



## Slum development - an integrated approach

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ONE OF THE major problems associated with increasing urbanization is the emergence of low income revenue pockets namely slums, squatter settlements etc. which arise within the growing urban centers or the cities growing around these revenue pockets. The unprecedented influx of rural masses into cities in search of better infrastructure, employment opportunities, better civic amenities, education, higher living standards results in increased pressure on population and resource availability. Inadequate sanitation and drainage facilities, stagnant waters which serve as breeding spots for insect vectors, shortage of quality drinking water, deplorable condition of the children, malnutrition, risk of epidemics, illiteracy also add on to this endless list.

An effort in this direction has been taken by CEE South in Satyanagar, a low-income revenue pocket in the North Eastern suburbs of Bangalore City. This project aimed at raising environmental awareness and establishing participatory, comprehensive and coordinated planning mechanisms. It also involved implementing low cost small-scale actions through the local residents and large scale actions through the major institutions and government agencies.

### Area profile

Satyanagar, developed thirty years ago in a low lying area, originally part of a large lake, covers an area of 4.04 hectares and houses a population of 3074. It is now registered under the City Corporation. The area is plagued with a lot of issues like lack of drinking water, inadequate sanitation and drainage facilities, illiteracy, unemployment, health problems, etc.

### Methodology

The various methodologies used during the study included

#### Surveys

An extensive **Physical Survey** of the area was conducted by Technology Informatics Design Endeavour (TIDE) to map footprints of houses and other buildings, roads, above the ground services like drains, garbage dumping sites, water resources, septic tanks, electric poles, trees, spot height of 5.0 m interval and other immediate surroundings.

Questionnaire based **Socio-economic Survey** of area covering 80 per cent of the total population was conducted. Data including Demographic profile, Educational status, Period of residence, Details of household assets and live stock owned, Amenities at residence, Condition of build-

ings, Building material, Migration details, Health status were recorded.

#### Geographic information system (GIS)

All the data collected was imported into MapInfo 4.0 using serial number as key. The two data sets - Map and Tabular were then joined to relate to each other and form thematic maps. This formed the base for the preparation of the Comprehensive Development Plan.

#### Participatory approach

One to one interviews, a drawing exercise was administered to probe perceptions of children on the utilization of the current available infrastructure and natural resources of the area, parents interviews were conducted to involve the beneficiaries right from the initial stages of the planning process. A community event was organized to finalize priorities and plan for other infra-structural facilities

#### Analysis

The individual houses shown in the base map and the socio-economic and physical survey were related to bring out the spatial analysis. The whole set of data base was analyzed to come up with a development plan encompassing all the issues of the area – water, sanitation, drainage, roads, garbage disposal, housing, health, education, environment up-gradation etc.

#### Results

The various methodologies used in the study led to complete details of the existing situation in the area. The physical surveys revealed a regular pattern of **roads** with a main metalled approach road with cross road on both the sides. Analysis of the **water** samples from various supply points revealed physico-chemical and bacteriological parameters exceeding the maximum permissible limits. A leak in the nearby water pipeline served as the sole source of potable water for all the resident of the area.

Basic **sanitation** facilities were highly inadequate with only 36 per cent of the household having toilet facilities, the area also lacks a municipal sewerage system and the existing septic tanks get water logged during the rains. CEE's community toilet complex has helped reduce the severity of this problem to a very large extent with around 500 residents using the facility daily. The existing **drainage** in the area consists of a main storm water drain along the north-west periphery carrying waste water of the layout and the neighbouring layouts into a lake adjacent to the

area. The roads have irregularly laid drains carrying storm water, wastewater from bath units and a considerable amount of solid waste. Only 13.2 per cent of the houses use the existing dustbins, **garbage** lands in open grounds, vacant sites, lake, open drains etc. Closely packed **houses** with inadequate lighting and ventilation are predominant in the area. **Health** related problems are prevalent in the area due to a lack of proper sanitation, drainage and lower levels of education and awareness. The area also lacks a clinic or hospital. Absence of **greenery** is also a noticeable feature in the area.

The area has a **population** of around 3000 with a majority of them belonging to a single community. Small families with five members from a majority and people from various castes and communities live in harmony. Another feature is the low levels of **literacy** and absence of **technical job** oriented skills among the literate. The residents were variously employed with around 18 household industries providing **employment** to many residents within the area itself.

Based on the results of the various surveys and the GIS computerized database created based on the data collected a **Comprehensive Development Plan** was evolved addressing various physical, social and environmental issues using an integrated approach. The Plan has formulated strategies addressing the various issues which will be implemented through an Action Plan.

**Sanitation** - The Community toilet complex constructed by CEE in the area is linked to a biogas plant and is used by close to 500 people everyday. The human night soil from the units serves as substrate for the production of biogas. The anaerobically digested slurry flows through sludge drying beds where partial drying of the sludge takes place by evaporation and partly by filtration through sand beds laid at the bottom of the beds. The harvested sludge is sun dried and analyzed for physico-chemical and biological parameters. For the houses with individual toilets, to overcome the problem of water logging of the septic tanks during rains, Aquaprivy and Septic tanks attached to soak pits have been suggested.

### **Drainage**

To overcome the problem of inadequate drainage network in the area and water stagnating in the existing drains, renovation and extension of the drains has been proposed as required. Drain made of either granite slabs or having pre-cast concrete base with granite sides have been proposed for the cross roads based on the road widths. The top of the drains will be raised above the road level and plinth level of the houses adjoining it. All the drains will have flagstone covering on the top to avoid entry of solid waste into it.

### **Aquaculture unit**

This unit has been proposed in the area to help treat all the wastewater from Satyanagar and the neighbouring layouts using a series of low cost treatment methodologies. The principle is that of dilution, oxidation and reduction of the

suspended solids along with nutrient recovery in terms of biomass. Under the technical guidance of the Central Institute of Freshwater Aquaculture, the unit will be set up comprising of an oxidation pond, duckweed ponds and fishponds. Reduction in the BOD and COD levels along with removal of heavy metals will be facilitated in the duckweed ponds that would otherwise enter the food chain through the cultured fish. Wastewater treated through this unit will then be let into the adjoining lake thereby reducing the pollutant entry.

### **Water supply**

Baseline hydro-geological studies have been conducted in the area and it has been proposed to meet the total requirement of the area amounting to 2-2.5 lakh litres per day through a single high discharge bore-well or a cluster of properly spaced bore-wells with depth below 260 feet.

### **Solid waste management**

A systematic solid waste management system ensuring source segregation of waste into wet and dry categories and proper treatment and disposal has been proposed. Specially designed garbage collection bins, with separate chambers for the segregated waste. The wet waste could be composted and can also be used as feedstock for the biogas digester. The dry waste serves as additional source of income for the waste retrievers.

### **Income generation**

Various schemes to help promote income generation activities for the residents, especially the women have been started. A poly-bag weaving unit has been set up in the area that produces mats, bags and other items using waste poly-bags. This unit serves as a source of income and also as an innovative method to reuse used poly-bags.

This Action Plan has already been initiated through local action groups formed in the area comprising of interested residents. This helps increase the level of community involvement in the development of their own layout and also creates a sense of belonging and unity in action. Improvement in the physical infrastructure and basic civic amenities improves the situation to a large extent. Simultaneously other social and environmental issues are being addressed so that an integrated approach is followed and the living environment is transformed to help improve the overall standard of living.

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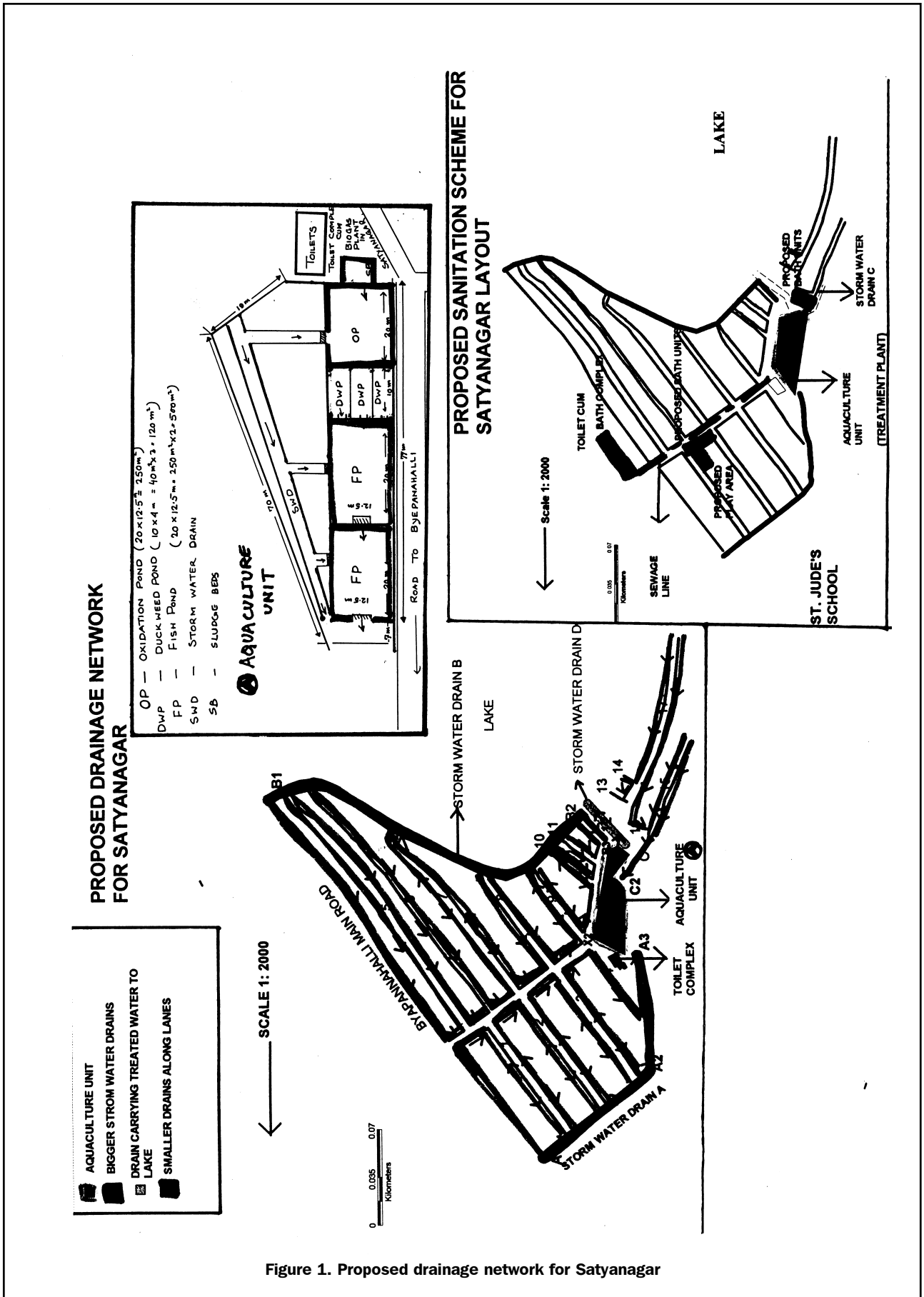


Figure 1. Proposed drainage network for Satyanagar