Ecological and Energy Efficient Practices for Storm Water Management, Guwahati, Assam

Area: 216 sq. km.
Population: 1.12 million

Background

The research work focusses on addressing issues in urban water sector in hill areas of Guwahati, Assam. Recommendations include design strategies to control runoff and sediment deposition which, in the long run, are expected to address issues of urban flooding, drainage and water scarcity. Guwahati is a riverine port city, located in the hills of Assam, on the south bank of the river Brahmaputra. The change in land utilization from 1972 to 2000 shows a stark increase in the built-up area.
The city receives an average rainfall of 35–40 mm per day during the monsoon seasons (1,740 mm average annually). A 20 per cent increase in precipitation is anticipated by 2050. It is estimated that such high intensity rainfall will result in high erosion in the hilly catchment area, high peak flow and longer dry spells.

The major issues faced by the city, particularly in the water sector are:
- Flooding due to high water yield from the surrounding catchments because of conversion of forest land to urban areas.
- Reduction in drainage capacity due to high sediment yield from the upper catchments and their deposition in the drains and river.
- Water scarcity due to rapid depletion of ground water for reduced recharge and extensive pumping.

To address these issues, more energy is required in terms of electricity, fuel, manpower for pumping out flood water, clearing waterways and drawing groundwater from deeper water tables.

**Strategies and Interventions**

A total of 10 experimental sub-watersheds were selected from the Guwahati Metropolitan Area (see and the results regarding benefits were estimated. Optimal ecological management practices (EMPs) were modelled in order to assess results.
Disturbed watersheds, where unscientific practices of development are followed showed, the following characteristics on denudation:

<table>
<thead>
<tr>
<th>Increase in total sediment yield: 21-fold</th>
<th>Efficiency in sediment control, compared to barren land</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in total runoff volume: 54-fold</td>
<td>Grassland cover: 65–100 per cent sedimentation control</td>
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<tr>
<td>Change in chemical composition of water</td>
<td>Herb-land cover: 38–97 per cent sedimentation control</td>
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</tbody>
</table>

**Recommended Planning and Design interventions in Guwahati**

![Recommended Planning and Design interventions in Guwahati](image)

Source: Planning and Design of Drainage in Hilly Area, IIT Guwahati, 2012.

**Additional/ Further information:**

- Indian Cities towards Smartness: A Case Study of Guwahati City: [https://www.researchgate.net/publication/298703643_Indian_Cities_towards_Smartness_A_Case_Study_of_Guwahati_City](https://www.researchgate.net/publication/298703643_Indian_Cities_towards_Smartness_A_Case_Study_of_Guwahati_City)