

Projects for Peace: Converting Livestock Manure into a Fuel Source for Thai Ethnic Tribes

Liza Mitchell, Phillip Sasser, Julianne Kellogg

Our Idea

There are nine major ethnic tribes located in Northern Thailand which are often referred to collectively as 'the hilltribes'. However, each of these ethnic groups have their own communities throughout the region, and although they interact more and more as globalization spreads, they all maintain their own identities. These identities are manifested in their dress, language, cultural traditions, and agricultural practices. Each tribe is a unique community, but they do have a commonality in their marginalization and segregation from central Thai society. Sustainable development initiatives are crucial at this moment as the modernization of Thailand begins to affect rural areas and catalyze cultural transformations. As these communities strive to retain their self-sufficiency and cultural independence it is in their best interest to utilize all of their available resources.

In recent years, the conversion of biomass to methane for use as an energy source has excited interest throughout the world. Biogas digestion was introduced into developing countries as a low-cost alternative source of energy to partially alleviate the problem of acute fuel source shortage for households. However, few farmers use biogas in practice. The poor acceptability of the digesters is believed to be due to the high cost of the digesters, difficulty in installing them and scarcity of spare parts. The biogas programs progressed quickly in some developing countries only under substantial support from governments and aid agencies (Marchaim, 1992; Karki, 1996). Many developing countries, such as Colombia, Ethiopia, Tanzania, Vietnam, Cambodia and Bangladesh have promoted the low-cost biodigester technology (Sarwatt, 1995; Soeurn, 1994). The projects in these countries have focused on low production costs and use of local materials with simple installation. To date, there have been very few projects of this nature targeting rural communities in Thailand, and this is precisely what we intend to change.

Our Inspiration

We participated together on a study abroad program in Thailand which focused on language studies and sustainable development in the fields of agro-ecology, political ecology of the forests, and coastal ecology. With the focus on experiential and place-based education, we spent one month trekking through remote villages in the mountainous region of Northern Thailand along the Burmese border and staying with indigenous households, and a second month living in rural farming communities in Central Northern Thailand. We were all inspired by the potential for more sustainable practices that could increase community self-sufficiency in the more remote areas. During an agro-ecology course in Fang province, we were exposed to the idea of biogas digestion. However, we saw a large, material-intensive, cement methane digester. This device did not seem to be well accepted locally as it served only one house and was built using foreign technologies that could not be replicated by the local inhabitants. This type of digester was not appropriate for the context of a small rural village, nor would it be very practical for us to implement with the time and money allotted. After researching the topic extensively, we have discovered there are many more types of biodigesters that are more practical in terms of materials, implementation, maintenance, and the potential for diffusion of the technology throughout the region. We have identified a design based on a bag biodigester model that can be constructed at a low cost and incorporates a continuous-flow flexible tube for easy gas transport to households.

Biodigesters improve the quality of life of rural farmers by using methane, produced by livestock manure, to power a kitchen stove. Furthermore, the manure can later be removed and used for fertilization. Pigs are one of the most common livestock for individual households across ethnic groups in Northern Thailand. Through extensive travel and home stay experiences, we learned pigs have always been a traditional part of a farm in Thailand for consumption, although recently they have become a commercial commodity. Pig manure creates a relatively high level of biogas (methane) output compared to other livestock, especially cows, providing very efficient fuel for the digester. Additionally using the methane for cooking fuel addresses the current environmental concern of emissions contributing to global climate change. The system uses methane gas that would otherwise go directly into the atmosphere and reduces emissions from wood burning that is the current fuel used for cooking.

Major Objectives / Project Specifics

The purpose of this project is to build small scale methane biodigesters in various hilltribe villages in Northern Thailand to provide the communities with a sustainable source of cooking fuel. Through workshops held in every village we attend, we intend to inform the locals on the process of building and maintaining these digesters, as well as focusing on the multiple benefits they provide such as fuel, fertilizer, lower energy costs, resource conservation and improved health.

We will target different ethnic tribes in order to maximize our influence in the region. Because each ethnic group has a strong internal network and the technology is simple, the methods can be shared and diffused throughout the area. Recognizing the controversial aspect of imposing foreign technologies on remote communities, we will only install the biodigesters in villages and for households that express an interest and commitment to maintaining the functionality of the digester. Farmer participation and involvement is a must in these projects. This includes aiding in material collection, understanding of costs for biodigester installation, and opinions on placement and construction. Upon installation, farmers will understand their digester life in terms of potential technical problems, when they may occur, how to fix them and what materials will be needed.

Promoting Peace

This project is not about forcing outside knowledge and technology onto another society. It is about opening a dialogue between two cultures. We hope to build peaceful relations with rural small farms surrounding the development of alternative energy sources that are site and culture specific. This project is not made for a team of three, but for a team of a village with three students excited to initiate the development of biodigesters that lead to the independence of villages from fuel sources that are costly (propane) or controversial and detrimental to their health (forest harvesting and burning). Again, small-scale farmers and villagers benefit from such low budget biodigesters in several ways. The use of biodigesters change cooking parameters to a low emission fuel source, the economics of biogas use is sustainable, and the effluent from livestock can be used for fertilizer. This project will not only promote a healthier, more efficient system into rural Thailand, but it will also help these cultures peacefully retain their identity by promoting self sufficiency.

Timeline for Project / Implementation

We have identified the specific villages we intend to visit based on our experience in Thailand and research since then. However, we realize that this project relies on cooperation and commitment by the communities themselves. We do not expect any major difficulties in this respect, but we are prepared to be flexible in our plan and use our existing contacts and networks in the area to find alternative destinations.

Week 1: Arrive in Thailand and travel to Chiang Mai to connect with contacts, explore material purchases, make final travel plans to the villages.

Weeks 2-3: Huay Chonu: A Palong village in Fang Province. This ethnic group is one of the smallest and most marginalized minorities in Thailand.

Weeks 4-5: Dton Loong: A Lisu village North of Chiang Mai marketing themselves as eco-tourism destination.

Weeks 6-7: Mae Sai: A town located on the border with Burma inhabited by a variety of ethnic groups

Weeks 8-9: Huay Hee: A Karen village with an established Community Based Tourism program in the province of Mae Hong Son

Week 10: Wrap up, organize records and create final report with suggestions for continuation of project.

At each location the first week will consist of a village wide workshop on the purpose, use and maintenance of bio-digesters. We intend to work with locals to gather whatever materials are locally available and decide on specific placement (near pig pens and water source). The second week will focus on the construction of digesters for the community. Four houses in each community will benefit directly from the digesters we build, but the community will be empowered with the knowledge to continue and expand biodigester use.

Budget

Total people working on project: 3

Transportation

- To and From Thailand:\$1700/person *3 persons = \$5100
- Visa Fees.....\$150/person *3persons=\$450
- Within Thailand
 - Trains:\$200/person = \$600
 - Buses and Taxis:\$100/person = \$30

Room and Board

- Total (host families and self-provided):\$50/person/week = \$150/week = \$1500

Biodigester Systems

- As used by past students in Vietnam:\$100/household = \$1600
- We are projecting to help 4 households per village for 4 villages
- Many sources say that biodigesters cost \$25 for materials available in Thailand

Sub Total:.....\$9550

For the Rest:

- **\$450** for unexpected costs or possible translator hiring with our connections with the International Sustainable Development Studies Institute and the organic farming communities in Phang, Mae Ta, and Mae Hong Son provinces.

Sources:

Fundación Cosecha Sostenible Honduras, “Gas-Biodigester Information and Construction Manual for Rural Families”

Ravindranath, N.H and Sathaye, Jayant A. “Climate Change and Developing Countries” Kluwer Academic Publishers. pp. 155 – 159

Bui Xuan An, Preston, Thomas R., Dolberg, Frands “Documents, Tools and Resources: The Introduction of Low-Cost Polyethylene Tube Biodigesters on Small-Scale Farms in Vietnam” University of Agriculture and Forestry, Thu Duc, Ho Chi Minh City, Viet Nam, Department of Political Science, University of Aarhus, Denmark
Marchaim, 1992; Karki, 1996; Sarwatt, 1995; Soeurn, 1994 Cited in this article

Duncan Forbes, CC Student '09, traveled to Viet Nam and constructed similar biodigester systems. He will act as an advisor and mentor for our project.

Contacts Abroad:

International Sustainable Development Studies Institute, Chiang Mai, Thailand – 0817240860

We have extensive contacts with many individuals within and connected to this reputable organization.