

## A Small-Scale Biodigester Designed and Built in the Philippines by Gerry Baron (Quoted with his kind permission)

### Introduction:

I am a semi-retired engineer in the poultry and piggery business. It's been many years since university chemistry and biology classes.

The Philippines is a tropical country with just a dry and a rainy season. Ambient temperature is in the 30°C to 40°C range year-round -- ideal for biogas. The temperature under direct sun can be much higher. (I have to put shades on some of my digesters!)

For waste management and pollution control, the Department of the Environment and Natural Resources (DENR) has been promoting biogas production in large pig farms specially those already equipped with waste lagoons. Unlike India and their huge Gobar supply, cattle farms are few in the Philippines. We have many pig and poultry farms.

We don't have a "Gobar Gas Research Station." We have very little information, promotion and programs for biogas specially for small-scale systems. Compared to India's 2.9 million family-type biogas digesters in 2000, there are probably less than 100 such units in the Philippines. ([www.undp.org/seed/energy/policy/ch\\_8.htm](http://www.undp.org/seed/energy/policy/ch_8.htm))

My interest in biogas is motivated primarily by its ability to replace LPG as a cooking gas for most rural households. Its ecological benefit is an added bonus.



With 4-200 liter test digesters working since June and a 2 cubic meter (m<sup>3</sup>) demo digester working for more than a month, I continue to be very interested with my experiments – “a very useful hobby.”

My most efficient digesters use 5 %

poultry-manure by volume charged once every 2 weeks. (My 2 m<sup>3</sup> digester is fed 100 liters of pre-soaked and well-stirred manure every 2 weeks.) Biogas yield starts at 60 % and drops to 40 % before the next feeding.

The biogas output of my old poultry-manure test digester has dropped sharply at the end of the 5th month. Could it be because of Nitrogen overdose? Except for a small amount of effluent displaced during charging (usually 50 % of charge volume), there appears to be no

sediments in the digester. All manure seems to liquefy. I understand excess nitrogen goes out with sludge and turns into a nitrogen-rich fertilizer.



I am also concerned about anaerobic bacteria over-population and in-sufficient charging. Grass or biomass is a good alternative but because it floats it will be difficult to load in my digesters. Besides it requires additional work.

I chose to work with poultry-manure after getting lesser biogas yield from pig-manure. My 2 m<sup>3</sup> digester produces 1 m<sup>3</sup> of biogas daily for cooking. It uses 100 liters of poultry-manure once every 2 weeks. It is a very inexpensive and practical system.

It's something that will appeal to many rural folk. Everyone is welcome to see my demo unit and copy it. I may even provide drawings for FREE. This is my primary objective.



From a business viewpoint, I plan to sell ready-to-install kits when my design has become problem-free. I also hope to provide design consultancy and building capability for larger applications.