

## **Project Gaia/Brazil Site Report: Salinas – Bairro Santo Antônio (610 km de Belo Horizonte)**

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*Regina Couto, Pilot Study Director*

Salinas is located in the northern region of the State of Minas Gerais in the semi-arid Valley of Jequitinhonha, very well known as an area of poverty. Salinas is known for its commercial and health services among the non-coastal cities. Salinas is known around the world as the 'World Capital of Cachaça,' a Brazilian liquor of high alcohol content. Many families make a living from producing cachaça.



Figure 1 View of the city of Salinas

For the production of the high quality cachaça, for which Salinas is renowned, about 20% of the production is thrown discarded. This residual part, if distilled again, in appropriate equipment, can produce alcohol. Salinas has three alcohol micro-distilleries today, and this was the reason Projeto Gaia wanted to work in the city; initially we had positive responses from these three producers for possible partnerships.

Salinas has the Federal Agrotécnica School of Salinas - EAFSAL, offering the first course in the country in 'Technology of Cachaça de Alambique.' Coordinating with the EAFSAL was also a favorable partnership, where we would install an alcohol distillation tower at the school which would be a model in alcohol production. After innumerable negotiations, due to internal decisions, the EAFSAL was able to reach agreement. The Agrotécnica School has a CleanCook Stove that it uses in classrooms, and in events in which the school participates.

The Municipal Government of Salinas provided us the necessary logistical support for the project, and indicated the Association of the Neighborhood of Santo Antonio as a study site, assisting with family selection. Barrio Santo Antonio is a poor urban community of Salinas located about two kilometers from the city center. From the community, thirty-eight families and one day care center were selected to participate in the study. Project Gaia was a factor in strengthening the Association; as a result of the study, more homes entered into the Association.

### **Socio-economic Profile of the Participating Families.**

In Salinas, 15% of the families were 'white,' 70% 'medium brown,' and 15% 'black.'

#### *Education*

Heads of households have the following levels of education:

- 25% had no formal education
- 65% had an elementary school education
- 10% completed middle school.



Figure 2 Bairro Santo Antonio

### *Family size*

Of the 38 participating families:

- 5% of homes have 2 people
- 40% are 3-4 person households
- 45% are 5-6 person homes
- 10% have more than 7 people

In relation to income level, the majority of the families of Salinas do not have regular work, and they earn lower than minimum wage.

Many live as *bicos* - a very difficult life. Some of the housewives make and sell biscuits and breads to raise the family income.

### *Income levels:*

Most families do not have a fixed income. Using the Shell Foundation parameters

- 45% of families live on less than US\$ 1.00/day
- 55% live on US\$ 1.00-3.00/day,
- none earn more than US\$ 3.00/day.

The families live very modestly in very simply homes, and some pay rent.

### *Cooking habits*

- 85% of families use both LPG and wood stoves
- 10% use only LPG
- 5% use only wood.

Santo Antonio is on the outskirts of town, about 2 km from the city center. The families have difficulty finding fuelwood, and of the families that use wood, 45% collect it at an average of 2 hours /week to gather it, and 40% buy fuelwood.

## **Findings**

Participant response on general aspects of the CleanCook stove:

### *Safety:*

- 25% say the CleanCook is very safe
- 75% say that it is safe
- Compared to LPG in the kitchen, 76% say the CleanCook stove is safer than LPG
- Compared to wood stoves, 71% say the CleanCook is safer.

### *Smoke levels*

- 90% say the CleanCook stove smoke level is very low
- 95% say it is equal or less than the smoke level of LPG
- 100% say the CleanCook smoke level is lower than their woodstove

### *Positive and negative factors of the CleanCook stove:*

Responses were open ended and the majority of families gave more than one response.

- Positive factors: 46% noted its Safety, 41% its Rapid cooking time and 8% noted fuel efficiency.

- Negative factors: 20% say the CleanCook has too few burners; 30% say the pot supports are not good; 10% say it dirties their pots, and 10% say the stove is difficult to clean and light. 55% were concerned about the price of a liter of ethanol.

#### *Willingness and ability to pay for stove*

Regarding a fair price to pay for the CleanCook stove, 45% didn't know. In relation to a price they could afford to pay for the CleanCook:

- 10% said up to R\$ 50.00
- 15% said between R\$ 50.00-100.00
- 25% said between R\$ 100.00-200.00
- 5% said more than R\$ 200.00.

80% of users would need financing, and of those, 56% would use microcredit.

#### *Fuel prices*

In relation to a fair price per liter of ethanol

- 35% didn't know
- 40% said the ideal price would be less than R\$ 1.00

Regarding a maximum price to pay per liter of ethanol:

- 35% didn't know
- 45% said up to R\$ 1.50.

In Salinas, a liter of ethanol at the pump cost R\$ 2.42 and at the end of the project it was R\$ 2.00. This difference is due to the sugarcane harvest in the southeast that began in May.

#### **Suggestions to improve the CleanCook stove:**

This was an open ended question. About 25% of families had no recommendations, and the rest gave more than 2 suggestions:

- 68% - improve pot supports
- 53% - more burners
- 35% - a support for small pots
- 10% - a built-in table
- 6% - additional oven

#### **Outlook**

The other sites in this region had results that were comparable to those in Salinas. During the study we used an increasing cost sharing mechanism to determine user willingness to pay per liter of alcohol. Of the total number of families, 72% continued using the CleanCook stove as the cost increased, noting safety and fast cooking times as the principal reasons. In Salinas, another relevant factor is the possibility of buying a small amount of ethanol at a time; many of the families are not on a fixed income.



*Marieta, resident of Bairro Santo Antonio 'We don't have fuelwood here that is close by. My husband goes out, but he is not able to bring much because it is so heavy. With the CleanCook stove it is much easier to cook, and I could buy alcohol in little amounts.'—D.*

We are negotiating with metal companies about manufacturing the CleanCook stove in Brasil. In relation to suggestions to improve the stove, a one-burner model already exists. This could be adapted and cooks could then choose a model based on the number of burners. Also, the suggestion to improve the pot supports is already being worked on.

We are also testing the CleanCook stove in other settings, like campgrounds and with truckers, where it is being accepted favorably by the users.



*'Before [the CleanCook stove] I lost a lot of time in the kitchen due to cooking with wood, and I had to gather wood. Now I have more time.'*—Eleni, resident of Bairro Santo Antonio

The biggest concern at this time is the high price of a liter of ethanol. We know that the CleanCook stove, in the near future, will be a viable cooking option for families because strict environmental regulations, including fuelwood cutting, are going into effect, and LPG prices continue to rise.

Brasil's climate is favorable for sugarcane production, and the people living in the rural areas understand the process very well. In Minas Gerais, like other parts of the country, the agriculturalists are familiar with the production of cachaça (a hard rum), which implements a distilling process that could be easily adapted to produce ethanol in a microdistillery. We intend to provide incentive to micro-distillery producers, with community investment to supply ethanol to families that use a CleanCook stove. Our intention is for communities to procure their own ethanol after having established a cooperative or association consisting of the families so that they could be self-sufficient at the local level.

In Salinas, we had intended to partner with the Federal Agrotechnical School to build an alcohol distillery tower in conjunction with the equipment for cachaça production at the school's farm, but it was not possible due to the little production carried out by the school. Something to consider in Salinas is the large number of cachaca producers and that 20% of the production is discarded. This residue could be distilled again to produce ethanol. The production of ethanol from this residual product would solve a regional environmental problem where many of the waterways have become toxic from dumping the residue into them.

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