

RECYCLED Dharavi

What is Dharavi?

Dharavi is a slum in Mumbai, India. Whilst being one of the largest slum areas in the world, it is also one of the oldest. Dharavi's total population is estimated as between 300,000 to about 1 million inhabitants.

Economic context

According to Wikipedia, Dharavi has an active informal economy: "Leather, textiles, pottery products are illustrative goods made inside Dharavi, by the slum residents. The total annual turnover has been estimated to be over US\$500 million"

Objectives

The "RECYCLED DHARAVI" slum rehabilitation project is aimed at taking advantage of both the formal and informal economic activities and small industry which exist on that slum area. Waste recycling industry and "recycling art and crafts" are suggested to supplement the existing field of small industry.

Economy assumptions

A. Waste recycling industry. The existing and continuously growing recycling industry are supposed to be involved in the development and construction phases of the "RECYCLED DHARAVI" slum rehabilitation project. All the Dharavi area will be divided into sectors and units, patronized by competing recycling companies. According to Wikipedia (<http://en.wikipedia.org/wiki/Dharavi>), "the district has an estimated 5000 businesses and 15,000 single-room factories, [and] the per capita income of the residents, depending on estimated population range of 300,000 to about 1 million, ranges between US\$500 to US\$2000 per year". We estimate that 20 % of "RECYCLED DHARAVI" slum rehabilitation investment costs (see below) can be covered by "slum businessmen".

B. "Recycled art and crafts". The artistic hand craft is expected to supplement basic recycling industry, with an estimation of another 20% of slum rehabilitation investment costs covered from this source. "Recycling artists and craftsmen" will be expected to be involved in their nearest neighborhood rehabilitation process.

C. Tourist industry. At present, there is a growing number of travel operators who offer guided tours through Dharavi. We suggest that basic infrastructural investments (related to sewage, roads, etc.) could be covered by local tourist industry. We assume this would be another 20% of "RECYCLED DHARAVI" slum rehabilitation investment costs.

D. Individual external donations arranged by the NGO's: 20% of "RECYCLED DHARAVI" slum rehabilitation investment costs.

E. Slum dwellers' donations: 20% of "RECYCLED DHARAVI" slum rehabilitation investment costs.

Totally, 100% of slum rehabilitation investment costs will be covered as stated above.

General layout idea – honeycomb structure

The main layout inspiration was sir Walter Christaller's graphic representation of his "Central Place theory" (1930's). A resulting module of a honeycomb has been assumed as the basic unit and duplicated as much as possible, to resulting with the vast structure implemented into existing urban context.

Honeycomb modules

A good road/transport structure between the honeycombs are provided, as shown on a layout plan. Meeting spaces and playfields are also provided for the Dharavi dwellers. In the center of each honeycomb, we placed a well with some bigger public meeting space around, where people can meet each other and rest.

The whole area is divided into 4 recycling sectors : *paper, glass, aluminum* and *plastic*, in order to enable dustmen drive and leave trash in the specific sector. People in this sector recycle it and produce new goods. In some corners of each honeycomb we create small "recycle factories" and other workshops where people can work and sell their products, other corners are used as schools, health centers and shops.

One single flat has area of 26 square meters. Thanks to light steel loadbearing construction, walls inside each flat can be arbitrarily shaped. In case of economic necessity, loadbearing steel structure can be substituted with bamboo structures, instead.

Every family can design and adapt its unit according to their own personal needs.

Facilities and convenience

To answer bad sanitarian conditions, our proposal is to make in each block of flats shared toilets. They are *compost toilets*, where feces can be used as a fertilizer in the garden, and urine in leather tanning.

Some greenery is assumed to complement the urban tissue. Because of the lack of space, we create little garden-plots on the rooftops, where dwellers can grow some vegetables, flowers or other plants.

Aesthetics

Our proposal is to use shipping containers because they're quite cheap and easy to get. Also they bring colors and life to overall look. Everything is enriched with balconies and big courtyards.

Costs

Estimated costs of the project are the maximum prices for a traditional construction process. There is an opportunity to reduce costs if dwellers would do it by themselves and would use replaceable solutions for example replace steel with bamboo as a structure material. The project can be entirely realized over a longer duration of time.

	COST OF ONE FLAT	COST OF ONE BLOCK OF FLATS	COST OF ONE HONEYCOMB	TOTAL
CONSTRUCTION	\$ 10 500	\$192 000	\$6 500 000	
CONTAINER	\$1 500	\$110.000	\$25 500 000	
ROADS				\$175 000 000
WELLS				\$150 000
CANALIZATION				20% of whole investment
TOTAL	\$12 000	\$302 000	\$32 000 000	
				\$975 150 000