

AGRICULTURE SUCCESS STORY

Electricity Generation from Dairy Farm Biogas

Province of Punjab, Pakistan

Winrock International

OVERVIEW OF AGRICULTURE PROJECT:

Winrock International, with a grant from U.S. EPA, implemented a project to build the capacity of private biogas companies for installing medium-sized biogas plants. Under this project, biogas plant construction companies and dairy farmers mobilized a project using cow manure for biogas production and to meet on-farm electricity requirements. Biogas construction companies were trained to design, construct, and monitor quality construction of biogas plants. Farmers were trained to use the biogas for electricity generation, identify the farm's load management for using the biogas in the most efficient manner, and operate and maintain the biogas plant/power generators. They were trained to monitor the overall system performance to maintain a record of gas production, electricity generation, and thermal use of biogas.

PROJECT START DATE: Mid-2011

ACTUAL ANNUAL EMISSION REDUCTIONS: 294 MTCO₂E

PROJECT DETAILS

- **Site name:** Province of Punjab, Pakistan
- **Geographic location:** Four dairy farms in Okara, Sukheki, Multan, and Sargodha
- **Type of feed stock(s):** Cow manure
- **System type and components:** Fixed dome biodigester, water separator, H₂S scrubber, power generator, cooking stoves

PROJECT HIGHLIGHTS

- Biogas plants are located at the Nestle Training Centre, and at private dairy farms in areas facing electricity shortages.
- During the project period 15 prefeasibility and eight feasibility studies were completed, five biogas plants were installed on four dairy farms, and a sixth one is under construction.



Gas Pressure Valve at 75 m³ Biogas Plant at Hamidpur Dairy Farm



Biogas-Generated Electricity Being used for Water Pumping at KhanKhel Dairy Farm

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COST & REVENUE INFORMATION

Installed Cost (for 5 plants on 4 farms): US\$38,620
Estimated net revenue (US\$/year): \$17,490

Estimated payback period : 2-3 years
Financial Internal Rate of Return (IRR): 25-35%

LESSONS LEARNED

- Animal manure can be managed with anaerobic digestion, leading to an improved manure management system.
- Nutrient-rich fertilizer is a byproduct of biogas generation, which replaces chemical fertilizer. This also reduces consumption of natural gas for chemical fertilizer production. There is also financial value accrued from the sale of nutrient rich fertilizer.
- Biogas-generated electricity is inexpensive when compared to diesel-generated energy and replaces consumption of fossil fuel, resulting in a reduction of GHG emissions and energy expenses.
- There is a huge potential to scale up this initiative. This will help Pakistan meet most of the on-farm electricity requirements from electricity generated from cow manure and provide a cost effective solution to meet the dairy farms' energy needs.
- The market-oriented, sector development partnership and strengthening of multiple stakeholders approach adopted in this project will serve as a multiplier for propagation of the concept.



Biogas Plant at Nestle' Farm



Manure Collection Pit



Inlet being filled with Manure-Water Mixture

FOR MORE INFORMATION

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