Eco-Productive Building Design

From an urban practice
Biome

is a small practice established in 1990 in Bangalore since last 20+ years has designed 500 ecological projects of various sizes.....
For a building to be eco-productive it has to address following concerns of environment and living ....

1. Resource
2. Water
3. Energy
4. Food
5. Bio-diversity...
RESOURCES

Avail of them closest to the site
BASEMENT

Space below the floor-
Cannot support biodiversity....
Study: 6 projects

<table>
<thead>
<tr>
<th>Units</th>
<th>Mini and Satheesh Residence</th>
<th>Mukherjee Residence</th>
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<tr>
<td>Plot Area sq.m.</td>
<td>368.0</td>
<td>218.5</td>
<td>220.8</td>
<td>147.2</td>
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<td>Plot coverage sq.m.</td>
<td>104.9</td>
<td>132.5</td>
<td>116.0</td>
<td>75.2</td>
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<td>127.7</td>
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<tr>
<td>Built Up Area sq.m.</td>
<td>290.9</td>
<td>272.0</td>
<td>389.6</td>
<td>175.5</td>
<td>151.4</td>
<td>225.0</td>
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<tr>
<td>No. of Occupants</td>
<td>6.0</td>
<td>4.0</td>
<td>4.0</td>
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<tr>
<td>Roof Area sq.m.</td>
<td>104.9</td>
<td>132.5</td>
<td>143.2</td>
<td>63.5</td>
<td>62.9</td>
<td>91.7</td>
</tr>
<tr>
<td>Basement Area sq.m.</td>
<td>80.9</td>
<td>64.7</td>
<td>126.0</td>
<td>0.0</td>
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<tr>
<td>Soil Available cu.m.</td>
<td>149.3</td>
<td>149.3</td>
<td>263.8</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
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<tr>
<td>Soil Required for Earth blocks cu.m.</td>
<td>55.2</td>
<td>55.6</td>
<td>38.8</td>
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<td>0.0</td>
<td>0.0</td>
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<tr>
<td>Embodied Energy/ Earth Walls MJ/m3</td>
<td>406658.0</td>
<td>412794.0</td>
<td>290438.0</td>
<td>333916.0</td>
<td>270267.0</td>
<td>348791.0</td>
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<tr>
<td>Embodied Energy/ Burnt Brick MJ/m3</td>
<td>1027921.0</td>
<td>1043430.0</td>
<td>734149.0</td>
<td>844048.0</td>
<td>683120.0</td>
<td>881649.0</td>
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Co-operating Collaborating process of design
Possibility of sharing—resource from within the city
CASE STUDIES
A. SANS SOUCI - 1995
1. Area of plot 9.6MX16.3M
2. Basement size 5.5MX 7M.
3. Soil available 69.3 cu m
4. Soil used for building 28.36 cu m.

B. MALINI RESIDENCE
1. Area of plot 9.6mX 13.3 m
2. No Basement
3. Soil used for walls 20 cu m.

DISTANCE BETWEEN THE TWO PLOTS 1.5 KM..
C. RAMADURAI RESIDENCE
2012
1. Area of plot 13.0MX18.7M
2. Basement size 126sqm.
3. Soil available 263 cu m
4. Soil used for building 38.75 cu m.

D. ROHAN RESIDENCE
1. Area of plot 9.6mX 13.3 m
2. No Basement
3. Soil for walls.

DISTANCE BETWEEN THE TWO PLOTS 8.0 KM..
Inference

1. Low on embodied energy
2. Low footprint
3. Low pollution
4. Low sand consumption
1. Buildings are changing----higher/ newer/ deeper
2. Old materials- wasted

A land fill... Hebbal Junction Bangalore
DEVELOPMENT PLAN
CASE STUDY: OLD FOR NEW...
Raghavan’s residence
COMPILATION OF ALL MATERIALS
SBC TEST REPORT SHOWED TILL 5M BROWN CLAYEYE SAND AND EXPECTED THE FOUNDATION TO START AT 3M. AS EXCAVATION BEGAN AT 2M DEPTH WATER WAS STUCK.
Starting a new project – damp proofing in the bottom of the rammed earth foundation.....

Incorporating waste
Computer key boards as filler material......

Incorporating waste
LOCALIZED WATER SYSTEMS.....HOMES
LOCALIZED WATER TREATMENT.....
A BIO-SWIMMING-POOL
# WATER AS A RESOURCE

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<td>Fresh Water Requirement</td>
<td>KL/day</td>
<td>295.7</td>
<td>197.1</td>
<td>197.1</td>
<td>197.1</td>
<td>147.8</td>
<td>147.8</td>
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<tr>
<td>Rain water Harvested</td>
<td>KL/yr</td>
<td>83.9</td>
<td>106.0</td>
<td>114.6</td>
<td>50.8</td>
<td>50.3</td>
<td>73.4</td>
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<td>Grey water Treatment</td>
<td>Ltr/day</td>
<td>540.0</td>
<td>360.0</td>
<td>360.0</td>
<td>360.0</td>
<td>270.0</td>
<td>270.0</td>
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<td>Grey water Treatment</td>
<td>KL/yr</td>
<td>197.1</td>
<td>131.4</td>
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<td>98.6</td>
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<tr>
<td>Black Water treatment</td>
<td>Ltr/day</td>
<td>240.0</td>
<td>160.0</td>
<td>160.0</td>
<td>160.0</td>
<td>120.0</td>
<td>120.0</td>
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<td>Black Water treatment</td>
<td>KL/yr</td>
<td>87.6</td>
<td>58.4</td>
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<td>43.8</td>
<td>43.8</td>
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<tr>
<td>Fresh Water From Outside</td>
<td>KL/yr</td>
<td>124.1</td>
<td>32.7</td>
<td>24.1</td>
<td>87.9</td>
<td>53.7</td>
<td>30.6</td>
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**CARRYING CAPACITY LIMITS DETERMINED...**
SMART ROOF as a generator of resources.................
A SMART roof that grows rice
How about?
A SMART roof that grows vegetables
SAFE DRINKING WATER
GREY WATER TREATMENT SYSTEM
Turns sewage to a nutrient through Eco-san
Site Location
Govardhan Eco Village (GEV) ISKCON at Galtare, Wada situated 110 km North of Mumbai