On-farm waste-to-energy for increased agricultural productivity

GBEP Semana da Bioenergia

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President Obama supports an “all-of-the-above” energy policy

“We’re not going to be able to just drill our way out of the problem of high gas prices…If we are going to control our energy future, then we’ve got to have an all-of-the-above strategy. We’ve got to develop every source of American energy—not just oil and gas, but wind power and solar power, nuclear power, biofuels.”
“All-of-the-above” for bioenergy means developing agricultural resources where they do best
“All-of-the-above” is important for Bioenergy and Agriculture in West Africa
The digestate – or slurry – is rich in Carbon, Nitrogen and Phosphorous and is an excellent soil fertilizer.
Fig. 3. Schematic representation of the closed cycle of anaerobic digestion of biogenic waste and the three main steps (A, B and C) of the quality management process (Al Seadi, 2002).
U.S. livestock production generates a lot of carbon co-products

The high Biological Oxygen Demand of this organic waste leads to anaerobic metabolism in these waste lagoons that produces methane.
Animal Waste Management System

Collection -> Digester -> Storage

Application / Utilization
USDA helps farmers to use methane to power farm operations or to feed into the electrical grid.

Biogas is “generating” jobs and higher farm income in rural America.
Biogas plants can be scaled for household or village use

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Advancing Renewable Biomass Energy: Promotion of Sustainable Bioenergy Policies and Production in the Western Hemisphere
Energy and Climate Partnership of the Americas (ECPA)

Washington State University collaborates with Honduran Institute of Coffee (IHCAFE): Model Biodigester and Small Biodigestors
Energy and Climate Partnership of the Americas (ECPA)

WSU, Texas A&M, and Hidronacion collaborate on producing biogas from water hyacinth in the Daule Peripa Reservoir in Ecuador
In Honduras and Colombia USDA is promoting biogas as a means to energy access and biowaste management.
Wet-processing of coffee generates pulp biomass and waste water
Anaerobic digestion of wet coffee pulp generates energy that can be used to dry the coffee beans
Palm oil production and processing is a rich source of biomass for agriculture and bioenergy.
Palm oil mill effluent (POME) spontaneously generates methane by anaerobic digestion in waste ponds. The efficiency and profitability of the business can be increased by harvesting that energy and using it to power the palm oil mill.
Numerous Relevant International Activities

Domestic biogas

SNV's support for national programmes on domestic biogas spreads across three continents: Asia, Africa and Latin America. In our multi-stakeholder sector development approach, we aim to optimise organisational and institutional capacities already available in the country.

SNV started supporting biogas activities in Nepal in 1989 and in Vietnam in 2003. Since 2006, domestic biogas programmes have also been established in Bangladesh and Cambodia, while a pilot programme in Lao PDR took off in 2007. Pakistan and Indonesia launched biogas programmes in 2009; Bhutan in 2011. By the end of 2011, 430,000 households (2.5 million people) have been equipped with biogas plants. At the invitation of the Asian Development Bank, SNV is now leading a working group on domestic biogas in the framework of the ‘Energy for All Partnership’. Through this initiative, an additional one million biogas plants are planned across the Asian region by 2015.

SNV’s biogas activities have been expanded to include Africa. Rwanda is the first country of engagement, with another six countries (Senegal, Burkina Faso, Ethiopia, Tanzania, Uganda and Kenya) targeted in the framework of the ‘Africa Biogas Partnership Programme’. This Programme took off at the end of 2008, in cooperation with Hiros, and aims to reach 70,000 households by 2013. Cameroon is developing its programme since 2009; Benin since 2010.

The experiences and lessons learned from Asia and Africa are underway to Latin America. Nicaragua conducted a feasibility study in 2010 and initiated a biogas programme in 2012. Peru and Bolivia are in an exploratory phase.

SNV-supported national domestic biogas programmes:
- Bangladesh: www.idcoi.org
- Cambodia: www.nbp.org.kh
- Indonesia: www.biru.or.id
- Lao PDR: www.biogaslao.org
- Nepal: www.bspnepal.org.np
- Tanzania: biogas-tanzania.org
- Vietnam: www.biogas.org.vn
Numerous Relevant International Activities

Africa Biogas Partnership Programme

The Africa Biogas Partnership Programme (ABPP) comprises a partnership between Hivos and SNV in supporting national programmes on domestic biogas in six African countries. The Programme aims at constructing 70,000 biogas plants in Ethiopia, Kenya, Tanzania, Uganda, Senegal and Burkina Faso providing about half a million people access to a sustainable source of energy by the year 2013.
Relevant USDA Programs

Food for Progress

Scientific Exchanges
The *Cochran Fellowship Program* provides U.S.-based agricultural training opportunities for senior and mid-level specialists and administrators from public and private sectors who are concerned with agricultural trade, agribusiness development, management, policy, and marketing.

The *Norman E. Borlaug International Agricultural Science and Technology Fellowship Program* (Borlaug Fellowship Program) helps developing countries strengthen sustainable agricultural practices by providing scientific training and collaborative research opportunities to visiting researchers, policymakers, and university faculty.
YouTube videos of anaerobic digesters for household and village level use

*Du biogaz pour préserver les forêts de RDC*
http://www.youtube.com/watch?v=PZYY24SIWQ4

*Kenya News Report*
http://www.youtube.com/watch?v=CBLUCw7Pafw&feature=related

*Greenpeace UK*
http://www.youtube.com/watch?v=but5ntRMQQc&feature=related

*Penn State simple digester*
http://www.youtube.com/watch?v=7Ha50GP4a00

*Large digester in Uganda*
http://www.youtube.com/watch?v=s4EWOoPY5OY&feature=related

And many, many more . . .
Policy and Technology Fair

Agricultural Biomass as a Renewable Energy Source

Focus countries include:
COLOMBIA, ECUADOR, GUATEMALA, HONDURAS, MEXICO, PANAMA, URUGUAY, and UNITED STATES

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Anaerobic digestion for on-farm energy production

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