

Project Gaia/Brazil Site Report: Dom Orione – Betim (35 km from Belo Horizonte)

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Betim is one of the principal cities in the state of Minas Gerais, and is considered to have the second largest economy in the state, behind the state capital, Minas Gerais. Known around the world as a great industrial park, most notably because of the car maker Fiat, and the Gabriel Passos Refinery, Betim attracts people from other parts of the state and country because of its better living conditions. In common with other metropolitan regions, Betim suffers from rapid and disorganized population growth.



Vegetable field at a farm in Dom Orione

The borough of Dom Orione is one such area. Some of the families have been around for more than 15 years, and some 33 families received a parcel of land within the past 9 years. The families make a living from family farms, with vegetables being the most common crops that are sold in the metropolitan area. The village received equipment from state and federal governments to make *cachaça* (a liquor made from fermented sugarcane) and *rapadura*, a form of sugarcane juice, used as a sweetener or as a candy. They received equipment to produce alcohol similar to that provided to the other boroughs. The families will be able to produce alcohol with the sugarcane harvest of 2007. The families have set aside an area for sugarcane production.

Twenty eight families participated in the study. The majority of families live off of what they produce on their land. Near 45% of the residents have retirement income, and if this is added to the number of people that receive a pension or government assistance, it amounts to 57% of the population.

Socio economic profile of the families

In Dom Orione, 28% of participants are 'white', ' 61% 'medium brown, ' and 11% 'black'.

Education

Heads of households have the following levels of education:

- 25% no formal schooling
- 53% elementary schooling
- 22% completed middle school.

Family size

Of the 28 study families, 18% are 2 person homes, 36% have 3-4 people in the home, 28% are 5-6 person homes, and the remaining 18% have 7 or more people living in the home.

Income levels

These are variable. The families own their land and most make a living from farming activities. From the interviews, 46% of families stated that they had a retirement income, and in some cases, families stated they had wage-earning jobs.

Using the Shell Foundation parameters:

- 32% of families lived on less than US\$ 1.00/day
- 27% lived on between US\$ 1.00-3.00/day
- 21% earned more than US\$ 3.00/day.

Findings

Findings from pilot study participants show the following:

Cooking habits:

- 64% of families used both LPG and wood stoves
- 25% used only LPG
- 11% used only wood.

Of the families that used wood for cooking, all collected wood within their own properties. Despite each family possessing two hectares of land, they have noticed the scarcity of wood.

Nearly 20% of users talked about some kind of health problem that they associated with cooking with wood, the most common ailments being cough, eye irritation and body aches and pains caused by carrying wood.

Safety

- 57% said the CleanCook stove is Safe
- 43% said it is Very Safe.
- Compared to LPG, 72% said the CleanCook is safer,
- Compared to wood, 54% said the CleanCook is safer.



'I always cooked with wood. Today I have serious pulmonary problems caused by the excessive smoke. I didn't use the LPG stove because it scared me. With the alcohol stove there is no danger'. —D. Nivea, female head of household

The families felt safe using the CleanCook stove, especially when children were around. They noted that the canisters could not leak fuel and there was no risk of explosion, unlike LPG.

Smoke levels

- 71% said the kitchen environment was cleaner from using the CleanCook stove.
- 76% said the smoke level was equal to or less than LPG smoke levels,
- Compared to wood, 85% said the smoke level of the CleanCook stove was lower.

Positive and negative factors of the CleanCook stove:

These were reported from open ended questions, and some families gave more than one response:

- Positive factors: 45% noted safety, 48% said rapid cooking time. Some commented on the low smoke levels and the use of the flame regulator. On average, families saved between 20-30 minutes a day from cooking on the CleanCook stove.
- Negative factors: 28% said they did not have anything negative to say, 19% said it did not fit some of their pots very well, 12% said the stove did not have enough burners, 9% said it made their pot bottoms dirty, and 9% said it was difficult to clean. 19% remarked about the high cost per liter of ethanol.



'My 11 year old daughter is able to use the CleanCook stove. It is very simple and has no danger. ' –Wilma Aparecida, Dom Orione

Willingness and ability to pay for CleanCook:

In relation to a price they could afford:

- 63% said between R101-200 (R100 ~ \$57US)
- 20% said more than R200,
- 14% up to R\$ 100,
- 3% did not know.

Payment options

- 35% said they would buy it on the spot
- 65% said they would need financing
- 70% of these respondents saying they would use microcredit

Fair ethanol price

The majority commented that the price at the pump is expensive. In Dom Orione, Betim:

- 66% considered a reasonable price to be under R1.00 (during the study, the pump price per liter was R1.80).
- 51% said they would use it up to a maximum price of R1.50, and 28% said between R1.50-2.50.

In Betim, 53% of families continued using the CleanCook stove after the pilot study, obtaining their ethanol from the local gas station.

Suggestions for improvements

Families gave two or more suggestions:

- 70% - improve pot supports
- 85% - additional oven
- 45% - a built-in table stand
- 9% - more burners

Outlook

The results from Dom Orione are consistent with the results of the other sites where we tested the CleanCook stove. After the 3 months that the alcohol was donated, we implemented an offsetting cost per liter of alcohol mechanism to determine willingness to pay for the ethanol.

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, such as campsites and for truckers, where it is being accepted favorably by the users.

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.

Brazil'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 microdistillery 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.

The agriculturalists intend to form an association for producing rapaduras to sell through the local government, and alcohol would be used to supply fuel to families with CleanCook stoves.

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