

# **Sustainable Housing Design**

## **A Proposal for a Summer Program In Brazil**

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### **Summary**

In the United States, India, South Africa and Brazil, governments have difficulty providing adequate housing to their lower income residents, let alone sustainably designed homes. However we live in a world of limited resources, which gives us no choice but to practice sustainable housing design. I originally wanted to study sustainable design aspects of government funded multi-story housing but soon realized that this aspect of sustainable design, high density housing, was not popular in the developing cities I visited and for various reasons. In Bangalore, there was no need to build high rises because there was still plenty of undeveloped land surrounding the city. In Cape Town, single family detached dwellings were the preferred housing style because that is what the rich whites lived in during apartheid and they were held to a high status. South Africa had also tried modelling their public housing on American high density apartments built in the 1970's and 1980's, commonly known as projects, but because of poor physical design, they ended up welcoming crime and isolation which was the exact reason they failed in the United States too. Rio de Janeiro's government recognized favelas as a solution to the low-income housing problem, hence they tried urbanizing favelas through a program called Favela Barrios, instead of relocating residents to tall apartment buildings. The Habitation Company for the City of

Curitiba has been trying to integrate public housing into the city, however the poor prefer single detached dwellings because unlike apartments they can make additions to their homes. With this in mind, I realized I would have to alter my research to encompass any form of sustainable housing design and not just concentrate on the high density aspect.

Sustainable design, for the sake of this paper, is defined as any innovation that lessens the city's ecological footprint. In other words, materials and methods that do not cause harm to the current or future environment and are low-tech to keep the cost down, for a design cannot be sustainable if it is not affordable.

My research proposal is to organize and participate in an eight-week summer program in Curitiba, Brazil in which Brazilian and American university students studying architecture and/or engineering would design and start construction on a 5-story apartment building for low-income families.

## **Introduction & Background**

India has a water scarcity problem. Not only is there not enough drinking water, the groundwater is depleting. However, with the expertise of A. R. Shivakumar, rainwater harvesting is becoming a widespread practice. It has been proven to bring groundwater levels from 330ft below to only 30ft below in just 6 years. In South Africa, I only found green papers but nothing to report on in terms of implementation. I have also been unsuccessful in finding any astounding best practices for Brazil although with programs to clean Rio's waters and desperate

attempts to preserve the Amazon rainforest there is some hope that sustainable design is around the corner. A summer studio in Brazil would introduce sustainable design as an innovative yet successful tactic and would aid in eliminating poorly built low-income housing such as favelas. Curitiba was chosen because it has a similar climate to that of major east coast cities of the United States. This is ideal so that the American and Brazilian students can communicate on the same page, given that they have a short time period to work together. Another reason for choosing Curitiba over Bangalore, Cape Town or Rio de Janeiro is that Curitiba is already convinced that dense high-rise housing is beneficial for the environment. I would not know where to start to tackle housing issues from a sustainable point of view in India or South Africa.

Building sustainable housing for the low-income families makes sense in the long run because they will save money on electric bills for example if the home is properly insulated. This project is also important because it will create a stronger relation between the low-income community and the government.

### **Project Description**

Eight American students and one professor, besides myself, will fly to Curitiba at their own expense and live with the Brazilian students participating in the design program. The Brazilians will be a combination of architecture and engineering students from the Catholic University and the Federal University. The students and professors will have studio space specifically designated for this project at Unilivre.

Together the professors and students will explore innovative design strategies for sustainable low-income housing in urban areas. Some sustainable design elements practiced in other cities mentioned above might be incorporated into the design such as prefabricated walls, use of recycled materials, water conservation and solar passive energy design. When the plans are finalized, they will start constructing the first floor of the apartment building on Unilivre's campus. For these eight weeks of the tourist bus line will have Unilivre as an additional stop that people from all over the world can reap the benefits of this project. The process will also be documented and compiled into books and videos for those not able to see it first hand. According to other sustainable apartment buildings, a prefabricated 5-story building can be built in 70 days with 20 laborers. After the Americans return home, local unemployed construction workers will finish the project with the Brazilian students and professors. The completed structure will only cost \$6,000, which does not include the price of the land. The land cost is not a factor because the apartment building will be built on a previously vacant lot owned by the city, which is on a main transportation corridor. The Habitation Company for the City of Curitiba will be responsible for the building and for matching families up with the apartments once the construction is completed. If this eight week program is successful, the following summer a new group of Brazilian university students studying architecture and engineering will partake in a similar design project in an urban area of the United States.

**Budget**

Roundtrip Airfare NY-Curitba.....	\$1,500.00
Transport for group while in Curitba.....	\$1,000.00
Previously unemployed construction worker’s pay.....	\$1,500.00
Construction materials.....	\$5,000.00
Printing costs for documentation.....	<u>\$1,000.00</u>
Total.....	\$10,000.00

**Timeline**

- week 1-educate each other on sustainable design techniques and materials so that everyone is on the same page
- week 2-critique each others schematic designs of multi-story apartment building
- week 3-finalize drawings and blueprints for construction
- weeks 4-7-construct the first floor apartment with the help of local unemployed construction workers
- week 8-compile documentation of process and final product to be distributed to the municipal government of Curitba and future residents

**Conclusion**

This eight week intensive summer exchange program will not only expose students to the worldwide housing crisis, but it will also give them the confidence and encouragement to create feasible solutions such as infill sustainable development.

The sustainable housing design summer studio in Brazil gives students and local construction workers alike the experience and skills they need to create affordable, ecologically conscience housing for low-income families everywhere. Finally, this project can be advertised as another low-cost environmental solution implemented by Curitiba, the city of social capital.