



News from IEI's Asian Regional Initiative in Bangalore (India) – March 2015

Value-addition to food crop processing: converting banana plant-waste to cooking fuel–up-scaling strategy

We have been advocating, through demonstration, the sustainable provision of clean energy services in villages, through the integration of economically- and environmentally-beneficial farm activities with the conversion of their waste to fuel.

In this case, currently being extended, banana cultivation with efficient resource use is combined with the generation of biogas for stove -fuel in homes. Expected benefits include production of a nutritious food source, enhanced local income from banana sales, replacement of solid-biomass-burning with clean (gaseous) fuel and the consequent impacts on local health and the quality of life, and availability of organic manure from digester effluents.

While the first phase of the project was successfully demonstrated at community-scale with large digesters linked through pipelines to houses in the community, we are now working on an up-scaling strategy for extending the “efficient banana cultivation -> waste used as renewable energy source -> clean fuel for homes” model to smaller groups in different localities. In this manner, even if entire villages/hamlets cannot be served, or all homes are unable to participate, groups of families willing to commit to a joint endeavour can avail of the integrated benefits. A critical resource is access to water: for sustainability, it is imperative that water is available either from surface sources or through wells in regions where groundwater has not been over-exploited.

At the project sites – four small farms in one village each, in Ramanagara district, Karnataka state -- banana cultivation is in progress, with efficient water and fertilizer use. The revenue from fruit sales will support not only the families involved but can contribute to the recovery of the capital costs of the efficient cultivation (e.g. drip-systems) and the biogas generation (digester plants).



The harvest of bananas is still some months away, but the construction of biogas-generation facilities was begun, so that the plantation waste can be digested as soon as it is available . All the plants have floating-drum digesters that have been successfully constructed by the project team for other projects and in other locations. The construction of each biogas



digester includes a masonry-lined cylindrical pit, metal guide-frame and gas-holder (dome) and two tanks (one each for input of dung-water slurry mixture and outflow of spent effluents, respectively). Construction is being monitored by our staff with adequate precautions.

Fabrication of the guide-frame and gas-holder are carried out elsewhere, followed by transportation to the site and installation there.

The biogas-digester capacities have been planned to suit the number and size of families involved and their expected cooking fuel requirements. Eight months into the project, the construction of one 10m³ digester has been completed and work is in progress on another 10 m³ and two 8 m³ plants.



Banana-plantation-waste -- chiefly the additional (“pseudo”) stems that regularly develop around the main fruit-bearing stalk of each plant – is used as



digester feedstock. As each biogas plant is completed, waste from the surrounding banana plantations is being chopped, mixed with measured amounts of water in the appropriate solid:water ratio, and inserted in the input tank, towards biogas generation.

Both phases of this project -- the initial village-based demonstration and this extension – have been financially supported by the Wuppertal Institute for Climate, Environment, and Energy, Germany, through their Wisions-SEPS programme.