Energy from Coffee Waste in Central America

Executive Summary

Latin America produces around 70% of the world’s coffee. Coffee processing, and in particular the practice of wet method extraction common in Central America, is energy intensive and demands a significant amount of water. The waste water generated from coffee processing is rich in organic matter and is often discharged untreated into local water sources used by the rural population for drinking water. Aside from water pollution, untreated coffee waste water also generates methane emissions more harmful than greenhouse gas CO2. As such, coffee processing is a major contributor to environmental contamination and poses a direct threat to human health.

Overview & Results

19 pilot sites in Guatemala, Honduras and Nicaragua were chosen to illustrate the benefits of implementing effective waste water treatment systems on different types of farms and to ensure adaptability and scalability of the initiative. Results achieved during the pilot are summarized below together with the criteria upon which the sites were selected. Costs mentioned are approximate and intended as a guide.

### Biomass for energy as a solution

The Energy from Coffee Waste in Central America project offers a solution to these on-going issues by focusing on the effective treatment of coffee waste water through newly installed water treatment systems. Methane generated by the waste water is captured in the system, providing a clean and safe biogas for farmers to run pulping machines, heat kitchen stoves and other appliances. This lowers both the carbon and water footprint of coffee production and provides multiple environmental, social and economic benefits to farmers and their communities as well as for the entire coffee sector.

<table>
<thead>
<tr>
<th>Goal 1: Sustainable Water Management</th>
<th>Goal 2: Biogas production</th>
<th>Goal 3: Sustainable environment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Small scale wet mill</strong></td>
<td><strong>Medium scale wet mill</strong></td>
<td><strong>Large scale wet mill</strong></td>
</tr>
<tr>
<td>Water used during processing was reduced by an average of 60-70%, reaching a water use of 18.2l/kg green coffee. On average 89% of contamination disposed.</td>
<td>Water used during processing reduced by an average of 50-60%, reaching a water use of 15.2l/kg green coffee. On average 83% of contamination disposed.</td>
<td>Water used during processing reduced by an average of 40-50%, reaching a water use 7.4l/kg green coffee. On average 89% of contamination disposed.</td>
</tr>
<tr>
<td>321m³ biogas generated per producer per harvest and was used for the stove, replacing firewood for 4-5 months.</td>
<td>2,043m³ biogas produced per harvest per cooperative and was used for the community stoves, replacing firewood for 4-5 months.</td>
<td>18,000m³ biogas produced by end of project and was used as a electric power for the wetmill and as heating power for the treatment system.</td>
</tr>
<tr>
<td>8.3tons less CO₂ released into the atmosphere due to reduction in use of firewood. 20 full size Guava trees saved by 5 producers who used biogas for cooking instead of firewood (harvest 2011-12, 2012-13)</td>
<td>9.84 ton less CO₂ released to the atmosphere due to reduction in use of firewood. 15,450kg firewood was saved, equivalent to 35 full size Guava trees (harvest 2011-12, 2012-13).</td>
<td>22,000m³ water was treated during the pilot project resulting in a significant reduction in contamination of the environment and water sources.</td>
</tr>
</tbody>
</table>
Technology used

- Cleaner Production Practices\(^2\) implemented to reduce water consumption during processing based on principles of Reject, Reduce, Reuse, Recycle, Treat and Dispose.
- Installation of anaerobic systems to treat highly contaminated coffee waste water.
- Methane generated during the decomposition process captured in the reactor and used as clean and safe fuel to run pulping machines, kitchen stoves, lamps etc.
- Low maintenance system, easy to operate and can be owned and managed by the beneficiaries.

Scalability

During the successful pilot phase, UTZ Certified gained the knowledge and practical expertise required to install and implement waste water treatment systems across multiple sites. As such the initiative is now ready to progress from pilot project to further expansion in and beyond Central America.

The results of the pilot sites illustrate how Energy from Coffee Waste in Central America contributes to reducing the negative environmental impact of coffee processing and provides the opportunity for farmers and their community to improve their livelihood. The initiative offers the entire coffee supply chain the opportunity to jointly build an environmentally and economically sustainable coffee sector supplying coffee that actively protects the environment and adds value to the chain. We invite interested parties to join us in this effort.

Contact information

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Background

In 2010, UTZ Certified, the Netherlands-based sustainability program was honoured to be awarded funding for the Energy from Coffee Waste in Central America project by The Global Sustainable Biomass Fund. The Global Sustainable Biomass Fund is commissioned by the Ministry of Foreign Affairs and implemented by Agency NL, a department of the Dutch Ministry of Economic Affairs, Agriculture and Innovation. Additional funding was also provided by Hivos in 2011.

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1. These are estimations of construction costs to scale a similar project in the same region based on our experience through this pilot project.
2. “Guide for Cleaner Production Practices” is an existing tool that offers a clear and simple analysis of the stages needed to develop a Cleaner Production Program for wet mills on farm and industry level. Available in Spanish only. Guide developed by ACERES for SNV-Solidaridad, 2009