Replacement parts are always available for purchase, at cost. Additional maintenance is performed upon request.

ACHIEVEMENTS

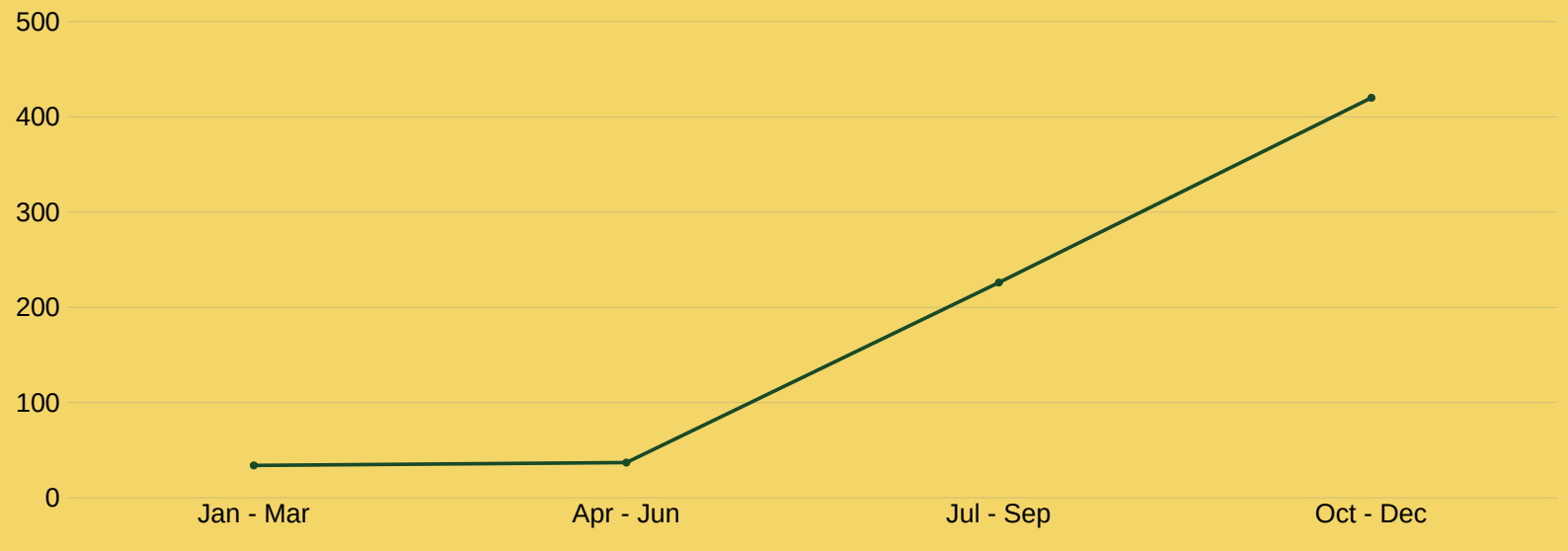
CURRENT STATUS OF STOVES INSTALLED IN 2019



*Note: as of December 2019, 94% of stoves were in good condition, 4% were pending use, and 1% needed maintenance.

TRL made several changes in 2019 to set the Association up for long-term success. In the first half of 2019, we prioritized the digitization of all client information, laying the groundwork for our new, digital monitoring and evaluation platform. In the second half of 2019, TRL welcomed two new members to the Outreach Team and two new members to the Program Development Team. By automating manual processes, like scheduling return visits to the majority of our previous clients and ensuring that 100% of visits were digitally reported, we were able to visit nine times the number of clients during the second half of 2019.

HOME VISITS LOGGED IN 2019



EXTERNAL CERTIFICATIONS

TRL currently partners with VERRA, an organization that develops and manages standards for a sustainable future. TRL expects to complete certification under the Verified Carbon Standard and Sustainable Development Verified Standard in 2020, enabling TRL to sell carbon offsets.

Verified Carbon Standard (VCS)

TRL's ICS project will achieve an estimated 12,868 tonnes of carbon dioxide equivalent in greenhouse gas (GHG) emission reductions over the next seven years. For those who wish to offset their carbon footprint, we offer an excellent option to support a project that is generating a net positive climate impact. To participate in the voluntary carbon market, TRL applied for certification under the VCS Program in 2019. Once approved and audited in 2020, we can to sell verified carbon units (VCUs), unlocking access to an ongoing funding stream for our project.

Sustainable Development Verified Standard (SDVISta)

TRL's programs generate additional social benefits beyond carbon sequestration. Our activities touch 8 of the 17 Sustainable Development Goals - objectives set by the United Nations in 2015 to guide progress on global challenges related to poverty, inequality, climate, environmental degradation and more. As one of 16 SD VISta Pilot projects, TRL is working with VERRA to establish a market for Sustainable Development Assets. Both programs will evaluate TRL's impact on the community and the planet, unlock a future funding stream for TRL, and provide the organization with prestigious certifications as a top performing not-for-profit association.

TRL uses an innovative digital platform to ensure that all data and parameters required to meet these standards are collected, tracked, and reported. Using Samsung tablets, TRL's Outreach Team administers various surveys and questionnaires built in KoboToolbox. TRL now digitally tracks maintenance records and survey data related to wood use, health concerns and poverty levels among stove owners.

Information is collected over five home visits in the first year of installation. At each visit we update the stove's status. This way we can verify whether the positive climate and other sustainable development benefits are ongoing and intervene to provide support to our clients when necessary.

Additionally, through a combination of community-informed surveys and interviews, we now monitor our impact on eight of the Sustainable Development Goals (SDGs). By gathering data on environmental, health, and economic indicators relevant to the community we serve, we are able to effectively track and report our work. Findings and data will also be used to inform project design in the future.

THE GLOBAL GOALS

EMPOWER PEOPLE

Over the first year of stove installation, Our Outreach Team ensures that families are aware of the direct impact of their wood consumption on the planet. The team discusses the increasing rate of deforestation on the volcanos and the environmental consequences for Lake Atitlán.

Beneficiaries learn about the relationship between stove use, decreased wood consumption, local ecological threats, and global climate change. We want to generate greater discussion and awareness within the community about imminent ecological threats, as well as encourage individual accountability to preserve biodiversity within the Lake Atitlán basin.

Our environmental educational program is championed by a team of Tz'utujil staff who can bridge language and cultural gaps. They foster an environment where participants are comfortable asking questions and contributing their own knowledge of local ecosystems. In this way, we strive to strengthen environmental values in Santiago Atitlán, and empower individuals to lead climate action efforts in the community.

OUR IMPACT:

OVER 2000 FAMILIES USE **SAFE**, CLEAN COOKING ALTERNATIVES

GIVEN THE AVERAGE HOUSEHOLD SIZE IS **4.94,** THAT'S NEARLY **10,000** INDIVIDUALS

WHO EXPERIENCE OUR PROGRAM'S **ECONOMIC**, **HEALTH** AND **EDUCATIONAL** BENEFITS

EACH FAMILY:

IS NO LONGER EXPOSED TO HEALTH RISKS ASSOCIATED WITH **HAP**

AND SAVES **$200/YR** ON FIREWOOD COSTS

FEMALE FOCUSED

Tz'utujil women are customarily very productive members of their families. In addition to preparing the food and caring for children, they maintain the tradition of backstrap loom weaving, embroidering the ancient bird and flower designs on their *huipiles*, and, more recently, making beaded jewelry for resale. Having an ONIL stove makes a great contribution as it reduces the time used to gather wood fuel and/or time dedicated to care for a child with a respiratory illness or burn. Now those hours can be spent in a productive manner that brings extra income into the household.

"I have five children, and the reason I bought an ONIL stove is for a future in which they have clean air and are healthy, and they won't be cutting down more trees..."

- Francisca Tziná Ajuchán

"The project is beneficial to the family... I have to embrolder and with a stove [my two kids] won't get close to an open fire like before."

- Andrea Simaj Mendoza

84% OF OUR ONIL STOVE OWNERS ARE WOMEN

BY PROVIDING ONIL STOVES THAT **SAVE MONEY, TIME, AND HEALTH COSTS,** WE ARE WORKING TO DECREASE THE AMOUNT OF TIME THAT WOMEN SPEND ON **UNPAID** DOMESTIC AND CARE WORK.

WE BELIEVE **CLIMATE ACTION** AND **WOMEN'S EMPOWERMENT** GO HAND IN HAND.

CONTROLLED COOKING TEST: A CASE STUDY

COMBUSTION CHAMBER REPAIRS

QUANTIFYING THE ENVIRONMENTAL BENEFITS

We've seen it in practice. Beneficiaries report lower wood consumption after we repair old, damaged combustion chambers. But we were curious – how inefficient are damaged cookstoves? We wanted to quantify the benefits of a repair. The methodology most cookstove projects use to quantify net GHG emission reductions contains provisions for *energy efficiency enhancements in existing biomass-fired devices*, which is an upgrade. Moreover, the Clean Cooking Alliance* has a procedure, the controlled cooking test (CCT), which research from the Universidad Michoacana de San Nicolás de Hidalgo and the University of California, Irvine, recommends as particularly apt for field-based experiments. The CCT determines the Specific Fuel Consumption (a simple ratio of fuel to food prepared) of a repaired stove. Measurements of the amount of wood consumed, ash left over, and weight of the food prepared all go into a formula, and the protocol mandates the same cook prepares a traditional meal. After the team discussed our options, we settled on the obvious choice: tortillas. Nearly 100% of our beneficiaries are using the ONIL stove to make tortillas daily. What better way to accurately reflect savings in wood consumption?

*A global network of partners to support clean cooking.

SANTIAGO ATITLAN, CANTON CHUK MUK

RESPONSIBLE PARTY

ISABEL QUINILLA

Isa, our Technology Adaptation Specialist (TAS) has expertise as a chef and community nutritionist, making her perfectly equipped to conduct the experiment.

CCT PROTOCOL

3 TRIALS ON 3 DIFFERENT DEVICES, BEFORE AND AFTER THE UPGRADE

This meant three rounds of cooking 20 tortillas on an old damaged stove, and then the same process post-repair. The grand total: 360 tortillas cooked across three different sites.

RESULTS

590.6 GRAMS OF COOKED TORTILLAS PER KG OF WOOD FUEL

In the first year, transitioning from a broken stove to a repaired one will avoid 2.416 tonnes of CO2 from being released into the atmosphere. For comparison, the transition between an open-fire and a new stove will save 3.105 tonnes of CO2. Upgraded stoves avoid 78% of the CO2 that a new stove would, for less than one tenth of the price.

4,972.58 T CO_2E

In Emission Reductions

Given we complete nearly 100 repairs annually, this means TRL will sequester an additional 4,972.58 tonnes CO2 over the next 7 years.

SANTIAGO ATITLAN, CANTON CHU'UL

A YEAR IN REVIEW

2019

FEBRUARY

A $40,000 unrestricted donation is made to TRL through Greater Good to benefit the ONIL Stove Project.

MARCH

Seattle International Foundation (SIF) begins a coordinated partnership enabling TRL to use SIF as a fiscal agent, expanding institutional funding access.

JUNE

TRL moves into a new office space in the center of town, and the TRL team is doubled in size with additions to the Outreach and Program Development Teams.

OCTOBER

TRL receives an in-kind donation of 100 LED light bulbs and completes its first installation, marking the commencement of Brighter Futures, TRL's 3rd project.

DECEMBER

$11,382 is crowd-funded during TRL's End-of-year Campaign, securing a permanent partnership with Global Giving and enabling them to attract additional donors.

FINANCIAL OVERVIEW

TRL strives to be both transparent and effective in the management of the Association's finances. For every dollar of revenue and support, we minimize overhead and administrative costs and maximize direct project costs. This way, we ensure that services to our beneficiaries constitute the majority of our expenses.

This year, TRL began preparations for a financial audit of FY 2019. Contracting Servicios Contables Galindo, TRL will undergo an independent audit, to be completed early 2020.

FINANCIAL SUMMARY

REVENUE

Grants from Greater Good	Q 299,850
Grants from Global Giving	Q 105,990
ICS Project Income	Q 26,600
	Q 432,440

EXPENSES

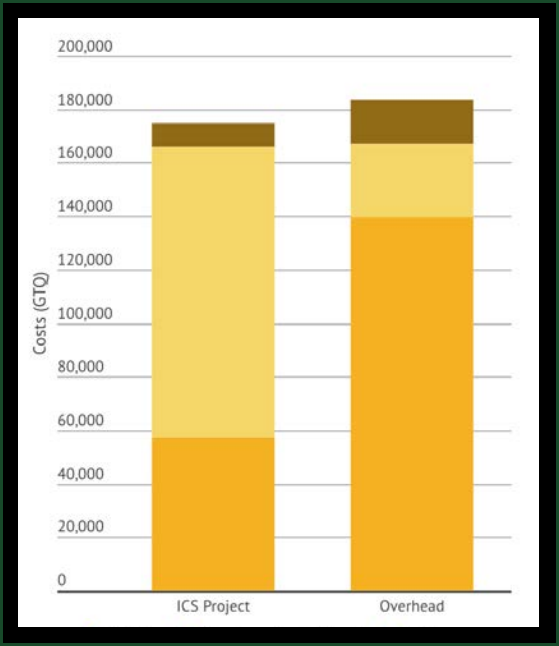
Improved Cookstove Project	
Salaries	Q 57,150
Equipment and Materials	Q 108,995
Other	Q 8,800
Administrative Costs	Q 43,561
Other Personnel*	Q 139,800
	Q 358,306

Our Outreach Team spends nearly 100% of its time in the field, installing and maintaining stoves and educating beneficiaries. For this reason, we categorize personnel costs for the Outreach Team under the Direct Costs of the ICS Project.

** Other personnel* include the Administrator and the Princeton in Latin America Fellow.

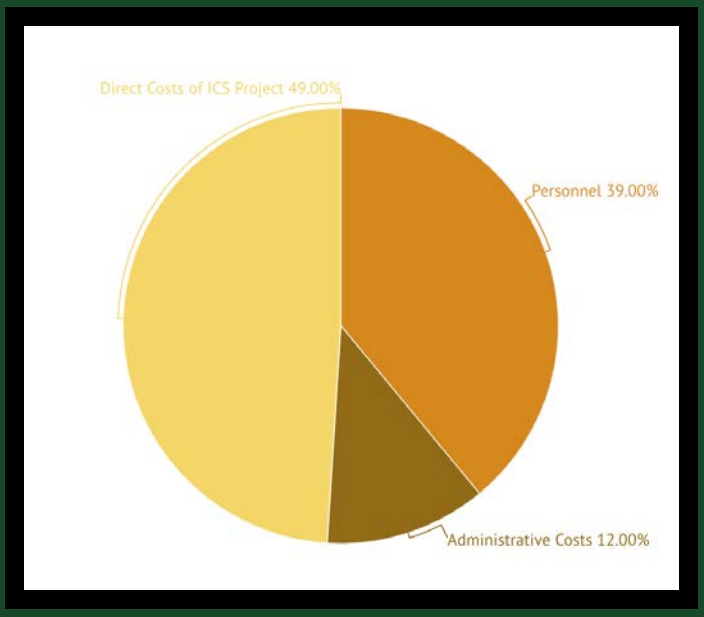
EXPENSES BY BUDGET CATEGORY

EXPENSES FY 2019



- SALARIES
- EQUIPMENT AND MATERIALS
- OTHER

EXPENSES FY 2019



- DIRECT COSTS OF THE ICS PROJECT
- ADMINISTRATIVE COSTS
- OTHER PERSONNEL

2020 Projected & Prospective Funds

GlobalGiving

$11,382.28

CROWD FUNDED THROUGH GLOBAL GIVING, TRL'S NEW ONLINE DONATION PLATFORM DURING THE END-OF-YEAR CAMPAIGN

VERRA

12,868 tCO2e

IN GHG EMISSION REDUCTIONS TO BE SOLD IN THE VOLUNTARY CARBON MARKET OVER THE NEXT 7 YEARS

Financial Strategy

To establish a sustainable future funding stream and diversify funding sources, TRL's 2019 development strategy was three-fold.

1) Apply to foundations for funding in the form of grants
2) Increase communications with the current TRL network and conduct TRL's first ever end-of-year crowdfunding campaign.
3) Undergo two rigorous external certifications to enter the voluntary carbon market, securing long-term sustainable financing for the ICS Project.

FUTURE PLANS

TRL'S 2020 VISION

TRL is seeking funding for two additional projects. One is a pilot project to bring sustainable, at-the-source sanitation to Santiago Atitlán in the form of biogas digesters connected to toilets. With the construction of a fixed dome biogas system, the project goals are to improve sanitation, reduce fecal matter contamination, and reduce poverty through biogas bi-products. These include gas that can be used for cooking (further reducing demand for wood fuel) and agricultural fertilizer. Our vision for the biogas digester model is to serve as a scalable, sustainable solution to confront the problem of fecal matter contamination in Lake Atitlán.

TRL is also seeking funds to expand the environmental education component of our projects. We envision a street-level, multimedia educational program on the ecological state of the lake for Tz'utujil Maya-speaking communities, as well as an introduction to sustainable solutions to empower community members to be agents of environmental action.

Contact us to learn more about how your contribution can help us turn these plans into reality.

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