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New Report from SEI:

Sugarcane Resources for Sustainable Development in Luena, Zambia

This study assessed the role of sugarcane as a renewable resource to support sustainable development in the Luena region of northern Zambia. In addition to sugar, the production of ethanol from sugarcane and the options for bagasse cogeneration were explored through detailed analysis of a range of production scenarios and technical configurations. The market analysis addressed product strategies for sugar, ethanol, and surplus electricity, as well as flexible combinations of all three products.

Luena is a remote region for which new development alternatives are being considered by the Zambian government. Although the establishment of a sugarcane estate has been considered in the region for many years, this study is the first to take a broad perspective based on the goals of sustainable development. The study included two major components: (1) Techno-economic options; and (2) Social and Environmental Impacts. These components have been integrated using an interdisciplinary approach that recognizes the relevant linkages in a broad societal context and examines the major policy options for the region.

The report analyses which strategies are viable and how they might be implemented in a way that promotes sustainable development. The report should be of interest to researchers and policy-makers concerned with renewable energy options in southern Africa, as well as to anyone interested in regionally-based strategies and/or modern bioenergy options that harness a nation's domestic resources more efficiently so as to support sustainable development. ■

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Sugarcane Resources for Sustainable Development: A Case Study in Luena, Zambia

By Deborah W. Cornland, Francis X. Johnson, Francis Yamba, E.N. Chidumayo, Maria M. Morales, Oscar Kalumiana and S.B. Mtonga-Chidumayo

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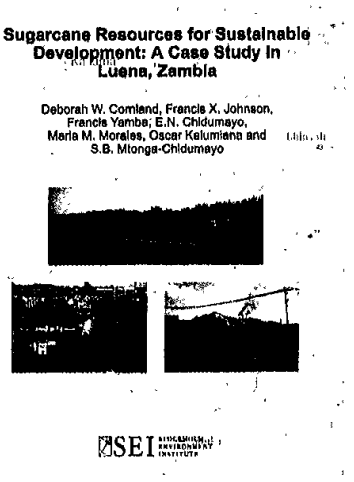

Moreover, no information is available on whether all the functioning plants are producing gas to their designed capacity. Also, there is no firm evidence that the entire slurry produced was being utilised as fertilizer. Consequently, the calculations made on fuelwood saving as well as nutritional enrichment of soil are far from fulfilled. The National Project on Biogas Development has failed to live up to its promised potential. Interestingly, it is not as if the reasons for poor performance of the project were not known to the government but the fact that serious efforts have not been made to address them. As a result, a technology that promised to support the environment and the rural energy scenario has yet to catch the imagination of those for whom it is targeted.

Photo: Anders Ellegård

A peasant farmer in Gujarat standing by his biogas plant, which was erected with support from the national Indian biogas programme. The biogas plant is a Deenbandhu ("friend of the poor") model which is currently the most popular model.

What went wrong?

It is difficult to imagine how a carefully structured, environment friendly, community oriented project on rural energy could fail to deliver the end product. Tragically, that is precisely what has happened. In the absence of an internal mechanism of repairing and overhauling, problems were compounded over the years. Yet, there are significant lessons to be learnt for countries who plan to follow India's footsteps in developing a biogas programme.

1. In the haste to spread the technology to every nook and corner of the country, proper assessment of socio-economic and ecological factors was not conducted, which led to dilution and inefficient utilisation of resources. For instance, while Maharasthra State has over 400,000 biogas plants, a small state like Goa has installed less than 2,000. Yet, the support structure continues for both.
2. Feedback on operational problems related to running of biogas plants was not adequately addressed with the result that the fixed–dome Deenbandhu model became the lone surviving design. Interestingly, this model did not come from the research network of NPBD. Consequently, users did not have any design options to choose from.
3. On the operational side, the main stumbling block is the dung required for initial charging. At least 30 quintals of dung are needed for charging a cubic metre plant. Often, many households find it hard to collect that much dung and/or wait for a hydraulic retention time of 42 to 52 days before any gas comes out. Research on alternate feedstocks did not go beyond the laboratory stage.
4. Poor performance and slow progress of the biogas project has led to reduced interest in the technology among renewable energy specialists. Centralised bureaucratic control and poor performing State nodal agencies have brought the downfall of an environment friendly technology. While subsidies are being phased out, there is no reduction in the overhead expenses on the project.

Does it have a future?

India's Biogas Project does have a future if the project authorities wake up to the realities. The project can be brought back to life with the following radical interventions:

- Based on biogas plant performance over the last two decades, select districts/regions where biogas project should be vigorously pursued.
- Address operational and technical glitches by reorienting the research machinery and by encouraging private sector investment in biogas research.
- Invest in design research to make biogas suitable to different climatic conditions. Develop models that take into account local problems like low temperature, less availability of water, alternate feeding material and proper feedstock mix.
- Batch-fed biogas systems, kitchen waste biogas plants and human excreta based biogas systems (developed in the non-governmental sector) need proper incentives and encouragement for dissemination.
- NPBD must reorient itself to accommodate developments in the sector and introduce new designs for speedy implementation. Currently, it takes years before a new design is approved by the government.
- Re-assess total biogas potential by not only recalculating dung potential but the available human excreta and degradable biomass as well. ■

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