



Supportive Environments for Healthy Communities

## Issue 5 April 22, 2011 | Focus on the Integration of WASH and IAQ

This *WASHplus Update* provides links to recent reports that highlight activities that integrate household water treatment (HWT) and indoor air quality (IAQ) as well as studies and videos on the use of biogas from human and other wastes and its use to replace firewood in cookstoves for health and environmental improvements.

### HOUSEHOLD WATER TREATMENT & SAFE STORAGE AND INDOOR AIR QUALITY

- **In the News: Swiss Water Firm Taps Kenya's Carbon Market**– April 20, 2011 ([Link to article](#))

Swiss firm Vestergaard Frandsen plans to distribute water purifiers in western Kenya to reduce the use of firewood and kerosene for water treatment.

- **Combined Household Water Treatment and Indoor Air Pollution Projects in Urban Mbanda, Cameroon and Rural Nyanza, Kenya, 2011**– WHO. ([Link to full-text](#))

The positive experience from these two projects concerning the apparently clear benefits of delivering household water treatment and household energy interventions in an integrated way has important implications for future programs. Specifically, the key strategic question is whether integrated delivery should be the norm, rather than, as at present, the exception and only seen in a few innovative projects.

- **An Investigational Research on the Synergy of Water Pasteurization and Improved Cook Stove for Providing Safe Drinking Water and Improved Indoor Air**, IN: *Appropriate Water Supply, Sanitation and Hygiene (WASH) Solutions for Informal Settlements and Marginalized Communities Proceedings May 19-21, 2010 Kathmandu, Nepal* ([Link to full-text](#)) (**Report starts on page 33**)

One of the popular smoke reducing technologies in Nepal is the mud two-pot-hole Improved Cook Stove (ICS) promoted by Alternative Energy Promotion Centre/Energy Sector Assistance Programme. Likewise, various household drinking water treatment options are currently available in Nepal. The Chulli System, used in Bangladesh,

reported the use of pasteurization to purify water using the heat in the combustion chamber of a traditional cooking stove.

- **Safe Drinking Water and Clean Air: an Experimental Study Evaluating the Concept of Combining Household Water Treatment and Indoor Air Improvement Using the Water Disinfection Stove (WADIS)**, IN: *Int J Hyg Environ Health*. 2009 Sep;212(5):562-8. ([Link to full-text](#))

A Water Disinfection Stove (WADIS) based on a Lorena-stove design with a simple flow-through boiling water-treatment system was developed and tested by a pilot experimental study in rural Bolivia. The results of a post-implementation evaluation of two WADIS and 27 Lorena-stoves indicate high social acceptance due to convenience gains of the stove rather than to perceived health improvements. The WADIS concept unifies two interventions addressing two important global burdens of disease.

## SANITATION AND INDOOR AIR QUALITY

### Reports

- **Bangladesh: Lessons from Household Energy and Sanitation Programs**, 2010. World Bank. ([Link to full-text](#))

Bangladesh has achieved tremendous success with its sanitation initiative – the Total Sanitation Campaign. The premise for this study is that given the similarities between the sanitation and household energy sectors it should be possible to follow the lead of the Total Sanitation Campaign and develop successful demand-based approaches for an improved cookstove program.

- **Biogas as a Potential Renewable Energy Source: A Ghanaian Case Study**, IN: *Renewable Energy* 36 (2011) 1510e1516. ([Link to full-text](#))

About 87% of Ghanaian households use woodfuel as their source of fuel for cooking. There is smoke exposure in the indoor environment as a consequence of using woodfuel as a source fuel in households. Biogas used as cooking fuel drastically reduces smoke in the kitchen.

- **Design and Performance Evaluation of Biogas Stove for Community Cooking Application**, IN: *International Journal of Sustainable Energy*, 29(2) 2010. ([Link to abstract](#))

Matured biogas production technology has led to the development of a number of biogas appliances for lighting, power generation, and cooking. The most promising among them is the biogas stove to meet the energy requirements for cooking application at domestic as well as at the community level.

- **Estimating the Potential for Biogas Production and Application in Morogoro Region, Tanzania**, IN: *Energy & Env*, 20(8) 2010. ([Link to full-text](#))

About 87% of Tanzanian households rely on energy from fuel-wood and charcoal for

cooking. This threatens sustainability as annual deforestation currently stands at about 500,000 hectares. Biogas can be an alternative source, especially where there is potential, as in the Morogoro region. Considering the corresponding calorific values of wood versus biogas and respective stove efficiencies, each household can realize up to US\$ 724 by replacing wood use with biogas, apart from other positive impacts to the environment.

- **Evaluation of Biogas Sanitation Systems in Nepalese Prisons**, 2010. Eawag, Swiss Federal Institute of Aquatic Science and Technology ([Link to full-text](#))  
Given the use of biogas for cooking, 59% of the interviewed inmates appreciated less smoke in the kitchen (and thus less respiratory health problems) and 49% mentioned the improved sanitary and hygienic conditions. Up to 41% of the money previously spent for conventional cooking fuel could be saved due to the use of biogas.
- **Greenhouse Gas Emission Reductions from Domestic Anaerobic Digesters Linked with Sustainable Sanitation in Rural China**, IN: *Environ. Sci. Technol.*, 2011, 45 (6), pp 2345–235 ([Link to abstract](#))  
Anaerobic digesters provide clean, renewable energy (biogas) by converting organic waste to methane and are a key part of China's comprehensive rural energy plan. The interaction of biogas installation programs with policies supporting improved stoves, renewable harvesting of biomass, and energy interventions with substantial health benefits are discussed.
- **Health Costs of Dung-Cake Fuel Use by the Poor in Rural Nepal**, 2010. SANEI ([Link to full-text](#))  
Switching the cooking fuel from dung-cake to biogas benefits households through health and productivity benefits as well as to society through reduced emission of greenhouse gases. The study estimated the burden of health costs due to the use of dung-cake and provided a basis for adoption of cleaner fuels like biogas.
- **Ethiopia - Indoor Air Pollution and Health Risks among Rural Dwellers in Odeda Area**, IN: *Ethiopian Journal of Environmental Studies and Management Vol.3 No.6. 2010.* ([Link to full-text](#))  
A sustainable alternative source of energy that is readily available should be developed for the use of rural dwellers. Biogas is prominent among the possible energy sources that could be managed at the household level. Cooking stoves with efficient combustion design should be introduced into rural communities to minimize the emission of pollutants during the cooking process.

## Videos

- **Biogas in Ethiopia**, 2010. ([Link to video](#))  
Fifty years ago nearly half of Ethiopia was covered in forests. Today, only 3% is left. Deforestation is an important cause for climate change and one way to stop

deforestation is to use biogas.

- **Goan Rural Women Await Biogas**, 2011. ([Link to video](#))

Produced from the anaerobic digestion of manure in small-scale facilities, biogas not only produces energy that can be used for cooking stoves, but it is also a clean way to dispose of material such as biomass, manure, municipal waste and sewage.

- **SNV and Domestic Biogas Technology**, 2009. SNV. ([Link to video](#))

Domestic biogas plants convert animal manure and human excrement at household level into small, but valuable, amounts of combustible methane gas. This biogas can be effectively used in simple gas stoves for cooking and in lamps for lighting. Especially in remote rural areas where electrification does not exist, farmers can use biogas for lighting and cooking.

*WASHplus Updates* will highlight topics such as Urban WASH, Indoor Air Quality, Innovation, Household Water Treatment and Storage, Handwashing, Integration, and more. If you would like to feature your organization's materials in upcoming issues, please send them to Dan Campbell, WASHplus Knowledge Resources Specialist, at [dacampbell@aed.org](mailto:dacampbell@aed.org).



**About WASHplus** - WASHplus, a five-year project funded through USAID's Bureau for Global Health, creates supportive environments for healthy households and communities by delivering high-impact interventions in water, sanitation, hygiene (WASH) and indoor air quality (IAQ). WASHplus uses proven, at-scale interventions to reduce diarrheal diseases and acute respiratory infections, the two top killers of children under five years of age globally. For information, visit [www.washplus.org](http://www.washplus.org) or contact: [washplus@aed.org](mailto:washplus@aed.org).

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