WASTE MANAGEMENT AND BIOGAS TECHNOLOGY PROMOTION IN THE PHILIPPINES

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SYNOPSIS

- Introduction
- Milestone
- Statistics
- Policies
- BAI Experience
- Comparative cost of Digester
- Biogas models
- Current Program
Introduction

- Livestock is considered socially and politically significant in the Philippines;
- In January 30, 1930 BAI was created by virtue of RA 3639 and is mandated to oversee the development of livestock, poultry and dairy industries.
- 9 production and research centers all over the country
- Have offspring specialized numerous offices
Milestone of Biogas Technology

- 70’s – BAI implemented a biogas project and installed nearly 400 floating dome type digester;
- 90’s – introduction of Tubular Polyethylene Digester (TPED);
- 2000’s – development of High Density Polyethylene Digester (HDPED) and Scalable Polyethylene Drum Digester (SPEDD);
- 2015 – Secretary Alcala signed AO #2 s 2015 – creation of the National Animal Waste Resource Management Program (NAWRMP)
The population of the Philippines is projected to reach 120M in 2050;

- 150 kg of rice
- 5 doz of eggs (1 layer per 5 persons) (24M layers)
- 14 kg of meat and poultry (pig 1:8) (broiler 4:1)
- 15-25 kg of fish
- 20 kg of fruit
- 43 kg vegetable
Table 1. Comparative figures for selected Asian countries

<table>
<thead>
<tr>
<th></th>
<th>Total Pop, Million¹</th>
<th>Rural Pop, Million</th>
<th>Surface 1,000 Km²²</th>
<th>HDI³</th>
<th>GDP/Capita in ppp USD</th>
<th>GDP growth 2008 %</th>
<th>Hogs Heads Million 2009⁴</th>
<th>Cattle Heads Mln 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philippines</td>
<td>93</td>
<td>31</td>
<td>300</td>
<td>0.745</td>
<td>3,153</td>
<td>3.8</td>
<td>13.5</td>
<td>2.6</td>
</tr>
<tr>
<td>Vietnam</td>
<td>89</td>
<td>65</td>
<td>331</td>
<td>0.718</td>
<td>2,363</td>
<td>6.2</td>
<td>26.6</td>
<td>6.7</td>
</tr>
<tr>
<td>Thailand</td>
<td>68</td>
<td>43</td>
<td>513</td>
<td>0.886</td>
<td>7,613</td>
<td>2.6</td>
<td>8.3</td>
<td>6.5</td>
</tr>
<tr>
<td>Indonesia</td>
<td>205</td>
<td>110</td>
<td>1,860</td>
<td>0.726</td>
<td>3,455</td>
<td>6.2</td>
<td>6.7</td>
<td>11.5</td>
</tr>
<tr>
<td>Malaysia</td>
<td>26</td>
<td>8</td>
<td>330</td>
<td>0.823</td>
<td>12,536</td>
<td>4.6</td>
<td>2.0</td>
<td>0.8</td>
</tr>
</tbody>
</table>

### Waste management of hog populations in different size categories as of 2002-2003

<table>
<thead>
<tr>
<th>Size of farms</th>
<th># of hogs</th>
<th>Waste management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COMMERCIAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small</td>
<td>21 to 999 heads</td>
<td>46% - Lagoon 40% - Settling Ponds</td>
</tr>
<tr>
<td>Medium</td>
<td>1000 to 9,999 heads</td>
<td>62% - Lagoon 7% - Biogas</td>
</tr>
<tr>
<td>Large</td>
<td>10,000 heads of more</td>
<td>65% - Lagoon 9% - Biogas</td>
</tr>
<tr>
<td><strong>BACKYARD</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 heads or less</td>
<td>20% - Lagoon 20% - Open Pit 13% Septic Tank</td>
</tr>
</tbody>
</table>

Swine = 13.5 million pigs,

- 69% is found in the smallhold sector/backyard farmers with <50 heads holding.
- The swine industry, which accounted for 80% of total livestock production registered a 2.72% growth during the year.
- The top three producing regions are Regions III, IV-A and VI with region VI having the most backyard inventory and region III topping the population in commercial farms (BAS, 2014)

Sources:


POLICIES

- Philippine Energy Plan (PEP) is one of Energy Independence and focuses on attaining a sustainable 60.0 percent energy self-sufficiency beyond 2010 through alternative fuels.

- Republic Act (RA) 8749 Philippine Clean Air Act of 1999 - sets goals for the reduction of GHG emissions in the country using permissible standards and control strategies.

- RA 9275 known as “Clean Water Act of 2004” - aims to protect the country’s water bodies from pollution from land-based sources (industries and commercial establishments, agriculture and community/household activities). It is later amended to utilized process water for agricultural irrigation and landscaping in times of water scarcity.
The Renewable Energy Act of 2008 - aims to further increase renewable energy utilization in the country, including biogas. The law provides for income tax holidays, duty free importation of equipment, 0% VAT, among other things.

Presidential Decree (PD) 984 known as Pollution Control Decree of 1976 to prevent, abate and control pollution of water, air and land for the more effective utilization of the resources of this country.

RA 9003 Ecological Solid Waste Management Act of 2000 ensures the protection of public health and environment through the adoption of a systematic, comprehensive and ecological waste management program.
**Comparative Cost**

Table 2. 4m³ Biogas Digester price in Asia for a

<table>
<thead>
<tr>
<th></th>
<th>Investment</th>
<th>Local currency</th>
<th>PHP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philippines HDPE</td>
<td>[PHP]</td>
<td>[PHP]</td>
<td>55,000*</td>
</tr>
<tr>
<td>Philippines Stacked dome</td>
<td>[PHP]</td>
<td>[PHP]</td>
<td>60,000*</td>
</tr>
<tr>
<td>Nepal</td>
<td>42,673</td>
<td>[NPR]</td>
<td>28,589</td>
</tr>
<tr>
<td>Vietnam</td>
<td>8,000,000</td>
<td>[VND]</td>
<td>24,046</td>
</tr>
<tr>
<td>Cambodia</td>
<td>2,052,650</td>
<td>[KHR]</td>
<td>25,915</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>26,000</td>
<td>[BDT]</td>
<td>21,138</td>
</tr>
<tr>
<td>Laos</td>
<td>4,232,000</td>
<td>[LAK]</td>
<td>26,076</td>
</tr>
<tr>
<td>Pakistan</td>
<td>43,351</td>
<td>[PKR]</td>
<td>28,487</td>
</tr>
</tbody>
</table>

Note: Government price, VAT Inclusive

Source: *Feasibility Study of a National Biogas Programme on Domestic Biogas in the Philippines, SNV and Winrock International, 2010*
Mitigation Practices
Tubular Polyethylene Digester (TPED)

Four units of Plastic tube digester were installed at the piggery in Soro-soro, Batangas to suit the farmer’s needs.
The HDPED gives you the flexibility to fabricate desired size and length; durable and resilience hence reduce maintenance and downtime
SCALABLE POLYETHYLENE DRUM DIGESTER (SPEDD)

Design for micro users.
STACKED DOME DIGESTER

Higher operating pressure thus more versatile; compact and high efficiency due to the mechanical stirrer
- Brooding Lamp
- Mantle Lamp
- Commercial Oven
- Converted stove
- Generator
- Water pump
- Biogas Rice cooker
Opps!
ON-GOING PROGRAMS THAT SUPPORT PROPER ANIMAL WASTE DISPOSAL
GOOD ANIMAL HUSBANDRY PRACTICES
NATIONAL ANIMAL WASTE RESOURCE MANAGEMENT PROGRAM

2015
MANILA BAY CLEAN-UP AND REHABILITATION
Key Causes & Areas of Pollution & Sedimentation

**Metro Manila:** Untreated sewage, solid waste, informal settler & structures.

**Laguna Lake:** Untreated sewage, point and non-point runoff causing excessive nutrients & siltation.

**Cavite/Pampanga/Bataan:** Agricultural/ livestock waste discharge leading to elevated coliform levels.

**Bulacan:** Untreated sewage, informal settlers/structures, industrial waste/ heavy metal contamination.

**Hotspots:** 14 areas identified for priority action. Detailed plans available for Bulacan (Marilao-Mecauayan-Orlando)
REFERENCES

- Feasibility Study of a National Biogas Programme on Domestic Biogas in the Philippines, SNV and Winrock International, 2010

- The Philippine Livestock and Food Processing Waste Initiative of the Methane to Markets Partnership, USEPA, 2009
THANK YOU!