

Climate Change and Waste Theme Park

A Complementary Project of the Gianyar Waste Recovery Project

1 Background and Justification

Awareness building and education is the key issue in tackling climate change and waste problems. The Gianyar Waste Recovery Project is visited frequently by schools, Government officials, NGOs and other interest groups. This makes the project site a perfect location to for a theme park that addresses not only waste problems but also climate change, because it prevents the strong greenhouse gas methane from being released into the atmosphere. Over a 10 year period, the project prevents 250,000 tons of CO₂ equivalents of greenhouse gasses of which 77,000 tons are eligible for Carbon Credits under the Clean Development Mechanisms of the Kyoto Protocol.

Traditional short-lived promotional materials like leaflets, expensive lecturing or coloring books have only a temporary and thus insufficient impact. Physically seeing solutions, combined with carrying out memorable experiments have a much longer impact, not only on school children, but also adult visitors. The Park is open since June 2008.

2 Description of the Theme Park

The theme park will focus on waste and climate change issues. Emphasis will be on interactive presentations, hands-on experiences and demonstrating practical climate change solutions for the general population. Addressing the root cause of problems in a practical manner is the key to induce change. Besides waste and water related climate issues, a range of further interesting topics will be presented concentrating on options to reduce greenhouse gasses at home, on the road and in agriculture. Accordingly, evolving technologies for alternative renewable energy, like biomass, photovoltaic and wind energy will be exhibited with related experiments to make visits interesting and memorable.

Early 2007, the Gianyar Waste Project has hired a young Balinese lady with a degree in Environmental Health for its composting research. She has the time and background to be trained also as a guide for the center.

A further important function of the educational center as component of a Gianyar Waste Project will be encouraging and actively supporting the planning and implementation of waste recycling facilities in other areas of Bali and Indonesia.

The design goal is to make repeated visits worthwhile. This is important in view of getting the expected impact and making the park attractive for out of town visitors, especially schools.

3 Infrastructure of the Center

The present pilot plant for the Gianyar Waste Project became redundant towards the end of 2007, when the capacity expansion of the waste facility from daily 3 to 50 tons is implemented. This building will then accommodate the indoor part of the theme park, a new office and a research laboratory. It will also have a large sitting area, where interactive presentations and discussions can take place.

For outdoor exhibits, a path will follow a logical sequence of themes, which are explained with posters and if feasible, hands-on experiments. It will lead visitors through the waste recycling facility with its research station, bamboo conservation, the biodigester and wastewater garden, as well as sections for producing drinking water and alternative energy.

4 Planned Themes

Below is a selection of planned themes:

- The three Re: reduce – reuse – recycle
- How the waste recycling facility in Temesi functions
- Dissemination of detailed instructions how to build recycling facility replicates
- Photovoltaic, windmill, mini hydroelectric plant and biogas as energy source for the buildings of the educational center. Small scale photovoltaic solution for isolated areas.
- Demonstration and assessment of alternative energies (photovoltaic, wind, biomass)
- Energy reduction in Balinese households (e.g. energy saving versus normal lamps, standby functions of electronic equipment etc.)
- Climate change, cause and remedy
- Climate impact of submerged versus dry rice fields (submerged rice fields create large amounts of the greenhouse gas methane due to anaerobic decomposition of dead plant material in water)
- Demonstration of various composting scales and techniques
- Demonstration of vermiculture (composting with worms)
- Making the compost research station with its laboratory available to students
- Health threats from waste and improper handling of hazardous materials
- Biodigester for the center's new toilet block
- Use of the methane gas from the biodigester for cooking, demonstration of solar cookers
- Wastewater garden to clean the grey water from the biodigester of the center's new toilet block
- Laboratory size biodigester for solid and liquid waste
- Laboratory scale production of biofuel with a stark warning that food crops or land suitable for food crops must not be used for biofuel production (this increases food prices, hurting the poor)
- SODIS process for easy, carbon neutral production of potable water, because an significant portion of all diseases in Bali are waterborne
- Prevention of Malaria, Dengue fever and Chikungunya
- Binocular microscopes to demonstrate composting microbes and to analyze water quality
- Posters of Swisscontact and others on climate, recycling and other environmental themes
- Climate neutrality of compost
- Properties of true aerobic compost and anaerobic soil conditioners. Proper use of compost
- Promotion dry SRI (System of Rice Intensification) rice fields, a traditional Balinese non-hybrid rice that uses 30 to 50 % less water and is richer in proteins and vitamins
- Promotion of traditional mud walls and floors as well as of bamboo as strong and fast growing renewable building material
- Education in proper Bamboo conservation methods to make it a durable renewable building material (bamboo grows up to 100 cm/day)
- Samples of products created from waste and hands-on creation of new objects
- Production of recycled paper

5 Initial Budget

Exhibits, posters etc	USD	17,000
Alternative energy supply (photovoltaic, windmill)	USD	23,000
Wastewater garden, followed by fishpond	USD	9,000
Presentation equipment (laptop, LCD, sound system)	USD	4,000
Furniture	USD	3,000
Gardening, paths	USD	12,000
Toilet building	USD	5,000
Bamboo building	USD	10,000
<u>Modifications to redundant pilot plant building</u>	<u>USD</u>	<u>17,000</u>

Total initial budget

USD100,000

The Indoor Section of the Educational Center



The 400 m² building housing the indoor section of the educational center



Model house to demonstrate energy savings



Water disinfection to make safe drinking water and prevention of waterborne diseases



Microbiology work on microscopes to monitor drinking water, wastewater and the composting microbes



Information racks



Sound system and LCD projector



The administration PC and printer

Alternative Energy Installations



Center: The new toilet building with the 1 kW photovoltaic panels on the roof and the controls below



The 3 kW vertical axle windmill. This type of windmill is not affected by turbulence. The energy is used to power the center

Composting Research



Composting research in aerated drums with self made flow meters. There are also 4 meter high composting boxes to simulate conditions in the large scale composting facility



The new toilet block with the methane producing biodigester in front (mostly under ground). The new large scale composting facility can be seen in the background



The wastewater garden that transforms the grey water from the biodigester to clear water that is nearly bacteria free and feeds a fishpond



Ari, our research assistant is proud to oversee the production of some of the best aerobic compost