Small Alcohol Plants as an Alternative Towards Sustainable Development

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Abstract
The evaluated Integrated Small Alcohol Plant (ISAP) is an agricultural industry that produces alcohol, electricity, and food for the surrounding cities which has up to 18,000 inhabitants. Sugar cane and sweet sorghum are the basic agricultural products that are used to produce 40,000 L/day of alcohol and 7.13 MW of electricity. The ISAP evaluated is able to extended up to 12 months per year its production period, against the usual 6-8 months of traditional sugarcane mills. The productivity is around 630 tons of sugar cane or sweet sorghum per day. During the eight months period between the harvest and a new plantation for sweet sorghum area, its available soil area is used to grow crops and vegetables; there are also beef cattle and milk production, as well as the introduction of pig farming. The ISAP total area is 4,360 ha including rural and industrial areas. It is based on the maximum environmental and social efficiency by eliminating the burning practice after harvesting. The vinasse is treated in anaerobic process to be further used in the agricultural areas as a fertilizer. Pig and cattle dejects are used for electricity generation in the plant. Results show that ISAP project may be considered as an effort towards a sustainable development.

Keywords: Agro-Industry, Alcohol, Renewable Energy, Emergy, Externalities.