Tonle Sap Sustainability Education Center

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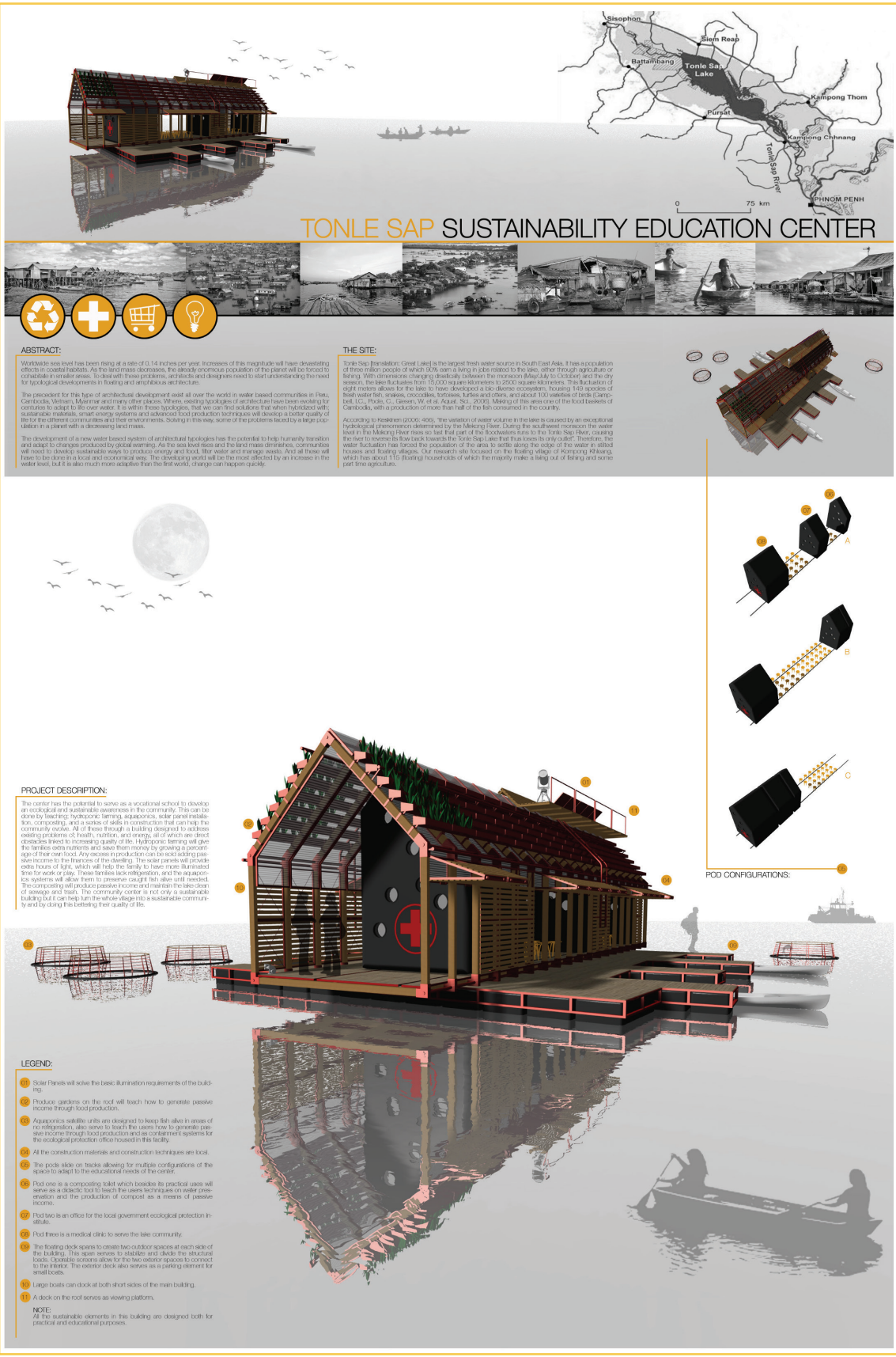
Worldwide sea level has been rising at a rate of 0.14 inches per year. Increases of this magnitude will have devastating effects in coastal habitats. As the land mass decreases, the already enormous population of the planet will be forced to cohabitate in smaller areas. To deal with these problems, architects and designers need to start understanding the need for typological developments in floating and amphibious architecture.

The precedent for this type of architectural development exist all over the world in water based communities in Peru, Cambodia, Vietnam, Myanmar and many other places. Where, existing typologies of architecture have been evolving for centuries to adapt to life over water. It is within these typologies, that we can find solutions that when hybridized with; sustainable materials, smart energy systems and advanced food production techniques will develop a better quality of life for the different communities and their environments. Solving in this way, some of the problems faced by a large population in a planet with a decreasing land mass.

The development of a new water based system of architectural typologies has the potential to help humanity transition and adapt to changes produced by global warming. As the sea level rises and the land mass diminishes, communities will need to develop sustainable ways to produce energy and food, filter water and manage waste. And all these will have to be done in a local and economical way. The developing world will be the most affected by an increase in the water level, but it is also much more adaptive than the first world, change can happen quickly.


Sisophon
Siem Reap
Battambang
Tonle Sap Lake
Kampong Thom
Pursat
Kampong Chhnang
Tonle Sap River
PHNOM PENH
0
75 km
TONLE SAP SUSTAINABILITY EDUCATION CENTER
ABSTRACT:
Worldwide sea level has been rising at a rate of 0.14 inches per year. Increases of this magnitude will have devastating effects in coastal habitats. As the land mass decreases, the steadily enormous population of the planet will be forced to cohabitate in smaller areas. To deal with these problems, architects and designers need to start understanding the need for typological developments in floating and amphibious architecture.
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THE SITE:
Tonle Sap (translation: Great Lake) is the largest fresh water source in South East Asia. It has a population of three million people of which 90% earn a living in jobs related to the lake, either through agriculture or fishing. With dimensions changing drastically between the monsoon (May/July to October) and the dry season, the lake fluctuates from 15,000 square kilometers to 2500 square kilometers. This fluctuation of eight meters allows for the lake to have developed a bio-diverse ecosystem, housing 149 species of fresh water fish, snakes, crocodiles, tortoises, turtles and otters, and about 100 varieties of birds (Campbell, I.C., Poole, C., Gweon, W. et al. Aquat. Sci., 2000). Making of this area one of the food baskets of Cambodia, with a production of more than half of the fish consumed in the country.
According to Keskinen (2006: 466), "the variation of water volume in the lake is caused by an exceptional hydrological phenomenon determined by the Mekong River. During the southwest monsoon the water level in the Mekong River rises so fast that part of the floodwaters runs to the Tonle Sap River, causing the river to reverse its flow back towards the lake Sap Lake that thus loses its only outlet". Therefore, the water fluctuation has forced the population of the area to settle along the edge of the water in stilted houses and floating villages. Our research site focused on the floating village of Kompong Khleang, which has about 115 (floating) households of which the majority make a living out of fishing and some part time agriculture.
POD CONFIGURATIONS:
A
B
C
PROJECT DESCRIPTION:
The center has the potential to serve as a vocational school to develop an ecological and sustainable awareness in the community. This can be done by teaching: hydroponic farming, aquaponics, solar panel installation, composting, and a series of skills in construction that can help the community evolve. All of these through a building designed to address existing problems of: health, nutrition, and energy, all of which are direct obstacles linked to increasing quality of life. Hydroponic farming will give the families extra nutrients and save them money by growing a percentage of their own food. Any excess in production can be sold adding passive income to the finances of the dwelling. The solar panels will provide extra hours of light, which will help the family to have more illuminated time for work or play. These families lack refrigeration, and the aquaponics systems will allow them to preserve caught fish alive until needed. The composting will produce passive income and maintain the lake clean of sewage and trash. The community center is not only a sustainable building but it can help turn the whole village into a sustainable community and by doing this bettering their quality of life.
LEGEND:
01 Solar Panels will solve the basic illumination requirements of the building.
02 Produce gardens on the roof will teach how to generate passive income through food production.
03 Aquaponics satellite units are designed to keep fish alive in areas of no refrigeration, also serve to teach the users how to generate passive income through food production and as containment systems for the ecological protection office housed in this facility.
04 All the construction materials and construction techniques are local.
05 The pods slide on tracks allowing for multiple configurations of the space to adapt to the educational needs of the center.
06 Pod one is a composting toilet which besides its practical uses will serve as a didactic tool to teach the users techniques on water preservation and the production of compost as a means of passive income.
07 Pod two is an office for the local government ecological protection institute.
08 Pod three is a medical clinic to serve the lake community.
09 The floating deck spans to create two outdoor spaces at each side of the building. This span serves to stabilize and divide the structural loads. Operable screens allow for the two exterior spaces to connect to the interior. The exterior deck also serves as a parking element for small boats.
10 Large boats can dock at both short sides of the main building.
11 A deck on the roof serves as viewing platform.
NOTE:
All the sustainable elements in this building are designed both for practical and educational purposes.