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“Challenges to Organic Farming and Sustainable Land Use  
in the Tropics and Subtropics”

**Waste Heat Utilisation in a Tropical Greenhouse in Ruswil,  
Switzerland**

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**Abstract**

The background for the project is the energy-law of the Canton of Lucerne that requires that 60% of the industrial waste heat must be reused to minimise environmental impacts. In 1997 the idea was borne to use the waste heat from a Gas Compressing Station in a Greenhouse with tropical climate in order to produce tropical fruits and fish on a commercial basis. After a preparation phase of two years a greenhouse was built and operation started in springtime 1999 for a pilot phase of five years. The Greenhouse covers a surface of about 1500 m<sup>2</sup> and integrates an aquaculture system. The principal question behind this project is to proof the feasibility of the project idea on a technical, ecological and economical level. Papayas (*Carica papaya*), Bananas (*Musa acuminata*), Carambole (*Averrhoa carambola*) and Guava (*Psidium guajava*) are the most successfully produced fruits of the greenhouse; a complete list of all cultivated fruits is available at <http://www.tropenhaus-ruswil.ch/produkte/index.htm>. The projects aims to create and close nutrient and water cycles within the greenhouse. The experiences show that the water-consumption can be covered with rainwater which is collected from the greenhouse roof. On the nutrient level the only input in the greenhouse system is fish fodder. The fish (waste)water is used to irrigate and fertilise the plants of the greenhouse. Studies shows that the fruits produced in the greenhouse are more ecologically and better in taste compared with imported ones. The business experiences show that profitability is as high as with comparable farm products. The greenhouse project generates new income for the nearby farmers and creates a platform for public awareness in Ecological Engineering.