Concrete Substrates for Accelerated Coral Restoration, Philippines

**Project description by author**

The Project is the development of Coral Reefs and thereby initiate the restoration of the Marine Ecosystem which is being damaged by Mankind.

The Project’s main methodology is the use of Concrete Substrates which are found to be biologically friendly to corals due to the presence of calcium bi-carbonate in cement. The design (named “acanthasia”), is a multi-legged structure that allows the penetration of sunlight necessary for growth of the juvenile corals, and would also insure stability at the seabed to withstand the underwater currents.

To experiment this concept, six (6) modules were constructed in the middle part of 2004. Three were planted with corals and the other three were not for comparison purposes. The growth of the corals in the planted modules were found to be significantly faster in view of the design and have those attracted more fishes and other forms of marine fauna, than the unplanted modules. Start of mass production of an improved design is tentatively planned on January 2006, depending on the in-vivo research being done at the site. This would incorporate a curved top legs to minimize the accumulation of silt at the top, as well as increase in the number of legs from eight to ten.

Relevance to target issues (by author)

- **Quantum change and transferability**
  
  The use of concrete substrates for rejuvenating the corals, has proven to be more efficient since the organisms have exhibited a much faster growth rate, as compared to the other types of materials. The phenomenal growth of the organisms in this model is attributed mainly to the presence of calcium, one of the ingredient in cement. The design is innovative, as it addresses the problems of sunlight penetration necessary for the growth of the juvenile corals as well as provide sea bed stability. The technology of this concept, from on shore pre-fabrication to the installation of the at the sea bed is relatively simple and can easily be replicated in other parts of the world for the rejuvenation of the coral reefs.

- **Ethical standards and social equity**
  
  As a project that only aims for the restoration of the marine ecosystem, no ethical standards nor any social equity concerns can ever be violated. On the contrary, this experiment has resulted to tangible positive social impact to the nearby fishing communities, by increasing their catch of up to 100%, as these newly formed corals became the new havens of varied fish species.

- **Ecological quality and energy conservation**
  
  Again both concerns are of non-issue to this project. On the first concern, the restoration of the ecological balance in our seas is the aim and purpose of this endeavor, on the second concern, the structures, once in place, do not require fuel or energy. Each module becomes a self sustained ecosystem.

- **Economic performance and compatibility**
  
  The prototype module costs $1,800; but because of the exponential growth of the corals, the economic returns for these experiments were already recouped. These are in terms of the financial value of the fishes caught around the area of the modules. Other benefits such as the money earned from scuba divers and tourist, were difficult to quantify, and were not included in the cost/benefit analysis.

- **Contextual response and aesthetic impact**
  
  An acanthasia module in a barren sea bed is but a start of a long process of rejuvenation in aquatic life. The aesthetic value comes, as nature undertakes the miracles of reproduction in the varied marine life-forms. This is our contextual response to the denudation of mankind against mother earth, the usage of cement, which comes from corals, as the medium for the rejuvenation of coral reefs!