WISIONS Webinar Series| Webinar 3 | 28.05.2018

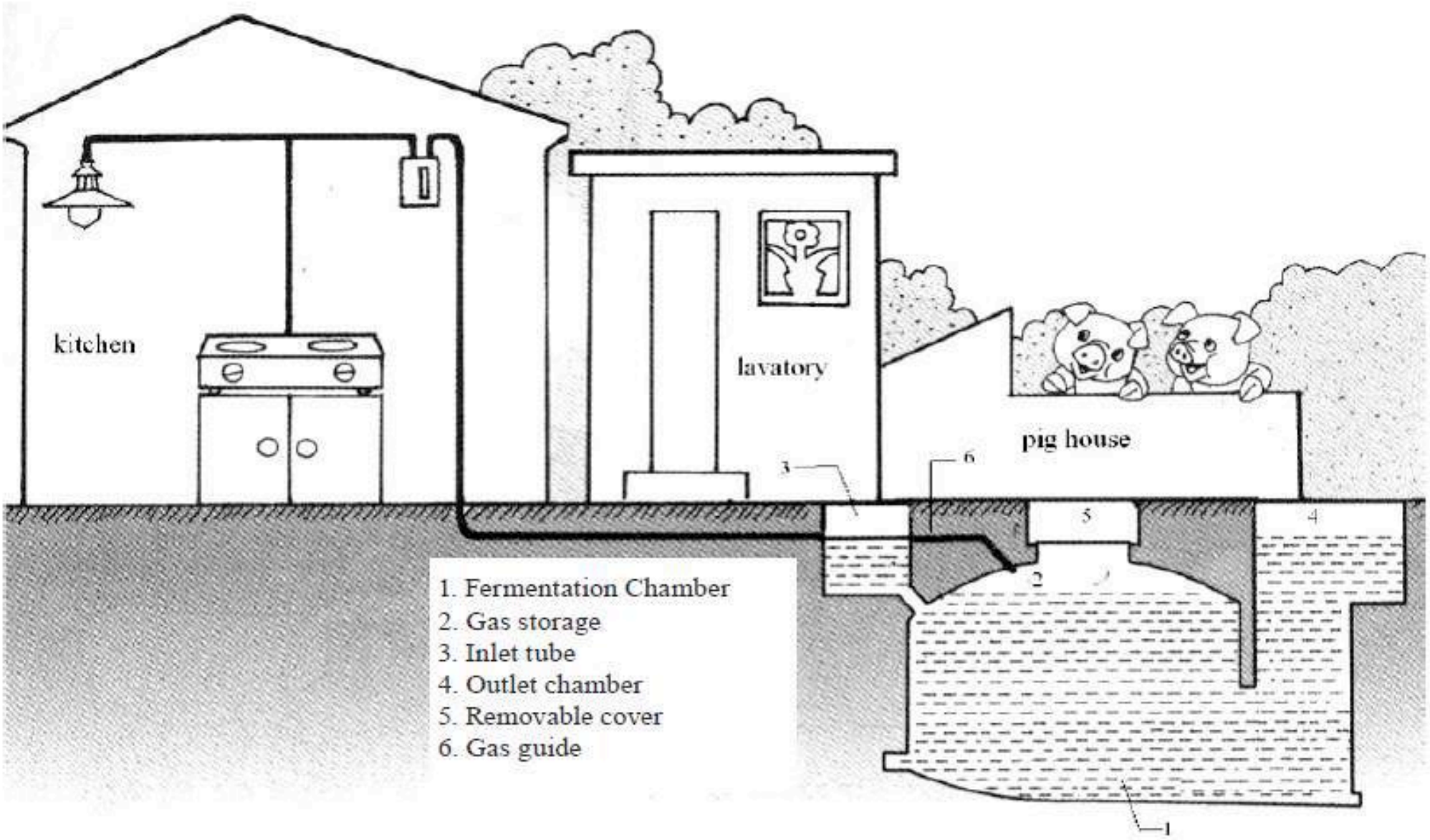
Beyond Cooking: Biodigesters for Family Farming in the Global South

Moderator: Molly Hurley Depret

Panelists:

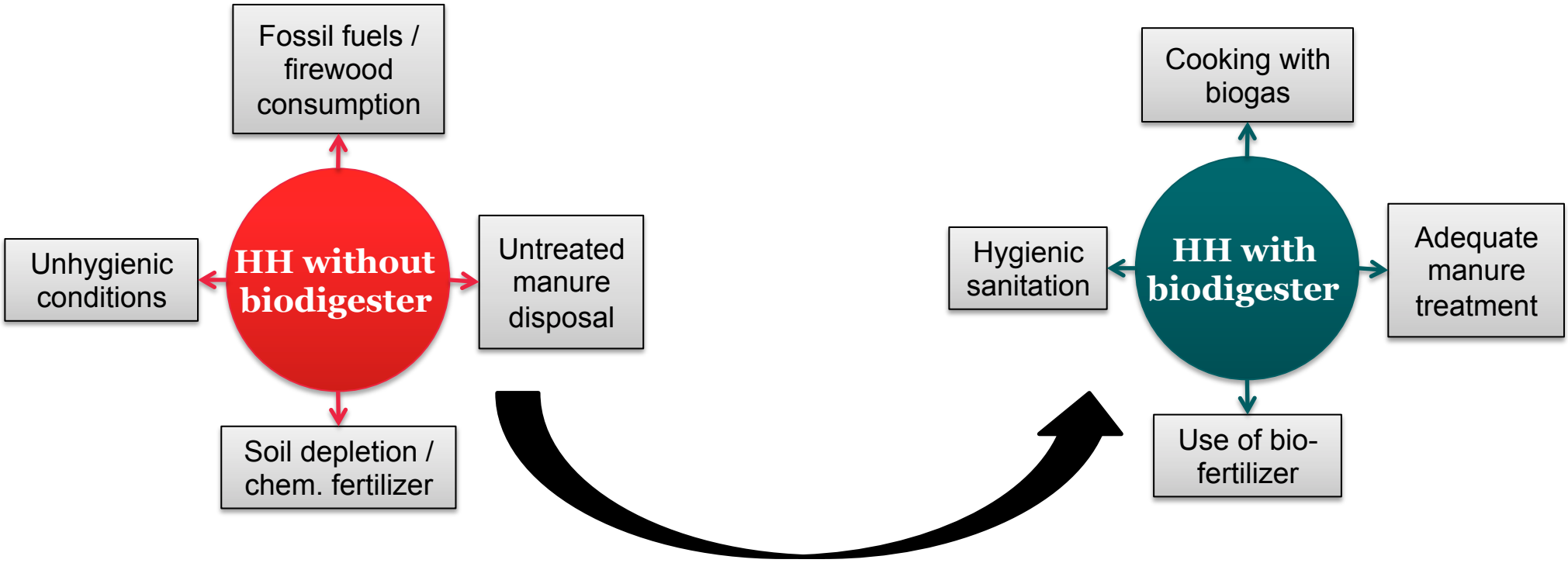
- **Willington Ortiz,** WISIONS / Wuppertal Institute
- **Lylian Rodriguez,** RedBioCol
- **Alex Eaton,** Founder of SistemaBio
- **Kevin Kinusu,** Kenya Biogas Program

Biodigesters in the Global South
vibrant innovation story across time and space



Three underground biogas digesters (http://www.climatetechwiki.org)

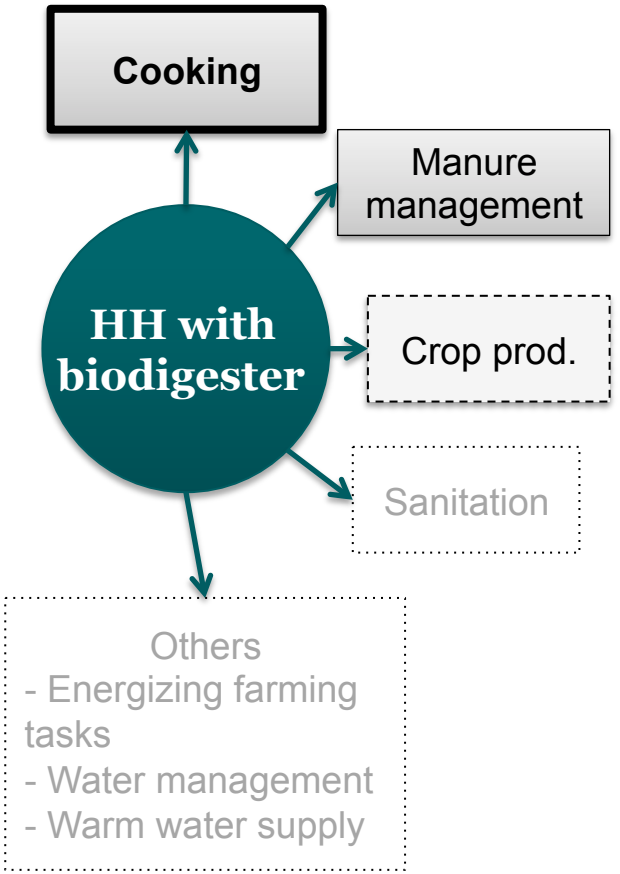
Why promoting biodigesters adoption/diffusion? … and how?



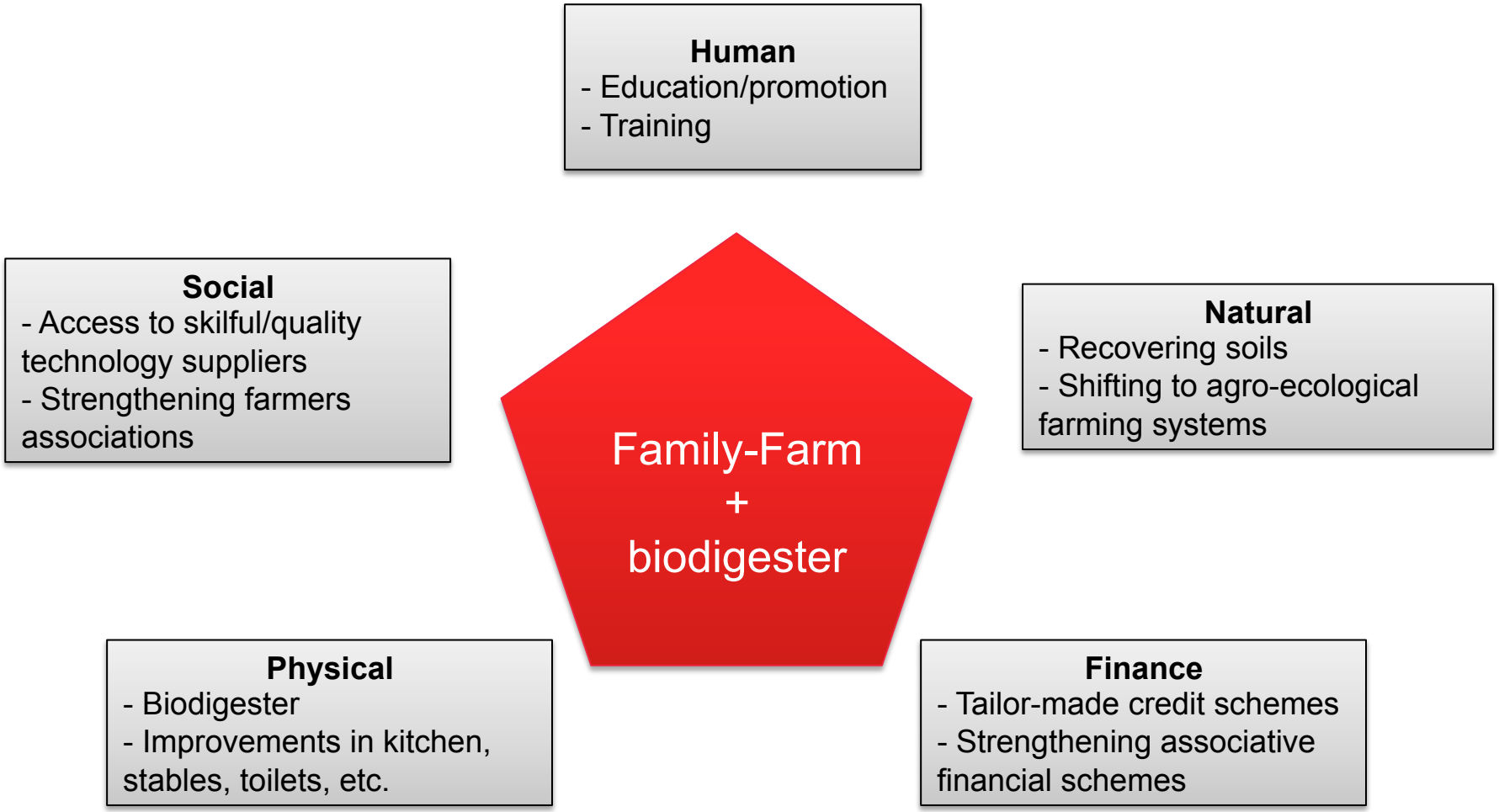
Journal article:
Ortiz, Terrapon-Pfaff & Dienst, (2017): Understanding the diffusion of domestic biogas technologies. Systematic conceptualisation of existing evidence from developing and emerging countries. Renew Sust Energ Rev 74.
http://dx.doi.org/10.1016/j.rser.2016.11.090

Harnessing potential benefits beyond cooking still challenging

- Focus on energy for cooking predominates
- Scarce evidence on the actual use of effluents as bio-fertilizer
  - Need for contextualized knowledge
- Very little evidence on the application for sanitation
  - Need for cultural sensitive strategies of promotion
- Marginal information on other uses of biogas
  - Small-scale biogas-based appliances (e.g. boilers, pumps, engines, heat radiators, etc.)



Promotion of biodigesters as mean for strengthening livelihoods of family farmers



willington.ortiz@wupperinst.org

Thanks!

More information about WISIONS and our research under:

www.wisions.net
and
www.wupperinst.org

"Beyond cooking: Biodigesters for Family Farming in the Global South“

Lylian Rodríguez Jiménez

May 28th 2018

Tosoly

Semilla de Vida

University for Tropical Agriculture 1996 Vietnam, 1999 Camboya

Tosoly Semilla de Vida

UTA Fundación para la Producción Agropecuaria Sostenible Tropical

Colombia 2002-2003

RedBioLAC Red de Biodigestores para Latino América y el Caribe

2012

RedBioCol Red Colombiana de Energia de la Biomasa

Tosoly is a farm with social projection

www.utafoundation.org

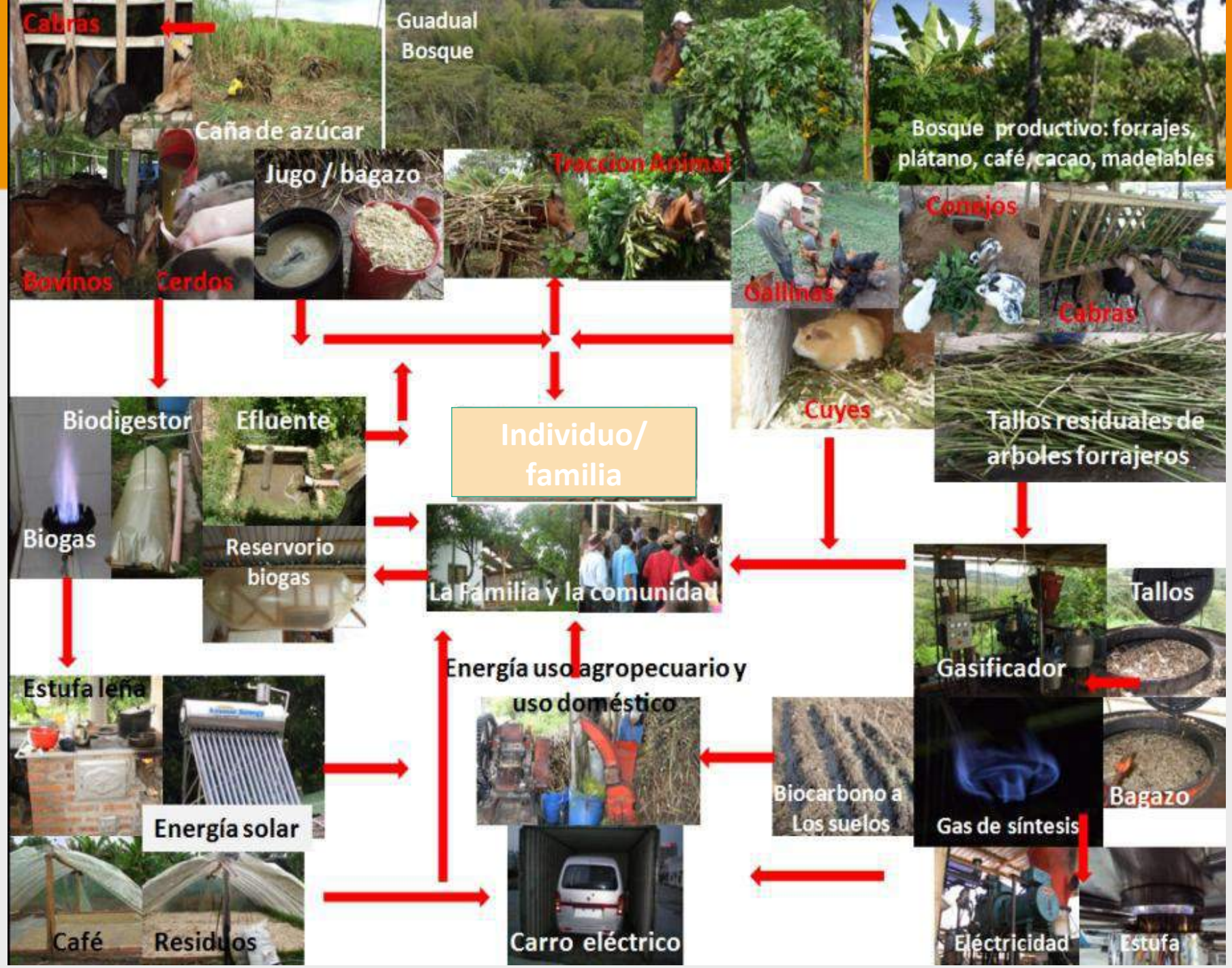
- ✓ Tosoly is a farm in Colombia with a comprehensive and coherent proposal
- ✓ Food and energy sovereignty: as a key for development
- ✓ Integration of animal and agriculture production
- ✓ Valuing the residues

The challenge: Respond locally to global problems:

- ✓Global warming
- ✓the rapid decrease of fossil resources as an energy source
- ✓the reduction of phosphorus sources.
- ✓the conflict
- ✓soil and water pollution
- ✓The lack of awareness of producers and consumers

The challenge: Respond locally to global problems:

- ✓The minero-energetic Colombian model (hydroelectric, oil)
- ✓The education model (recycling and renewable energy is left out of the curricula)
- ✓Monoculture production dependent on agro toxics


Cabras
Caña de azúcar
Guadual
Bosque
Bosque productivo: forrajes, plátano, café, cacao, madelables
Jugo / bagazo
Traccion Animal
Bovinos
Cerdos
Gallinas
Conejos
Cabras
Cuyes
Tallos residuales de arboles forrajeros
Biodigestor
Efluente
Biogas
Reservorio biogas
Individuo/ familia
La familia y la comunidad
Tallos
Gasificador
Energía uso agropecuario y uso doméstico
Estufa leña
Energía solar
Biocarbono a Los suelos
Gas de síntesis
Bagazo
Café
Residuos
Carro eléctrico
Eléctricidad
Estufa

7. Integrated farming systems: food – feed and energy without conflict

- Biogas (CH4) for cooking

- People involvement at all levels

- Effluent (High quality fertilicer

Lylian R, Finca TOSOLY 2018

Biodigester is a tool, a start point tp integrate the farm, the family and the community

Gas reservoir, CIPAV Foundation, Colombia and innovation of a Colombian farmer in 1989

Plastic biodigesters: allows always the Participation of the community and the Formation of women and men technology promoters!!
Young people always present too.


Plastic biodigesters an alternative
to solve problems with septic tank.
Codigestion with pig manure!


Biodigester as
septic tank,
TOSOLY Santander
16 years working!!

Bigger scale Biodigesters

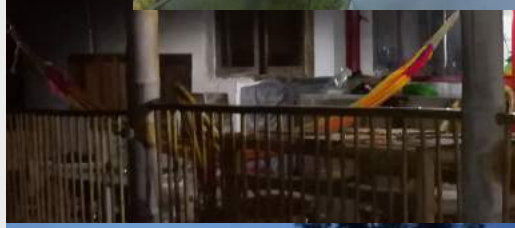
Reserva Natural Pozo Verde, Jamundi, Valle

Biomass gasification: biochar, gas and heat

Use of byproducts (effluent and biochar → improving productivity and soils

Solar panels for lighting a tool of energy soveranigthy





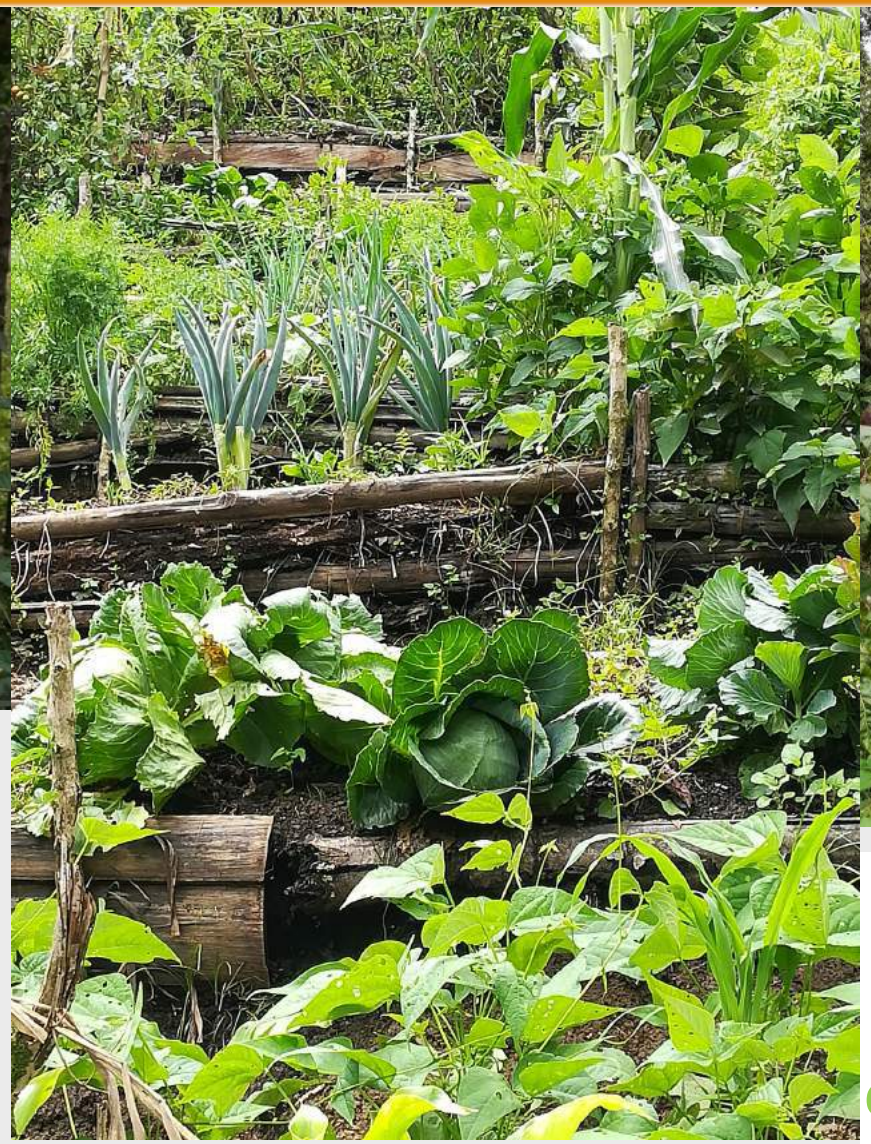
Harvesting water and use of solar pumps to move effluent at the farm

Effluent and biochar for home garden

Community integration - network

Community work: interdisciplinary and intergenerational

Community integration - network



Community work:
effluent for home garden, coffee plantation and all crops

Ways of work

- ✓ Workshops and field days to share knowledge on low cost plastic biogas technology
- ✓ Use of tools of solidarity economy (rotatory funds where one of the credit lines is to set up biodigester or irrigation.

Ways of work

- ✓ Project preparation and funds go to rotatory funds
- ✓ Promoting technology working on:
  - ✓ Advancing in the value chain (transforming products)
  - ✓ the possibility to sell products in just markets (local, regional and national markets.)
- ✓ Confidence stamp ¨RedBioCol¨

Ways of work

- ✓ Project preparation and funds go to rotatory funds
- ✓ Promoting technology thought the possibility to sell products in just markets (local, regional and national markets.)
- ✓ Confidence stamp ¨RedBioCol¨

Biodigesters: more tan cooking

- ✓ Women empowerment
- ✓ Community enpowerment
- ✓ Promotes integration at farm level and community level
- ✓ Development of local tools to promote technology
- ✓ Bottom up development

Thanks!!

Lylian Rodríguez and team
57 3167492341
lylianr@utafoundation.org
tosoly@Gmail.com

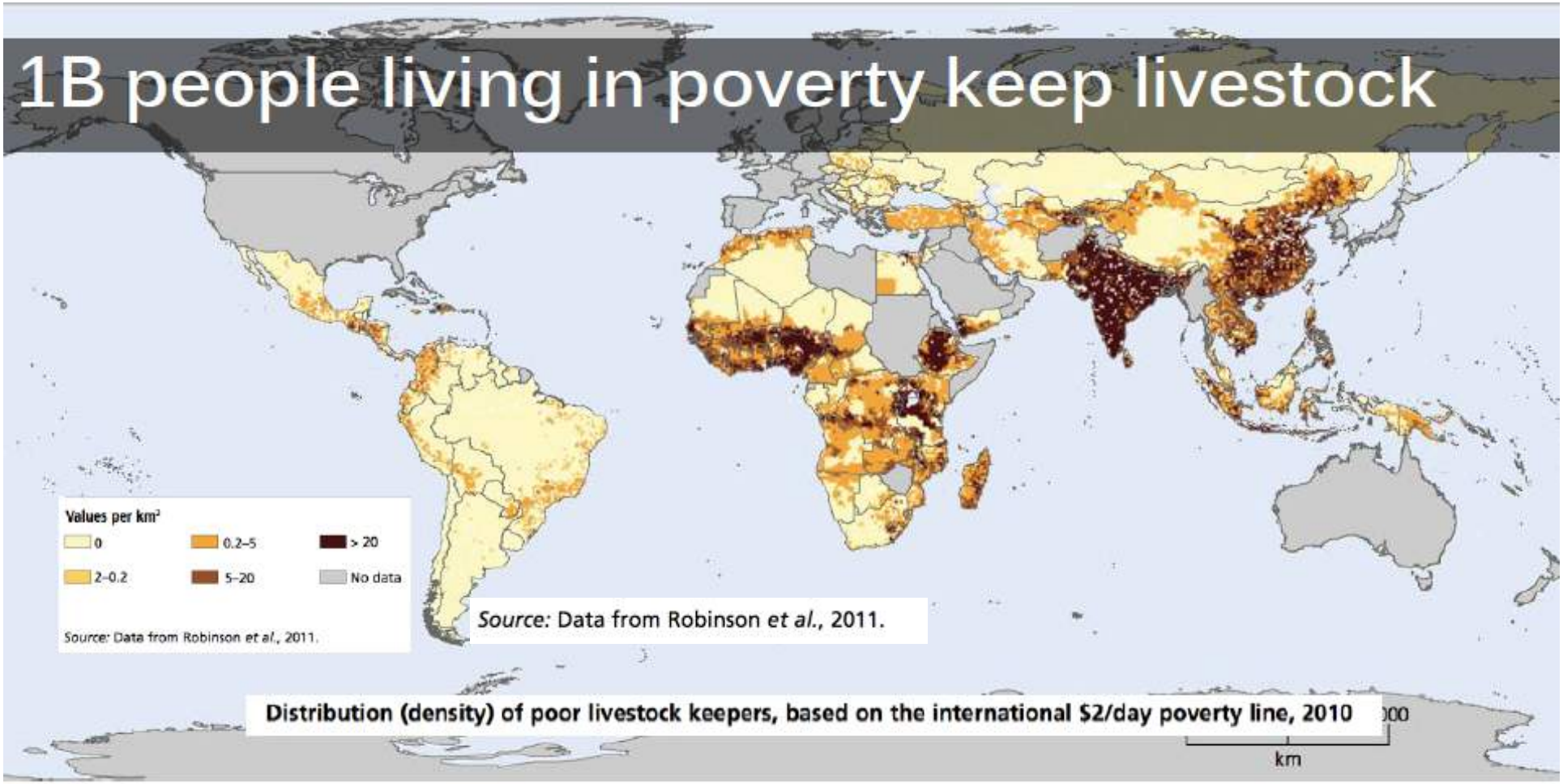
SISTEMA.bio®

CREATING VALUE FROM WASTE

www.sistema.bio


80% of the food we eat is grown by small farmers
Yet they lack access to technology capacity building financing

1B people living in poverty keep livestock



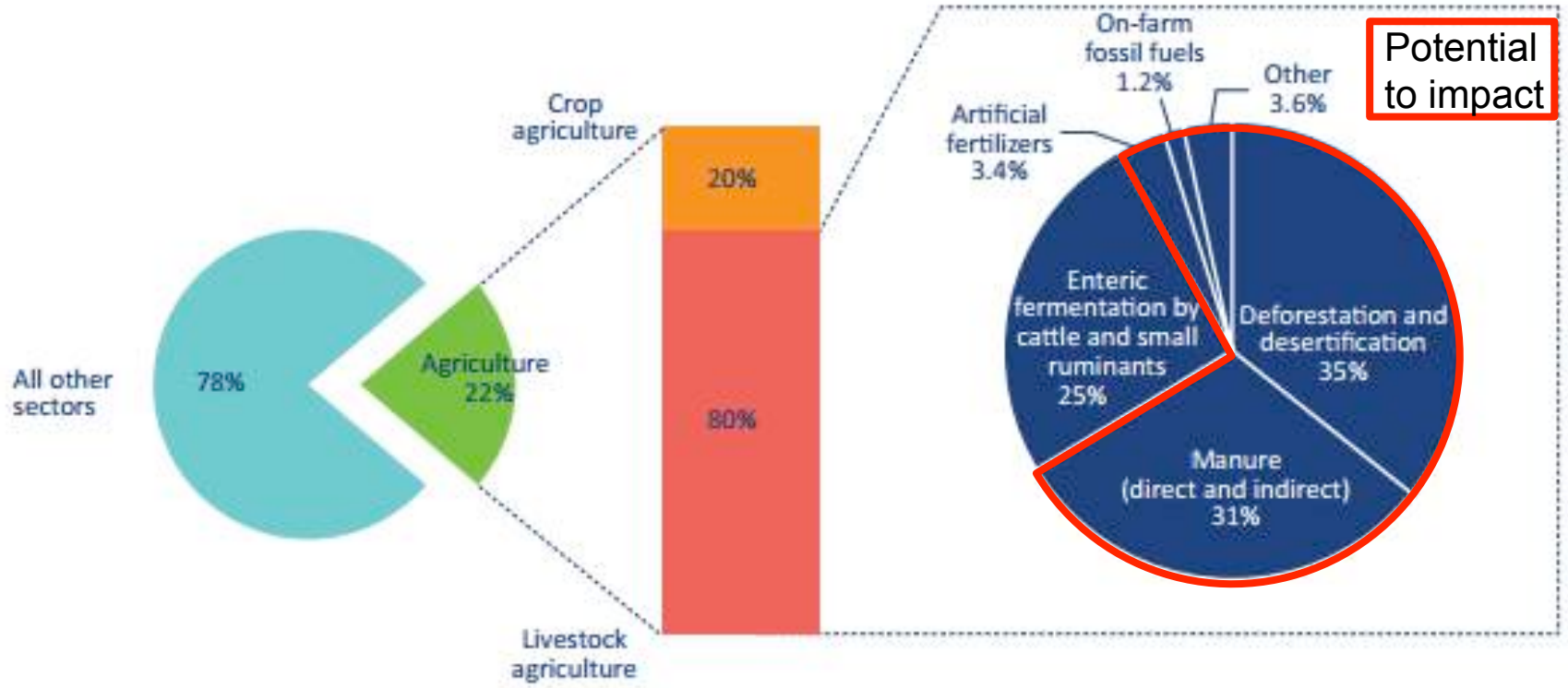
- **400 M total farms (FAO) and 2 billion people could be reached *with enough feedstock for biogas (2 or more cows)***
  - **200 M where 1 billion living with less than <$2 per day**

SISTEMA.bio®
CREATING VALUE FROM WASTE

www.sistema.bio


There is a high
economic, health and environmental cost of waste, energy and agriculture inputs for small farmers
www.sistema.bio

Carbon abatement and sequestration with livestock agricultural systems is a significant short term opportunity

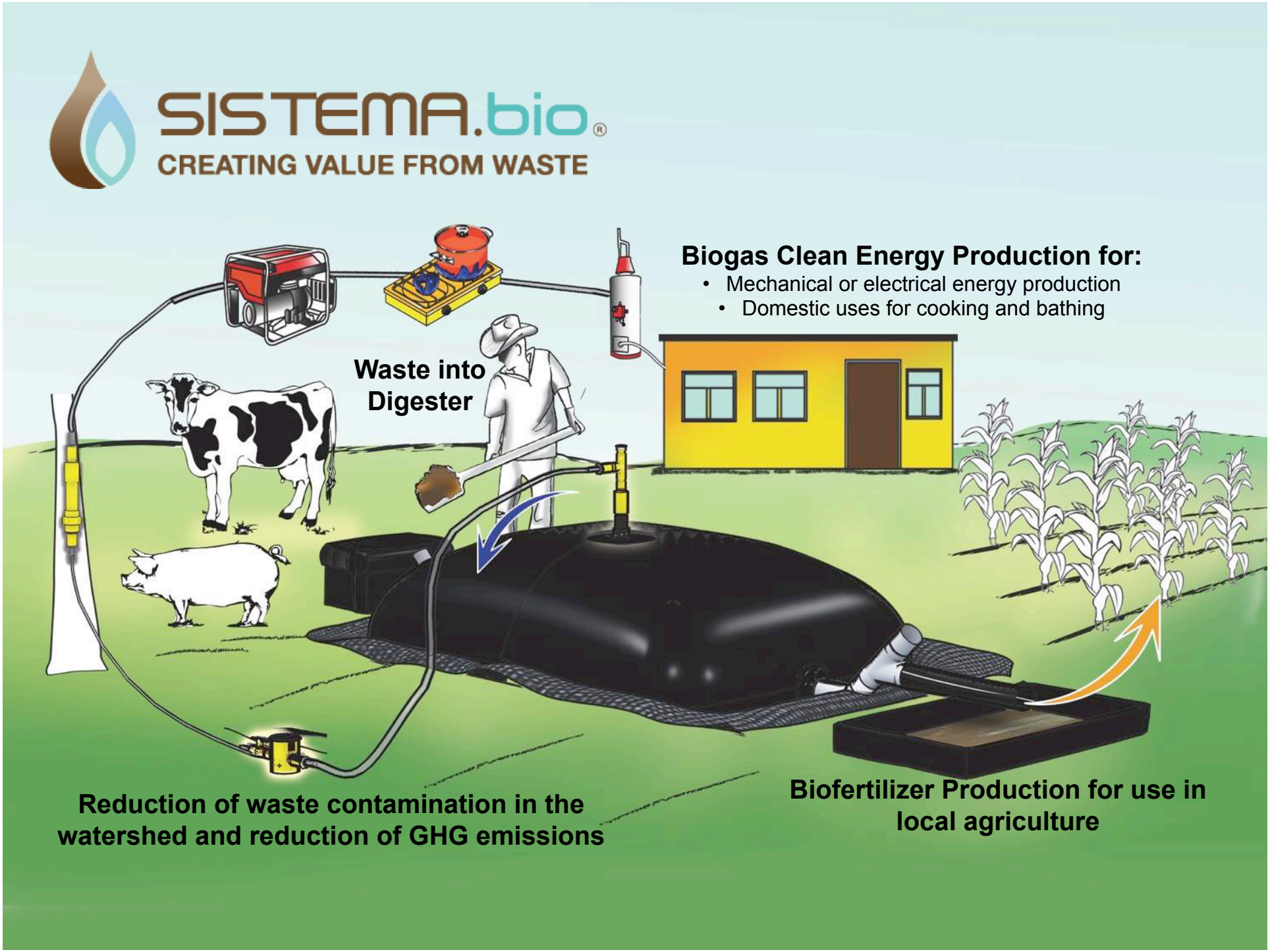


SISTEMA.bio®
CREATING VALUE FROM WASTE

www.sistema.bio

SISTEMA.bio®

CREATING VALUE FROM WASTE



Value Proposition for Farmers




CHALLENGES

-Inappropriate waste management, contamination of rivers and lakes
-Global warming
-Negative health effects

-Use of chemical fertilizers
-Changes in crop cycles

-Increase in energy costs
-Tree cutting and use of wood
-Contamination through smoke inside the house

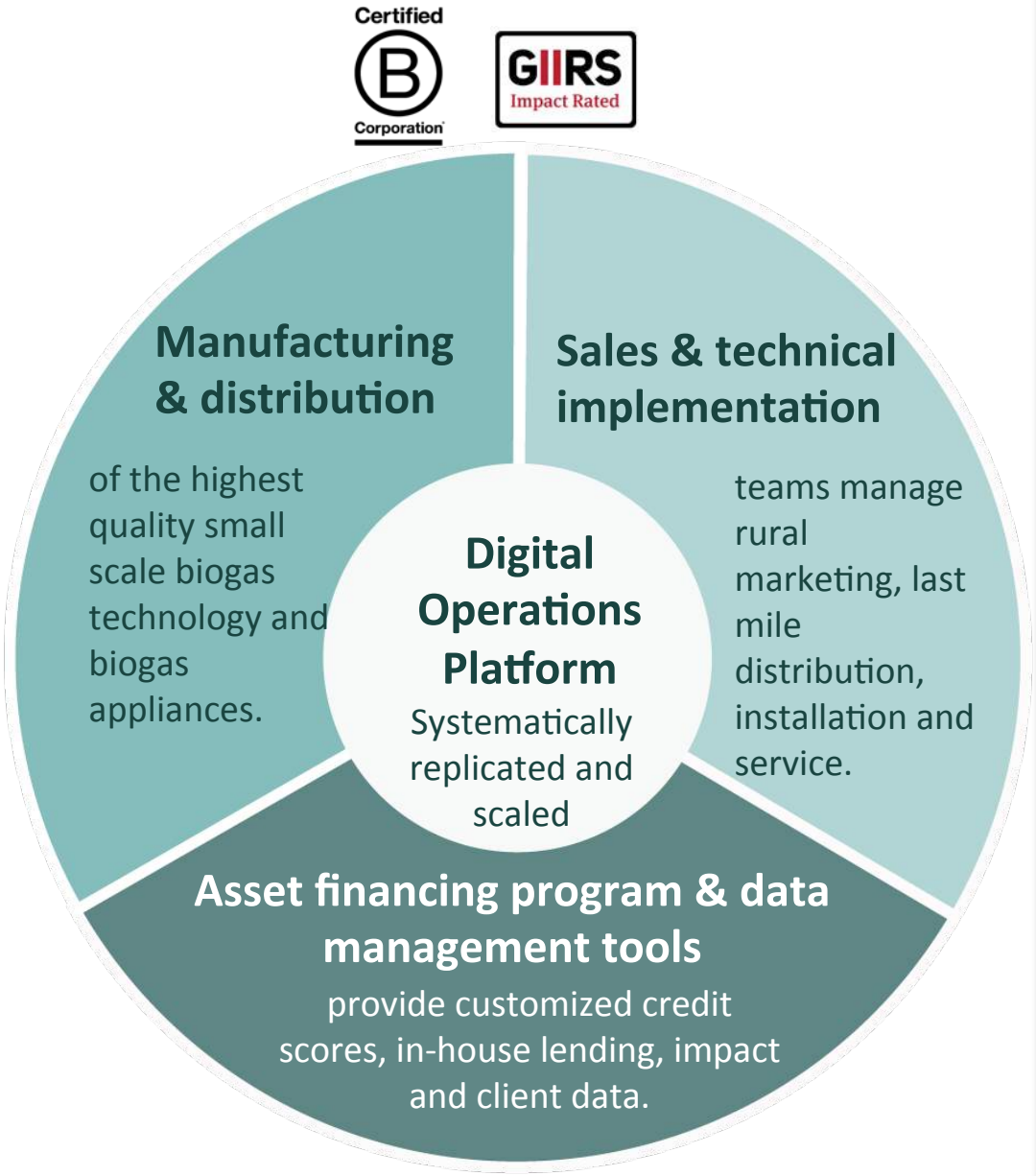
SISTEMA BIOBOLSA SOLUTION

IMPACTS

-Protection of water sources and basins
-Reduction of greenhouse gases
-Reduction of sanitary risks

-Increased productivity in harvest and soil remediation

-Self-generation of renewable energy
-Savings through displacement of fossil fuels and chemical fertilizers
-Protection of forests
-Wood displacement and reduction of respiratory diseases



Sistema.bio technology and business model addresses farmers' challenges

Sistema.bio combines the high quality product with a unique and complete set of services and operations to guarantee the highest value proposition to its customers

Product Characteristics

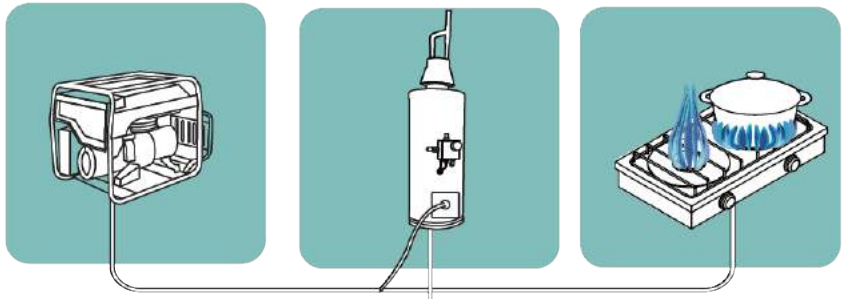
Durable

Easy to install

Modular

Easy maintenance

Diversity of sizes



Biogas uses

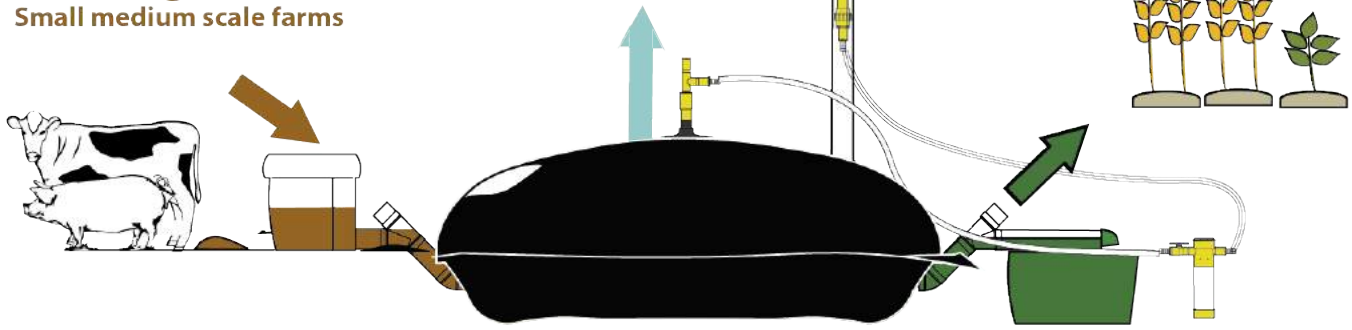
Displaces biomas and fossil fuel

Organic fertilizer

Increases crop yield
Supports healty soil

Recives organic waste

Small medium scale farms



Reduces H2O contamination GHG emmision. Insects and smells

SISTEMA.bio®
CREATING VALUE FROM WASTE

www.sistema.bio

Household Units

SISTEMA.bio®
CREATING VALUE FROM WASTE

www.sistema.bio

SISTEMA.bio®
CREATING VALUE FROM WASTE

www.sistema.bio

Small Farms

Sistema 10

SISTEMA.bio®
CREATING VALUE FROM WASTE

www.sistema.bio

Sistema 80

SISTEMA.bio®
CREATING VALUE FROM WASTE

www.sistema.bio

Productive Scale Units

SISTEMA.bio®
CREATING VALUE FROM WASTE

www.sistema.bio


San Francisco Agrícola
Entrada
Biogas
Salidas
Reactor D.A.
40 m³ fase líquida
12 m³ fase gaseosa
Canaleta
Reja
Trampa de grasas/ Tanque de mezcla
Línea desechos PVC 6"
Manguera y válvula
Cámara de inspección
Tanque desplegable 15,000 litros
Motor 1+2
Estufa biogas


Tubería de alimentación
Tubería de retorno de líquidos
Tablero eléctrico de paro y arranque
Tubería de líquidos con dirección al biodigestor o laguna de oxidación
Tubería alimentación directa

Nicaragua

SISTEMA.bio®
CREATING VALUE FROM WASTE

www.sistema.bio

Biogás Appliances: Thermal Energy

Biogas cookstove

Water heater

Heating with biogas

Heating with biogas

Biogás Appliances: Productive Mechanical and Electrical Generation

Biogas Electrical Generators

Cereal grinder

Corn stripper

Milking machine


HONDA
GX
120

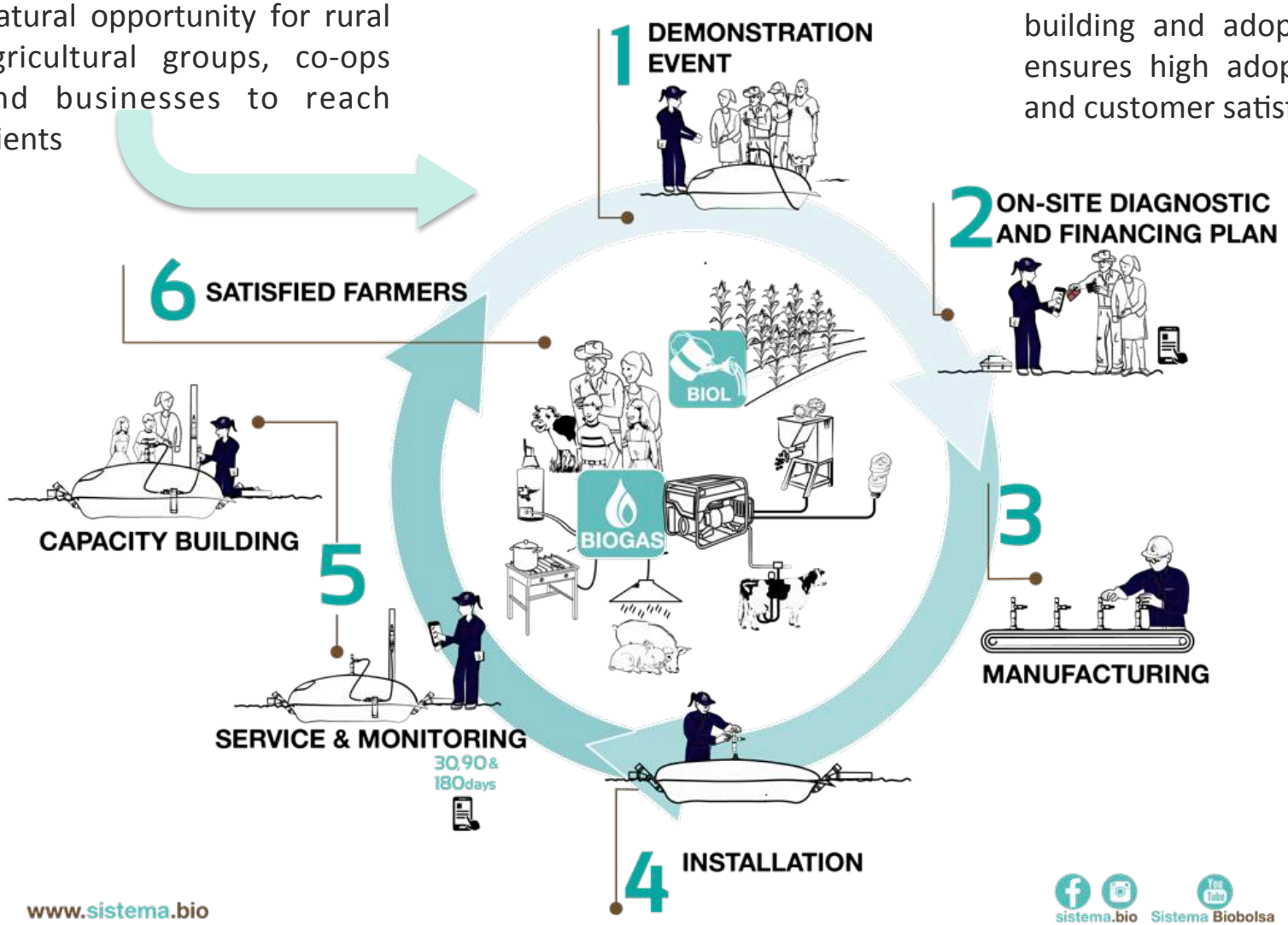
Biofertilizer Application

Sales and Technical Implementation

SISTEMA.bio®
CREATING VALUE FROM WASTE

Natural opportunity for rural agricultural groups, co-ops and businesses to reach clients

We leverage rural social networks and successful early adopters to open new markets. Our capacity building and adoption steps ensures high adoption rates and customer satisfaction.



www.sistema.bio

sistema.bio Sistema Biobolsa

Service and monitoring:

Our field team ensures long term training, service and monitoring that ensures adoption and customer satisfaction, using a clear monitoring methodology, training and user tools.

Asset financing program

In-house credit program

Combination of Kiva and Sistema.bio capital

Integrated data management with our Salesforce platform

Origination

Loan appraisal survey tailored to our clients cash flow and needs

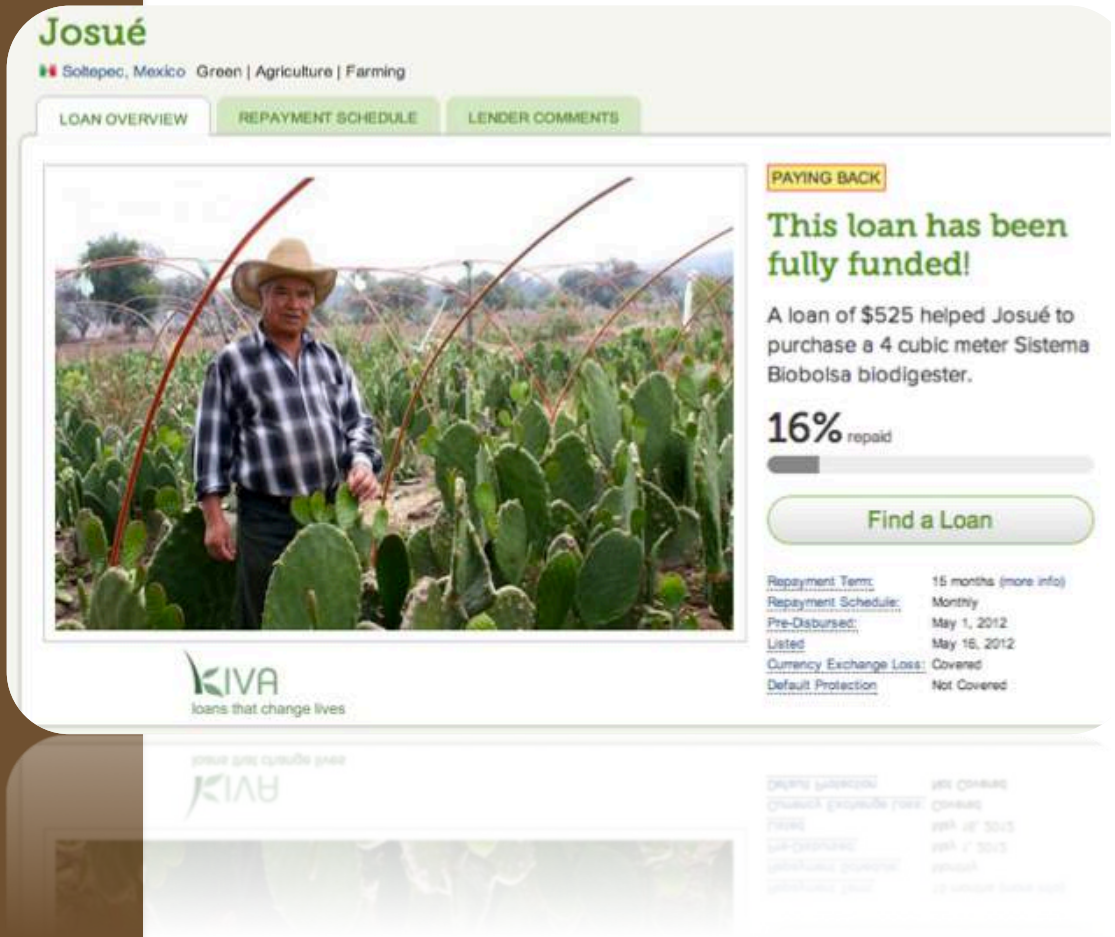
Customized credit score and committee for rural clients

Collections

Integrated payment incentives

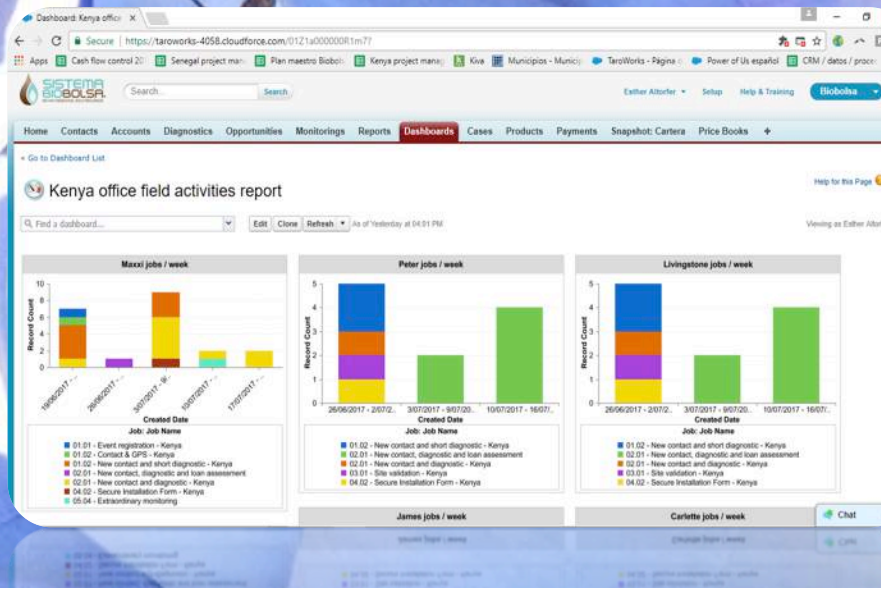
Leveraged field team activities

Variety of payment options through mobile banking



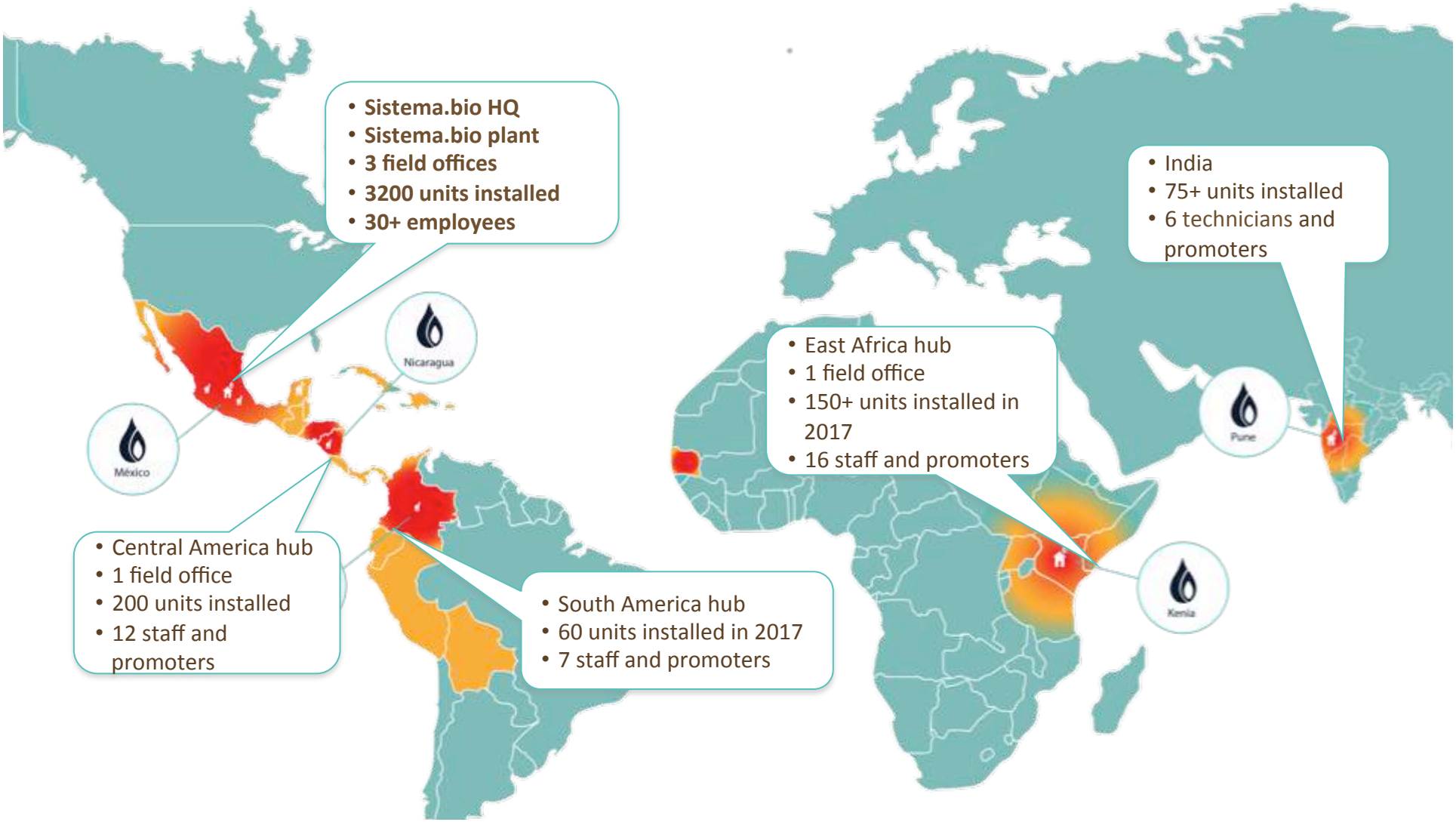
Data management tools

All of our lead generation, sales processes, quality control, service, monitoring and payments are managed on a cloud-based data base that allows our technicians to use smartphones and SMS communications to manage our processes end to end. This allows for better sales results, customer service, data-based decision making and impact tracking.

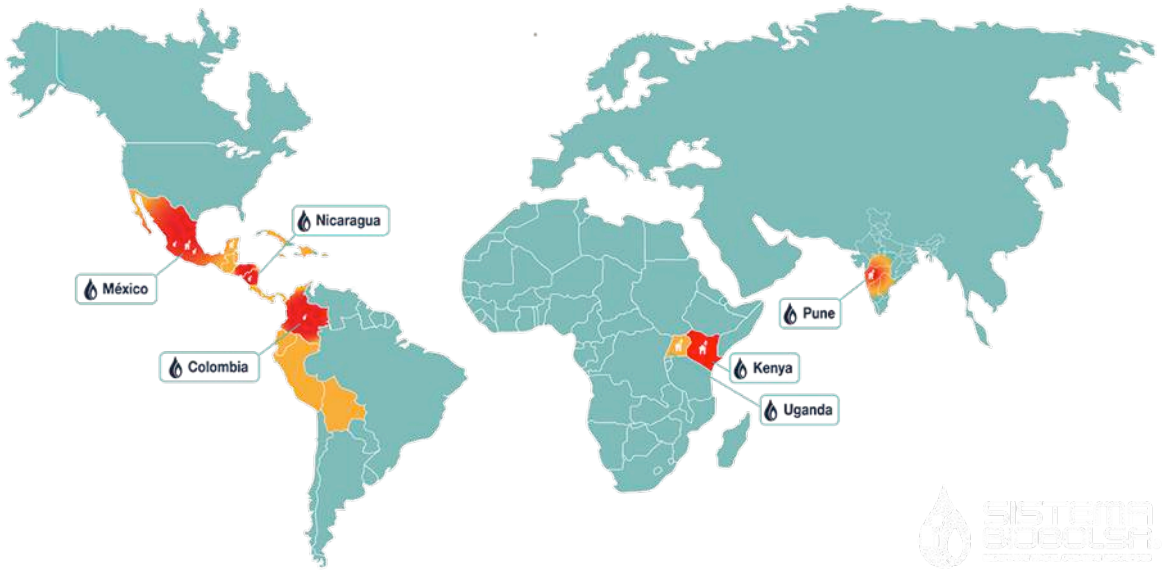


With its current offices, Sistema.bio has access to almost half of the global small farmer biogas market

Sistema.bio has proven the case for scaling and continued international growth with our own team (Mexico, Nicaragua, Colombia and Kenya) and through partnerships (India)



Impact To Date



4,000+
biodigesters intalled

125,000+ ha
fertilized with biol per year

25,000+
people producing clean-renewable energy

19.7 M m3
of biogas produced per year

40,500 ha
of trees saved per year

6.7M ton
of waste treated

85,000+ ton
of CO_2 e mitigated

SISTEMA.bio®
CREATING VALUE FROM WASTE

SISTEMA.bio®
CREATING VALUE FROM WASTE

www.sistema.bio

A committed and passionate team

Engaging every day to deliver impact to change small farmer's life

SISTEMA.bio®
CREATING VALUE FROM WASTE

www.sistema.bio

Worldwide Partnerships

Certified B Corporation

RECHERCHE APPLIQUÉE

INNOVATION

IMPLEMENTATION

GENERATION

ANF

FOMIN
Multilateral Investment Fund
Member of the IDB Group

BID

FACTOR(E) VENTURES

ENGIE
RASSEMBLEURS D'ÉNERGIES

kiva

SNV

The ERM Foundation
Low Carbon Enterprise Fund
Sponsored by ERM

ASHOKA FELLOW

GREATER IMPACT foundation

USAID
UNITED STATES AGENCY INTERNATIONAL DEVELOPMENT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WISIONS of sustainability

FIRCO

GSBI accelerator

UNIVERSITY OF MARYLAND

PROYECTO ESTRATÉGICO PARA LA SEGURIDAD ALIMENTARIA

UNIVERSIDAD EARTH

The Nature Conservancy

CLINTON GLOBAL INITIATIVE

engineers without borders uk

HSBC

UADY
UNIVERSIDAD AUTÓNOMA DE YUCATÁN

UNAM

W.K. KELLOGG FOUNDATION

FAO FIAT PANIS

FIRA

Kenya BIOGAS program
moto safi, mbolea shwari

SEDESOL

INAES
INSTITUTO NACIONAL DE LA ECONOMÍA SOCIAL

Universidad Autónoma CHAPINGO

SEMARNAT

SAGARPA
SECRETARÍA DE AGRICULTURA, GANADERÍA, DESARROLLO RURAL, PESCA Y ALIMENTACIÓN

PEPSICO

LUCHAR PARA LOGRAR
UNIVERSIDAD AUTÓNOMA DE CHIHUAHUA

Global Methane Initiative

SISTEMA.bio
CREATING VALUE FROM WASTE

SISTEMA.bio®

CREATING VALUE FROM WASTE

www.sistema.bio

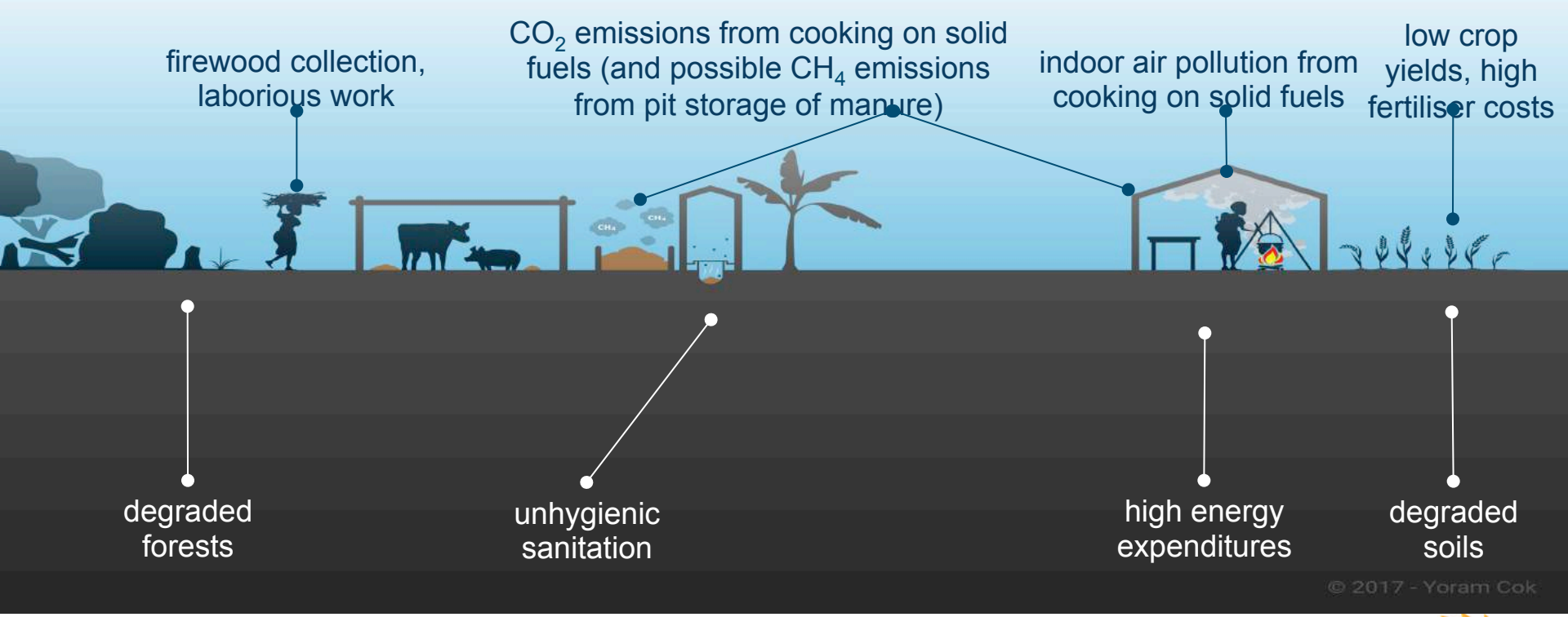
@sistema_bio Sistema.bio YouTube Sistema.bio sistema.bio

Building a Sustainable Domestic Biogas Sector in Kenya

Kevin Kinusu,
Program Team Lead - Kenya Biogas Program

Kenya BIOGAS project
moto safi, mbolea shwari

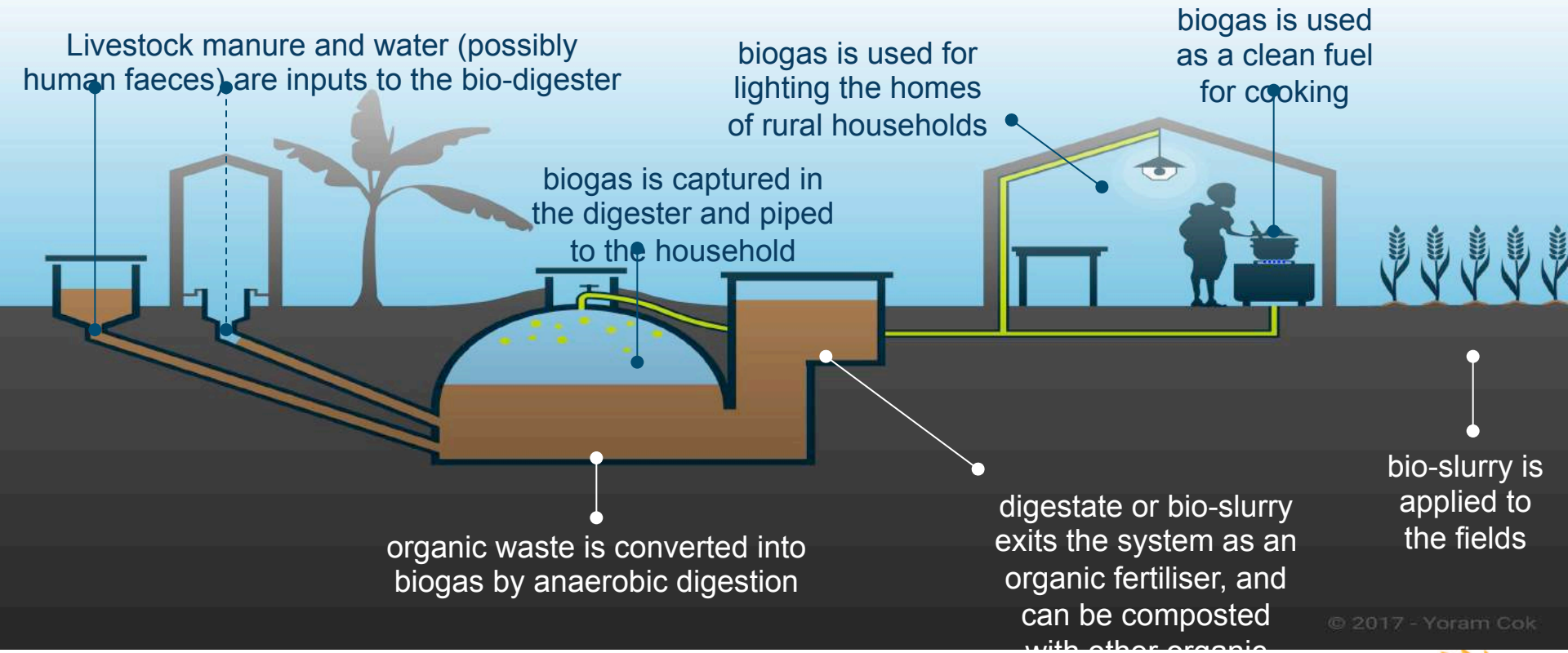
Why Biogas



The problem explained...

Kenya BIOGAS program
moto safi, mbolea shwari

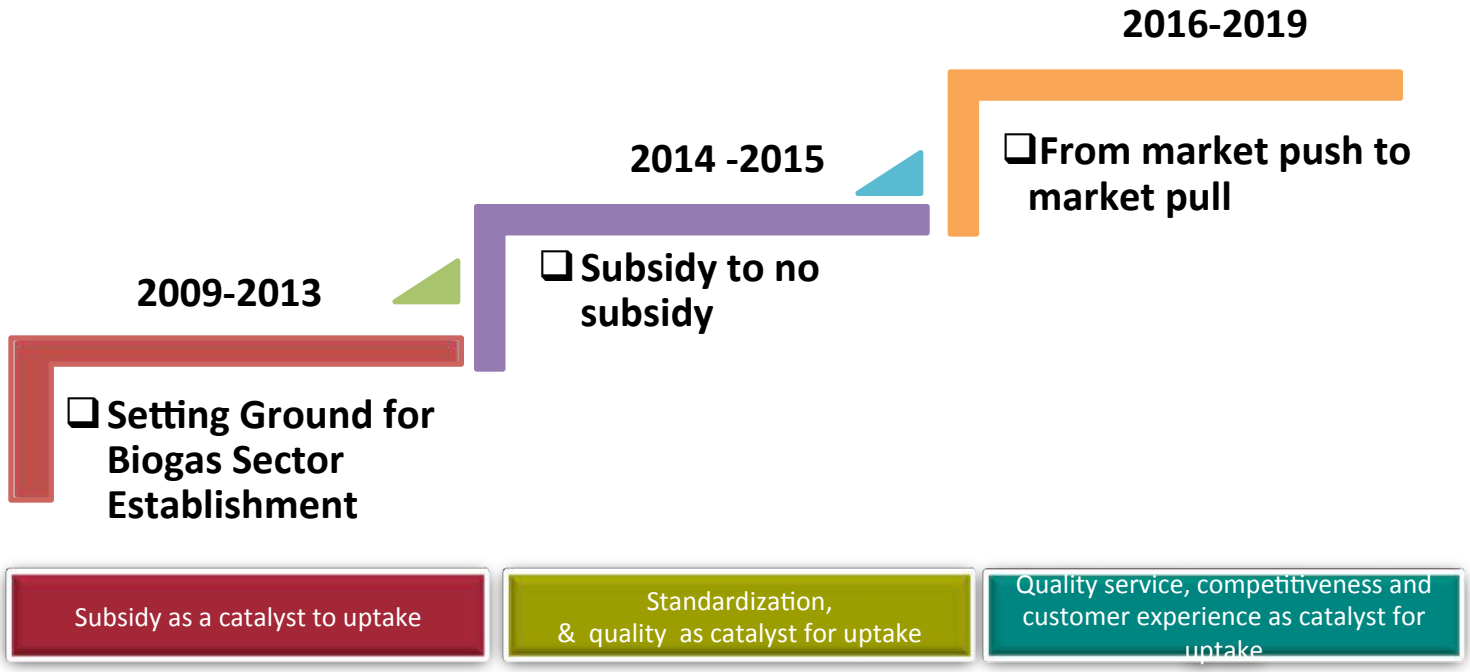
KBP's contribution



The solution explained...

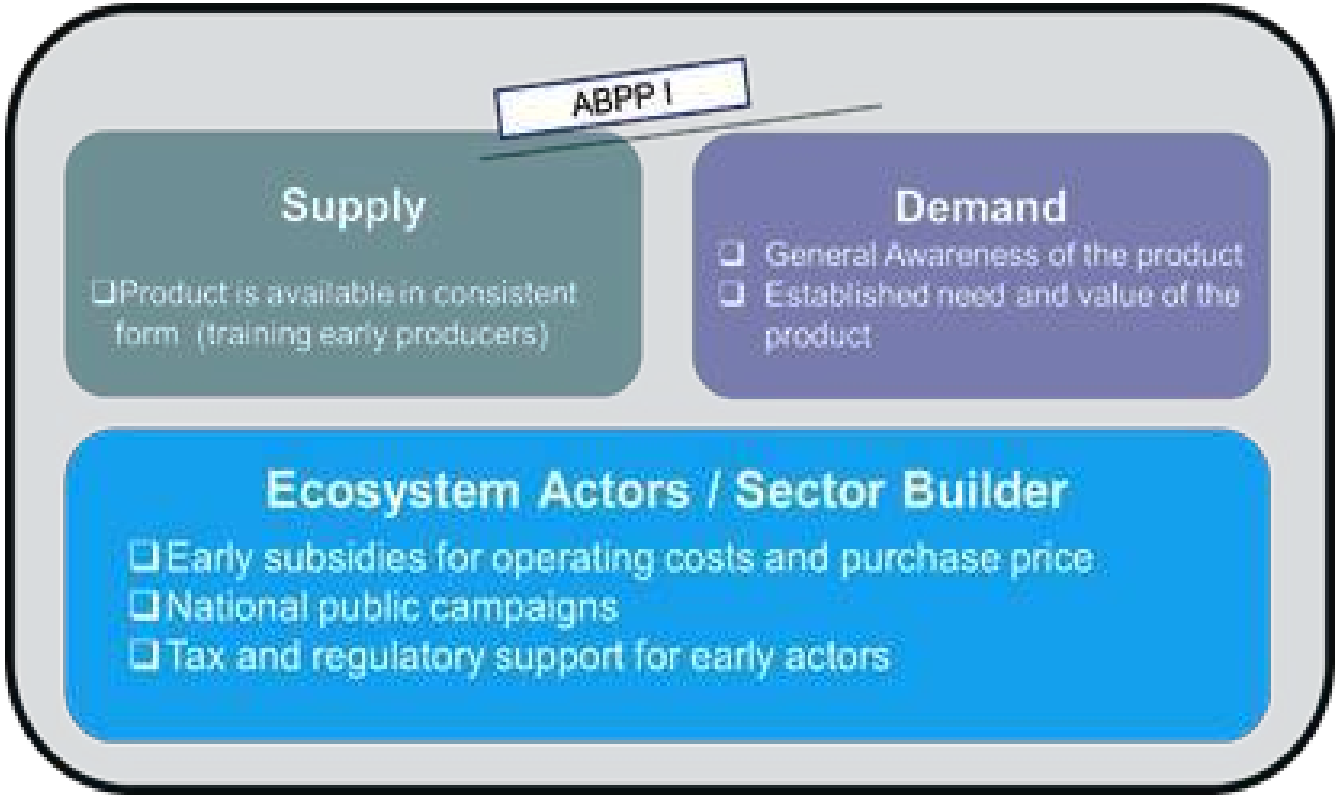
Kenya BIOGAS program
moto safi, mbolea shwari

Our Story- How we've done it



Kenya BIOGAS program
moto safi, mbolea shwari

2009-2013: Market Creation



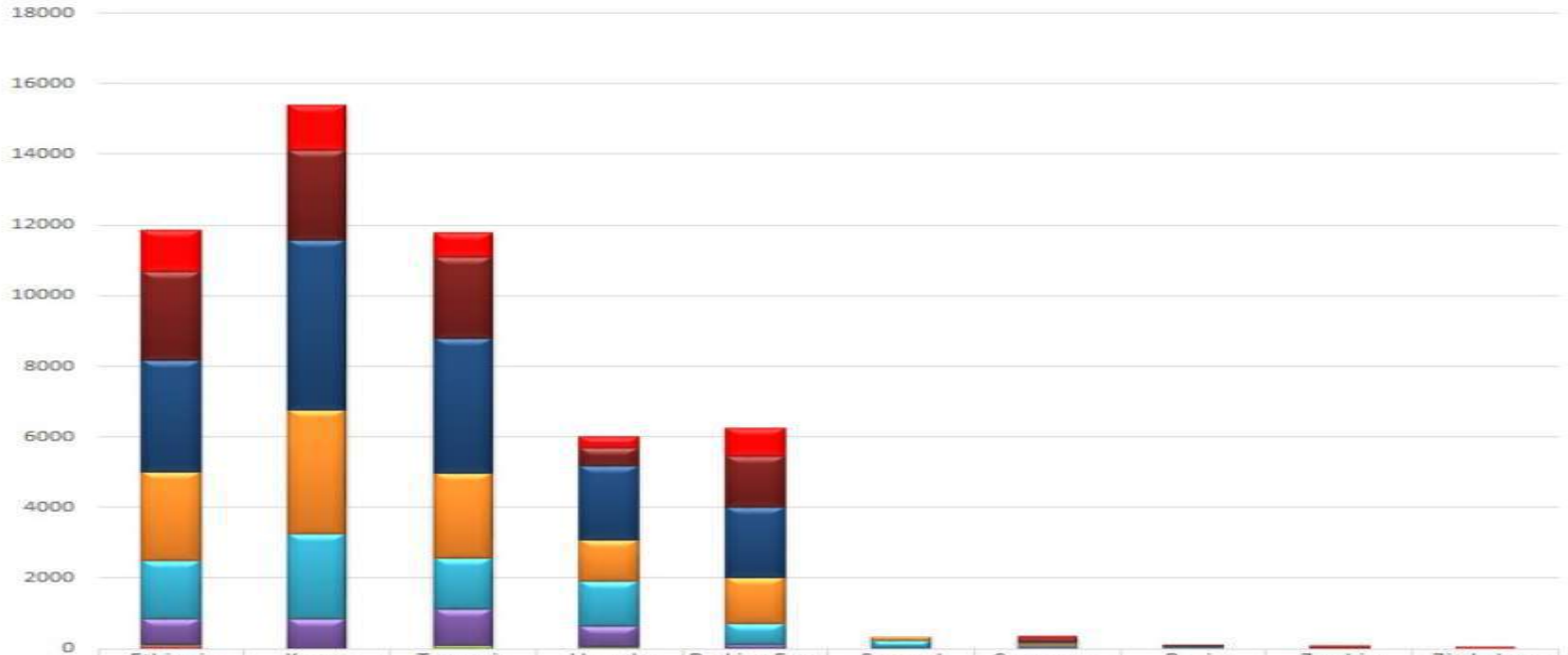
Kenya BIOGAS program
molo safi, mbolea shwari

2014-2019: Market Establishment

Kenya BIOGAS program
molo safi, mbolea shwari

Achievements

- **60,000 units**



	Ethiopia	Kenya	Tanzania	Uganda	Burkina Faso	Senegal	Cameroon	Benin	Zambia	Zimbabwe
	ESA				WCA				SA	
2015	1188	1271	667	306	792	0	53	0	9	16
2014	2517	2533	2304	527	1448	0	104	35	60	26
2013	3150	4830	3819	2085	2001	0	39	18		
2012	2511	3510	2409	1181	1292	95	54	12		
2011	1641	2399	1444	1276	609	225	33	20		
2010	731	837	1021	583	111	14	49	22		
2009	30	3	103	43	1	0	23	0		
2008	98		3							

Kenya BIOGAS program
moto safi, mbolea shwari

Challenges

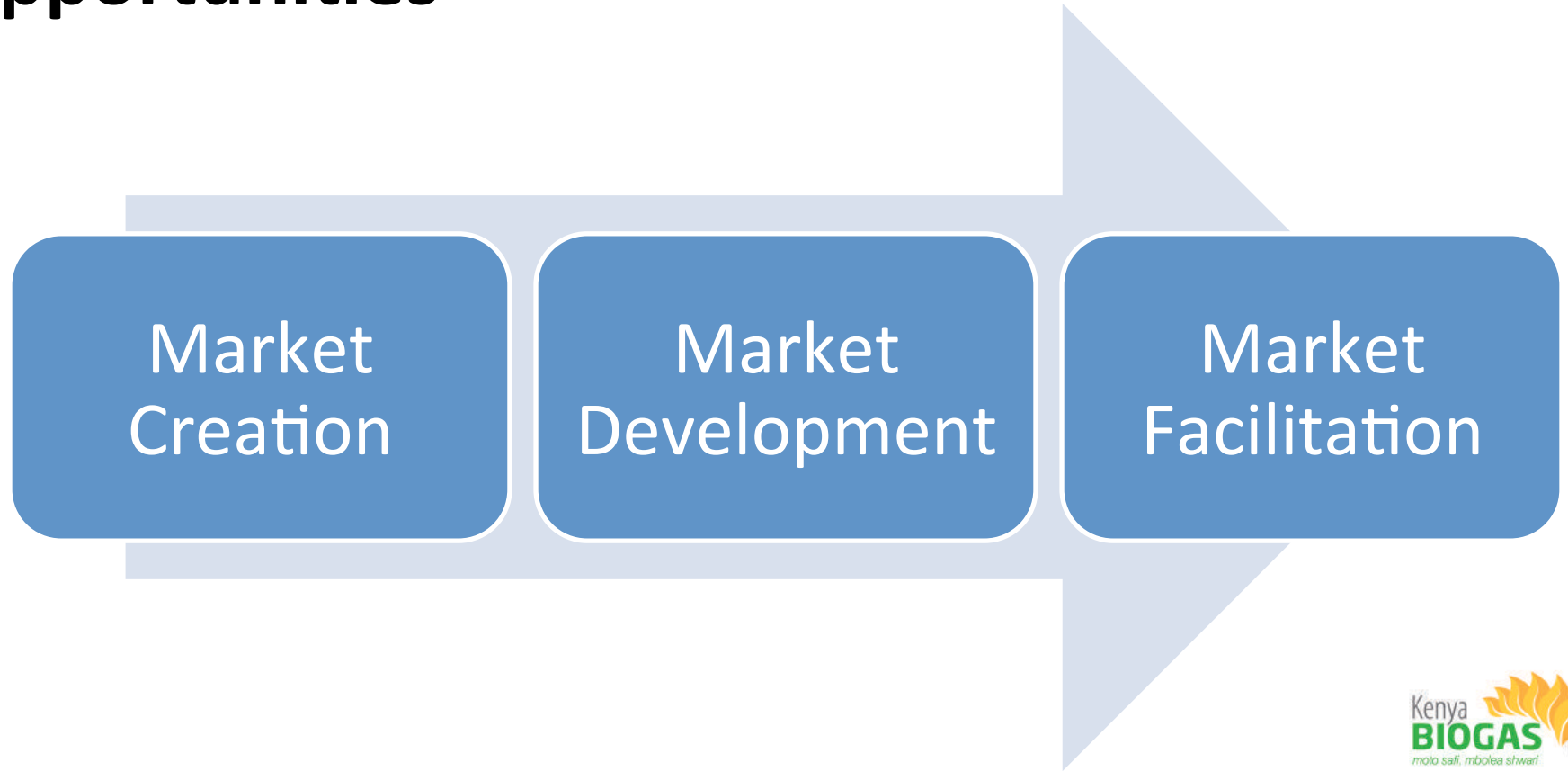
Programmatic Challenges

- Nascent private sector engagement:
  - Transition from ‘mason’ to BCEs
  - Supply of other/alternative biodigester technologies
- Availability of finance
  - Supply of end-user finance
  - BCE finance
- Quality: Functionality of systems
  - Need for high quality after-sales services
  - Quality of construction and training

Kenya BIOGAS program
moto safi, mbolea shwari

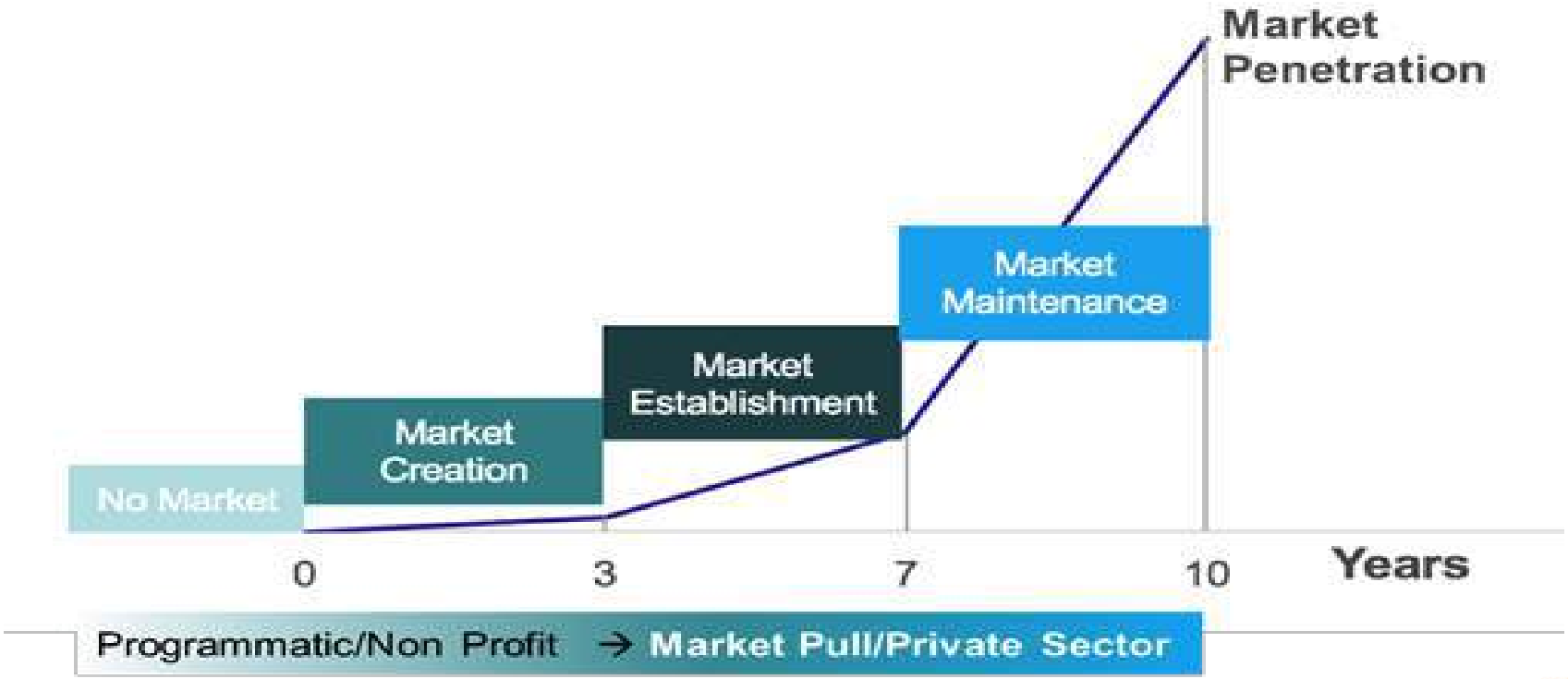
Opportunities

Summary of Program Opportunities

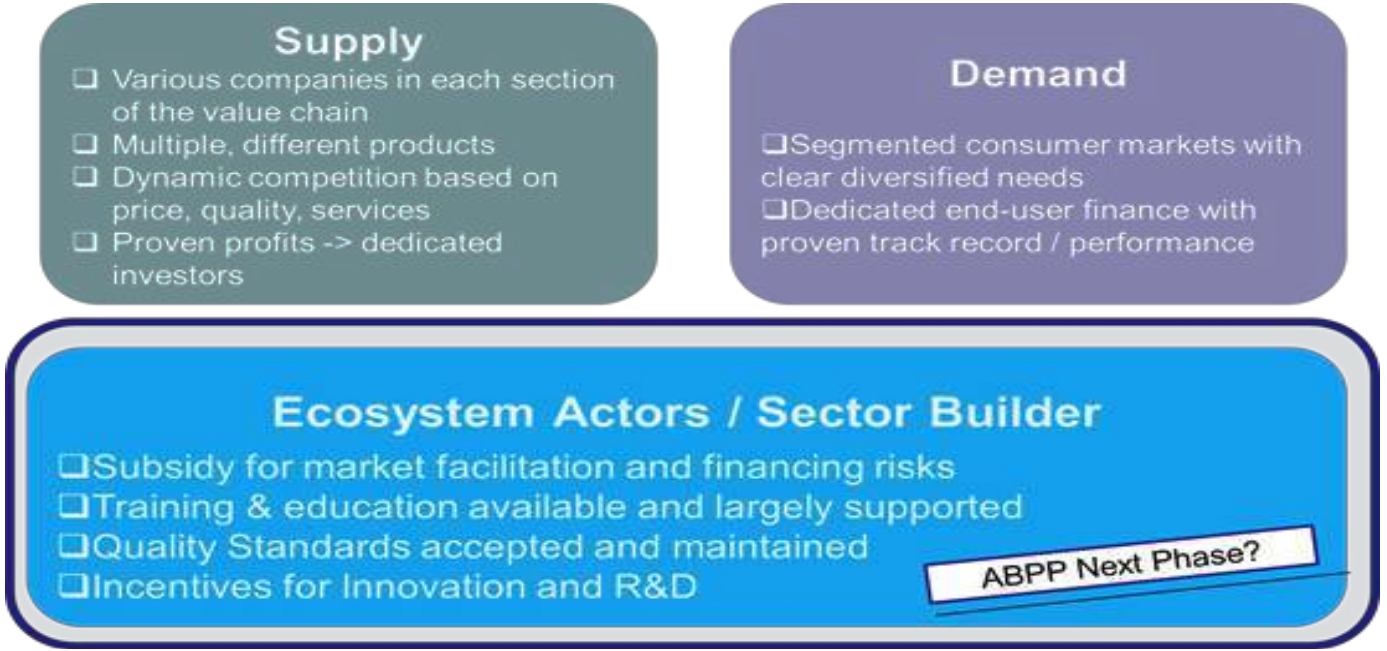


Kenya BIOGAS program
moto safi, mbolea shwari

Market Building Trajectory



Our future: Market Facilitation



Kenya BIOGAS program
moto safi, mbolea shwari

Critical Elements in Market Building

- In general, actors aiming to create a market should ensure that multiple elements of an ecosystem exist, to allow the markets to operate independently. These include:
  - Market Intelligence
  - Quality Assurance
  - Access to Finance
  - Consumer Education
  - Business Development Support
  - Policy and Regulatory Systems

Kenya BIOGAS program
moto safi, mbolea shwari

Contribution to UN SD Goals

BIOGAS program
moto safi, mbolea shwari

Our Contacts

Kenya Biogas Program

PO Box 19875-00202

ACS Plaza, Lenana Rd

Nairobi, Kenya

info@kbp.co.ke

www.kenyabiogas.org

Kenya BIOGAS program
moto safi, mbolea shwari

Thank You