ENERGY EFFICIENCY IN ARTISANAL BRICK KILNS IN LATIN AMERICA TO MITIGATE CLIMATE CHANGE

Argentina, Bolivia, Brasil, Colombia, Ecuador, México, Perú

Workshop on:

Science and Policy of Short-lived Climate Forcers

September 9-10, 2011Mexico City

A program from :

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Agencia Suiza para el Desarrollo y la Cooperación COSUDE

Implemeted by:

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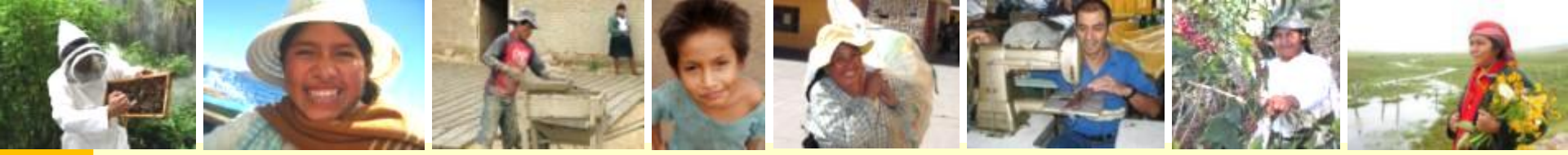

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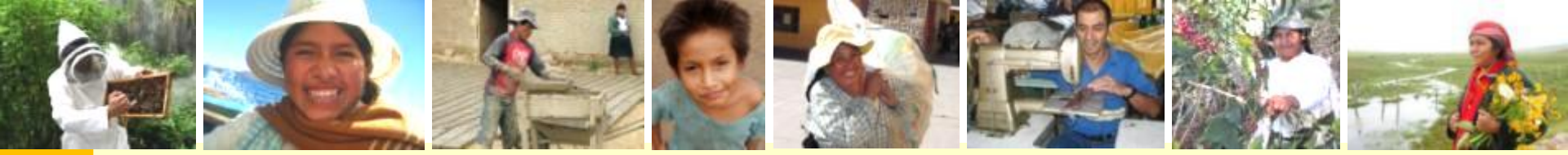
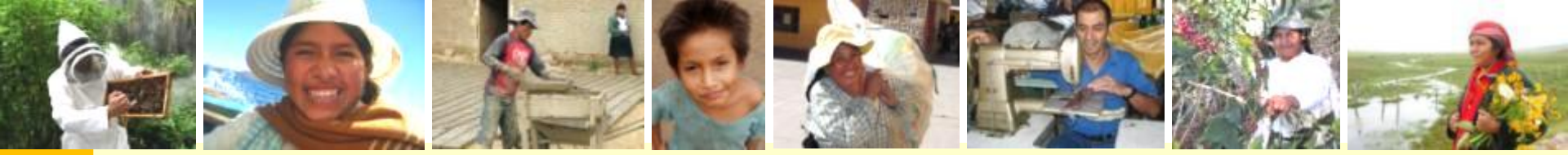


Background

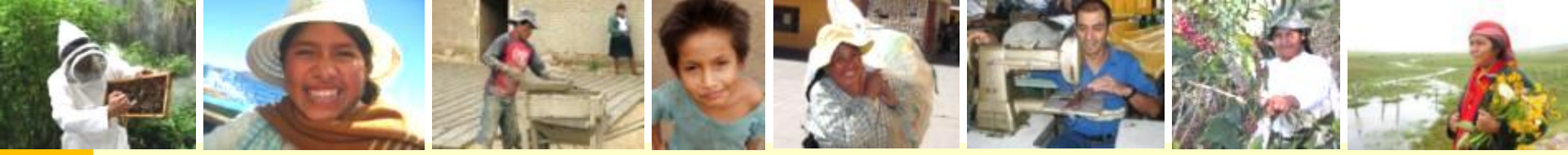
- Artisan brick kilns in L.A. countries use fuels with high environmental impact and low energy efficiency kilns
- Small brick kiln industry emits GHG contributing to climate change and affecting air quality in nearby cities with a negative impact on the health of brick artisans, their families and workers and people from nearby cities.
- The use of wood, used tires and plastic to fire bricks also contributes to air pollution, deforestation and water availability, increasing climate change factors
- L.A. countries contribute with 8.5% of global emissions of GHG and they are implementing programs to mitigate climate change.



Brick kiln enterprises

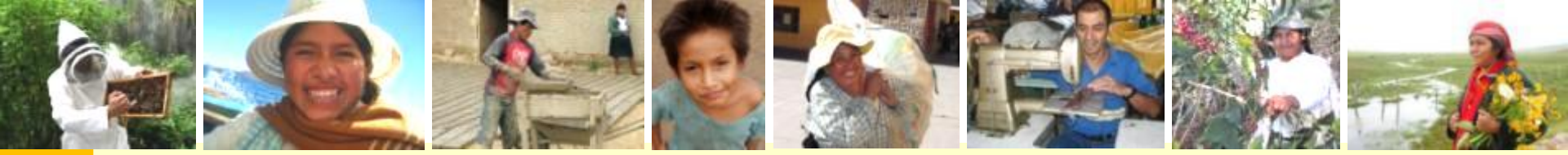
- Many brick producers live in poverty excluded from public policies
- The artisan brick kiln enterprises are mostly non-formal and are not included in social, economic or environmental public policies although they contribute to the strenghthening of the construction sector and to the creation of over 500,000 employments in L.A.

- Artisan brick kilns roughly produce between 30% and 50% of national brick production in L.A. countries, contributing importantly to the growth of the construction sector that has been one of the most important factors of economic growth in the last years.



Sector problems

Problem	Effect	**Solution**
Low quality of the product	Low demand Low Price	Improve product,
Low price of the product	Low incomes, little innovation, failure to comply with environmental standards, Informality, low income, child labor	Improvement of product, support for consumers (builders, constructors).
Low energy efficiency of the Kilns	**High emissions**, high costs of energy, low-quality product	Support in improving efficiency of kilns and better use fuel
High emissions of pollutants and greenhouse gases	Breach of rules, persecution by the authority	Improvement of kilns, improvement of combustion participation in carbon market
Low quality of life	Low school attendance, domestic violence	Improvement of income, participation of women in the management of the brick enterprise



Project Location

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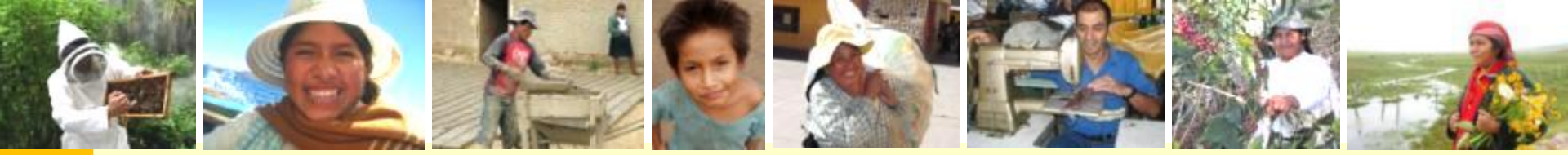

Program Objectives

- **GENERAL OBJECTIVE**

  To contribute to mitigate climate change through the reduction of GHG in LA and improve the quality of life of the population.

- **PHASE I OBJECTIV E**

  To promote the reduction of GHG emissions in artisan brick kilns through the implementation of energy efficiency integral models based in experience interchange between countries and through the incidence in national public policies.

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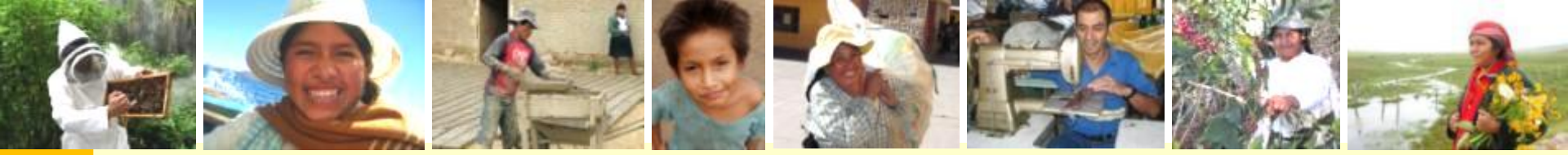

Specific Objectives

1. Promote GHG emission reduction through the promotion of more efficient technology and energy processes and the use of less pollutant fuels

2. Artisan brick producers have access to the carbon market

3. Adequated public policies for the artisan brick production sector, adapted to local conditions, include the promotion of integral models of energy efficiency.

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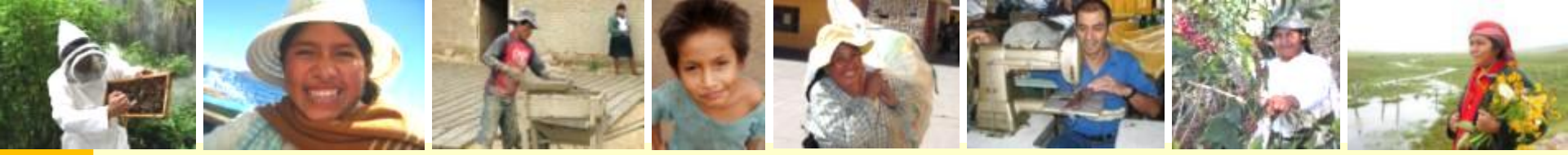

Specific Objectives

4. Strenghthen managerial capabilities of the brick producers and service suppliers to be included in the value chain.

5. Promote the South-South knowledge and experiences interchange.

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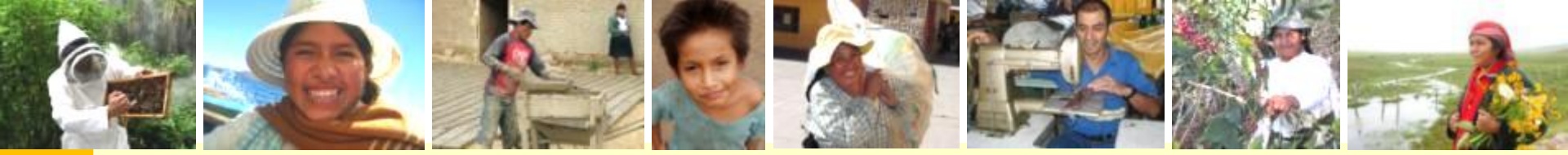
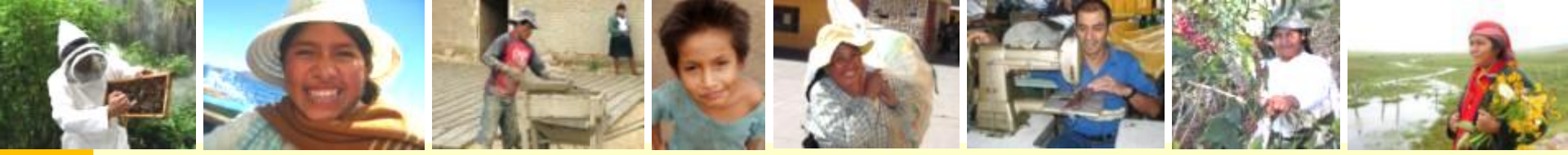


Systemic intervention

					Validated model for the reduction of GHG	**Mitigation of Climate Change**
		Estimation of emission reduction	Selection or adaptation of methodology	Elaboración of PDD	PDD (National Approval)	**Carbon Market**
	Norms review	Policy Dialog	Public incidence	Preparation of proposals	Support to implementation	**Public Policy**
	Entreprenurial Management: formalization, commercialization, market skills and cost management					**Integral Managerment Model**
	Social Management :promotion of gender equity in the domestic and production domains and school attendance to children that work in brick production					
	Environmental management: sensitization of brick producers about pollution, ecoefficiency and carbon market					
	Technological concept: 1) Brick kilns 2)Fuels 3)Products 4)Raw Material					
Baseline	Adjustment of Technology Model	Validation of Technology Model	Promotion of Technology model	Promotion of Technology model	Promotion of Technology model	
6	**6**	**6**	**6**	**6**	**6**	**Months**



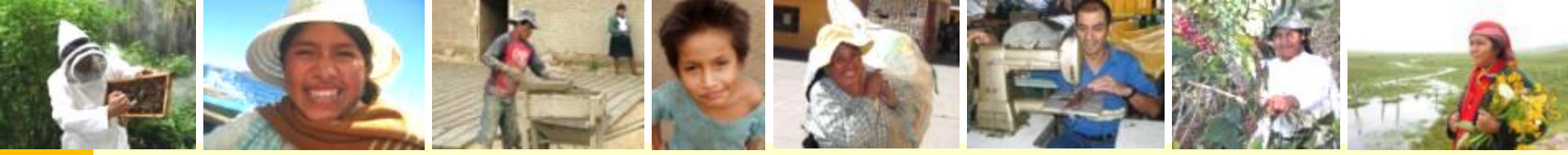
Implementation strategies

1. Strengthen managerial and technological capabilities of producers along the value chain of artisan bricks

2. Develop global proposals based in local experiences and articulating with international partners for climate change mitigation.

3. Promote learning, articulation, harmonization and alignment between national and international actors (South - South cooperation)

4. Demonstrate integral model viability and promote ownership of processes to create sustainability in the reduction of GHG emission.
5. Encourage gender equity and children assistance to school



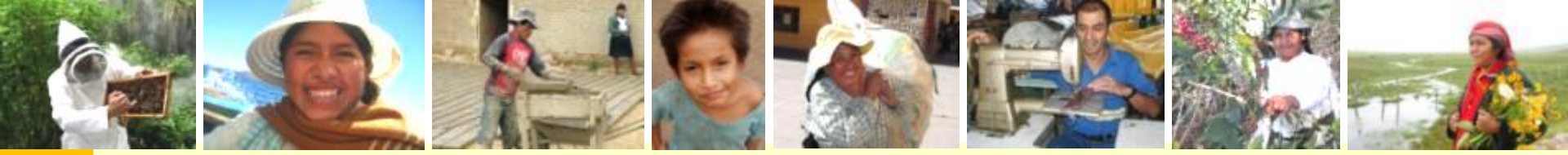
GHG reduction potential

- Approximately 48,000 brick kilns in the 7 countries produce an average of 2.619 kg of CO_2 per burn, an estimated 6 million tons of carbon dioxide in a year

- Technology improvement (more efficient kilns and fuels and reduction in the use of clay) would allow around 30% of the GHG emissions reduction according to previous experience

- The reduction potential of GHG emissions in artisan brick kilns in LA is estimated to be around 1.8 million tons in per year

Considering a kiln of 20,000 bricks with an average of 48 burns in a year



First Phase Expected Outputs

- Energy efficiency in 970 brick kilns has increased in 30% and GHG emissions have decreased with respect to baseline emission.
- 808 artisan brick enterprises in 7 LA countries have adopted the integral energy efficiency model.
- The authority at the national or local levels have approved al least one country program to increase energy efficiency in artisan brick kilns and have included the sector in public policies.
- 970 artisan brick producers have increased their incomes in 10 %.

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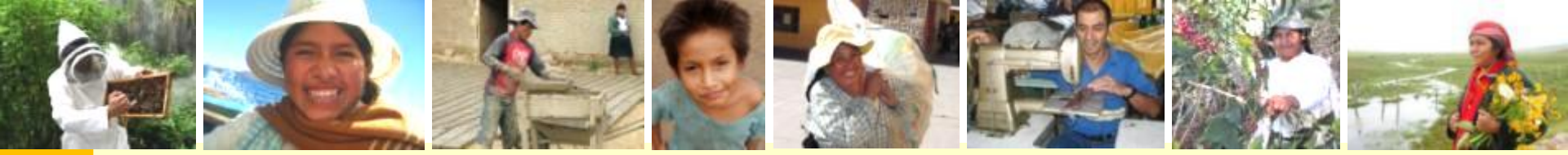

VISION TO 2015

The integral models of management, technology and carbon market access reinforce each other through experience interchange and are replicated in the 7 countries.

The sum of achievements allows to reach GHG emission reduction goals

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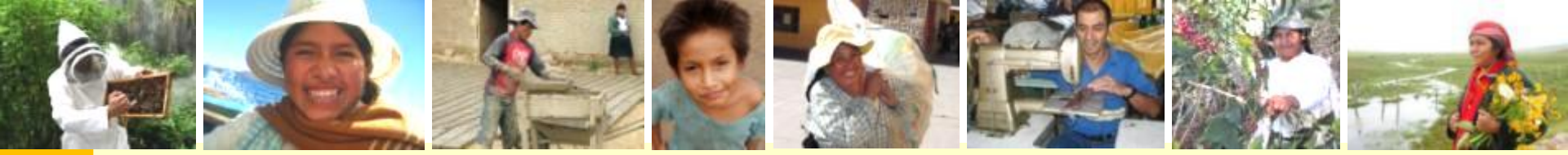


Demand and Supply

Project EELA

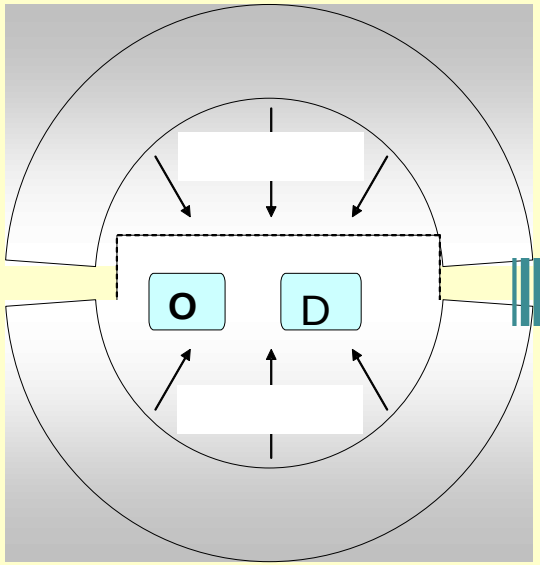
Informal Networks

Supporting functions

Private Sector

1. Cost
2. Design
3. Quality

1. Quality
2. Design
3. Cost



Self construction
- Formal
- Informal

1. Price
2. Availability
3. Quality

Formal Construcción

1. Quality
2. Availability
3. Price

Government

Rules

Gremial Organizations

Formal sector

Informal sector

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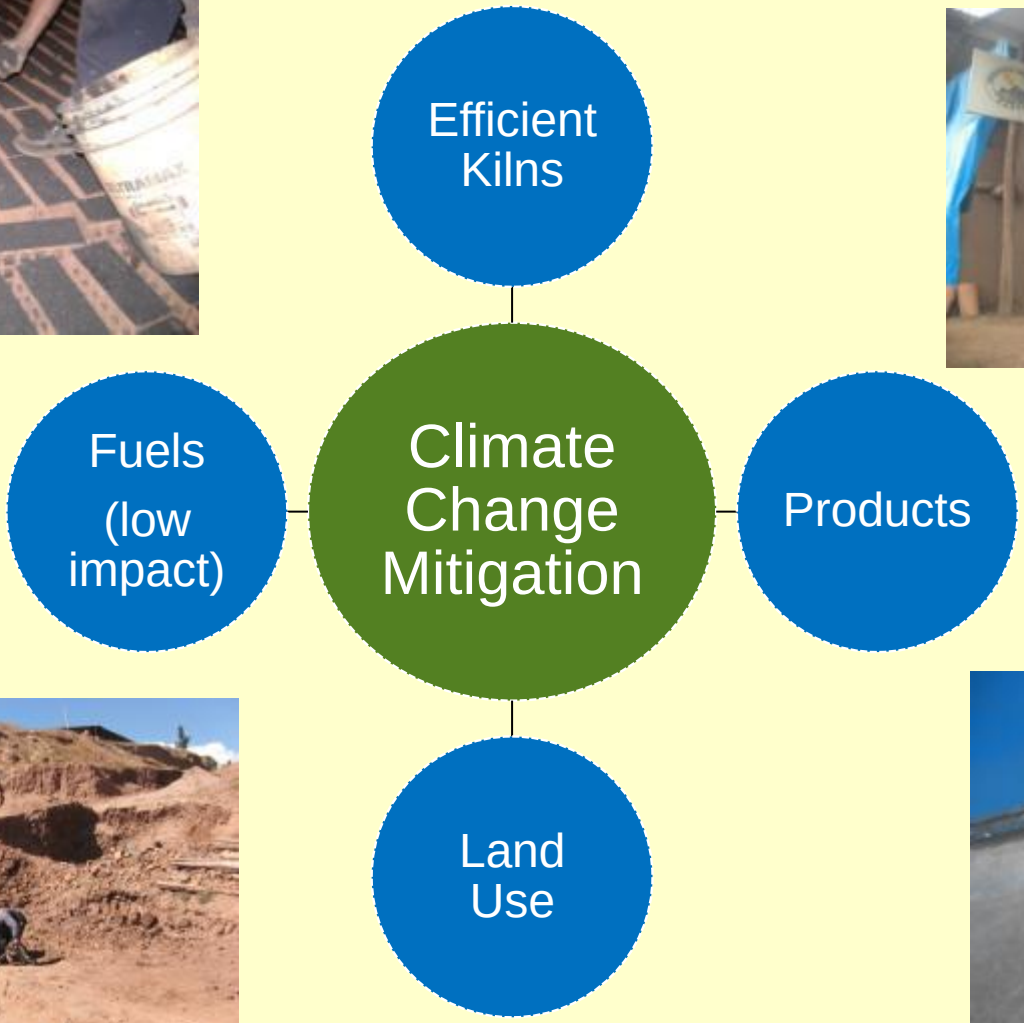
Technology concept







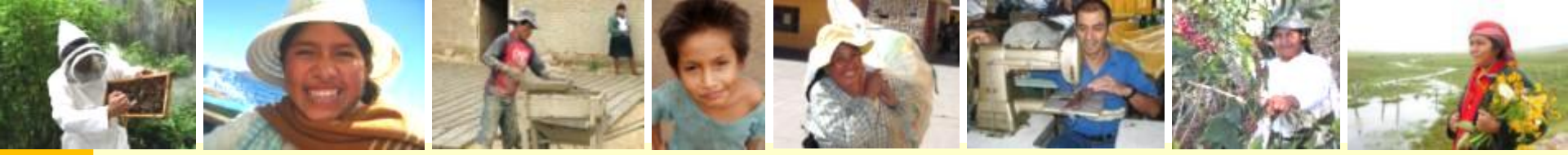



CO^2 emissions from brick firing (m^2 wall)



Solid bricks	Hollow Bricks	Hollow Brick with thin wall
Weight 3 kg	Weigh 2.5 kg	Weigh 2.5 kg
Dimensions 24X11X7 cm	Dimensions 24X11X8 cm	Dimensions 30X15X20 cm
Bricks per m2 44	Bricks per m2 40	Bricks per m2 20
CO^2 for m^2 132 kg	**CO^2 for m^2 100 kg**	**CO^2 for m^2 50 kg**

Traditional kiln fired with sawdust and firewood (Cusco)



EELA and the carbon market

Duration aprox. 6 years

- Base line
- Assistance in the implementation of the integrated model
- Outreach by the countries

- PoA starting with a pilot
- Outreach
- Sustainability of the model

Duration max. 28 años

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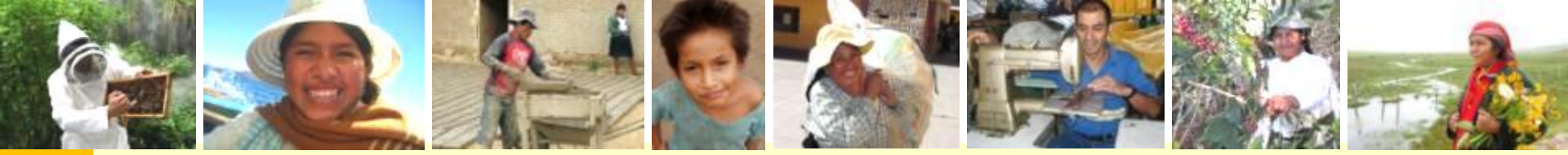
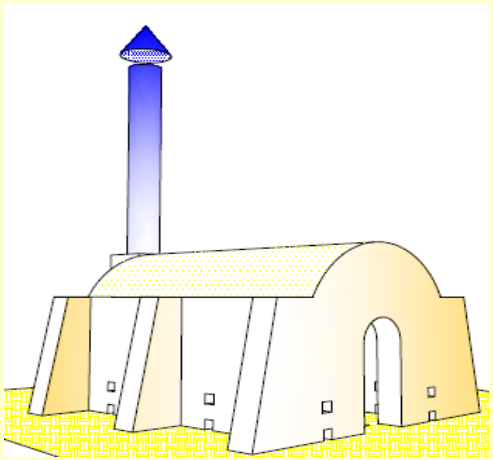


Efficient Kilns



- Meet environmental norms
- Energy efficiency
- Low smoke emisions

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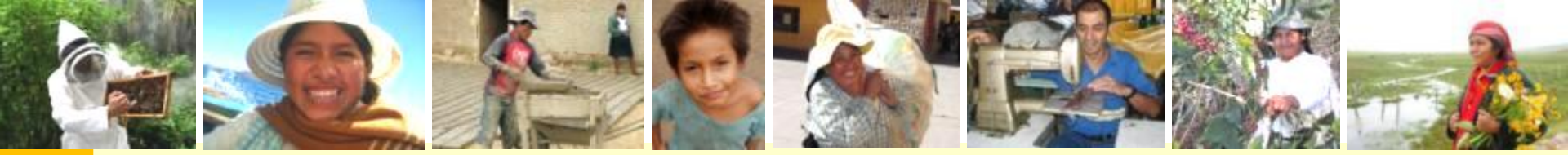

Products

- Quality, meet specifications
- Reduced use of prime material
- Thermal Efficiency.
- Green Label ????

SELLO VERDE

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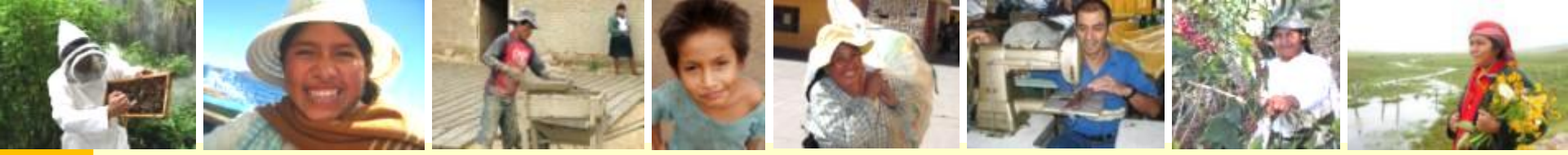

Fuels

Energy policy includes:

- Wood, biomass
- Carbon
- Waste such as plastics an tires.
- Natural gas

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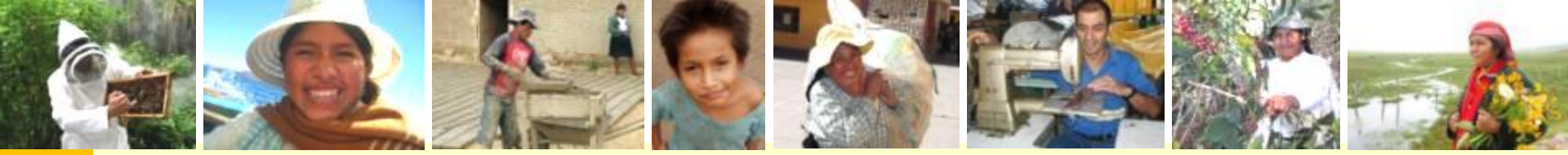
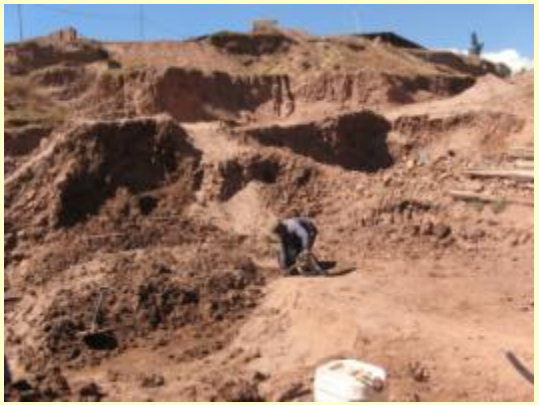


Land use



- Land use planning and definition of the use of the soil
- Definition of use of certified wood as fuel,
- Handling clay soil

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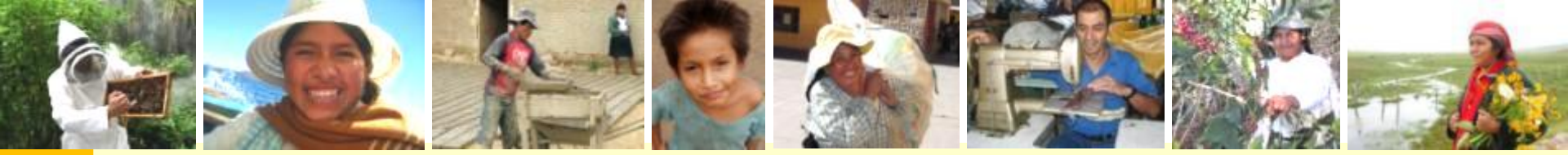

Project indicators for the artisan brick manufacturers

PAIS	Number of entrprises	CO2 Emisiones /Ton of bricks	GJ Energetic Efficiency /of bricks	Utility /1000 of Bricks	Emissions CO2 (ton /Year)	Production volume (ton/year)	Average production p/enterprise	TSP/tons 0.00
ARGENTINA	147	0.494	5.841	12.5	86,493	175,181	1,192	460
BOLIVIA	155	0.174	3.36	12.02	44,741	257,178	1,659	675
BRASIL	120	0.15	2.22	57	170,024	1,133,493	9,446	2,976
COLOMBIA	212	0.304	3.62	5.76	44,878	147,500	696	387
ECUADOR	214	0.387	4.58	-144.83	14,168	97,949	458	257
MEXICO	128	1.9	2.71	-2.3	22,959	126,154	986	331
PERU	195	1.51	9.1	109.75	232,522	150,754	773	396
Total	1171				615785	2,088,209	1783	5483
Latin America	480000	Estimated				855,969,530		2,247,605

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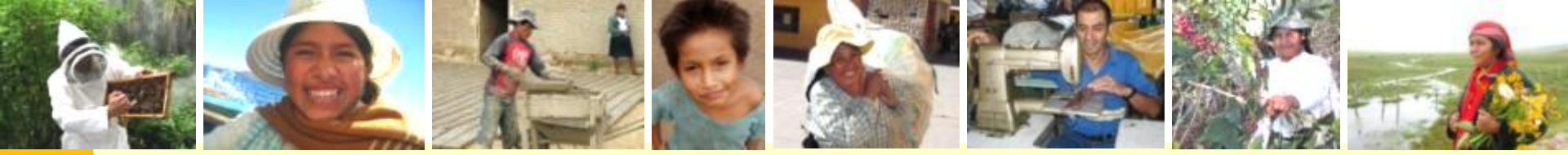
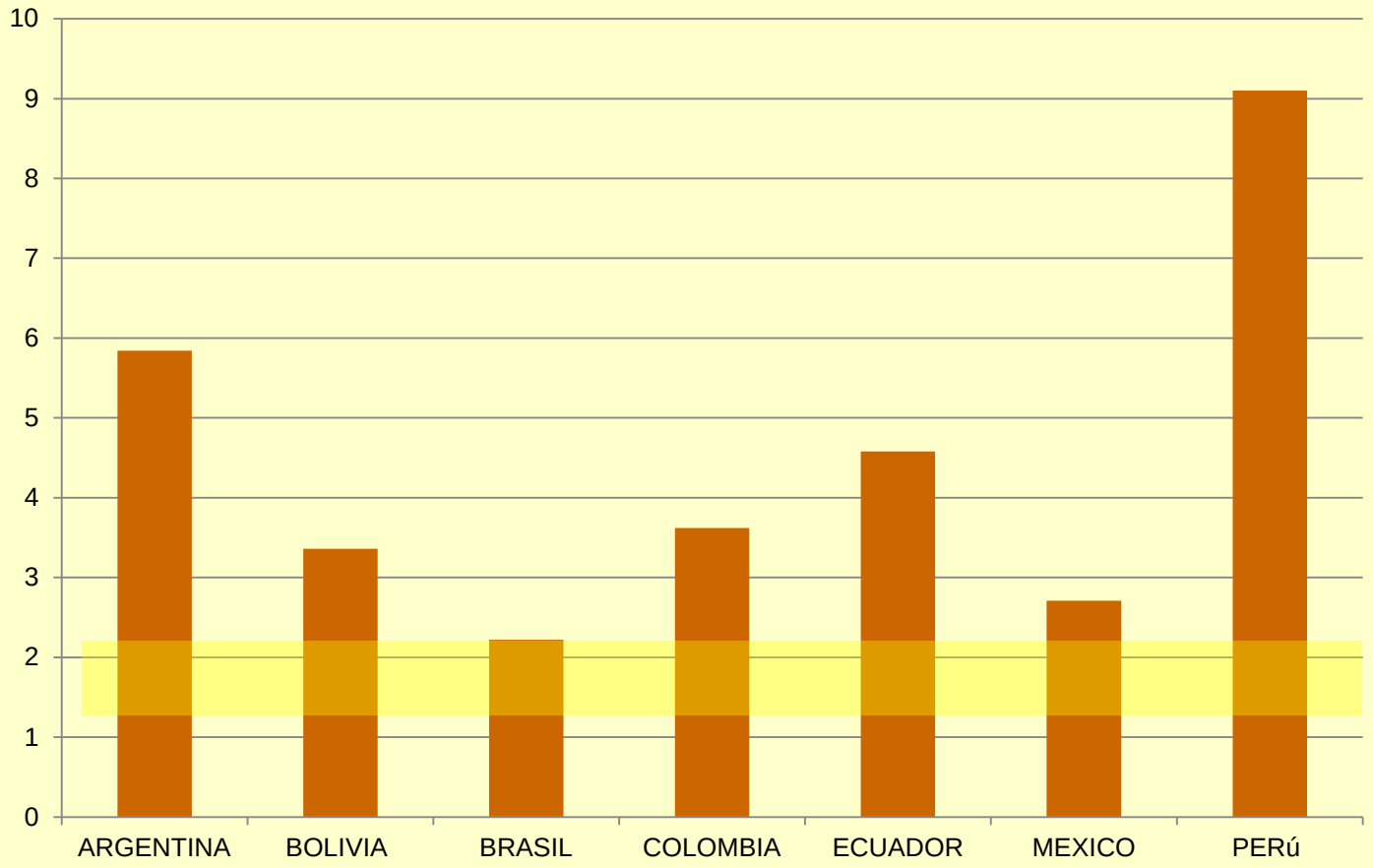


Energy efficency MJ /Ton of bricks



Ideal 09 to 2 MJ/ton

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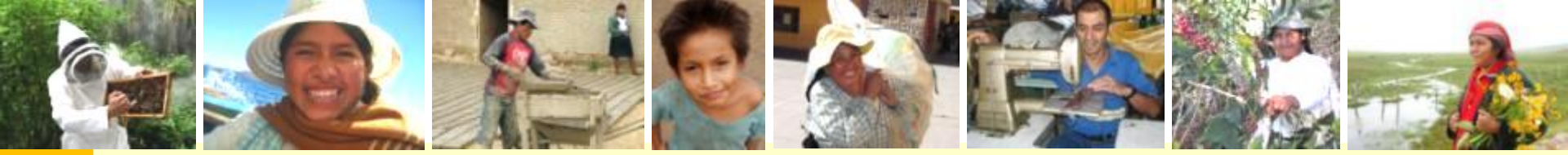
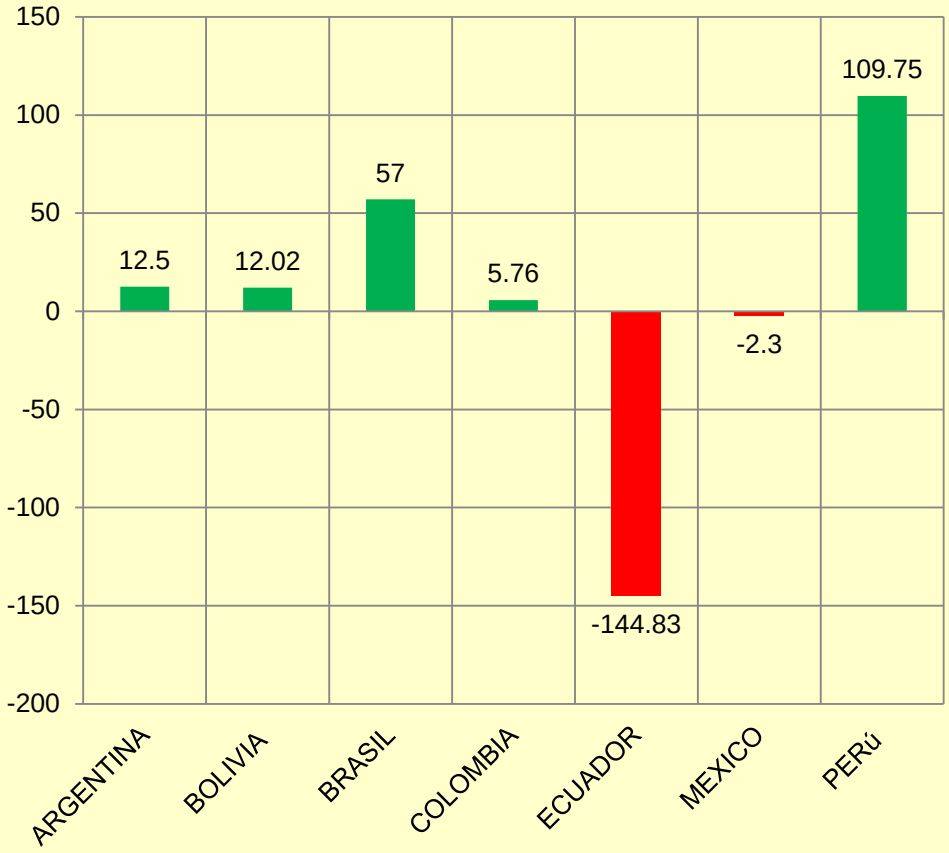


Utility USS$ /1000 bricks



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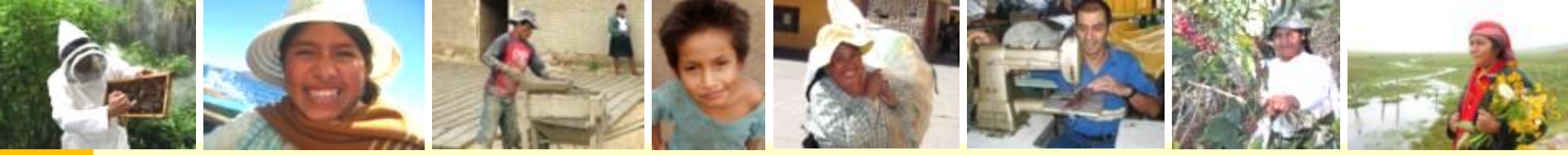
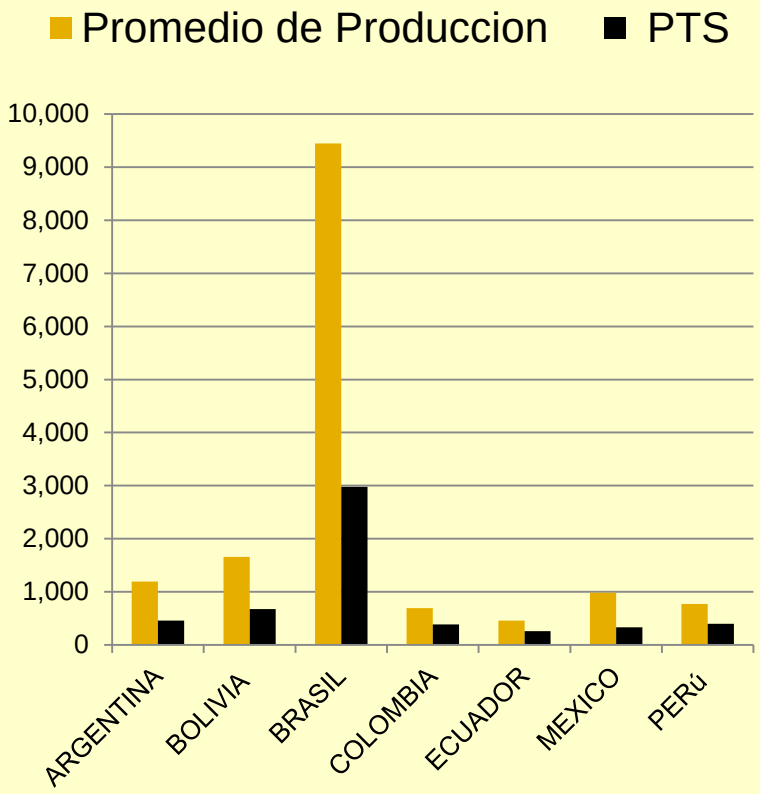


Average production per Kiln



In the 7 Countries we estimate:
48000 Kilns
855,969,530 tons Annual production

2,247,605 Tons of Suspend particulate matter (annual)

140475 Trucks (16Ton) full of TSP

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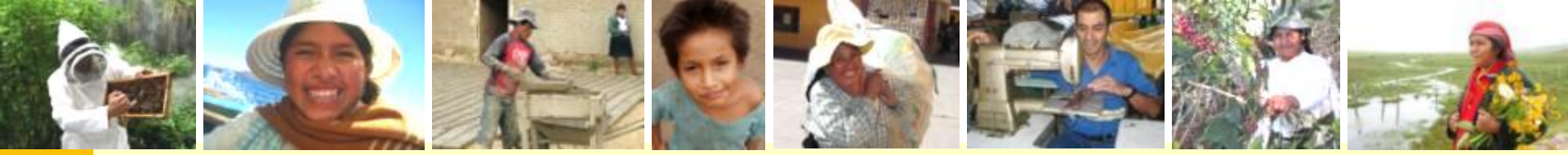

Glaciers

About 90% of the Latin American tropical glaciers are located in EELA countries

- Brick production occurs close to the zone

- Water reserve
- High potential for Tourism

Disaster potential
Mudslides
Overflowing lagoons

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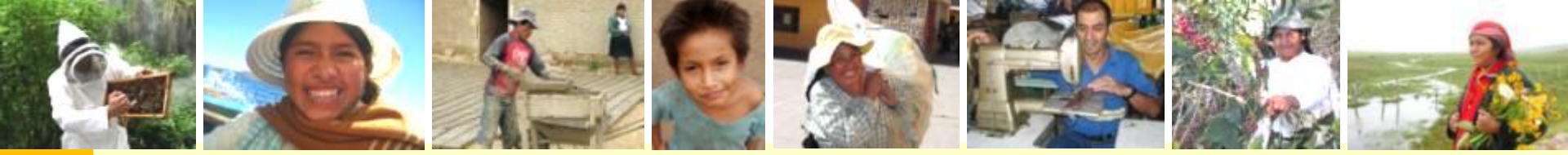

Black carbon

- BC is a new topic for most of the Authorities
- Little is known about BC emissions from artisan brick production
- Little impact evaluation so far
- National limits for BC or PM (if available) are not adapted to the possibilities of artisan producers

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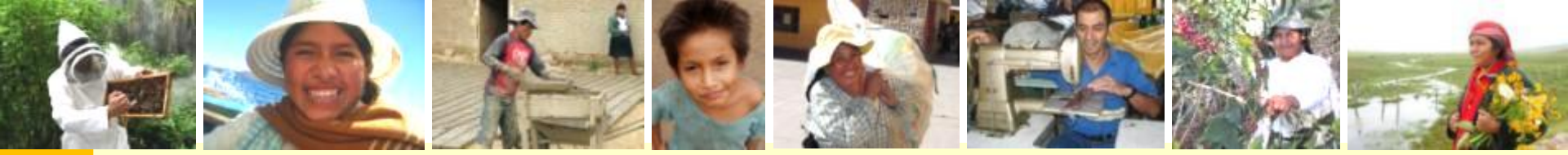

Next Steps

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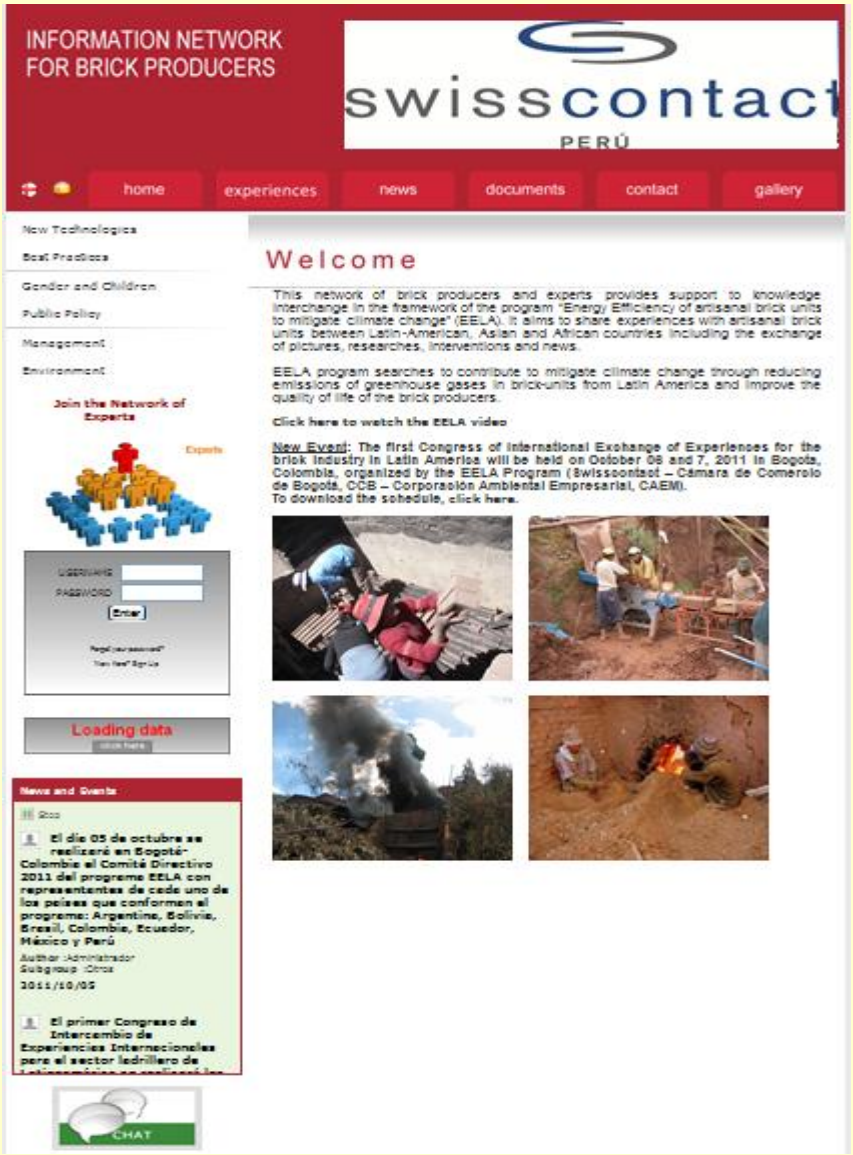

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