

# The Justa Cookstove Turns 20: Lessons Learned, and the Future in Honduras and Beyond



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Our Mission: To improve people's lives by helping communities protect, conserve, and manage the natural resources on which their long-term well-being depends

# Outline



**Part One: A Brief History of the Justa Stove 1999-2019**



**Part Two: 2014-2018  
Community-engaged  
Research in Honduras**



**Part Three: The Future of the Justa Stove**



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# Part One: Justa Stove 1999 -2019







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**Aprovecho  
Research Center**



## Participatory Design

**Designed for rural cooking  
customs in Honduras**

- Local materials and labor and co-investment
- Griddle cookstove with chimney
- “Rocket” Combustion Chamber
- Built-in cookstove
- Manufactured technical components



Photo by Joanna Pinneo, National Geographic



## Justa Stove Accomplishments:

~250,000 - 300,000 constructed in Honduras since 1999

**High adoption rates (80%++)**

Meets WHO Interim Targets for indoor air quality, and in certain cases the Air Quality Guideline

Reduces approximately 10 - 12MT of CO<sub>2</sub>e during 5 yr useful life

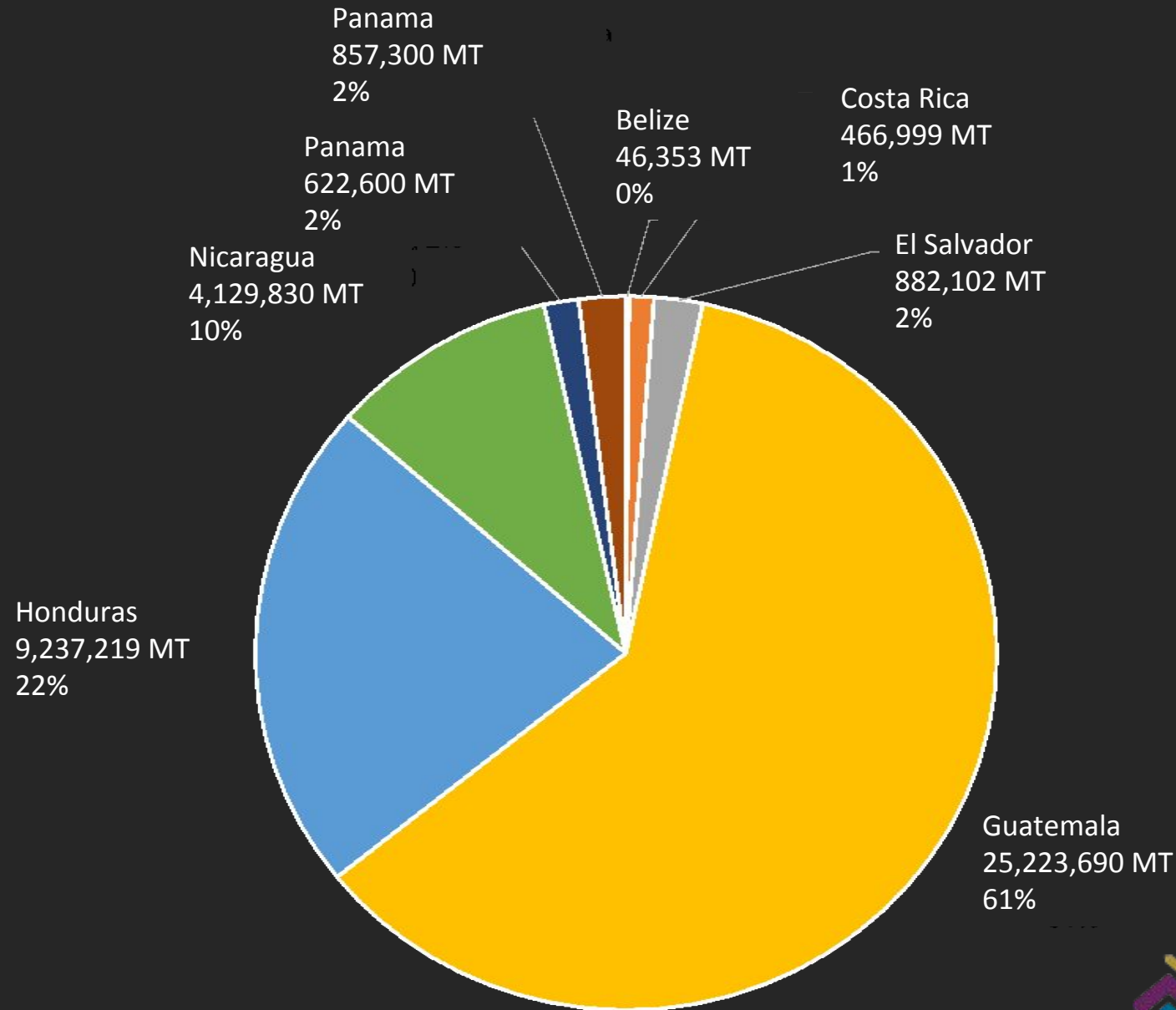


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# Metric Tons of Firewood Consumed by Country and % of Regional Consumption

93% is consumed in Nicaragua, Honduras, and Guatemala

1 MT = 2,200 lbs



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# Part Two: Community-engaged Research 2015-2019



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Colorado  
State  
University



# Can the Justa cookstove substantially reduce HAP, and contribute to a change in health compared to traditional stoves?



# Can the Justa cookstove substantially reduce HAP, and contribute to a change in health compared to traditional stoves?

## 24-hour air pollution measures x 6 visits



**Kitchen:**  
PM<sub>2.5</sub>, ultra fine PM  
Black carbon  
Carbon monoxide  
Temp and humidity  
Stove temp



**Personal:**  
PM<sub>2.5</sub>  
Black carbon  
Carbon monoxide  
Physical activity



# TWP's Cookstoves Meet WHO Air Quality Guidelines

WHO 24-hr Recommendations	PM <sub>2.5</sub> ( $\mu\text{g} / \text{m}^3$ )	Personal Measure n=191	Kitchen Measure n=190
Interim Target (IT-1)	75	152 (80%)	128 (67%)
Interim Target (IT-2)	50	131 (69%)	101 (53%)
Interim Target (IT-3)	37.5	109 (57%)	79 (42%)
AQG	25	75 (39%)	52 (27%)

UN WHO  
Air Quality  
Guidelines  
(AQG)

NIH + Colorado  
State University  
2015 – 2019

La Esperanza,  
Honduras



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7 peer-reviewed articles  
so far:

-The Justa stove meets  
WHO Air Quality  
Guidelines!

High levels of HAP  
associated with  
HIGHER PREVALENCE  
OF:

- Diabetes
- Elevated Blood Pressure
- Metabolic Syndrome



7 peer-reviewed articles so far:

-One of the few biomass stoves to have both high adoption and meet AQG

-Women over 40 could particularly reduce their cardiovascular disease risk by switching to the Justa stove

The collage features the following articles:

- Exposure to household air pollution and blood pressure: a cross-sectional study** by Megan L. Benka-Coker, Annette M. Bachand, Steve J. Reynolds, and Kirsten Koehler.
- Household air pollution and cardiovascular disease: a cross-sectional study** by Sarah Rajkumar, Annette M. Bachand, Christian L'Orange, and Anibal B. Osorio.
- Measuring personal exposure to household air pollution using a personal sampler (UPAS)** by Ajay Pillarisetti, Jennifer L. Peel, Michael J. Griffin, and Ellison C. Gerber.
- Exposure to household air pollution and blood pressure among women in rural Honduras** by S. Rajkumar, R. D. Brook, N. Good, M. L. Clark, B. N. Young, T. L. Nelson, J. Volkens, S. J. Reynolds, A. B. Osorio, A. M. Bachand, C. L'Orange, and J. L. Peel.
- Exposure to household air pollution and blood pressure among women in rural Honduras: a cross-sectional study** by Bonnie N. Young, Megan L. Benka-Coker, Tracy L. Nelson, Christian L'Orange, and Anibal B. Osorio.
- Exposure to household air pollution and blood pressure among women in rural Honduras: a cross-sectional study** by Ethan S. Walter, L. Benka-Coker, S. J. Reynolds, and B. Osorio.
- Exposure to household air pollution and blood pressure among women in rural Honduras: a cross-sectional study** by Jennifer L. Peel, Annette M. Bachand, Steve J. Reynolds, and Kirsten Koehler.

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**Part Three: Now  
What?  
The Future of The  
Justa Stove**



# Familias pobres de Comayagua reciben Eco-fogones de “Vida Mejor”

Prensa Oficial La Primera Dama 15 August 2017



- **Failed Honduran Govt Cookstove Intervention:**
  - Distribution of ~250,000 Envirofit cookstoves in 5 years
  - Very low rates of adoption (5-10% or less)
  - Cookstoves don't meet user's needs
  - Not enough training and monitoring
  - Paternalistic project
  - Population's lack of trust in cookstoves projects

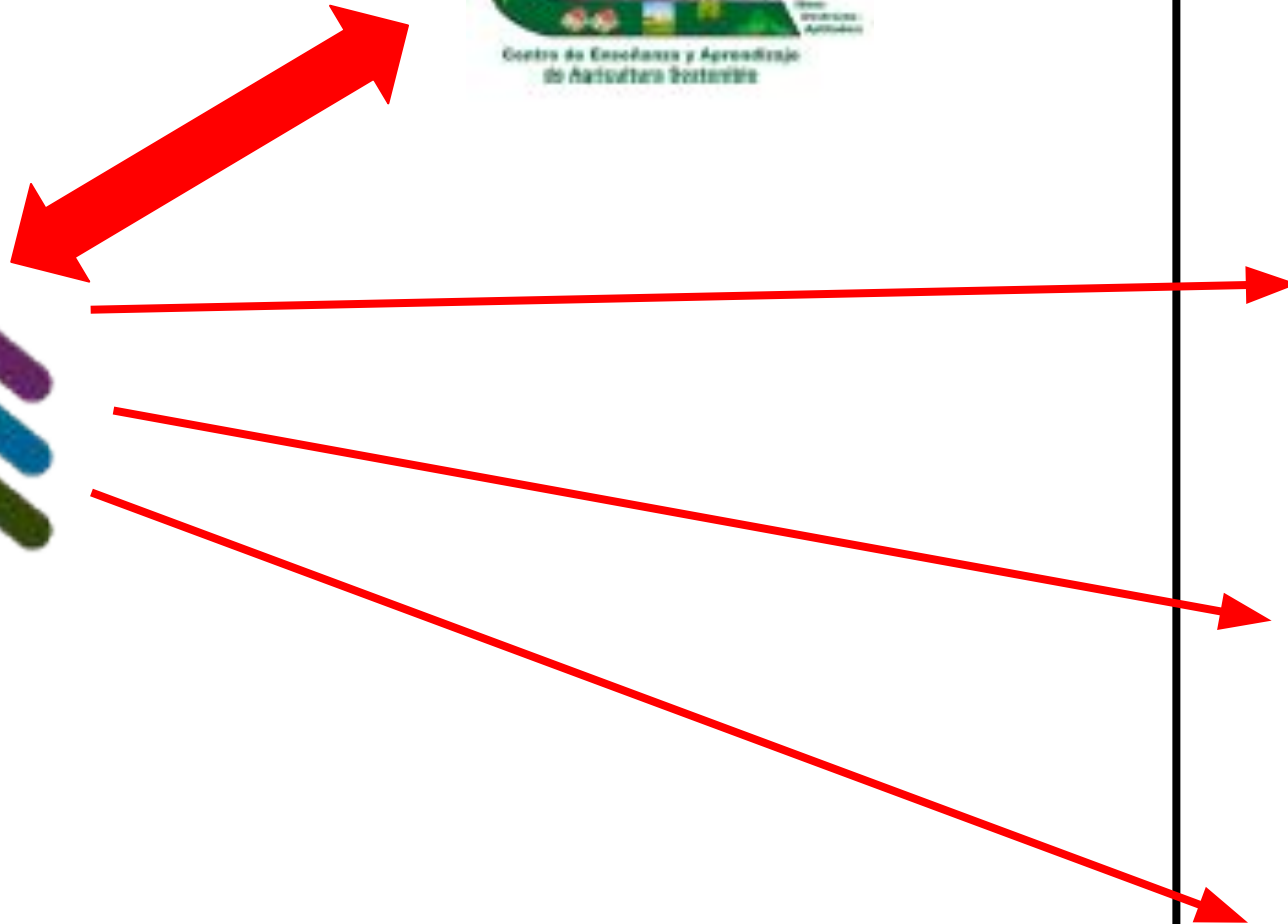


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**MAESTROS FOGONEROS PROGRAM**



# AHDESA (Honduran Association for Development): TWP in Honduras



- **1999:** AHDESA creates the Justa stove, TWP co-funding cookstoves since then
  - ~80,000 stoves installed in 20 years
  - AHDESA - “Proyecto Mirador” (2004-2020), 185,000 cookstoves installed.
- **2020:** AHDESA becomes part of “Maestros Fogoneros” project



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# CEASO (Center for Education in Sustainable Agriculture): TWP in Honduras

- TWP partners with CEASO in 2016 “Resilient families and forests: An experience in the Montecillos Reserve”.
- 636 cookstoves built in 2.5 years in 24 communities, 90% adoption
- Holistic model: Agroforestry and nutrition training, gardens, tree nurseries, ferrocement water catchment cisterns
- 2 MF included in our program



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# Maestros Fogoneros: Rural Employment in the Honduras Stove Sector

- 125 Builders Certified through IADB Project 2018 - 2019
- TWP employing 35 - 50 Maestros Fogoneros in 2020
- Intensively trained to build Justa Stove - designed by TWP, AHDESA & Aprovecho in 1999
- Certified by National Autonomous University of Honduras (UNAH) and National University of Forestry Sciences (UNACIFOR)
- Almost ½ of builders are women - all are entrepreneurs



# Maestros Fogoneros: Rural Employment in the Honduras Stove Sector

- Business planning workshop with TWP Jan 2020
- Refining 3 Business Models:
  - Independent sale of services
  - Contract work with large projects (200+ units)
  - Sale of replacement parts & refurbishment
- “Seed Capital” provided, 15 Justa stove kits each
- Direct partnership with 3 Honduran entities:
  - AHDESA - 20 year TWP partner
  - Ecofogón - 15 year TWP partner
  - Fundación Vida - IADB grantee, new TWP partner



# Conclusion

1. Migration out of Honduras and C.A. is increasing
2. Key moment in time to invest in a rural, sustainable business model with proven solution - the *Justa*
3. Let's reflect: Why was the Justa stove a success? No need to recreate the wheel!
4. Must approach cookstove programs with a holistic, community-based model (with SCALE)



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