CHAWLS: Popular Dwellings in Bombay

by

MAYANK SHAH
Dip. Arch. School of Architecture, Ahmedabad, India
1978

SUBMITTED TO THE DEPARTMENT OF ARCHITECTURE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE DEGREE OF MASTER OF SCIENCE IN ARCHITECTURE STUDIES AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY.
June 1981

Copyright © Mayank Shah 1981

The Author hereby grants to M.I.T. permission to reproduce and to distribute copies of this thesis document in whole or in part.

Signature of author

Mayank Shah, Department of Architecture, June 1981

Certified by

Horacio Caminos, Prof. of Architecture, Thesis Supervisor

Accepted by

Julian Beinart, Chairman, Departmental Committee for Graduate Studies

MAY 28 1981

LIBRARIES
CHAWLS: POPULAR DWELLINGS IN BOMBAY
ABSTRACT

The chawls, usually associated with the working class, are observed to be popular also among the rest of the population of Greater Bombay.

Case Studies representing different types within the category of chawls, built in the past as well as in the present by different developers, are analyzed and evaluated. The positive as well as negative aspects of such dwelling environments with reference to the case studies are brought onto the surface so as to provide a basis for the recommendations. The recommended guidelines with respect to physical as well as social aspects of such dwelling environments are provided and also demonstrated through an example layout.

Thesis Supervisor: Horacio Caminos
Title: Professor of Architecture, M.I.T.
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREFACE</td>
<td>6</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>7</td>
</tr>
<tr>
<td>CASE STUDIES: CHAWLS</td>
<td>10</td>
</tr>
<tr>
<td>1. Bhiwandiwala Terrace</td>
<td>12</td>
</tr>
<tr>
<td>2. Pannalal Terrace</td>
<td>18</td>
</tr>
<tr>
<td>3. Ganjawala Chawls</td>
<td>24</td>
</tr>
<tr>
<td>4. Chandanwadi Chawls</td>
<td>30</td>
</tr>
<tr>
<td>5. Vijaynagar Co-operative Housing Society</td>
<td>36</td>
</tr>
<tr>
<td>CASE STUDY ANALYSIS</td>
<td>42</td>
</tr>
<tr>
<td>Summary &amp; Conclusions</td>
<td>44</td>
</tr>
<tr>
<td>Evaluation Chart</td>
<td>46</td>
</tr>
<tr>
<td>RECOMMENDATIONS</td>
<td>48</td>
</tr>
<tr>
<td>Example Layout</td>
<td>49</td>
</tr>
<tr>
<td>Post Script</td>
<td>52</td>
</tr>
<tr>
<td>APPENDIX</td>
<td></td>
</tr>
<tr>
<td>National Context: India</td>
<td>54</td>
</tr>
<tr>
<td>Urban Context: Bombay</td>
<td>56</td>
</tr>
<tr>
<td>By-laws For Chawls</td>
<td>62</td>
</tr>
<tr>
<td>Co-operative Housing Society - An Overview</td>
<td>63</td>
</tr>
<tr>
<td>Glossary</td>
<td>64</td>
</tr>
<tr>
<td>Bibliography/Explanatory Notes</td>
<td>68</td>
</tr>
</tbody>
</table>
PREFACE

Although my first introduction to the Chawls dates back to about fifteen years ago when I used to spend my school vacation in playing with my friends in a chawl, it caught my due attention after my involvement in housing issues during architecture studies, about ten years later. The opportunity of conducting a research on chawls actualised after coming to M.I.T. under the experienced direction of professor Horacio Caminos, in Urban Settlement Design in Developing Countries Program.

Fieldwork for the study was conducted during the summers of 1979 and 1980 in Bombay. Physical and socio-economic surveys were carried out for the selected case studies during that period.

I gratefully acknowledge the guidance and support of professor Caminos. The assistance, critique and friendship of Reinhard Goethert is sincerely appreciated. Comments and company of Happy, the classes of 1978-80 & 1980-82 and the members of my class is greatly appreciated.

My deep gratitude to Varin Kiatfuengfoo and Mohamed El-Sioufi whose friendship and comments were of a great help. My warm thanks to Hsueh-Jane Chen for her invaluable friendship and support.
INTRODUCTION

Of the estimated total of 1138 thousand dwelling units in Greater Bombay, 18% are Shanties, 20% are Apartments and 61% are Chawls. The Chawl-affordable and culturally acceptable form of dwelling, today houses about 3.8 million people, 73% of whom belonging to low income groups.

Such a substantial type of housing having been ignored till now as viable & popular dwelling environment, has been focused upon in this study.

CHAWLS
DEFINITION:
The Chawl is a group of one or two room dwelling units along a corridor, sharing sanitary facilities.
'Chawl' or 'Chaal' means a corridor or a passage in local languages.
A chawl building may be one storied to five storied. Sanitary facilities, mainly lavatories & sometimes bath and washing also, may be common to the residents on one floor or in the entire building. Dwelling units, one or two-room, with or without balcony or verandah, may be arranged in a row on one side or on both sides of the corridor or open court.

ORIGIN:
Chawls were initially created for housing industrial workers who were single, male, migrants. This form of housing originated in the latter part of the last century in response to increasing migrants and industrial development, based on early industrial England's back-to-back workers' terraces.

These housing activities for industrial workers were mainly confined to private developers until the end of the last
century when Public housing agencies (Bombay Improvement Trust and Bombay Development Department) entered the field and provided a considerable number of dwellings, mainly in the form of chawls.

The chawls were later adopted by families and even the middle income groups.

### POPULATION OF BOMBAY BY SOCIO-ECONOMIC STATUS & DWELLING TYPE

<table>
<thead>
<tr>
<th>SOCIO-ECONOMIC LEVEL</th>
<th>DWELLING TYPE</th>
<th>HUT (SHANTY)</th>
<th>CHAWL</th>
<th>FLAT (APARTMENT)</th>
<th>BUNGALOW (HOUSE)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>VERY LOW</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>17.0</td>
</tr>
<tr>
<td>upto Rs.2400</td>
<td></td>
<td>8.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOW</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>61.0</td>
</tr>
<tr>
<td>Rs.2400-6000</td>
<td></td>
<td>8.5</td>
<td>35.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MIDDLE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20.0</td>
</tr>
<tr>
<td>Rs.6000-12000</td>
<td></td>
<td>2.0</td>
<td>8.5</td>
<td>6.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIGH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.5</td>
<td>2.0</td>
</tr>
<tr>
<td>over Rs.12000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>17.0</strong></td>
<td><strong>61.0</strong></td>
<td><strong>20.0</strong></td>
<td><strong>2.0</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

*SOURCE: Housing Situation in Greater Bombay, P. Ramachandran, 1977 TISS

**PRESENT SITUATION:**
Out of every five dwelling units today, one is a shanty, one is an apartment and three are chawls. Households with the sizes varying from 1 to 13 and with the income varying from Rs. 250 to 1000 (U.S.$ 30 to 125) per month, are residing in chawls. The chawls are popular not only among the migrants but also among the local households. The chawls are also popular in the other cities of India, coexistent with the industrial activities.

Majority of the chawls comprise one-room dwelling units with shared facilities. Households with an average size of 6.3 persons live in the chawls.

**TREND:**
Even when the public housing agencies are now inclined towards providing self-contained dwelling units, a number of private or co-operative housing schemes are adopting the form of chawl.

**PROJECTED DEMAND:**
'On the assumption that the population of one million which is planned to be settled in New Bombay will have the same pattern of socio-economic distribution and dwelling preferences as in Greater Bombay, 90 to 100 thousand such dwellings are required to be created in New Bombay.'* Apart from that, most of the housing activities in the suburban areas of Greater Bombay will be adopting chawl form of dwelling as it is the only viable, affordable option for the city's poor.

**OBJECTIVES:**
The objectives of this study are to bring onto surface the positive and negative aspects of this type of dwellings through evaluating the selected case studies in Greater Bombay. It also provides suggested guidelines applied to the Example Layout, for improved, physically and socially efficient planning of such type of developments.
About 62,000 persons live on the pavements of Bombay. Service industry buildings are also seen in the foreground.

(LEFT) Atmosphere at the chawls; about two-thirds of Greater Bombay's population lives in chawls.

(BOTTOM) A 'calm' afternoon sleep under the bridge. About 12,000 persons live on the pavements of Bombay.

BOTTOM) Newly sprung up high rise apartment blocks in the background and a few walk-up and single-storey chawls in the middle right and center.
CASE STUDIES

The case studies representing prevalent dwelling systems in the old city as well as in new developments in the suburbs, are selected to provide basis for formulating urban housing guidelines. Examples of different dwelling types within the 'chawl' category and having different characteristics in terms of size, age, etc., are analyzed and evaluated. A total of five case studies accommodating low and lower middle income groups are studied at locality segment, dwelling group or community and dwelling unit scale.

DWELLING/GROUP: Multi-family residential building or group of buildings built on one parcel of land by one developing agency is studied at this scale.

DWELLING UNIT: Typical residential unit for a household or family is selected from the above dwelling group for study.
case studies

1 Bhiwandiwala Terrace
2 Pannalal Terrace
3 Ganjawala Chawls
4 Chandanwadi Chawls
5 Vijaynagar Co-op. Society

LOCALITY: BHULESHWAR
BUILDER: PRIVATE
INCOME GROUP SERVED: LOW
NUMBER OF FLOORS: 5, (6) STORY
YEAR OF CONSTRUCTION: 1920
COMMUNITY: PARSIS
SIZE: TOTAL DW. UNITS: 180
TOTAL POPULATION: 900

LOCALITY: TARDEO
BUILDER: PRIVATE
INCOME GROUP SERVED: MODERATE
NUMBER OF FLOORS: 5 STORY
YEAR OF CONSTRUCTION: 1911
COMMUNITY: GUJARATIS
SIZE: TOTAL DW. UNITS: 165
TOTAL POPULATION: 917

LOCALITY: TARDEO
BUILDER: PUBLIC
INCOME GROUP SERVED: VERY LOW
NUMBER OF FLOORS: 1 STORY
YEAR OF CONSTRUCTION: 1900
COMMUNITY: MIXED
SIZE: TOTAL DW. UNITS: 116
TOTAL POPULATION: 890

LOCALITY: BHULESHWAR
BUILDER: PUBLIC
INCOME GROUP SERVED: LOW
NUMBER OF FLOORS: 4 STORY
YEAR OF CONSTRUCTION: 1904
COMMUNITY: MIXED
SIZE: TOTAL DW. UNITS: 584
TOTAL POPULATION: 3530

LOCALITY: ANDHERI
BUILDER: CO-OPERATIVE
INCOME GROUP SERVED: MODERATE
NUMBER OF FLOORS: 3 STORY
YEAR OF CONSTRUCTION: 1961-65
COMMUNITY: MARATHI
SIZE: TOTAL DW. UNITS: 480
TOTAL POPULATION: 2165
1 Bhiwandiwala Terrace Bombay

LOCALITY: This dwelling example represents the typical process of conversion of one family dwelling units into multi-family units. It was built in 1920 by a Parsi Community Trust in order to provide subsidized housing to this minority group.

As it is located in the city center, both the modes of circulation—vehicular and pedestrian—are intense and always clash with each other during working hours.

It is situated in the city center, off Princess street—the main street with wholesale/retail drugstores and bookstores. Bhiwandiwala terrace can be approached by Girgaum road and also by Trinity street, both parallel to each other.

Communal facilities in the vicinity include many private and municipal schools, health facilities, cinema houses, retail markets and also religious institutions.

CASE STUDY SOURCES
- Segment Plan: (accurate) Bombay Municipal Corporation, 1972
- Dwelling Group Plan: (accurate) BMC, 1972
- Author, 1980
- Dwelling Unit: (accurate) Field Survey, Author 1980
- Physical Data: (accurate) Field Survey, Author 1980
- Socio-Economic Data: (approximate) Field Survey, Author 1980
- Photographs: Author 1980
- General Information: Field Survey, Author 1980

PHOTOGRAPHS: The court surrounded by dwellings, the back entrance is kept closed most of the time.
CASE STUDY: SHIWADIWALA TERRACE

LOCALITY

CONSTRUCTION TYPES

- Shack
- MD/Nattle
- Wood
- Masonry
- Concrete

The chart shows (1) the approximate percentage of each construction type within the total number of dwellings and (2) the building group that generally produces each type.

Quality of information: approximate

LOCALITY UTILITIES AND SERVICES

- Water Supply
- Sanitary Sewerage
- Storm Drainage
- Electricity
- Gas
- Refuse Collection
- Public Transportation
- Paved Roads, Walkways
- Telephone
- Street Lighting

LOCALITY COMMUNITY FACILITIES

- Police
- Fire Protection
- Health
- Schools, Playgrounds
- Recreation, Open Spaces

The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: None, Limited, Adequate.

Quality of information: approximate
DWELLING: Five to six stories high dwelling is built on a long lot with streets on two sides. Entrance gates on both sides have dwellings above them starting from second storey up to 5 stories. Its location in commercial area permits shop activities on the ground floor. These shops are managed by some of the residents and are causing public use of the court.

Two four-room dwelling units are divided in four two-room units in response to the increasing demand for housing. In other words, a total of 90 dwelling units are divided to make 180 units. As a result, one family has to pass through another family's unit.

Two latrines, located in the passage since the beginning, are now used by four households instead of two. Showers or bathing places, either private or common, do not exist, instead the 'mori' or washing place in the kitchen is used for the purpose.

Outer stone masonry walls of the building are load bearing; whereas the inner structure is built in timber posts and beams with brick masonry partitions. Physical condition of this 60 years old building is good.

OCCUPANTS: A total of 900 persons, all Parsis, occupy this dwelling. Average family size among the occupants is five and the average family income is Rs. 500 (US$ 60) per month. Most of the family heads are well-educated and are engaged in white collar jobs.
PHYSICAL DATA
(related to land, dwelling and dwelling unit)

LAND/LOT
utilization: PUBLIC
area (sq.m.): 1740
tenure: LEASED RENTAL

DWELLING
location: CITY CENTER
type: CONVERTED CHAWL
number of floors: 5, (6)
utilizations: MULTI-FAMILY
physical state: FAIR

number of dwelling units: 180
number of people: 900
private floor area (sq.m.): 5040 (77%)
shared floor area (sq.m.): 1510 (23%)
total floor area (sq.m.): 6550
open area (sq.m.): 505 (2%)
lot coverage (sq.m.): 1235 (71%)
total lot area (sq.m.): 1740
total floor area/lot area (FSI): 3.7

Density (people/ha of lot area): 5172

SOCIODEMOGRAPHIC DATA
(related to user)

GENERAL: SOCIAL
user’s ethnic origin: PERSIAN
place of birth: GUJARAT
education level: MEDIUM

NUMBER OF USERS
married: 2
singles: 1
children: 2
total: 5

MIGRATION PATTERN
number of moves: 1
rural - urban: 1
urban - urban: -
urban - rural: -

why came to urban area:

GENERAL: ECONOMIC
user’s income group: LOW
employment: CLERICAL
distance to work: 2 KM
mode of travel: BUS / WALK

DWELLING UNIT PAYMENTS
financing: SUBSIDIZED BY PERSIAN TRUST
rent/mortgage: US $ 2
% income for rent/mortgage: 3 - 4
extra payments: NONE
Entrance to Shivandiwala Terrace located on one of the main commercial streets.

(RIGHT) Multi-purpose room of a Parsi household.

(BOTTOM) Cooking area, raised platform and a 'nari'.
LOCALITY: The locality is among the oldest and densest developments in the city. Pannalal Terrace, built in 1911, is located at the junction of Lamington Road and Grant Road. The area is the north extension of the commercial center. Both the roads are busy with extensive commercial activities and vehicular as well as pedestrian traffic. Educational and health facilities are located in the vicinity but are inadequate as they serve large population. Number of cinema houses are concentrated in this locality. Light service industries also exist in the locality.

CASE STUDY SOURCES
Segment Plan: (accurate) Bombay Municipal Corporation, 1972
Dwelling Group Plan: (accurate) BMC, 1972
Dwelling Unit: (accurate) Field Survey, Author, 1980
Thesis: Avani Trivedi, 1978
Physical Data: (accurate) Field Survey, Author, 1980
Socio-Economic Data: (approximate) Field Survey, Author, 1980
Photographs: Author, 1980
General Information: Field Survey, Author, 1980

PHOTOGRAPHS: A large courtyard between two wings of the building; note the stair flight from ground floor to first floor connecting to the central stair in order to segregate the shopping activities on the ground floor.
CASE STUDY: PANHALAL TERRACE

19

LOCALITY CONSTRUCTION TYPES

<table>
<thead>
<tr>
<th>Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHACK</td>
<td>100%</td>
</tr>
<tr>
<td>MUD/MATILE</td>
<td></td>
</tr>
<tr>
<td>WOOD</td>
<td></td>
</tr>
<tr>
<td>MASONRY</td>
<td></td>
</tr>
<tr>
<td>CONCRETE</td>
<td></td>
</tr>
</tbody>
</table>

The chart above (1) approximate percentage of each construction type within the total number of dwellings and (2) building group that generally produces each type.

Quality of information: approximate

LOCALITY UTILITIES AND SERVICES

<table>
<thead>
<tr>
<th>Service</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>WATER SUPPLY</td>
<td></td>
</tr>
<tr>
<td>SANITARY SEWER</td>
<td></td>
</tr>
<tr>
<td>STORM DRAINAGE</td>
<td></td>
</tr>
<tr>
<td>ELECTRICITY</td>
<td></td>
</tr>
<tr>
<td>GAS</td>
<td></td>
</tr>
<tr>
<td>REFUSE COLLECTION</td>
<td></td>
</tr>
<tr>
<td>PUBLIC TRANSPORTATION</td>
<td></td>
</tr>
<tr>
<td>PAVED ROADS, WALKWAYS</td>
<td></td>
</tr>
<tr>
<td>TELEPHONE</td>
<td></td>
</tr>
<tr>
<td>STREET LIGHTING</td>
<td></td>
</tr>
</tbody>
</table>

LOCALITY COMMUNITY FACILITIES

<table>
<thead>
<tr>
<th>Facility</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLICE</td>
<td></td>
</tr>
<tr>
<td>FIRE PROTECTION</td>
<td></td>
</tr>
<tr>
<td>HEALTH</td>
<td></td>
</tr>
<tr>
<td>SCHOOLS, PLAYGROUNDS</td>
<td></td>
</tr>
<tr>
<td>RECREATION, OPEN SPACES</td>
<td></td>
</tr>
</tbody>
</table>

The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information: approximate

LOCALITY SEGMENT PLAN

1:2500

SELECTED DWELLING/GROUP
<table>
<thead>
<tr>
<th>Land/Lot</th>
<th>Sq.m.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lot Coverage</td>
<td>1485</td>
<td>54</td>
</tr>
<tr>
<td>Open Area</td>
<td>1265</td>
<td>46</td>
</tr>
<tr>
<td>Total Lot Area</td>
<td>2750</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dwelling</th>
<th>Sq.m.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Floor Area</td>
<td>3960</td>
<td>62</td>
</tr>
<tr>
<td>Shared Floor Area</td>
<td>2405</td>
<td>38</td>
</tr>
<tr>
<td>Total Floor Area</td>
<td>6365</td>
<td>100</td>
</tr>
</tbody>
</table>

**Key**
- Private Floor Area: dwellings
- Semi-Private Floor Area: corridors
- Semi-Private Floor Area: cluster courts

**Floor/Land Utilization Plan**
DWELLING: This private development contains 165 dwelling units, in a five story L shape building with one wing facing the street having corridors on either side and the other wing perpendicular to it having one corridor looking over the large courtyard. The ground floor units facing the street are sold away for commercial activities. In order to prevent interference of these commercial activities in the courtyard, their access to court is closed and the central stairs start from the second story which is connected by a flight of stair from ground floor. The two wings of the building are independent each having stair(s) and common sanitary facilities within. About 4 households share one w.c., whereas, more than 6 households have to share a shower.

The material used for structure is timber and for walls is brick masonry. Physical condition of the building is dilapidated.

OCCUPANTS: About 920 Gujaratis inhabit this dwelling. Most of the residents are self-employed involved in business which brings them a monthly household income of Rs. 700 to 900 (U.S.$ 90 to 120). About 6 to 8% of the income is spent on the rent and about 60% on food.

PHOTOGRAPH: Larger distance from floor to floor allows addition of mezzanine. Note the louvres for ventilating the top portion of the corridor which facilitates drying of clothes in monsoon.
PHYSICAL DATA
(related to land, dwelling and dwelling unit)

LAND/LOT
utilisation: SEMI-PRIVATE
area (sq m): 2750
tenure: LEGAL RENTAL

DWELLING/DWELLING/GROUP
location: CITY CENTER
type: CHAWL
number of floors: 5
utilisation: MULTI-FAMILY
physical state: DILAPIDATED

number of dwelling units: 165
number of people: 917

private floor area (sq.m.): 3900 (62%)
shared floor area (sq.m.): 2405 (38%)
Total floor area (sq.m.): 6365 (100%)
open area (sq.m.): 1485 (24%)
lot coverage (sq.m.): 1265 (46%)
Total lot area (sq.m.): 2750 (100%)
total floor area/lot area (FSI): 2.3
density (people/ha of lot area): 3334
(dwelling units/ha of lot area): 600

shared facilities dw units/facility p/facility
wo: 4.1
shower: 6.6
kitchen: -
rms: 37
other: 11

DWELLING DEVELOPMENT
mode: INSTANT
developer: PRIVATE
builder: CONTRACTOR
construction type: TIMBER/MASONRY
year of construction: 1911

DWELLING UNIT

type: TWO-ROOM
area (sq m): 24
tenure: RENTAL

average household size: 5.4
average area per person (sq.m.): 4.2

facilities
room: 1
kitchen: 1
shower:
other: -

w.c.:

SOCIO-ECONOMIC DATA
(related to user)

user's ethnic origin: GUJARATI
place of birth: GUJARATI
education level: MEDIUM

NUMBER OF USERS
married: 4
single: -
children: 2
total: 8

MIGRATION PATTERN
number of moves: 2
rural - urban: 1
urban - rural: -

why came to urban area:

EDUCATION/EMPLOYMENT

user's income group: MIDDLE
employment: SELF-EMPLOYED
distance to work: 2
mode of travel: BUS

DWELLING UNIT PAYMENTS
financing: SELF-FINANCE
rent/mortgage: US $ 6
% income for rent/mortgage: 6-8
extra payments: US $ 1,000 - 5,000

KEY
R Room (multi-use)
K Kitchen/Cooking Area
E Expansion
C Corridor
L Loft
M (R) Room
M (K) Kitchen
M (E) Expansion
M (C) Corridor
M (L) Loft

DWELLING UNIT

Plan

Section
CASE STUDY: PANHALAL TERRACE

Photographs: Dilapidated exterior... Renovated interior, water storage drum and water heating coal stove are seen near the 'mori' which is used for washing utensils, clothes, etc., and also for bathing.
3 Ganjawala Chawls
Bombay

LOCALITY: Ganjawala chawls is one of the oldest cases representing early form of chawl-type dwellings. It is located near service industrial lots and commercial activities extended from the city center. Because of its location near the Bombay Central railway station, industrial activities developed after the establishment of rail links with the mainland.

In terms of the communal facilities, the locality has municipal primary and secondary schools, a hospital, market, etc. within the walking distance from Ganjawala chawls. The main roads passing through the area are congested with pedestrian as well as vehicular circulation. However, the access to Ganjawala chawls is seldom crowded.

CASE STUDY SOURCES
Segment Plan: (accurate) Bombay Municipal Corporation, 1972
Dwelling Group Plan: (accurate) BMC, 1972
Dwelling Unit: (accurate) Field Survey, Author, 1980:
Thesis, Avani Trivedi, 1978
Physical Data: (accurate) Field Survey, Author, 1980
Socio-Economic Data: (approximate) Field Survey, Author, 1980
Photographs: Author, 1980
General Informations: Field Survey, Author, 1980

PHOTOGRAPH: (TOP) Approach to the 80 year old, single storied chawls. The construction in the background is being carried out by Bombay Municipal Corporation to house the residents of these dilapidated chawls. (BOTTOM) Common latrines without water supply, are located in a corner of the site.
CASE STUDY: CANJAWALA CHAWLS

LOCALITY CONSTRUCTION TYPES

- CHICK
- MUD/MATTLE
- WOOD
- MASONRY
- CONCRETE

The chart shows (1) approximate percentage of each construction type within the total number of dwellings and (2) building group that generally produces each type. Quality of information: approximate

LOCALITY UTILITIES AND SERVICES

- WATER SUPPLY
- SANITARY SEWERAGE
- STORM DRAINAGE
- ELECTRICITY
- GAS
- REFUSE COLLECTION
- PUBLIC TRANSPORTATION
- PAVED ROADS, MAMYS
- TELEPHONE
- STREET LIGHTING

LOCALITY COMMUNITY FACILITIES

- POLICE
- FIRE PROTECTION
- HEALTH
- SCHOOLS, PLAYGROUNDS
- RECREATION, OPEN SPACES

The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE. Quality of information: approximate

LOCALITY SEGMENT PLAN

1:2500
DWELLING: These chawls were built by private developer in the year 1900. The layout was based on early industrial England’s back-to-back workers' terraces. The group of chawls has 116 dwelling units, divided 8 rows. Small back-to-back, single-room dwelling units are divided by corrugated tin sheets and covered by clay-tiled roof. One-story structures are built in timber and brick masonry. Except common washing places (fortunately with 24 hours water supply) no facilities existed until Bombay Municipal Corporation (BMC) provided common latrines. B.M.C. is presently building walk-up chawls in the same lot to house the occupants of these dilapidated dwellings.

OCCUPANTS: These chawls house about 890 low-income people, many of them single, male, migrant, industrial workers, fulfilling the original purpose of chawls when initiated. The dwellers' group is heterogeneous, comprising the natives of Uttar Pradesh, Gujarat and rural parts of Maharashtra.

PHOTOGRAPH: Interior of a one-room, back-to-back unit divided by tin sheets, their needs have shrunk, the lady is satisfied for what she has.
**Physical Data**

(related to land, dwelling and dwelling unit)

- **Land/Lot**
  - Utilization: Semi-Private
  - Area (sq m): 2530
  - Tenure: Legal Rental

- ** Dwelling**
  - Dwelling Group: Inner-Ring
  - Type: Chawl
  - Number of Floors: 1
  - Utilization: Multi-Family
  - Physical State: Dilapidated

- **Number of Dwelling Units:** 116
- **Number of People:** 890

- **Private Floor Area (sq m):** 1391 (100%)
- **Shared Floor Area (sq m):** - (0%)
- **Total Floor Area (sq m):** 1391 (100%)
- **Open Area (sq m):** 1139 (45%)
- **Lot Coverage (sq m):** 1391 (55%)
- **Total Lot Area (sq m):** 2530 (100%)

- **Density (people/ha of lot area):** 3517
- **Density (dwelling units/ha of lot area):** 458

- **Private Floor Area (sq m)/Shared Floor Area (sq m):** 6.4
- **Private Floor Area (sq m)/Total Floor Area (sq m):** 0.55
- **Private Floor Area (sq m)/Lot Area (sq m):** 0.55

- **Total Floor Area (sq m)/Lot Area (sq m):** 0.55

**Social-Economic Data**

(related to user)

- **User's Ethnic Origin:** U.P. Hindu
- **Place of Birth:** -
- **Education Level:** None

- **Number of Users:**
  - Married: 4
  - Single: -
  - Children: 2
  - Total: 6

- **Migration Pattern**
  - Number of Moves: 1
  - Rural - Urban: 1
  - Urban - Rural: -
  - Why Came to Urban Area: Employment

- **General: Economic**
  - User's Income Group: Very Low
  - Employment: Industrial Workers
  - Distance to Work: 1 km
  - Mode of Travel: Walk

- **Dwelling Unit Payments**
  - Financing: Self-Finance
  - Rent/Mortgage: US $1
  - % Income for Rent/Mortgage: 2.4
  - Extra Payments: None

**Key**

- R Room (multi-use)
- K Kitchen/Cooking Area
- V Verandah
- L Loft
- E Expansion

**Plan**

**Section**

**Diagram**

- Section Key
- Court
- Dwelling Unit 2
- Dwelling Unit 1
- Section

**Diagram Scale:** 1:100
CASE STUDY: GANJAWALA CRAWLS

USES OF THE COURT; playground for cats, buns and children; bathing place; a place for drying grain, knitting, etc.
Chandanwadi Chawls Bombay

LOCALITY: This case is selected to represent the public housing efforts for low income groups. These chawls are located in the same area as the first case, across Princess street—the main commercial street of the area.

Bombay Improvement Trust (B.I.T.) built this groups of six buildings in the year 1904. B.I.T. was formed in 1898 for the purpose of providing housing to the city’s poor. Until then, the housing activities were confined to the private enterprises. These chawls are now owned by the Bombay Municipal Corporation.

Service industries also exist in this largely commercial and residential area. A municipal primary school and municipal dispensary are located just opposite the dwelling group under study, apart from many other communal facilities in the locality. Chandanwadi is name of the street where a large number of basket weavers live.

CASE STUDY SOURCES

Segment Plan: (accurate) Bombay Municipal Corporation, 1972
Dwelling Group Plan: (accurate) BMC, 1972
Author, 1980
Dwelling Unit: (accurate) Field Survey, Author, 1980;
Thesis, Avani Trivedi, 1978
Physical Data: (accurate) Field Survey, Author, 1980
Socio-Economic Data: (approximate) Field Survey, Author, 1980
Photographs: Author, 1980
General Informations: Field Survey, Author, 1980

PHOTOGRAPH: Entrance staircase right on the street, but no many watching eyes won’t let a stranger in.
The chart shows (1) approximate percentages of each construction type within the total number of dwellings and (2) building group that generally produces each type.

Quality of information: approximate

LOCALITY UTILITIES AND SERVICES

- WATER SUPPLY
- SANITARY SEWERAGE
- STORM DRAINAGE
- ELECTRICITY
- GAS
- REFUSE COLLECTION
- PUBLIC TRANSPORTATION
- PAVED ROADS, WALKWAYS
- TELEPHONE
- STREET LIGHTING

LOCALITY COMMUNITY FACILITIES

- POLICE
- FIRE PROTECTION
- HEALTH
- SCHOOLS, PLAYGROUNDS
- RECREATION, OPEN SPACES

The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information: approximate
DWELLING: Six buildings are arranged in three rows—one behind another, parallel to the street. This group of dwellings also has a second entrance through an access road from the other side. Each building is four stories high, having a central corridor with single room dwelling units on either side. The stair is in the center opposite the common sanitary facilities in a narrow block extending out of the building facade. Each building has 80 to 128 dwelling units, i.e., 20 to 32 units on a floor. Four units share one w.c., one shower and a washing place.

OCCUPANTS: A heterogeneous group of Gujaratis, Christians, Marathis, etc., live in these chawls; each group occupying a separate building. These chawls serve more than 3,500 people, most belonging to low income group. Occupation of the dwellers varies, with the majority involved in clerical and factory jobs. Monthly household income of the occupants ranges from Rs. 400 to 800 (US$ 50 to 100). About 3% of the income spent on rent and about 70% on food.
<table>
<thead>
<tr>
<th>LAND/LOT</th>
<th>sq.m.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOT COVERAGE</td>
<td>7785</td>
<td>70</td>
</tr>
<tr>
<td>OPEN AREA</td>
<td>3360</td>
<td>30</td>
</tr>
<tr>
<td>TOTAL LOT AREA</td>
<td>11145</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DWELLING</th>
<th>sq.m.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRIVATE FLOOR AREA</td>
<td>7884</td>
<td>59</td>
</tr>
<tr>
<td>SHARED FLOOR AREA</td>
<td>5556</td>
<td>41</td>
</tr>
<tr>
<td>TOTAL FLOOR AREA</td>
<td>13440</td>
<td>100</td>
</tr>
</tbody>
</table>

**KEY**

- PRIVATE FLOOR AREA: dwellings
- SEMI-PRIVATE FLOOR AREA: corridors
- SEMI-PRIVATE FLOOR AREA: cluster courts

**FLOOR/LAND UTILIZATION PLAN**
PHYSICAL DATA

(related to land, dwelling and dwelling unit)

LAND/LOT
utilization: SEMI-PRIVATE
area (sq m): 11145
tenure: LEGAL RENTAL

DWELLING
location: CITY-CENTER
type: CHAWL
number of floors: 4
utilization: MULTI-FAMILY
physical state: FAIR

number of dwelling units: 584
number of people: 3530

private floor area (sq.m.): 7884(55%)
shared floor area (sq.m.): 5556(41%)
Total floor area (sq.m.): 13440(100%)
open area (sq.m.): 7785(70%)
lot coverage (sq.m.): 3360(30%)
Total lot area (sq.m.): 11145(100%)
cotal floor area/lot area (FSI): 1.2

density (people/ha of lot area): 3167

(shared facilities dw units/facility p/facility
WC: 4 24
shower: 6 46
kitchen: -
room: -
other: -

DEVELOPMENT
mode: INSTANT
developer: PUBLIC (HIV)
builder: LARGE CONTRACTOR
construction type: MASONRY/CONCRETE (SKELETON)
year of construction: 1904

DWELLING UNIT
type: ROOM
area (sq m): 104.4
tenure: LEGAL RENTAL

average household size: 4
average area per person (sq.m.): 2.25
facilities:
room: 1
kitchen: -
shower: -
washing area/mori: 1
w.c.: -
other: BALCONY

SOCIO-ECONOMIC DATA
(related to user)

GENERAL: SOCIAL
user's ethnic origin: CHRISTIAN
place of birth: GOA
education level: MEDIUM

NUMBER OF USERS
married: 2
single: 1
children: 1
total: 4

MIGRATION PATTERN
number of moves:
rural - urban: 1
urban - urban: -
urban - rural: -
why came to urban area: EMPLOYMENT

GENERAL: ECONOMIC
user's income group: LOW
employment: CLERICAL
distance to work: 4 KM
mode of travel: BUS

DWELLING UNIT PAYMENTS
financing: SELF-FINANCE
rent/mortgage: US $ 2
% income for rent/mortgage: 3
extra payments: NONE
CASE STUDY: CHANDANWADI CWARES

PHOTOGRAPHS: USES OF THE COURT: elders sit and chat while the children play.
LOCALITY: This case is the typical of the new developments occurring in the suburban areas of Bombay. Although it is built (in 1965) by a private enterprise to form a cooperative housing society of a homogeneous ethnic group, it doesn't differ from the other public housing schemes in the suburbs. Located in Andheri, one of the eastern suburbs of Bombay, it is surrounded by a railway station, a vegetable market and a bus-terminal within short distances. Vehicular traffic and density are low, compared to the other case studies. The site is occupied by 20 identical blocks in rows, and it also contains a primary school and a community hall within the boundary.
CASE STUDY: VIJAYNAGAR SOCIETY

LOCALITY CONSTRUCTION TYPES

<table>
<thead>
<tr>
<th>LOCALITY</th>
<th>CONSTRUCTION TYPES</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHACK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MUD/WATTLE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WOOD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masonry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concrete</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The chart shows (1) approximate percentage of each construction type within the total number of dwellings and (2) building group that generally produces each type.

Quality of information: approximate

LOCALITY UTILITIES AND SERVICES

<table>
<thead>
<tr>
<th>COMMON SERVICES</th>
<th>SELECTED DWELLING/GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>WATER SUPPLY</td>
<td></td>
</tr>
<tr>
<td>SANITARY SEWERAGE</td>
<td></td>
</tr>
<tr>
<td>STORM DRAINAGE</td>
<td></td>
</tr>
<tr>
<td>ELECTRICITY</td>
<td></td>
</tr>
<tr>
<td>GAS</td>
<td></td>
</tr>
<tr>
<td>REFUSE COLLECTION</td>
<td></td>
</tr>
<tr>
<td>PUBLIC TRANSPORTATION</td>
<td></td>
</tr>
<tr>
<td>PAVED ROADS, WALKWAYS</td>
<td></td>
</tr>
<tr>
<td>TELEPHONE</td>
<td></td>
</tr>
<tr>
<td>STREET LIGHTING</td>
<td></td>
</tr>
</tbody>
</table>

LOCALITY COMMUNITY FACILITIES

<table>
<thead>
<tr>
<th>COMMUNITY FACILITIES</th>
<th>SELECTED DWELLING/GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Police</td>
<td></td>
</tr>
<tr>
<td>Fire Protection</td>
<td></td>
</tr>
<tr>
<td>Health</td>
<td></td>
</tr>
<tr>
<td>Schools, Playgrounds</td>
<td></td>
</tr>
<tr>
<td>Recreation, Open Spaces</td>
<td></td>
</tr>
</tbody>
</table>

The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information: approximate
CHAWLS: POPULAR DWELLINGS IN BOMBAY

ACCESS TO CHANDRASHEKHAR SOCIETY

PRIMARY SCHOOL

COMMUNITY HALL

SALSET ROAD

Dwelling Group

1:1000

Plan
DWELLING: The dwelling is a three storied, reinforced concrete and brick masonry building with slightly sloped concrete roof. Each building contains 24 dwelling units, 8 on each floor, with stair and sanitary facilities, two w.c.s and a washing place on each floor. Two room dwelling units, are provided with a cooking platform, bathroom, and a loft. Water storage tanks and pumps facilitate 24 hour water supply.

OCCUPANTS: The occupants belong to the Marathi Brahmin community. The total number of people residing in this co-operative society is about 2,200. Many of them are officers, falling in middle income groups, monthly income of a household varies from Rs. 700 to 1,000 (U.S.$ 85 to 125). The deposit of Rs 3,000 (U.S. $ 375) at the time of registration in 1961, and a monthly installment of Rs 70 (U.S.$ 9) for 15 years was required from each household after occupation in 1965, towards ownership of the dwelling unit. The land, however, is owned by the whole society. (see appendix for co-operative housing systems)
40 CHAWLS: POPULAR DWELLINGS IN BOMBAY

PHYSICAL DATA
(related to land, dwelling and dwelling unit)

LAND/LOT
utilization: SEMI-PRIVATE
area (sq m): 21797
tenure: COOPERATIVE

DWELLING GROUP
location: SUBURB
type: CHAWL
number of floors: 3
utilization: MULTI-FAMILY
physical state: -

number of dwelling units: 480
number of people: 2165
private floor area (sq.m.): 12384 (66%)
shared floor area (sq.m.): 6516 (34%)
Total floor area (sq.m.): 18900 (100%)

open area (sq.m.): 15497 (71%)
lot coverage (sq.m.): 6300 (29%)

LOT AREA (sq.m.): 21797 (100%)

COSTLY AREA/LAT (PSI): 0.86

density ( PEOPLE/HA OF LOT AREA): 993
(dwelling units/HA OF LOT AREA): 220

shared facilities/units/facility per facility

wc: 4
kitchen: -
rooms: -
other: -

DWELLING DEVELOPMENT
mode: INSURANCE

developer: PRIVATE
builder: LARGE CONTRACTOR

construction type: SKELETON (MASONRY CONCRETE)

year of construction: 1961-65

DWELLING UNIT

area (sq m): 25.8
tenure: OWNERSHIP (RERE/PURCHASE)

average household size: 4.5
average area per person (sq.m.): 5.7

facilities: room: 1
kitchen: 1
shower: 1
washing area/multi-use: -

why came to urban area: EDUCATION/EMPLOYMENT

SOCIO-ECONOMIC DATA
(related to user)

GENERAL: SOCIAL
user's ethnic origin: MAHARASHTRA
place of birth: MAHARASHTRA
education level: HIGH

NUMBER OF USERS:
matured: 2
single: 1 (WIDOW)
children: 2

total: 5

MIGRATION PATTERN
number of moves: 1
rural - urban: 1
urban - rural: -
urban - urban: -

why came to urban area: EDUCATION/EMPLOYMENT

GENERAL: ECONOMIC
user's income group: MIDDLE
employment: CLERICAL

distance to work: 30 KM
mode of travel: TRAIN

DWELLING UNIT PAYMENTS
financing: SELF-FINANCE
rent/mortgage: US $ 9/MONTHLY INSTALLMENT
extra payments: DEPOSIT US $ 375 (IN 1961)

KEY

- Room (multi-use)
- Kitchen/Cooking Area
- Corridor
- Loft
- Shower

0 1 2 3 5
1:100

SWELLING UNIT

SWELLING UNIT 1

Plan

Section
PHOTOGRAPHS: (TOP) Clothes drying in the kitchen is not an unusual sight in Bombay during Monsoons. Storage of grain, cooking oil, etc., is kept on the dividing wall between the room and the kitchen.

(BOTTOM) Kitchen platform and laundring place were provided and ceramic tile finish was added later.

(RIGHT) View of the corridor with eight dwelling units on a floor.

In Bombay during Monsoons, clothes drying in the kitchen is not an unusual sight. Storage of grain, cooking oil, etc., is kept on the dividing wall between the room and the kitchen. The kitchen platform and laundring place were provided and ceramic tile finish was added later. The view of the corridor with eight dwelling units on a floor.
# CASE STUDY ANALYSIS

## Space/Activity Chart

### Case Study Number 1

<table>
<thead>
<tr>
<th>Room</th>
<th>Area (sq.m)</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16.5</td>
<td>Sleep, Read</td>
</tr>
<tr>
<td>2</td>
<td>10.8-13.8</td>
<td>Cook</td>
</tr>
<tr>
<td>3</td>
<td>10.5</td>
<td>Sleep, Wash Utensils, Clothes, Bathe</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>Sleep, Eat, Cook</td>
</tr>
<tr>
<td>5</td>
<td>10.9</td>
<td>Cook, Clean Grain, Eat, Wash Utensils, Clothes, Sleep</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Balcony</th>
<th>Area (m²)</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2</td>
<td></td>
<td>Sleep, Read</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Veranda</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Loft</th>
<th>Area (sq.m)</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5*</td>
<td>Storage, Sleep, Read, Cook</td>
<td></td>
</tr>
<tr>
<td>5*</td>
<td>Sleep</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sanitary</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bath</td>
<td>In Unit*</td>
</tr>
<tr>
<td>W.C.</td>
<td>In Unit/Common</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Corridor Width (m)</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.85</td>
<td>Storage, Clean Grain</td>
</tr>
<tr>
<td>2.4</td>
<td>Sleep</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Court</th>
<th>Area (sq.m)</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2040</td>
<td>Shops, Play, Parking, Kite Flying, Gathering</td>
<td></td>
</tr>
<tr>
<td>960</td>
<td>Play, Sleep, Parking, Kite Flying, Gathering</td>
<td></td>
</tr>
<tr>
<td>6750</td>
<td>Sleep, Parking, Kite Flying, Gathering</td>
<td></td>
</tr>
<tr>
<td>7300</td>
<td>Play, Sleep, Parking, Kite Flying, Gathering</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Roof</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kite Flying, Play, Gathering, Sleep</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Street Activities</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Play, Kite Flying</td>
</tr>
</tbody>
</table>

**Note:** *converted or added by majority of residents - into kitchen - into mezanine - into bathroom*
comments: space/activity chart

DWELLING UNIT

- Number of rooms are one or two but never more. The second room is always used as cooking area which is also a room for entertaining women guests.

ALTERATION & EXPANSION

- One room units extend most of the activities outside. Generally, more space is added to one room units by constructing a mezzanine or enclosing balcony/verandah. Enclosed balcony or verandah is invariably used for cooking as it needs most light and ventilation. The housewife spends most of her time in the kitchen.

- Because of tight space in the units, which are anyway sparsely furnished most of the inexpensive storage is kept in corridors. Lofts, in such a case, become very useful. As can be seen in the chart, in cases 2 & 3 many users have extended lofts to form mezzanines which are used for sleeping.

- As a next step for growth, another unit is bought because of the increase in number of married members of the household or the increase in income. This extra unit may or may not be adjoining to existing unit and is used mainly for sleeping only. Cooking, eating, etc. takes place in the former unit.

FACILITIES

- 'Mori' or washing place in the unit, in many cases, is enclosed and used as bathing area also apart from washing clothes and utensils.

- The common facilities are invariably over-loaded (one w.c. used by more than 6 families as in case 3), causing ill-maintenance. One reason for this is, often, as many as 12 persons live in one unit but the facilities are provided in proportion to the number of dwelling units, as mentioned in the by-laws.

SHARED AREAS

- As clearly seen in the chart, in spite of case number 4 having more width than case number having wider corridor than case 2, more activities take place in case 2. Cleaning grain or knitting accompanied by chatting and gossiping, are the favorite activities of the women residents which can not take place in the dark, noisy corridor, as in case 4.

- Sleeping in the semi-open spaces like corridor, balcony, etc. is very common because of the hot-humid climate and tight, inadequately ventilated units. The central, double loaded corridor doesn't serve for this purpose.

- Activities in the courts in all the cases are more or less same, except in the first case where shopping activities, loading-unloading, etc. dominate during day. However, the efficiency of utilization and maintainability varies in different cases. Public use of the court is observed in case one and case five where access to the other lot passes through the court which makes it difficult to control. In case four and five the courts between the 'backs' of the buildings are misused and ill-maintained.

- Roof terrace, if exists, is widely used for variety of activities like; sleeping in summer, playing, kite flying—exciting sport for the entire family, drying grain, spices etc., social gathering, festivities, etc., etc.
## CASE STUDY

<table>
<thead>
<tr>
<th></th>
<th><strong>1 Bhiwandiwala Terrace</strong></th>
<th><strong>2 Pannalal Terrace</strong></th>
<th><strong>3 Ganjawala Chawls</strong></th>
<th><strong>4 Chandanwadi Chawls</strong></th>
<th><strong>5 Vijaynagar Co-op. Society</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Locality:</strong></td>
<td>BHULESHWAR</td>
<td>TARDEO</td>
<td>TARDEO</td>
<td>BHULESHWAR</td>
<td>ANDHERI (EAST)</td>
</tr>
<tr>
<td><strong>Builder:</strong></td>
<td>PRIVATE</td>
<td>PRIVATE</td>
<td>PUBLIC</td>
<td>PUBLIC</td>
<td>CO-OPERATIVE</td>
</tr>
<tr>
<td><strong>Income Group Served:</strong></td>
<td>LOW</td>
<td>MODERATE</td>
<td>VERY LOW</td>
<td>LOW</td>
<td>MODERATE</td>
</tr>
<tr>
<td><strong>Year of Construction:</strong></td>
<td>1920</td>
<td>1911</td>
<td>1900</td>
<td>1904</td>
<td>1961-65</td>
</tr>
<tr>
<td><strong>Resident Community:</strong></td>
<td>Parsis</td>
<td>Gujaratis</td>
<td>Mixed</td>
<td>Mixed</td>
<td>Marathi Brahmin</td>
</tr>
<tr>
<td><strong>Size:</strong></td>
<td>180</td>
<td>165</td>
<td>116</td>
<td>584</td>
<td>480</td>
</tr>
<tr>
<td><strong>Total Dw. Units:</strong></td>
<td>900</td>
<td>917</td>
<td>890</td>
<td>3530</td>
<td>2165</td>
</tr>
<tr>
<td><strong>Total Population:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pattern</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Lot Area:</strong></td>
<td>1740 (100%)</td>
<td>2750 (100%)</td>
<td>2530 (100%)</td>
<td>11145 (100%)</td>
<td>21797 (100%)</td>
</tr>
<tr>
<td><strong>Lot Coverage:</strong></td>
<td>71%</td>
<td>46%</td>
<td>55%</td>
<td>30%</td>
<td>29%</td>
</tr>
<tr>
<td><strong>Open Area:</strong></td>
<td>29%</td>
<td>54%</td>
<td>45%</td>
<td>70%</td>
<td>71%</td>
</tr>
<tr>
<td><strong>Number of Floors:</strong></td>
<td>5 (6)</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Floor Area:</strong></td>
<td>6550 (100%)</td>
<td>6365 (100%)</td>
<td>1391 (100%)</td>
<td>13440 (100%)</td>
<td>18900 (100%)</td>
</tr>
<tr>
<td><strong>Private Floor Area:</strong></td>
<td>77%</td>
<td>62%</td>
<td>100%</td>
<td>59%</td>
<td>66%</td>
</tr>
<tr>
<td><strong>Shared Floor Area:</strong></td>
<td>23%</td>
<td>38%</td>
<td>0%</td>
<td>412%</td>
<td>34%</td>
</tr>
<tr>
<td><strong>Floor Space Index:</strong></td>
<td>3.7</td>
<td>2.3</td>
<td>0.55</td>
<td>1.2</td>
<td>0.86</td>
</tr>
<tr>
<td><strong>Net Density: Dw.Units/Ha:</strong></td>
<td>1034</td>
<td>600</td>
<td>458</td>
<td>524</td>
<td>220</td>
</tr>
<tr>
<td><strong>People/Ha:</strong></td>
<td>5172</td>
<td>3334</td>
<td>3517</td>
<td>3167</td>
<td>993</td>
</tr>
<tr>
<td><strong>No of Units/Facility:</strong></td>
<td>2/1 w.c. (no shower)</td>
<td>4/lw.c. 6.5/lshower</td>
<td>6.5/lw.c. (no shower)</td>
<td>4/lw.c. 6/lshower</td>
<td>4/lw.c. (private shower)</td>
</tr>
<tr>
<td><strong>No of Persons/Facility:</strong></td>
<td>10/l w.c.</td>
<td>23/lw.c. 37/lshower</td>
<td>45/lw.c.</td>
<td>24/lw.c. 36/lshower</td>
<td>18/lw.c.</td>
</tr>
<tr>
<td><strong>No of Units on a Floor Served by a Stair:</strong></td>
<td>4</td>
<td>12</td>
<td>16</td>
<td>32</td>
<td>8</td>
</tr>
<tr>
<td><strong>Length/Width of Corridor:</strong></td>
<td>3.3</td>
<td>1.8</td>
<td>1.1</td>
<td>1.4</td>
<td>1.9</td>
</tr>
<tr>
<td><strong>Opening Area/Fl.Area of Corridor:</strong></td>
<td>0.08</td>
<td>1</td>
<td>open court</td>
<td>0.17</td>
<td>1.15</td>
</tr>
<tr>
<td><strong>Grouping of Units:</strong></td>
<td>180</td>
<td>120</td>
<td>16</td>
<td>68</td>
<td>24</td>
</tr>
<tr>
<td><strong>No of Units in a Building</strong></td>
<td>180</td>
<td>165</td>
<td>16</td>
<td>584 (cluster undefinable)</td>
<td>480 (cluster undefinable)</td>
</tr>
</tbody>
</table>
CONCLUSIONS

The significance of chawls in Bombay's housing situation, as said earlier, is remarkable. Physical and social environment of this dwelling system is analyzed through the selected case studies representing the past and present efforts in Greater Bombay. The chawls have always been a rental housing system until recently when a few co-operatively owned housing societies were developed in chawl form. However, it is apparent from the studied examples that the earlier private developments were physically more efficient than the present efforts. The semiprivate open spaces and related social aspects are neglected in the present designs of housing schemes, as seen in the last case study. One of the reasons for inefficient physical layout would be the complexity of the present by-laws and interpretation of the same.

The semiprivate areas, open as well as covered are of prime importance in such dwelling environments because of the extension of varied household activities outside the dwelling unit which is invariably too small. Moreover, the social or community activities which take place in the semiprivate courtyards are requisite to ensure social integration and cohesion. The goal should be to recognize and to promote communal living.

Analyzing the situation through case studies, it is revealed that smaller group sizes are socially better integrated and have a strong social control, as in the cases with 116 and 165 dwelling units. It is also observed that comparatively smaller size of middle income groups and larger size of low income groups are socially more successful than vice versa. People with the same ethnic or cultural origin or from the same native place usually unite together to form a close, homogeneous group. However, the cultural differences tend to reduce in an urban environment where people from different background have to live in close proximity with each-other.

Generally, the chawl dwellers have a very strong social control where a stranger would be immediately spotted and asked for the reason of his being there. However, in a very large group of dwellings, as in case five, social control loosens out, where not everyone knows everyone. The semiprivate areas are maintained and used better if they are well controlled.

People start storing goods in the corridors in the initial stage of extension. Later, when more space is desired, mezzanine floor is added or the balcony is enclosed. With the increase in the number of married members more number of rooms are desired. Their first preference for growth would be to rent the adjoining unit or to rent a unit in the same building—may it be on another floor, and the next preference would be to rent a dwelling unit in the locality.

Having a kitchen has a priority over having a balcony or a verandah in the dwelling unit. The users desire more space rather than more facilities within the dwelling unit.
LAYOUT EVALUATION

1. Bhiwandiwala Terrace
2. Pannalal Terrace
3. Ganjawala Chawls
4. Chandanwadi Chawls

- Peripheral layout, two points of entrance
- Shops facing the court, therefore public use of the court; no privacy in semi-private area
- Setback area not well-maintained because of undefined ownership of land
- A passage across the width of the building serves four units
- Light in the passage is poor
- Offers no privacy, as one unit is accessible only through another unit
- Density and floor space index regulations are not fulfilled in this 60 year old example

- Peripheral layout, one entrance to the court
- Shops on ground floor face the street and their access to the court is closed
- Building participates in the street as well as in the court due to the corridors on either side
- Setback area unutilized
- Corridor facing the street is seldom used for circulation and therefore offers more privacy and serves as a balcony
- Independent length of corridor serves 12 units
- As this chawl is about 70 years old it does not comply with the present dwelling unit density and F.S.I. regulations

- Dwelling blocks perpendicular to the access lane
- Directly accessible and visible courts therefore lack of privacy in courts
- Compact layout, no wasted areas
- Corridor is absent; one storied back-to-back units are directly accessible from the court; lack of intermediate semi-private area
- Offers minimum privacy in one room dwelling units
- A number of additions; mezzanines, deck raised on the verandah, etc.
- One of the oldest chawls in Bombay; has low F.S.I. but dwelling unit area is less than the minimum area permitted and the density is higher than required

- Two points of access, the court becomes a thoroughfare
- Too large undivided group of dwellings and mixed ethnic groups result in lack of social cohesion
- Large parts of land wasted between the sanitary block and a pair of buildings which becomes a garbage dump
- Double loaded corridor serving 32 dwelling units at a length is dark and noisy and offers limited privacy
- F.S.I. standards are abided by but density of dwelling units is too high in these public chawls
### Issues

<table>
<thead>
<tr>
<th>streets/accesses /thoroughfares</th>
<th>undefined/wasted area</th>
</tr>
</thead>
</table>

#### Dwelling Group Plan

#### Layout with Respect to Street/Accesses

- **Access Lane** passing through the site to another development; thoroughfare not segregated from semi-private areas.
- Too large a development without definite clusters.
- Loss of social controls inspite of homogenous ethnic group.

#### Utilization of Courtyard

- Corridors in this case serve 8 units, therefore better utilization and maintenance of the corridor.
- Stair and water-closets are located centrally on each floor.
- As it is built presently, this development fulfills all the present building codes and development control rules.

#### Characteristic of Corridor

- And therefore this example is selected for demonstrating recommended guidelines through a revised layout for the same.

#### By-Law Fulfilment

- Access lane to another plot is demarked and segregated from the well-defined semiprivate courts.
- Small, socially and physically manageable clusters ensure privacy and prevent vandalism.
- Required setback areas are allocated to individual households as private lots having physical controls, like fence, etc.
- Co-operative shop, committee office, etc., are located in semipublic area overlapping with thoroughfare area so as to protect privacy of semiprivate courts.
- Layout of the dwelling units within the dwelling block is kept untouched.

- F.S.I. or the ratio of built-up area to the area of the lot and the dwelling unit density are more than in the existing layout, as this layout accommodates 90 more dwelling units in the area gained from elimination of wasted areas.

#### Vijaynagar Co-op. Society

**Existing**

**Revised Layout** (see pages 50-51)
RECOMMENDATIONS

DENSITY AND F.S.I.
Net dwelling unit density should preferably be between 200 to 300 per hectare. However, it depends on the development control rules and also on the land value and paying capacity of the user groups, apart from many other aspects. This range is applicable to new development areas or suburban areas and to low-moderate income group housing. It is also guided by the Floor Space Index permitted by law. Most of the developments for low income groups fail to achieve success due to mismatching of F.S.I., density and minimum area standards and land values. Especially in the case of private developers, when they try to achieve maximum returns by using full F.S.I. but can not increase density. This results in increased area for dwelling unit which is not affordable by the target low income groups.

SEMI-PRIVATE AREAS:
Shared or semi-private areas are the priority spaces in such developments. The maintenance and usability of these areas determine the quality of such developments.

Providing well defined and well controlled semi-private courtyards, providing adequate light and ventilation in the corridors, stairs and sanitary facilities area, providing slightly generous shared areas, etc. promote good maintenance and better usability of these areas, especially in long run. Suggested width of corridor = 2.5m minimum, 3.0m desirable.

Preferably corridor should be single loaded, with one longer side open to outer open space. Corridor length should be preferably to serve 9 to 12 dwelling units but not more. Lesser the number of people sharing better the usability and maintenance.

Common facilities, should be provided to the ratio of 1 per 3 double-room dwelling units or per 4 single room units.

USER GROUP
Ethnic/cultural background of the target user groups should be carefully studied in order to determine social compatibility before grouping them in a cluster. It is suggested that a group or cluster size should be between 50 to 100 dwelling units - with low income groups on larger side of the size bracket and the moderate on the smaller side, in order to ensure a cohesive social group and strong social control.

SAFETY/STABILITY
The legal right to occupy or to own a dwelling unit gives stability or safety to the users. Co-operative housing society, hire-purchase schemes, etc. should be utilized wherever possible. Co-operative housing schemes, however, should be enforced in its true sense of non-profit users' organization.

DWELLING UNIT
Area of the dwelling unit, being the function of the user's capacity to pay rent, depends greatly on the user income-group. The dw. unit area could be as small as 12 sq.m. and still function well, as most of the household activities extend outside.

Note: This low dw. unit area is not permitted in the by-laws.

Facilities desired to be in the dwelling unit include a cooking and a washing place. W.c.s are always preferred to be away and common. Provision of bathroom in the dw. unit should be decided according to socio-economic level of the users.
BASIS FOR RECOMMENDATIONS

CASE STUDY OBSERVATIONS

USER GROUP
- The cases with 116 and 165 were observed to have a strong social control and cohesion, where everybody knows everybody. Especially, low income people have well united group which provides social safety.
- In case of moderate income groups smaller sizes are observed to function better.

SEMI-PRIVATE AREAS
- Lower the number of dwelling units sharing a corridor better is the usability and maintenance.
- Cases with single loaded corridors with 8 to 12 units are observed to be used better.
- However, light in the corridors also play a very important role. Even though only 4 units share a corridor or a passage in the first case, corridor is hardly used for extending household activities because of the poor light.
- Higher the number of people sharing a facility, poorer the maintenance.
- The majority desire sharing w.c. facilities. None of the cases have w.c. within the unit.

DWELLING UNIT
- No separate cooking area exists in case #3 & 4; balcony is covered and used as a kitchen in the fourth case.
- Almost all desire a separate kitchen with a water tap and a 'mori' (a washing place)

BUILDING CODES

DENSITY AND F.S.I.
- Development control rules permit Floor Space Index from 1.00 in the suburbs to 1.66 in the city, in general case. However, it varies according to different zones.
- Net dwelling unit density or tenement density permitted, generally varies from 100 in the suburbs to 432 in the city depending on the zones.

- One bathroom, one w.c., and one washing place for every four single-room dw. units, or for every 3 double-room dw. units should be provided.
- Opening of the corridor to an outside open space should occur at every 55 feet or less.

- One-room chawls should be at-least 18 sq.m. in area.
- In case of two-room chawls the living room should be at-least 14 sq.m. and the kitchen should be 10 sq.m. minimum.
- In case of one-room chawls, no cooking area less than 6 sq.m. shall be screened off.
EXAMPLE LAYOUT

Recommendations based on positive as well as negative aspects of the existing situation are applied to this example for providing realistic physical demonstration base.

EXISTING SITUATION / SELECTION CRITERIA

Vijaynagar Society represents the current trend of housing developments, may it be public or private. As the land availability in the city is practically nil, all the recent developments take place in the suburbs.

Vijaynagar is located in Andheri (east), a suburb approximately 25km north of the city center. The triangular site is bounded by public streets on two sides and a similarly developed lot on the third side. Andheri railway station, a bus terminus and a market are nearby, apart from other communal facilities in the vicinity. The site now has 480 dwelling units in twenty identical 3 storied structures housing about 2165 people belonging to moderate income group of Marathi Brahmin community.

This case is selected for demonstrating layout implications, as it is built presently following the by-laws and development control rules, so as to provide comparable grounds for evaluation.

CONSTANTS FOR THE REVISED LAYOUT:
- physical characteristics of the site
- access lane passing through the site
- primary school and community hall area is untouched and also excluded from area calculations
- compliance with the by-laws
- target income group and community
- dwelling unit area
- layout of dwelling units and sanitary facilities within one dwelling block
- height of the dwelling blocks

Note: Net dwelling unit density is increased by a small fraction in order to achieve full permitted Floor Space Index instead of increasing dwelling unit area (which is done by most private developers for maximum returns) which fails to cater to the target low/moderate income groups.
**RECOMMENDATIONS: EXAMPLE LAYOUT**

<table>
<thead>
<tr>
<th>LAYOUT</th>
<th>DWELLING UNIT</th>
<th>DWELLING/GROUP</th>
<th>LAND UTILIZATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total number</td>
<td>area net sq.m</td>
<td>Density</td>
</tr>
<tr>
<td>EXISTING</td>
<td>480</td>
<td>25.8</td>
<td>220/ha</td>
</tr>
<tr>
<td>REVISED</td>
<td>572</td>
<td>25.8</td>
<td>262/ha</td>
</tr>
</tbody>
</table>

**COMMENS**

As seen clearly in the revised layout land utilization plan, undefined land is eliminated and private/semi-private land parcels are well controlled. The required setback area is utilized as private lots, having physical controls, which can be better used as extensions of living areas.

The total dwelling group is divided unambiguously in 10 sections to form small, socially and physically manageable clusters. The clustercourts are well controlled having one entrance each. The stairs of the dwelling blocks can only be approached through the central court thereby preventing vandalism or any stranger sneaking in without noticing.

The access lane serving another lot is segregated and passes through between the backs of the blocks without interfering the semi-private or private areas. The cooperative store, committee office, parking, etc., are centrally located in the semi-public area to achieve the same result.

Analyzing the benefits numerically, semi-public area is reduced to 26.5% in the revised layout from 54% in the existing layout whereas the private & semi-private areas are increased to 16% and 11.5% more than the same in the existing layout, respectively; as a result of providing better controlled & well defined land parcels. The existing situation fails also in terms of forming cohesive social groups because of its large undivided size of 480 dwelling units, whereas the revised layout allows a choice of having 48 to 68 dwelling units in a manageable well united cluster.

Concluding; these guidelines provide a firm basis for evaluating such dwelling environments in urban areas and a foundation for developing new urban settlements.
POST SCRIPT

Proximity to employment opportunities is an important aspect for achieving goals of such developments, as most of the low income people are engaged in labor jobs on daily or freelance basis. In case of Bombay, the port workers and wholesale market laborers form the majority living in city center chawls; not to forget the original purpose, most of the chawls in the city as a whole cater to industrial workers.

The next priority is to provide convenient, cheap mode of public transportation— which is essential for the people living at a distance who cannot be accommodated in the city center.

On the other hand, employment opportunities should be created in a dispersed manner to distribute concentration and to cater to the people living at a distance from the city center. This is often essential in case of big cities where the land and transportation networks are saturated and overburdened.

In such a case, the attention on chawls as the only viable, legal dwelling option for the urban poor should be strengthened and not rejected as is the trend today in public housing agencies. Due to prestige reasons the public agencies today are inclined towards providing self-contained dwelling units which cannot serve the mass low income groups of Bombay.

The constraints of the by-laws and development control rules further contribute to limiting the housing supply for the low income groups. High area per person standards and low permitted densities discourage private builders to provide housing to the low income people. As for example; in order to achieve maximum returns or profits, the builders utilize the full permitted Floor Space Index, and in order to abide by the density regulations they provide more area per dwelling unit— thereby increasing the cost of the dwelling unit and also the shared cost of land, which the poor can not afford.

General attitude towards chawls as a nonhealthy non-viable dwelling system needs to be revised. There is a possibility that the above outlook may be because of dilapidated, ill-maintained, chawls which is often the result of inefficient physical planning. This study provides base for reconsideration of this dwelling form option.
APPENDIX

INDIA

NATIONAL CONTEXT

1. PRIMARY INFORMATION

Country: Republic of India
Capital: New Delhi
Population: 547,949,809 (1971)
20% urban, 80% rural
Population growth: 2.48% per year
Area: 3,280,483 sq. km.
Languages: Hindi, English; there are 14 other official languages.
Currency: Rupee (8.90 Rupees = U.S. $1, 1976)
Per Capita Income: Rs. 338 (1973)
Religion: 84% Hindu, 11% Muslim
Government: Democracy
Major Cities: (1971)
- Calcutta: 7,005,362*
- Bombay: 5,968,546
- Delhi: 3,629,842
- Madras: 2,470,288
- Hyderabad: 1,798,910
- Bangalore: 1,648,232
- Ahmedabad: 1,585,544
- Kanpur: 1,273,016

* Inside municipality boundaries.
2. GEOGRAPHY:
India, situated between 8°4' and 37°6' latitude, dominates the South Asian subcontinent geographically. It is bounded on the east by Bangla Desh, Burma and the Bay of Bengal; on the west by Pakistan and the Arabian Sea; and on the north by the People's Republic of China, Nepal and Bhutan. It measures 3,214km. north to south and 2,933km. east to west, has a land frontier of 15,206km. and a coastline of 6,083km. Its diversified topography has three major regions: 1)sparsely populated Himalaya Mountains which extend along the whole of the north border; 2)heavily populated, well watered and fertile area in the north, on the Indo-Gangetic Plains; and 3)southern peninsula including the tableland of the Deccan Plateau. The major river systems are associated with each of the main regions. Chains of low mountains and hills lie roughly west to east across central India and north to south along the peninsular coasts. Deserts and arid regions of west-central India contrast with the heavy forestation in the eastern area.

The climate varies from tropical in the south to temperate in the north. Four seasons are recognized south of the Himalayas: a relatively cool, dry period from December through February; a dry, hot season from March through May, and a rainy season or southwest monsoon period from June through September as well as a northeast or retreating monsoon period of October and November. The temperatures seldom lower below freezing anywhere south of the Himalayas, but often reach as high as 110°F during summer months. Precipitation ranges from over 1,000cm. annually in the northeast (Assam Hills) to less than 12cm. in the northwest (Rajasthan Desert).

3. PEOPLE:
Two major ethnic groups predominate in India: Indo-Aryan in the north and Dravidian in the south. The aboriginal tribal people live in the central forests and mountains, and some Mongoloid people live in the far northern regions. 84% of the people are Hindus, 11% Muslims, and the rest are Christians, Sikhs, Jains, Parsis, Buddhists, etc. The caste system, based on employment/occupation related categories ranked on a theoretically defined hierarchy, is gradually breaking down under the impact of urbanization, industrialization, wider communication and educational opportunities. According to the 1961 census 1,652 languages were reported as mothertongues. However, the 14 principal languages described in the Indian Constitution are collectively spoken by about 87% of the people. The Indo-Aryan languages are spoken by two-thirds of the population in the northern regions whereas 24.5% speak the Dravidian languages in the south. English is widely used in government, business and education throughout the country.

4. HISTORY:
The known history of the Indian people spans some five millennia. Between 3000 and 1500 B.C., a number of settlements developed in the Indus River Valley (now in Pakistan) into complex urban centres based on commerce, trade and agriculture. Aryan tribes originating in Central Asia absorbed parts of this culture as they spread out over the South Asian subcontinent. During the next few centuries India flourished under several successive empires. The Muslim Arabs came to Western India in the seventh and the eighth centuries, A.D. The Mughals reigned from 1526 to 1707, A. D. and were constantly challenged by the Rajputs, the Sikhs and the Marathas.

The first British outpost in South Asia was established in 1619. Later in that century, permanent trading stations were opened by the East India Company at Madras, Bombay and Calcutta; the British gradually expanded their influence from these footholds. Following the first war of independence in 1857, the East India Company was withdrawn and a direct rule of the British Crown was established.

The Indian National Congress, formed for the purposes of promoting political reforms, was transformed into a mass movement for independence by Mahatma Gandhi in 1920, adopting parliamentary and extra-parliamentary means: non-violent resistance and non-cooperation. After partition of the South Asian subcontinent into India and Pakistan. India became independent on August 15, 1947, with Jawaharlal Nehru as the Prime Minister. India's Constitution was promulgated on January 26, 1950 and the country was declared to be a Democratic Republic.

India is a member of the United Nations, the Commonwealth of Nations, the Asian Development Bank, the International Atomic Energy Agency, the International Bank for Reconstruction and Development, the Colombo Plan and the International Monetary Fund.

5. GOVERNMENT:
India is a Sovereign Democratic Republic with a parliamentary form of government. The President, elected by an indirect electoral college, is the executive head of the Indian Union. His term of office is five years and it is eligible for re-election. He also acts as the Supreme Commander of the armed forces and appoints the Prime Minister, the Attorney General, Governors of the States of the Union, the Chief Justice and other Justices of the Supreme Court as well as the High Courts, and appoints and receives diplomatic representations. The President is aided and advised by a Cabinet of Ministers, headed by the Prime Minister. Members of the Cabinet are chosen from among the two houses of the Parliament and are responsible to it.

The Parliament consists of the President and the two houses—the Rajya Sabha, or the Council of States, and the Lok Sabha, or the House of the People. The Parliament usually holds three sessions a year. One of the principal functions of the Parliament is to make laws on the matters the Constitution specifies to be within its domain. Among its constitutional powers are the fixing or changing of the state boundaries, making amendments to the Constitution, controlling the nation's finances, and removing the Cabinet by a vote of non-confidence.

The Rajya Sabha consists of a maximum of 250 representatives, 11 of whom are nominated by the President and the rest are elected indirectly by the members of the state and territorial legislatures. One-third of the members retire every two years, with each member completing a six-year term. Members of the Lok Sabha are elected directly by the people, all for a five-year term. Lok Sabha seats are allocated to states in proportion to their population. In 1973 there were 523 members of the Lok Sabha, including 3 nominated by the President.

By early 1974 there were 21 States and 9 Union Territories. The governmental struc-
NATIONAL CONTEXT: INDIA

NATIONAL CONTEXT: INDIA

The structure at the state level is similar to that of the Central government. The President appoints a Governor for a five-year term, who is sided and advised by a Cabinet of Ministers headed by a Chief Minister. Subject to legislation by the Parliament, the President governs the Union Territories through appointed administrators. The District is the major geographical and administrative subdivision within the state, and usually has 4 to 5 million people, with the District Collector as the chief administrator. The 'Panchayati Raj' system, as a means of decentralizing administration at the very local level, involves a three-tier structure of self-governing bodies at the village, block and district levels which are known as the 'Gram Panchayat', 'Block Panchayat' or 'Panchayat Samiti' and 'Zila Panchayat' or 'Zila Parishad', respectively. In large towns and cities, the local self-governing bodies are the Municipality, or the Municipal Corporation, Committee or Board. The Judiciary is a single, integrated, hierarchical system, with the Supreme Court at the top, the High Courts at the state level and lower courts at the district and local levels. The Supreme Court is the ultimate interpreter of the Constitution and of the laws of the land. Its jurisdiction is divided into three categories: Original, Appellate and Advisory, and its decisions are binding on all the courts. The Chief Justice and a maximum of 13 other Judges of the Supreme Court are appointed by the President. At the village level, judicial bodies called the 'Nyaya Panchayat' try cases of minor offenses in many states. However, they have limited powers and may only impose moderate fines as punishments.

6. ECONOMY:
India has a mixed economy having a small but important and growing public sector and a large private sector which contributes nearly 75% of the national income. The public sector owns the country's infrastructure, strategic resources, and basic heavy industry. The private sector includes a large small-scale industrial sector and the traditional sector which accounts for 75 to 80% of the population and 50 to 60% of the national product consisting mainly of a subsistence level agriculture and the household and village handicraft production. Surplus labour results in high rates of unemployment and under-employment. Vocational and training programmes are encouraged by the government to produce skilled manpower in order to support the growing industrial sector. Complete information on India's natural resource base is not available. Relatively large quantities of water for irrigation and hydro-electric power generation are potentially available. The annual growth of the Gross National Product at constant prices between 1961 and 1972 showed an average rate of about 4%. For the same period, Per Capita Income rose at an average rate of 3.7% annually.

7. DEVELOPMENT PLANNING:
Two major objectives of the Fifth Five-Year Plan (1974-1979) are: removal of poverty and destitution by raising the consumption standards of the lowest 30% of the population from Rupees 25 per capita per month to Rupees 40 per capita per month and attainment of economic self-reliance. The plan aims at an accelerated growth of agricultural (4%) and industrial (10%) output with an overall average rate of growth of 5.5% in the national product. The plan's proposals, on a priority basis, are:
- speedy completion of the projects and programmes already underway and spilling over from the Fourth Plan; the fullest and the most rapid utilization of the capacity already created;
- achieve as soon as possible the minimum targets in the main sectors of the economy upon which development or utilization of capacity in other sectors is dependent;
- provide for the minimum levels of: elementary education for children up to the age of 14; public health facilities inclusive of preventive medicines, adequate nutrition and family planning devices; safe drinking water for all villages; all-weather roads to villages with population of 1,500 and more; houses for landless farmers; electrification for 30 to 40% of the rural population; and slum improvement.

8. EDUCATION:
Under the provisions of the Constitution, education is primarily the responsibility of individual states, with some specific powers and responsibilities reserved for the Central government. This accounts for the lack of uniformity in the country's educational system. The predominant pattern of education is comprised of eight years of elementary education, followed by three years of secondary education which is in turn followed by three years of university education leading to the first professional degree. A uniform pattern of ten years of primary and secondary education followed by two years of secondary or, as it is sometimes called, 'higher secondary' education, and three years of university education is being adopted in many states. Regional languages are the common media of instruction up to secondary education, whereas English replaces them, for the most part, at the university level. In 1971, 29.45% of the total population, 39.45 of the males and 18.70% of the females were literate. A number of measures have been adopted by the Central and state governments to encourage education to adults and women. Vocational and training programmes have been introduced to lower the currently unsatisfactorily high ratio of liberal arts graduates to technically trained personnel.

9. LIVING CONDITIONS:
Consumer goods and preferences vary widely throughout the country. For a large sector of the population, particularly rural and urban poor, little money is left after expenditures for food, clothing and shelter, which are mostly obtained from what is locally produced and available. However, with increasing communication and extensive transportation networks, wider distribution of consumer goods has been possible. Housing continues to be inadequate in all India. In 1969, government estimates showed a shortage of 84 million housing units; 12 million in urban areas, and 72 million in rural areas. Basic services: water supply, sewage disposal and electricity are inadequate in both rural and urban areas. Poor environmental conditions have created serious health hazards. The main objective of the national health programme is the control and eradication of communicable diseases. The overall medical economy is a mixed one, having a general system of private practice and an extensive national and state support of medical facilities, training and specialized programmes. The ratios of doctors to population were 1:5,150 in 1968, 1:4,550 in 1972, and 1:4,300 estimated by the end of 1974. In addition to several medical facilities following the western pattern, several highly developed indigenous systems of medicine exist and serve an unknown but probably substantial number of tradition-oriented Indians.
The achievement of political freedom brought added importance to Bombay with the diversion of air-borne and sea-borne trade and traffic, hitherto converging on Karachi to this city; Bombay naturally emerged as the leading sea and air terminal of India. Independence also brought in its wake an influx of large refugee populations to the city and its outskirts.

Bombay is built on a group of seven islands originally lush with palm groves and paddy fields and occupied by communities of 'koli' fishermen & farmers. Its link with the mainland of Konkan was through another group of islands- the Salsette group lying atwast Ulhas estuary. Though many ancient ports such as Sopara, Thana, Kalyan and Chaul in the neighborhood were there for centuries as contact points with Arabs and Africans, the Portuguese were the first to recognize the worth of a sheltered harbor site in one of the islands. According to some, the name Bombay is a corrupt form of Bombaim, or Boa Vida, meaning 'lucky harbor' in Portuguese.

The Portuguese built a quinta and a few churches in the main island of Bombay and used it as a trading post. With the transfer of the islands to the British king as dowry, and the subsequent leasing of the islands to the East India Company for a pittance of 30 pounds per year, the growth of Bombay as a port city began.

During the late 18th and early 19th centuries, the islands were interconnected, and intervening seas and creeks filled and reclaimed. Each phase of reclamation was followed by the laying of the east-west running roads. With the building of the Mahim and Sion causeways, communications with the Salsette were improved by the middle of the last century. New docks were laid along the eastern waterfront and the harbor bay was deepened with further increase in population and commercial activities. After the great fire of 1803 in which old fort town was destroyed, a new township was built. Malabar hill became the Governor's resort.

In 1853, when Bombay-Thana rail link of 33km was being laid down, Baroda, Jabalpur, Nagpur and Raichur were rail-linked with Bombay, leading to further growth of the city northwards. Soon the city was cable-linked with
Europe, strengthening international commercial relations. By the turn of the century, cotton-spinning industry was established in the areas then outside the city limits. The ready market for yarn in China, and the excellent access by rail to the raw material producing hinterland in Gujarat, Khandesh and Berar raised the growth of this industry to a spectacular level. In 1900, there were 136 units. Bombay became the Manchester of the East, employing nearly a hundred thousand workers, largely drawn from the districts of Konkan and Satera.

In the nineteen thirties, the oil-mills, structural machine building and small engineering units were established. The post-independence policy of promotion of indigenous industrial output gave rise to a wide range of light and medium engineering, chemical and drug industries, refineries and associated petrochemicals, including fertilizers.

The entire eastern water-front extending from Colaba to Trombay started humming with port activities. Many business houses and financial institutions came into existence, and warehousing and bulk-handling facilities increased. A wholesale trade area emerged in an area north of the Fort, adjoining the docks. Soon the city engulfed the urban realm of the whole island and spread further beyond Salseette, developing suburbs and absorbing them all into a well-knit city of metropolitan dimensions.

GEOGRAPHY: The western seaboard location just off the mainland, facing the industrially and commercially better developed West had always been an advantage to Bombay. Though somewhat eccentrically located, the absence of natural harbors on the Arabian Sea coast and the shortening of sailing distances to the West through Suez route were added advantages. Bombay is practically the only natural harbor on the western coast of India.

In terms of site, the city island is a hill-flanked valley, the central plain of which stretches about 17 km almost due north-south with a maximum breadth of 5 km. At the north end is the Mahim Bay separating the city island from Salsette and Trombay group of islands. Salsette has a hill core in the north center; its southern spurs enclose three lake basins - Tulsi, Vehar & Powai. Suburban Bombay has developed on the Salsette-Trombay group of islands. The hill core is skirted on either side by extensive lowlands. Southern spurs enclose creeks and inlets; extensive areas even today are liable to tidal inundations. Trombay and Salseette are now linked with wide reclamation of marshes inbetween.

Climatically, Bombay is not a comfortable city. The cool weather season from December to February, when the mercury dips at 20°C, is the best season of Bombay. The sky is clear and the sea breezes abundant. March to May constitute summer season, followed by four months of rains. The weather is very uncomfortable because of high humidity. The wettest month of Bombay is July with about 61 cm of rain. The total rainfall in Bombay amounts to 180 cm spread over 74 rainy days.

THE CITY AND ITS REGION: The city draws its work force from its region, giving rise to a large number of dormitory suburbs like Dombivli and Kalyan on the Central railway, Basavanagudi and Virar on the Western railway. Dombivli has shown a growth rate of 384% during the last decade.

Bombay draws its perishables - fish, vegetables, flowers, milk, etc.-from its region. The daily milk supplies from the rail heads along the central and western railways augment the heavily strained city milk supplies provided by the bottling plants at Aseley and Worli.

DEMOGRAPHY: Population Growth: According to Fryer's account, the population of Bombay during the Portuguese period was about 10,000 and it rose to about 60,000 during the early British period. At the turn of the century, the city island had 770 thousand people which steadily grew to 1.16 million by 1931, 2.32 million by 1971. During the same period, the population in what now constitutes the suburban zone grew from 150 thousand in 1901 to 240 thousand in 1931, 770 thousand in 1951 and 2.9 million in 1971. The present population of Greater Bombay is estimated to exceed 9 million. Thus, the population of Greater Bombay has grown during the period 1901-1971 by 543%. On the whole the population of Bombay proper did not grow so fast as the population of its suburbs. A great number of migrants were absorbed by the industries in the suburban areas.
giving rise to a variety of substandard housing colonies.

Population Distribution: Of the total population of 5.96 million (1971), nearly 52% live in the city island, 28% in the inner suburbs and 20% in the outer suburbs. The western suburbs have a larger population (1.7 million) than the eastern suburbs (1.2 million).

The spatial patterns of population distribution reveal the city center, coincident with the British fort, possessing relatively low residential densities. To its immediate north are the old core areas that record the highest residential densities exceeding 2000 per hectare. A fairly significant drop in densities is noticeable just beyond the Mahim and Sion causeways. Barring two small pockets of high density adjoining Bandra and Kurla railways stations, the densities fall rapidly northwards.

The general distance-decay of urban population densities from the city center exists, with an almost continuous trend northwards, approximating to an exponential curve. The paramount influence of the railways and arterial roads on this density pattern is obvious, particularly in absence of an east-west extension of the residential areas.

During the forties, the north of the city recorded rapid residential infilling. At the same time, many of the residential areas adjoining the city center, like Bhiuleshwar, Umakhadi and Manori, became less congested because of the successive urban renewal schemes, both public and private, and the steady infiltration of the area by high rental commercial functions.

Socio-Cultural: The cosmopolitan nature of the city's population is reflected in its constituent religious and linguistic groups. It provides a broad spectrum of the Indian population. The Hindus are the dominant group, about 70% of the total population, scattered all over the city. The Muslims form the largest minority group with a concentration in wards 8 & 9 and in the suburban sections of Bandra and Kurla. The Buddhists, the next largest group, have the heaviest concentration in the industrial wards of central and north Bombay. The Christians and Jains are in smaller groups. The Marathi speaking population forms the majority, but all other linguistic groups from the country are present in Bombay cosmopolitan character of Bombay's population and residential living patterns of the varied groups strongly reveal the regional, linguistic and religious activities. Social grouping of homogeneous cultural units of people is evident in the building societies, Wadis and Mohallas.

MIGRATION: About 63% of the population of greater Bombay is enumerated as being born outside the city. Forty-two percent of the migrants were from the other parts of Maharashtra, 52% from the other states of the country and 6% from other nations of the world. Two-thirds of the migrants come from rural areas, especially the young.

CULTURAL GROUP AND OCCUPATION: The different cultural groups are clearly discerned in their residential clusters as well as in their occupational preferences. Panjabis and Sikhs as skilled workers in transport services, engineering industries workshops; the Uttar-Bharatiyas in transport, teaching, dairying and perishable supplies; the Sindhis, Gujaratis and Rajastanis mainly in whole sale and retail trade services and the Southerners in administrative and managerial services.

The sex ratio in Greater Bombay shows a preponderance of males over females, particularly in the working age groups (about 650 females to 1000 males). The sex ratio is most adverse in the case of out of state migrants particularly the Uttar-Bharatiyas, and the least among Gujarati group. The strong ties of migrant population to their farm-lands and their high frequency of visits to their home land is the cause for that.

Literacy rate in Greater Bombay as a whole is 64%—higher in males (71%) than in females (54%). Literacy rates are the lowest (about 50%) in central Bombay which shows the concentration of illiterate labour class in the city center.

Socio-Economic: About 37% of the population of Bombay constitutes the work-force and 4% of this work-force is engaged in industrial activities. The highest densities of employees per hectare, exceeding 400 per 1000, are recorded in the city center areas of Colaba, Mandri and Girgaum. 75% of Bombay's population lies in low income group, with yearly household income up to Rs. 6000 (U.S.$ 750); 17% middle income with incomes varying from
URBAN CONTEXT: BOMBAY

61

Rs. 6000 to Rs. 12000 (U.S.$ 750 to 1500) and the rest 8% form the higher income group with incomes above Rs. 1200 per annum.

AMENITIES: Transportation: The backbone of public transport in Greater Bombay is the suburban rail system, catering mainly to the long distance commuters and the B.E.S.T. buses provide feeder services.

Community behaviour in Greater Bombay shows that 39% in railway, 39% in buses, 10.6% in cars, 9.3% in taxi, and other in miscellaneous. Over 2000 suburban trains daily carry the commuters living in the suburban Bombay to work places and back. The peak hour traffic can carry 150 thousand passengers per hour. With staggered working hours, the suburban trains now run to full capacity even during the non-peak hour times. Nearly 40% of the employment is concentrated within a radius of 3 km from the city center and about 60% within a 10 km radius.

Power & Water Supply: The city consumes more than 60% of the power generated in Maharashtra state. Two thermal plants located at Thakurli (136 mw) and Trombay (336 mw), one nuclear plant located at Tarapur (190 mw) and three hydel units located in the ghats at Bhivpuri, Khopoli and Shir (together 276 mw) supply electric power to the city and its region. The total power consumption in the city exceeds 1200 mw.

The need of domestic and industrial water is met from the reservoirs-Tulsi, Vehar, Powai, Tapsee and Vaitarna. Together they supply 218 million gallons per day. About 55 million gallons are used up by industries and the rest is available for domestic use giving about 20 gallons per day per head. Plans are afoot to further augment the water-supply from Ulhas river and its tributaries in the immediate hinterland.

HEALTH AND EDUCATIONAL: Bombay has 125 general hospitals, 74 dispensaries 10 TB hospitals and 13000 hospital beds, apart from a large number of medical practitioners. This facility accounts for about 25% of the total in the state, yet, it is inadequate and concentrated in central Bombay.

The same is the case with the educational facilities. 435,000 children are at secondary school level, and 8000 are at higher education level. It is a seat of two universities apart from a number of specialized research institutions like TIFR, BARC, Institute of Demography, TISS, and others.

RECREATION: Parks and open grounds are quite inadequate in the city. The old residential area is the worst hit, while, the northern suburbs have a number of reserved, open spaces and parks. Recreation centers as well as points of entertainment such as cinema houses are crowded in south Bombay.

Housing: About 1.3 million housing units, apart from a large number of slums, house the population of Bombay and its suburbs. Over 20,000 tenements are being added every year by various bodies such as the Maharashtra Housing Board, Municipal corporation, Co-operative bodies of private builders and others. The estimated deficiency in housing is about 200,000 units. To provide minimum standard housing to residents of Bombay, the city needs about a million dwelling units. Further, 38% of buildings in Bombay are as old as 60 years and above. In 1971, there were over 200,000 single-room tenements where more than 1.5 million persons were living under subhuman conditions.

A sizeable population lives on pavements and in slums. The 1971 census enumerated 59,000 pavement dwellers and about 1.2 million slum dwellers. There are as many as 466 hutments or squatter settlements that have been identified within the municipal limits of Bombay. The slums of Bombay usually develop along railway tracks, quarry sites and the water and drainage mains. These slum dwellers are not necessarily workers in transit or socially the lowest order of urban strata.

The slums of Bombay usually develop along railroads, quarry sites and the water and drainage mains. These slum dwellers are not necessarily workers in transit or socially the lowest order of urban strata.

The chawls house more than 60% of Bombay's population. 61% of the total dwelling units in Greater Bombay are chawls. 20% are shanties, 18% are apartments and 2% are miscellaneous, including bungalows, out houses, etc.
BY-LAWS FOR CHAWLS

Interpretation of terms:

'CHAWL' - means a building so constructed as to be suitable for letting separate tenement each consisting of a single room or of two rooms, but not more than two rooms, and with common sanitary arrangement.

'TENEMENT' - means a room or rooms in the occupation of or meant for the occupation of one tenant.

Building codes:

Water-closet, Bathroom, Urinal

5 (b) 3 sq.ft. superficial area opening upon an external space; at least one louvered ventilator, 3 sq.ft. in area, opening into external open space.

6A No water-closet etc., shall be placed in front of the main entrance of a chawl so as to be visible to persons using the stair or entrance or, it shall be completely screened by a partition or so from the floor to the ceiling.

42 (a) Fenestration - 1/10 of floor area, or 1/7 (aggregate door & window)

(i) No room in a chawl shall be built so that any part of it is more than 25 feet from any such window or door.

(ii) Any room in a tenement containing four rooms or more may be subdivided by a partition wall not exceeding 2/3rd of the height from floor to ceiling if such room is otherwise satisfactorily ventilated.

43 In back to back rooms and other single, two or three room tenements in addition to any other means of ventilation required in these by-laws, every such room shall have a ventilation, at least 3 sq. ft. in area near top of each of two walls of such room and opposite to each other if practicable.

44 (i) Corridor in Chawls

Every corridor should be open at least from each and within 55 feet in length, or at intervals of every 55 feet.

SINGLE ROOM TENEMENT CHAWLS

48 In addition to other by-laws applicable, the following shall apply:

(a) there shall be no back to back rooms in such chawls

(b) no single room tenement wherein cooking is to be done shall be less than 180 sq.ft. in area.

(c) a portion of such room, not less than 60 sq.ft. in area, shall be screened off to form a kitchen as provided in by-law 42 (d)

(d) there shall be provided one nahani(mori), not less than 3 ft.x3 ft. in internal area, in every kitchen.

(e) a water tap shall be provided in each such tenement in accordance with the water by-laws in force from time to time.

(f) one loft may be provided in each such kitchen, 3 ft. in width.

(g) one water-closet(3X4'), one bathroom (16 sq.ft.), one general washing place (24 sq.ft.) and one metal dust-bin with cover. should be provided for every four single-room tenements.

(h) washing place shall have a roof on it.

(i) any four tenements on any floor shall have the above req. as(g) situated on the same floor in proximity to such tenements.

(j) each such tenement shall be provided with at least one access from any one stair through open veranda, gallery, or passage.

(k) every such veranda, gallery or passage shall not be less than 6 feet in clear width and shall abutt on an interior or exterior open space of requisite width.

DOUBLE ROOM TENEMENT CHAWLS

49 In addition to other by-laws applicable to such buildings, the following shall apply:

(a) no double room tenement shall contain a living room less than 140 sq.ft. in area and a kitchen room less than 100 sq.ft. in area and shall be subject to by-law 42 (d).

(b) a water-closet, a bathroom, a washing place, and a dust-bin shall be provided for every three double-room tenements on the same floor.

DEVELOPMENT CONTROL RULES

FOR GREATER BOMBAY

(as amended up to Aug.1,1978)

Zone F.S.I. Number of tenements per net hectare

R1, 1.33 198
R2, 1.33 247
R3, 1.33 309
R4 1.66 247
R5 1.66 309
R6 1.66 370
R7 1.66 432
R8 2.45 345
R9 3.50 432
R10 1.00 100 to 125

Floor Space Index (F.S.I.)

total built up floor area

area of the site

- in Mahim Creek reclamation

area 494 tenements/ha. shall be permitted.

SOURCE

BUILDING REGULATIONS AND BY-LAWS

MUNICIPAL CORPORATION OF GREATER BOMBAY
CO-OPERATIVE HOUSING SOCIETY - an overview

Bombay today has more than 8000 Co-operative Housing Societies.

ORIGIN AND BACKGROUND
The first co-op society act was passed in 1904 and until 1947, only 52 co-op societies were formed. It was after independence, 1947, that the refugees and the industrialization in the city created a massive shortage of housing. As an individual, it was impossible to construct due to high costs of land and building, due to which the government encouraged collective efforts for which the loans were provided. However, the government loan assistance was meagre.

In 1950, a conference of commercial banks, insurance companies and other groups decided to float the Bombay Housing Finance Society which began functioning in 1952 with an initial capital of rupees 8 million, with the nationalization of the Life Insurance Corporation in 1955, it became the principal financier of the Bombay Housing Finance Society.

Till 1965 there were no conditions on loans, like maximum carpet area, or the income of the number of restriction on the costs of construction which helped only the richer section. In 1965, Mirdha Committee, laid down the conditions, one of which was to raise the initial 35% of costs, due to which it did not help the needy sections anyway. In late fifties, private builders began to intervene in the co-operative housing schemes substantially.

According to the Maharashtra Co-operative Housing Finance Society, "the private builders went for co-ops, as government incentives provided finance at a comparatively lower rate of interest and exemption from stamp duty & registration fees in respect of documents executed. Its spirit was destroyed." In 1960, Maharashtra Co-op Society Act was declared for orderly development of co-operative movement. Though in 1970 and 71 two more amendments were added, the situation did not improve.

From 1972 to 1979 loan disbursement by the finance society fell sharply from Rs. 130 million per annum to Rs. 65 million.

Shortage of loan facilities was not the problem. The central problem was the shortage of land on Bombay island, massive speculation, artificial shortage, etc.

To supposedly help the situation, the State Govt. enacted the Land Ceiling Act in 1976, to take control of all unbuilt-upon land above 500 sq.m. and to make it available to needy parties, like housing societies. The result was; that it frozen all transactions of land above the ceiling limit, thus making the little available land more dear due to the tremendous demand concentration on land. The bureaucratic procedure of acquisition of surplus land has so far took control of only 171 hectares out of 19,915 hectares estimated surplus land in Maharashtra.

As one of the rules, only 20% of costs is to be taken from members before construction. Maximum cost per flat should be Rs. 40000/-

PRESENT SITUATION
About 40-60% of flats(apartments) in societies are ultimately bought by professional investors and given out to leave and licence tenants, who have no right of occupation beyond an 11-month contract, unless it is renewed. Almost every residential building now-a-days is registered as co-op housing society.

TYPES OF CO-OP HOUSING SOCIETIES:
1. Tenant ownership housing society, where the land is owned by the society while the construction is carried out by individuals.
2. Tenant co-partnership housing society, where both, land and building, are owned by the society while its member occupants do not own, but hold the right of occupation which is transferable, as long as they fulfill the rules of the society.
3. According to the Maharashtra Ownership of Flats Act, 1963 flats privately constructed and then sold individually can be converted into co-operative society; after the sale of 10 flats or could be registered as companies. Since the facilities available are more, builders register as co-operatives.
GLOSSARY

TOR: device to measure flow of water.

UNITS: circuit with the power never dropping to zero.

FLUSH TANK TOILET: Toilet with storage tank

PRIVATE SECTOR: (U.S.D.P.) energy for use; measured in watts.

SEVERAL APARTMENT BLOCKS: Housing for use; measured in watts.

MODE. Two modes are considered:

EFFICIENCY. Capacity to produce desired results with a minimum expenditure of energy, time, money or materials.

EASEMENT. Right in respect of an object or area recognized by law. (Merriam-Webster, 1971)

SINGLE OR MULTIPLE DWELLING. A detached, semi-detached and row/group dwelling types.

EASIMENT. Right in respect of an object or area recognized by law. (Merriam-Webster, 1971)

A.單純: a group of individuals or families inhabiting a dwelling.

WASTE. Material eliminated from the body.

GASEOUS emission that are usually odorous and sometimes noxious. (Merriam-Webster, 1971)

WELLING GROUP. The blocks determined by the dimension of the lots. In gridiron blocks all the lots have direct access to public streets.

GRID LAYOUTS. The urban layouts with grid blocks.

GRID LAYERS. The urban layouts with gridiron blocks.

GOVERNMENT/MUNICIPAL REGULATIONS. In urban areas, the development of the physical environment is a process usually carried out by a government/municipality through all or some of the following means: Master Plan, Zoning Ordinance, Subdivision Regulations, Building Codes. (Merriam-Webster, 1971)

HEAD. (State). The height of water above any plane or point of reference. Head in ft = (lb/sq. in. x density in lb/cu. ft.) / 64.

HIGH-RISER. Dwelling units grouped in five or more stories with stairs and lifts for vertical circulation.

FUEL. Wire carrying current between itself and a ground. (NYC ST 45-7, 1951)

HYDRAULICS. That branch of science or engineering that deals with water or other liquid in motion. (Merriam-Webster, 1971)

ILLEGAL. That which is contrary to or violating a rule or regulation or something having the force of law. (Merriam-Webster, 1971)

INCOME. The amount (measured in money) of gains from capital or labor. The income of a family per year may be used as an indicator of income groups.

INCOME GROUPS. A classification of dwelling units grouped together linearly or in clusters.

ELECTRIC SERVICE DROP. That part of the electric service equipment serving one or more lots.

ELECTRICAL CIRCUIT. A closed, complete electrical path with various connected loads. Circuits may be divided into branch circuits or one interior circuit and a series circuit.

ELECTRICAL FUSE. A device which carries the current from distribution voltages to user voltages; a distribution conductor or a service drop or service drop. (HUD, Mobile Court Guide, 1970)

ELECTRICAL TRANSFORMER. A device which changes the voltage of alternating voltages and currents generated by distribution voltages to user voltages; a distribution conductor or a service drop or service drop. (NYC ST 45-7, 1951)

ELECTRICAL CIRCUIT. A closed, complete electrical path with various connected loads. Circuits may be divided into branch circuits or one interior circuit and a series circuit.

ELECTRICAL FUSE. A device which carries the current from distribution voltages to user voltages; a distribution conductor or a service drop or service drop. (HUD, Mobile Court Guide, 1970)

FILLING. The process of raising or providing funds.

FIRE/HAZARD HAZARDS. Danger, the state of being threatened by fire or other natural causes such as flood or explosion.

FIRE PROTECTION. Measures and practices for preventing or reducing injury and loss of life or property by fire.

FLEXIBLE PAVEMENT. A pavement structure which maintains intimate contact with the soil and distributes loads to the subgrade and depends upon aggregate interlock, particle忻屑, and cohesion for stability.

FOOKING. A rising and overflowing of a body of water that covers land not usually under water.

FOOKING FLOODS. Floodplains area land under which the natural floodway would be inundated by low velocity flood waters.

FLOOY WATER. A device to measure flow of water.

FLUSH TANK TOILET. Toilet with storage tank of water used for flushing bowl.

FLUSH VALVE TOILET. Toilet with self-closing valve on top of water tank.

FOOKING. A rising and overflowing of a body of water that covers land not usually under water.

FOOKING FLOODS. Floodplains area land under which the natural floodway would be inundated by low velocity flood waters.
Basically, a material or body that is a poor conductor of electricity, heat, or sound (Merriam-Webster, 1971).

INTERIOR CIRCULATION NETWORK (SITE PLANNING). The physical and mechanical circulation system inside the site. It should be designed based upon the exterior circulation/acces/land development requirements (U.S.D.P., 1971).

INTERVAL. A space of time (or distance) between the occurrences of similar conditions or states (Merriam-Webster, 1971).

KILAMOT (kw). (1000 watts) A convenient manner of expressing large wattages. Kilowatt hours (kh) measure the amount of energy consumed during a given time. One kw represents the use of an average of 1 kilowatt of electrical energy for a period of one hour (N.Y. ST 45-7, 1953).

LANDFILL. A vertical pipe or shaft leading from the surface of the ground to a sewer, for admitting light gas for use in lighting or heating or a path or thoroughfare for travel (Merriam-Webster, 1971).

LAND COST. Price: the amount of money given or set as the amount to be given as a consideration for the sale of a specific thing (the site). (Merriam-Webster, 1971).

LAND DEVELOPMENT COSTS. The costs of making raw land ready for development through the provision of utilities, roads, streets, playgrounds, parks, etc. (U.S.D.P., 1971).

LAND LEASE. The renting of land for a term of years for an agreed sum; leases of land may run as long as 99 years. (U.S.D.P., 1971).

LAND MARKET VALUE. Refers to: 1) the present monetary equivalent to replace the land; 2) the present tax based value of the land; or 3) the present common value of land for sale in the area. (Merriam-Webster, 1971).

LAND OWNERSHIP. The exclusive right of control and possession of a parcel of land. (U.S.D.P., 1971).

LAND SUBDIVISION. The division of the land into blocks, lots and laying out streets. (U.S.D.P., 1971).

LAND TENURE. Temporary holding or mode of holding a parcel of land of another. (U.S.D.P., 1971).

LAND UTILIZATION. A qualification of the land around a dwelling in relation to user, physical controls and relationships (front, sides, rear and open spaces); user - anyone/unlimited; physical controls - street, sidewalk, streets, alleys, parks, etc. (save corridors); open spaces (parks, playgrounds, schools); user - limited, social or economic use; physical controls - partial or complete; responsibility - public sector user and owner, private party, tenant or owner, community, etc. (Merriam-Webster, 1971).

MANHOLE. An opening access hole used for a man to enter, particularly in sewer and storm drainage pipe systems for cleaning, maintenance and inspection. (U.S.D.P., 1971).

MATRIX (OF BASIC REFERENCE MODELS). A set of models and symbols arranged in rows and columns. (Merriam-Webster, 1971).

MAXIMUM DEBRIS Haulage. A double-faced guard rail in the median of a highway dividing two adjacent roadways. (Merriam-Webster, 1971).

MINIMUM. A low, minimum or restricted level (Merriam-Webster, 1971).

POND. A small body of water - a pond (Merriam-Webster, 1971).

PUBLIC CIRCULATION. The circulation network which is owned, controlled, and maintained by public agencies and is accessible to all members of a community. (Merriam-Webster, 1971).

PUBLIC FACILITIES. Facilities such as schools, playgrounds, parks, etc. (Merriam-Webster, 1971).


RESIDUAL. A device or machine that raises, transfers, or converts energy, which may be driven by, or operated by suction or pressure or both. (Merriam-Webster, 1971).

RESERVE COLLECTION. The service for collection and disposal of all the solid wastes from a community. (U.S.D.P., 1971).

RESERVOIR. Large-scale storage of water; also functions to control fluctuations in supply and pressure. (Merriam-Webster, 1971).

RESIDENTIAL AREA. An area containing the basic needs/requirements for daily life activities: housing, food, education, recreation, supplies, etc. (Merriam-Webster, 1971).

RESISTANCE. The opposition to electrical flow. The resistance increases as the length of wires is increased and decreases as the cross-sectional area of wires is increased. (Merriam-Webster, 1971).

RIGHT-OF-WAY. A legal right of passage over another person’s ground (land), the area over which a right-of-way exists such as an 8-foot or 12-foot right which one may legally use, the strip of land devoted to or over which is built a public road, the land...
GLOSSARY

GRANT. Can afford housing without subsidy, (generally for a year) provided a dwelling unit and/or the lot/land is considered a ten-year tax exemption on new buildings. (Abrams, Webster, 1971)

HOUSING. Dwelling units grouped together linearly or in clusters. (U.S.D.P.)

HOUSEKEEPING. That part of precipitation carried off from the various rainfall overfalls. (Delina, 1972)

HOUSE-RAINFALL RATIO. The percentage fraction of stormwater runoff that is not reduced by evaporation, infiltration, or surface holding and retention. With increased rainfall duration, runoff-rainfall ratio increasing runoff flow. (U.S.D.P.)

SAND. Loose, distinguishable grains of quartz/feldspar (ranging from 0.16 to 0.002 mm in diameter). (U.S.D.P.)

SANTITARIAN SITE. The system of artificially usually subterranean conduits to carry off sewage composed of: a) secret; a waste matter eliminated from the human body; domestic wastes: used water from a home/community containing 0.5 is total solids; and some industrial wastes, but not water from ground, surface, or storm. (U.S.D.P.)

SEMI-DETACHED DWELLING. Two dwelling units sharing a common wall (duplex). (U.S.D.P.)

SEPTIC TANK. A tank in which the organic solid matter is allowed to decompose; the commonly flowing sewage is deposited and retained until it has been disintegrated by anaerobic bacteria. (Merriam-Webster, 1971)

SERIES CIRCUIT. Fixtures connected in a circuit by a single path from one fixture to the other or one circuit is broken. Fixtures with different amperages cannot be used efficiently in the same circuit. (NOW ST 45-4, 1953)

SETTLEMENT. Occupation by settlers to establish a residence or colony. (U.S.D.P.)

SENSITIVE. The efficient in a sewer network. (U.S.D.P.)

SEWER. The conduit in a subterranean network used to carry off water and waste matter. (U.S.D.P.)

SEWER BUILDING CONNECTION. The pipe connecting the dwelling with the sewer network. (U.S.D.P.)

SEWERAGE. Sewerage system: the system of sewers including its materials and man-made features. (Merriam-Webster, 1971)

TOILET. A fixture for defecation and urination, esp. a toilet seat. (19th Century Webster, 1963)

TOPOGRAPHY. The configuration of a (land) surface including its natural and man-made features. (Merriam-Webster, 1971)

TRANSFER. Means of conveyance of passengers or goods from one place to another along ways. (U.S.D.P.)

URBANIZATION. The quality or state of being or become urbanized, to come to take on urban characteristics. (Merriam-Webster, 1971)

USE TAX. The tax on land assessed primarily at enforcing its use or improvement. (U.S.D.P.)

USER INCENTIVES. Based upon the subsistence income of the family group; the income group with no household income available for housing, services, or transportation; income group able to afford no or very limited subsidized housing. MIDDLE (3 x subsistence level): the income group that cannot afford no or very limited subsidized housing.

USEFUL. The right to profit from a parcel of land without control of the owner or formal lease; legal possession by decree without charge. (U.S.D.P.)

UTILITIES. Includes: water supply, sanitary sewerage, storm drainage, electricity, street lighting, gas, telephone. (U.S.D.P.)

VALUE. A water supply distribution component which is taxed for the supply of maintenance purposes. (U.S.D.P.)

VENT. A pipe opening to the atmosphere, which provides ventilation for a drainage system and prevents trap siphonage or back pressure. (NOW ST 45-7, 1953)

VIBRATION. A quivering or trembling motion (such as: produced by: heavy traffic, industry, aircraft, etc. (Merriam-Webster, 1971)

VIEWS. That is revealed to the vision or can be seen from the site. (Merriam-Webster, 1971)

WALK-UP. Dwelling units grouped in two to five stories with stairs for vertical circulation. (U.S.D.P.)

WHITE PIPE. A pipe in a dwelling which carries water from wash basins, sinks, and similar fixtures. (NOW ST 45-7, 1953)

WATER SUPPLY. Source, means, or process of supplying water, for a community usually involving reservoirs, pipelines, and often the watershed from which the water is ultimately drawn. (Merriam-Webster, 1971)

WATERSHED. The catchment area or drainage basin from which the waters of a stream or stream system are drawn. (Merriam-Webster, 1971)

WATERWORKS. The whole system of reservoirs, channels, mains, and pumping and purifying equipment by which a water supply is obtained and distributed to consumers. (Merriam-Webster, 1971)

WATT. Watts (w) measure the power of the flow of electricity in a circuit. (NOW ST 45-7, 1953)

WORKING ORDINANCE. The denominating of a city by ordinance into zones (areas/distinctive) and the establishment of regulations to govern the use of land and the location, bulk, height, shape, use, population density, and coverage of structures within each zone. (U.S.D.P.)
BIBLIOGRAPHY


Gore, M.S., URBANIZATION: INDIA, TISS, 1970

IMMIGRANTS AND NEIGHBOURHOODS, TISS, 1970


Government of India, INDIA'S URBAN HOUSING, New Delhi, India, 1965

Maharashtra Housing Board, GRIHA NIRMAM, Bombay, India, 1966

Municipal Corporation, Bombay KNOW YOUR WARD, FACTS AND FIGURES, Bombay, India, 1977-78

Municipal Corporation of Greater Bombay, BUILDING REGULATIONS AND BYE-LAWS, Bombay, India, 1978

Muttagi, URBAN DEVELOPMENT- A PERSPECTIVE, TISS, Bombay, India, 1976


Ramachandran, P., HOUSING SITUATION IN GREATER BOMBAY, TISS, Bombay, India, 1977

Ramachandran, P., PAVEMENT DWELLERS IN BOMBAY CITY, TISS, 1972

Ramachandran, P.; Padmanabha, A., SOCIAL AND ECONOMIC NEEDS AND SUBSIDIES FOR LOW INCOME GROUPS IN GREATER BOMBAY, NBO, New Delhi, 1967

Seminar, TWIN CITY FOR BOMBAY-DEVELOPMENT PROSPECTS AND PROBLEMS, NBOC, Bombay, 1970


Zachariah, K.C., MIGRANTS IN GREATER BOMBAY, Demographic Training and Research Centre, Bombay, India, 1968

EXPLANATORY NOTES

QUALITY OF INFORMATION

The quality of information given in drawings, charts and descriptions has been qualified in the following manner:

Approximate: when deduced from different and/or not completely reliable sources.

Accurate: when taken from reliable or actual sources.

Tentative: when based upon rough estimations of limited sources.

QUALITY OF SERVICES, FACILITIES AND UTILITIES

None: when the existence of services, facilities and utilities are unavailable to a locality.

Limited: when the existence of services, facilities and utilities are available to a locality in a limited manner due to proximity.

Adequate: when the existence of services, facilities and utilities are available to a locality.

METRIC SYSTEM EQUIVALENTS

Linear Measures

<table>
<thead>
<tr>
<th>Metric</th>
<th>Equivalent in English</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 centimeter</td>
<td>0.3937 inch</td>
</tr>
<tr>
<td>1 meter</td>
<td>39.37 inches</td>
</tr>
<tr>
<td>1 kilometer</td>
<td>3,280.83 feet</td>
</tr>
<tr>
<td>1 inch</td>
<td>2.54 centimeters</td>
</tr>
<tr>
<td>1 foot</td>
<td>0.3048 meters</td>
</tr>
<tr>
<td>1 mile</td>
<td>1,609.34 kilometers</td>
</tr>
</tbody>
</table>

Square Measures

<table>
<thead>
<tr>
<th>Metric</th>
<th>Equivalent in English</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 square meter</td>
<td>1,550 square inches or 10.7639 square feet</td>
</tr>
<tr>
<td>1 hectare</td>
<td>10,000 sq. meters</td>
</tr>
<tr>
<td>1 acre</td>
<td>4,046.86 square meters</td>
</tr>
</tbody>
</table>

DOLLAR EQUIVALENTS

All income, cost and rent/mortgage data have been expressed in terms of U.S. dollar equivalents:

1 U.S. Dollar = 8.00 Rupees