Capacity Building for the Urban Environment:
A Comparative Research, Training and Experience Exchange

Project Paper No. 9

Sustainable Urban Development : A Case of New Bombay (Navi Mumbai)

by

City and Industrial Development Corporation, Navi Mumbai

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Capacity Building for the Urban Environment:
A Comparative Research, Training and Experience Exchange

A project implemented by the

Institute for Housing and Urban Development Studies (IHS), Rotterdam

In co-operation with the

Instituto de Desarrollo Urbano (CIUDAD), Lima
Institut Africain de Gestion Urbaine (IAGU), Dakar
Instituto para la Democracia Local (IPADEL), Lima
Human Settlements Management Institute (HSMI), New Delhi
Centro de Servicios para el Desarrollo Urbano (PROA), La Paz

Sponsored by

Directorate General for International Co-operation (DGIS), Netherlands Ministry of Foreign Affairs, The Hague

and

Swiss Development Co-operation, Federal Department of Foreign Affairs, Bern

Introduction to the Project

Focus and Outline of the Project

Capacity Building for the Urban Environment is a comparative research, training and experience exchange project that was launched in October 1994 with the support of the Dutch government. It provides an inventory and review of the experiences of relevant bilateral and multilateral organisations and of Best Practices in urban environmental management. For the countries of India, Peru and Bolivia, it identifies, communicates and extends the application of Best Practices in environmental management for cities. In May 1995, the project was expanded to include Senegal/West Africa with the support of the Swiss government.

The focus of the project is on learning from experiences in urban environmental management at the city level and on developing strategies for capacity building in order to replicate and scale up the best of these experiences elsewhere. The overall co-ordination of the project is the responsibility of the Institute for Housing and Urban Development Studies in Rotterdam, while co-ordination in the participating countries is the responsibility of the following partner organisations:

- Human Settlements Management Institute (HSMI), New Delhi, India;
- Instituto para la Democracia Local (IPADEL), Lima, Peru;
- Instituto de Desarrollo Urbano (CIUDAD), Lima, Peru (since January 1997);
- Centro de Servicios para el Desarrollo Urbano, (PROA), La Paz, Bolivia, and
- Institut Africain de Gestion Urbaine, (IAGU), Dakar, Senegal.

Project Activities

Support to cities in the form of applied research and development activities in the area of urban environmental management has been, and continues to be, provided by the co-ordinating partner organisations through the following set of activities:

Research

Within the applied research programme undertaken in the project, Best Practices in urban environmental management in Bolivia, India, Peru and, to some extent, Senegal were identified, and their lessons and experiences reviewed. An analysis and review of the identified Best Practices then took place involving a large number of individual research groups and professionals. In a process of on-going monitoring and review, guidance and support were provided by IHS and its partner organisations. The results of both the individual studies of Best Practices and their review are being published in several books and papers in both English and Spanish. These and their publication dates are listed in the *Introduction to the Project Papers*, which follows this note.

Networking

In identifying the research priorities of the project, during the conduct of the research studies, and throughout the review of research findings, a structure was developed and utilised to ensure the participation of all interested and concerned individuals and institutions through a consultative process. Expert group meetings and consultative seminars were organised for this purpose.

Capacity Building Strategies

After the Best Practices research, analysis and review were completed for all countries, outline capacity building strategies were developed for each based on what was learned from these local experiences and practices. These strategies were developed through a broad-based consultation process involving a large number of research institutions, individual professionals and academics, city representatives, NGOs and local representatives. They are currently being modified based on the outcome and findings

of Habitat II, which was held in Istanbul in June 1996, and the emphasis has now shifted to applying a number of Best Practices to selected cities.

Best Practices Documentation

Concurrent to and co-ordinated with this project, IHS served as the secretariat of and contributed to the review of the Best Practices that were submitted to the United Nations Centre for Human Settlements (UNCHS) for the *Global Best Practice Initiative for Improving the Living Environment* in preparation for Habitat II. HSMI, PROA, IAGU and IPADEL were also involved and contributed to the national preparatory processes that took place in their own countries. An overview of the Best Practice submissions to UNCHS, as well as summaries of the additional case studies received by IHS, are being made available on the Internet through the IHS Home Page.

Databases

Two databases are also under preparation: an institutional database and a literature database. The institutional database is being developed in co-operation with the International Institute for Environment and Development (IIED) in London. It contains entries on relevant organisations, some of which are documented in extensive profiles, while others are included as shorter reference information entries. IHS is developing the second database, which provides references in the literature on experiences with urban environmental management.

Rotterdam Seminar

The Rotterdam Seminar, which took place in May 1996 during the two weeks preceding Habitat II, brought together all principal researchers, as well as city representatives and other professionals involved in the project for a period of intensive discussions. The seminar resulted in a document that provided a comparative analysis of practices and experiences in the field of urban environmental management. This analysis included the project process and network building, governance, job creation and poverty alleviation and gender. This was published as a book in February 1997 and is listed later in the *Introduction to the Project Papers*.

The Rotterdam seminar also discussed *city-level capacity building strategies* for the cities of Calcutta, India; Ilo, Peru; Santa Cruz, Bolivia and Dakar, Senegal. Experiences in *urban environmental management* were reviewed for the cities of Tilburg, The Netherlands and Nairobi, Kenya.

Habitat II

At Habitat II the project was presented in the Special Meeting on Implementing the Urban Environment, organised by UNEP and UNCHS, as well as in other fora.

Capacity Building Strategies for Peru, Bolivia, India and Senegal

The outline capacity building strategies which were developed in preparation for Habitat II (i.e., by CIUDAD, PROA, HSMI and IAGU with the support of IHS). They are being modified for implementation, which is expected to begin late in 1997.

Outline Training Program for Local Officials, CBO Workers, and other Partners for Peru, Bolivia and India

These training materials are to be developed over the next few months and will comprise curricula for short courses related to the most directly applicable Best Practices identified for each country in view of its national strategy for capacity building in urban environmental management.

The Development of a Medium-Term Capacity Building Strategy for Senegal and West Africa

This activity is in progress and addresses the building of individual and institutional capacities at the local level for urban environmental management in both Senegal and throughout West Africa.

Ed Frank, Project Manager
Rotterdam, February 1997

Introduction to the Project Papers

A number of publications have appeared under the Capacity Building for the Urban Environment project. These are listed below and can be ordered from IHS or its partner organisations respectively:

- *Capacity Building for the Urban Environment,* edited by David J. Edelman and Harry Mengers, summarises the research findings of the project and the conclusions of tile Rotterdam Seminar. It was published by the Institute for Housing and Urban Development Studies (IHS) in Rotterdam in February 1997;
- *Urban Environmental Management: The Indian Experience,* edited by B.N. Singh, Shipa Maitra and Rajiv Sharma, reviews the Indian experience in urban environmental management and presents all the Indian Best Practice of the project in detail. It was published by the Human Settlements Management Institute (HSMI) and (IHS) in New Delhi in May 1996;
- *Problems and Issues in Urban Environmental Management: Experiences of Ten Best Practices,* also edited by B.N. Singh, Shipa Maitra and Rajiv Sharma reports on the Indian Best Practices of the project in an abridged form. It was published by HSMI and IHS in New Delhi in May 1996, and
- *Ciudades para la Vida: Experiences exitosas y propuestas para la accion,* edited by Liliana Miranda Sara, presents the Best Practices and outline capacity building strategies for Peru and Bolivia for a Spanish speaking audience. It was published as Volume 6 in the Urban Management Series of the joint UNCHS/UNDP/World Bank Urban Management Programme in Quito in May 1996.

The objective of this series of *Project Papers,* then, is to bring to an English speaking, audience the results of the project research in Peru and Bolivia appearing in the Miranda book. In addition, the Indian research, while documented in English in the second and fourth references listed above, has not appeared as complete, individual studies. Consequently, a selection of these will also be chosen for this series. Finally, the first reference in the above list covers aspects of the research undertaken in all four countries of the project.

As a result, the selection of work appearing in the *Project Papers* includes the following:

Bolivia

- 'Urban and Environmental Reality Workshops' by Zoila Acebey;
- 'Urban Agriculture in Community Gardens' by Julio Prudencio Böhrt, and
- 'Institutional and Development Framework for Urban Environmental Management in Bolivia' edited by Gastón Mejía.

Peru

- 'Defence and Conservation of the Natural Swamp Area Pantanos de Villa, Lima' by Arnold Millet Luna, Eduardo Calvo, Elsie Guerrero Bedoya and Manuel Glave;
- 'Consultation in Urban Environmental Management: The Case of Ilo' by José Luis López Follegatti, Walter Melgar Paz and Doris Balvín Díaz;
- 'Promotion of Employment, Health and the Environment, Lima' by César Zela Fierro and Cecilia Castro Nureña
- 'Environmental Sanitation and Infrastructure: The Case of the Marginal Urban Areas of the Southern Cone of Lima' by Silvia Meléndez Kohatsu, Víctor Carrasco Cortez and Ana Granados Soldevilla, and
- 'Inter-institutional Consultation and Urban Environmental Management in San Marcos Cajamarca' by Marina Irigoyen and Russeles Machuca.

India

- 'Power to the People: The Local Government Context' by the Times Research Foundation;
- 'Carrying Capacity Based Regional Planning' by the National Institute of Urban Affairs;
- 'NGOs/Civic Societies and Urban Environmental Advocacy' by Development Associates;
- 'Integrated Low-Cost Sanitation: Indian Experience' by Sulabh International Institute of Technical Research and Training;
- 'City-Wide "Best Practices" in Solid Waste Management in Collection, Transportation and Disposal' by HSMI/WMC of UIFW;
- 'Environmental and Health Improvement in Jajmau Area, Kanpur: Lessons and Experiences for Wider Replication' by Ministry of Environment and Forests;
- 'An Approach to Pollution Prevention in Electroplating Sector' by Development Alternatives;
- 'Integrated Study on Wetlands Conservation and Urban Growth: A Case of Calcutta's Wetlands' by Institute of Wetlands Management and Ecological Design;
- 'Sustainable Urban Development: A Case of Navi Mumbai (New Bombay)' by City & Industrial Development Corporation;
- 'Community Based Sanitation and Environmental Improvement Programme: Experiences of Indore, Baroda and Ahmedabad' by Shri Himanshu Parikh, and
- 'Institutional and Development Framework for Urban Environmental Management in India' by HSMI.

It should be emphasised here that the nineteen *Project Papers* in this series reflect the views of their authors only and have been edited to varying degrees. Initial English language editing was done by, among others, B.N. Singh, S. Maitra and R. Sharma for India and by D.J. Edelman for Peru and Bolivia. In fairness to both the authors and the publishers, they should, therefore, be characterised as working papers rather than full academic papers.

David J. Edelman, Series Editor
Rotterdam, February 1997

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Sustainable Urban Development : A Case of New Bombay (NAVI MUMBAI)

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BACKGROUND

Some of the main factors responsible for the present state of affairs in Bombay are embedded in its physical form. The majority formal sector jobs in Greater Bombay are located in its island part at the southern tip. This is because the development of the city began with the construction of a Fort at the southern tip of the island, very early in the life of the city. Through successive periods of history this area has been accumulating newer activities to finally become the present day Central Business District (CBD) of the city. The eastern side of the island part provides deep waters and an excellent natural harbour, as the result of which, development of the Port and consequent trading facilities took place here, accompanied by the growth of industries, which also chose to locate themselves in the island part.

THE REGIONAL SETTING

Recognizing the need for planned expansion of Bombay in the wider context of a metropolitan influence zone, the Maharashtra Government appointed the Gadgil Committee in 1965 to report on the steps that should be taken to achieve planning in a regional context. Following on its recommendations, the Bombay Regional Planning Board (BMRPB) was set up in 1967.

While deliberating upon the Bombay Metropolitan Regional Plan in early 1970, BMRPB had before it three alternative scenarios of growth for the Region. It could be a linear corridor plan or it could be a series of medium sized New Towns, around the Bombay Metropolis, forming a sort of a circular ring road or it could be a Single New Counter Magnet of Metropolitan size (BMRPB-1973). Out of the three, the last alternative had the best potential for sustainable growth, both for itself as well as for the already congested Bombay Metropolis. The new metropolis was expected to be 'Capable of absorbing large numbers of tertiary sector jobs' (BMRPB op cit p XXVII). This metropolis, later named as New Bombay, was expected to hold a population of two million by the year 1991, thus relieving Bombay from further congestion and also preventing rapid & unregulated growth of other small towns in the region.[1]

FORMATION OF CIDCO

To implement the twin city recommendation of the BMRPB, the Government of Maharashtra set up the City & Industrial Development Corporation (CIDCO) under the Indian Companies Act, in March 1970. CIDCO is wholly owned by the State Government. It has been designated as the New Town Development Authority (NTDA) under the Maharashtra Regional & Town Planning Act (MRTP) Act) for the New Bombay Project. Simultaneously, the State Government notified 166 sq. Km. of privately owned land in 86 villages in the area across the creek for acquisition. Along with it, the State Government land located in these villages was brought under CIDCO's control for effective planning and development of the city of New Bombay. While as NTDA CIDCO was to prepare and administer the plan, the Government, by a separate order entrusted to it also the works of plan implementation and provision of urban services. Services will be transferred to a local body when it is established and is ready to take over this responsibility. New Bombay and other new towns, were to be self-financing by tapping financial sources other than the State ex-chequer. These included private capital and value-addition to land.

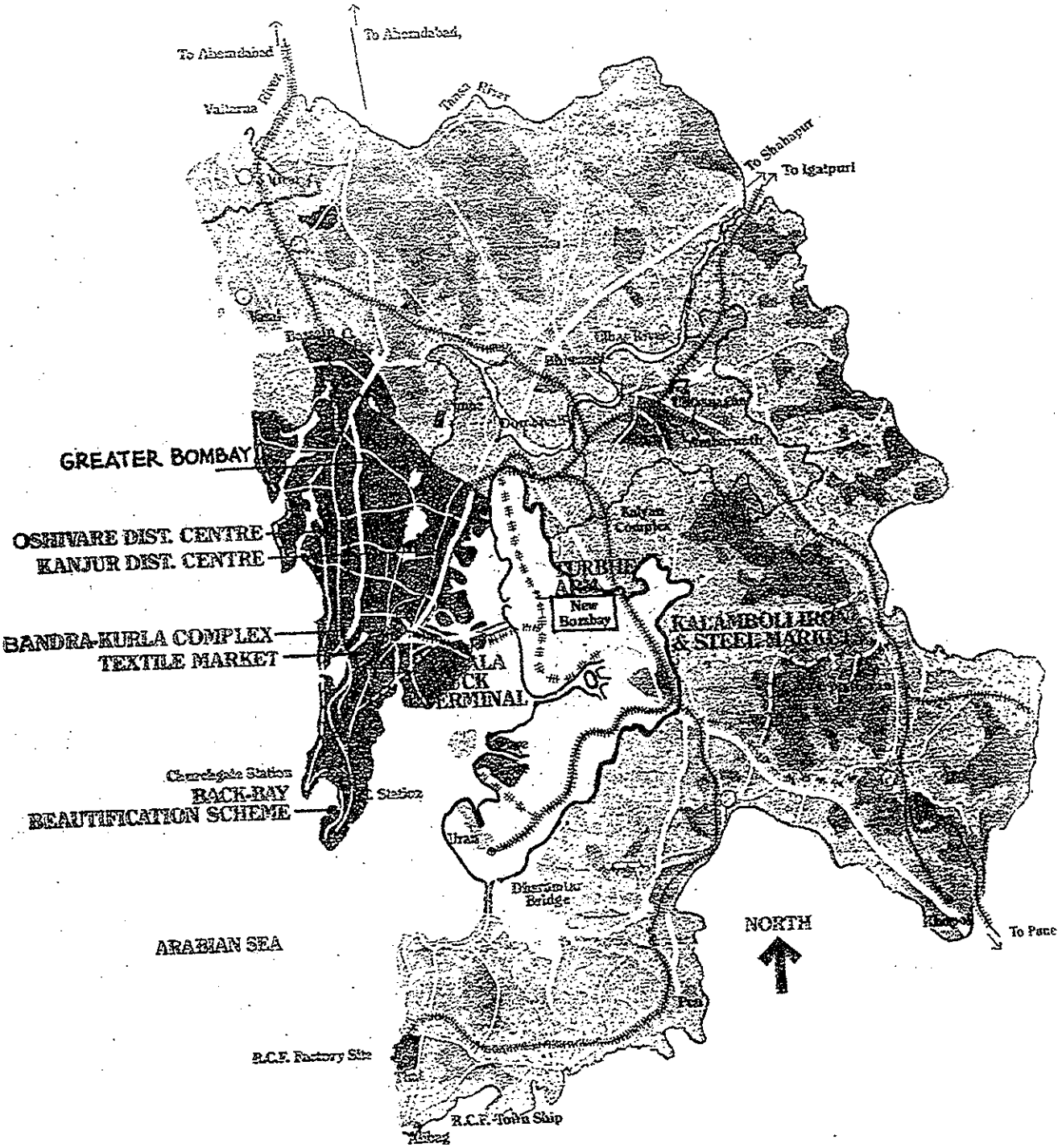
SITE OF THE NEW CITY

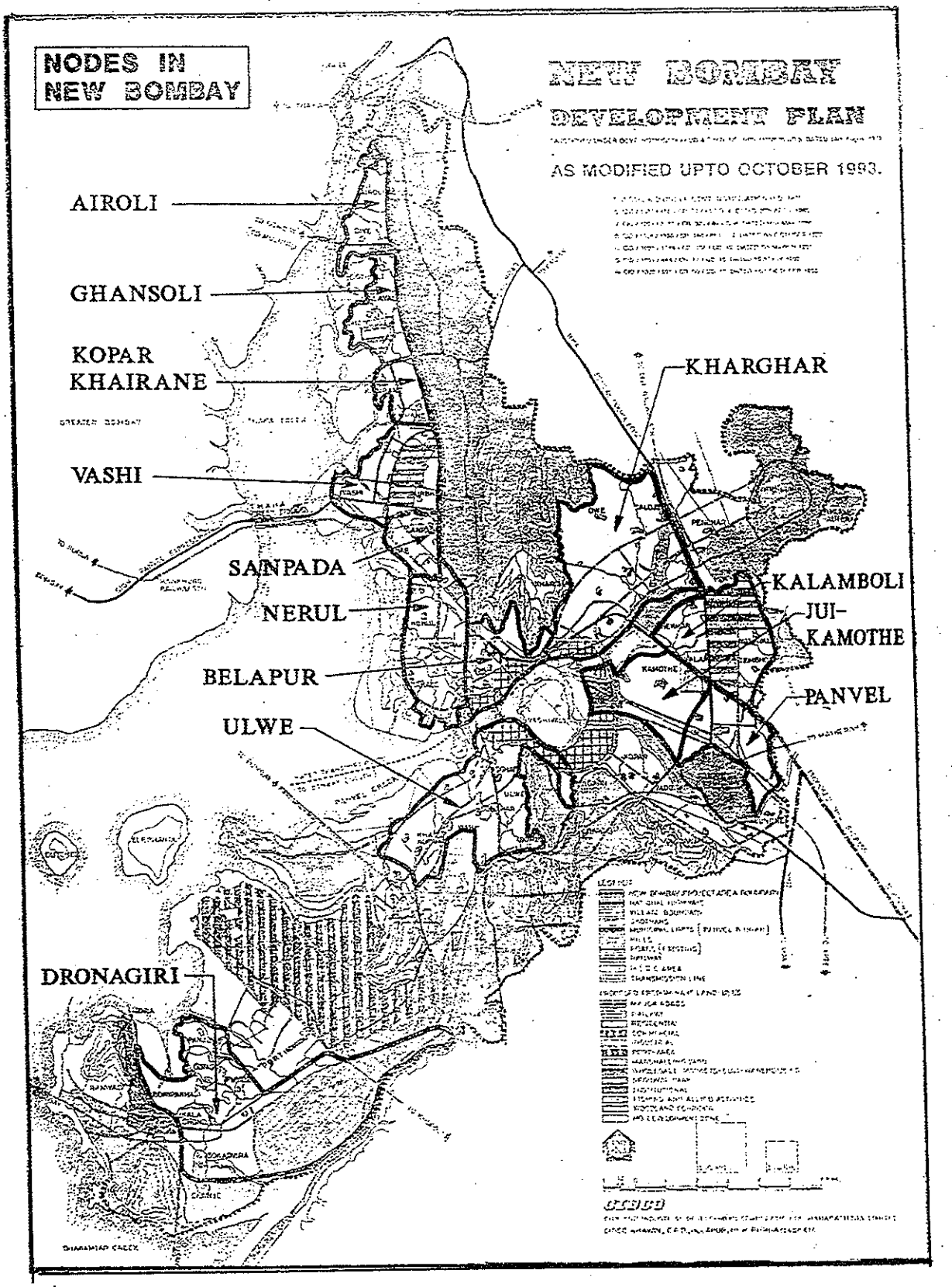
BMRPB recommended the location of the new metropolis within the BMR itself, primarily because any other location would defeat the basic objective of decongesting Bombay. A new city located away from the existing metropolis would have required more effort, it would have also lost the benefits of agglomeration economy which its location closer to Bombay would have assured. While deciding the location within the BMR, BMRPB focussed on the following criteria:

> "....The new location must be able to provide all the necessary inputs for Metropolitan Development, must provide scope for its extension over the hinterland area when such a contingency arises in future, and must also be able to exploit the growth potential created by major development projects already initiated in the region. Above all, the location for the New Metropolis must not be drab, and must offer a variety

[1] In 1971, there were 10 Municipal Towns and 8 non-municipal towns in the region. Some of the towns like Thane & Ulhasnagar had a population of over 100,000 and were rapidly growing and were in the process amalgamating the smaller adjoining towns.

REGIONAL PLAN FOR BOMBAY METROPOLITAN REGION




NODES IN NEW BOMBAY
NEW BOMBAY
DEVELOPMENT PLAN
AS MODIFIED UPTO OCTOBER 1993.
AIROLI
GHANSOLI
KOPAR KHAIRANE
VASHI
SANPADA
NERUL
BELAPUR
ULWE
DRONAGIRI
KHARGHAR
KALAMBOLI
JUI-KAMOTHE
PANVEL

in its setting & an aesthetic potential for being exploited while molding the city plan..."(BMRPB op cit p XXVII).

Trans-Thane Creek (TTC) and the Trans-Harbour area extending up to Panvel was selected as the site of New Bombay, as it fulfilled all the requirements laid by BMRPB. Geographical location of this area vis-a-vis the existing Bombay, and its metropolitan region is shown in Figure 9.1. Area of New Bombay including the Municipal townships of Urban & Panvel, is 344 sq.km. The area comprises marshy lands along the Thane-Creek, hills of the Sahyadri Range and generally east and west sloping land.[2] The hills rise up to a height of 235 mtrs.

ENVIRONMENTAL CONSIDERATIONS AND THE SITE OF NEW BOMBAY

The Bombay Metropolitan Regional Planning Board (BMRPB), while stressing the physical and economic suitability of the site had also highlighted its aesthetic and amenity values. It, however, did not consider two major environmentally negative aspects of the site. Its location between two existing industrial areas exposes the site to risks of high air and water pollution as well as to the risks on account of industrial disasters. A recent study has enumerated over 1200 industrial units of different sizes in the area. Some of the industrial units are highly polluting. They collectively discharge over 500,000 M /day of waste water and large amounts of SO, NO and TSPM (Govt. of Maharashtra (GOM), 1994a).

Pollution effects are further compounded by the peculiar geographical location of the city. Vast plane surface i.e. creek and low lands, bordered by the curved (concave towards Bombay) Sahyadri range, provides a good trapping ground for pollutants both from Thana Belapur Industrial Area (TBIA) as well as from Chembur area across the creek. Large land-fill (Deonar) on the Bombay side of the Thane Creek further worsens the situation. Incineration of waste at this site results in large amount of smoke which due to easterly wind, settles over the Thane Creek and beyond over some of the residential areas of New Bombay.

Study conducted by the Govt. of Maharashtra (ibid) further identified that use of fire/explosion prone chemicals such as ethylene oxide, kerosene, LPG etc. can be potential sources of industrial disaster or toxic pollution. Other toxic chemicals used in TBIA are Ammonia, Chlorine, Hydrogen Sulphide and oleum/sulfuric acid (GOM, 1994a).

Second environmental consideration that was overlooked was the large scale reclamation which will be necessitated. Nearly 27 sq.km. of land consisted of salt pans and many more sq.km. consisted of low lying marshy land. Their reclamation has two major consequences. Firstly, large amounts of sand and debris will be required for reclamation which may lead to disturbance to the fauna and flora found in the littoral zone. Second, modifying the natural drainage may lead to flooding, if proper and adequate storm water drainage network is not provided. Some of the negative aspects of the site of New Bombay have been mitigated by proper strategy and planning, as will be seen in subsequent sections of this study.

Third environmental consideration is the passage of major highway (Bombay-Pune Highway), right through the heart of the new city. Nearly 18 km. of this very busy highway passes through the city. According to a survey conducted in 1994, traffic load on this highway is 27,830 vehicles.

PLANNING OF NEW BOMBAY

New Bombay city is perhaps the largest New Town anywhere, and hence experiences gained while planning for this city are expected to be of use to other places, especially in the developing world. While preparing the New Bombay Development Plan (NBDP) in 1973, the following main principles were followed:

a. Poly-centric pattern of development;

b. Development to be undertaken through land banking by acquisition of the entire notified area of New Bombay. This is to exercise better control on overall environment as well as to use land as the main resource for development.

PROJECT OBJECTIVES

The main objectives of creation of New Bombay included not only provision of a better urban environment in New Bombay, but also a consequent improvement in the environment of Bombay. These objectives[3] are given below:

- to reduce the growth of population in Bombay city by creating an attractive urban centre which will:
  a. absorb the immigrants who will otherwise come to Bombay
  b. attract some of Bombay's present population so that overall population of Greater Bombay can be contained within a manageable limit.
- to support the state-wide Industrial Location Policy which will eventually lead to an efficient and rational distribution of industries over the State and a balanced development of urban centres in the hinterland
- to provide physical and social services, raising the living standards and reducing the disparities in the

[2] Sahyadri range which runs almost parallel to the Thane Creek divides the New Bombay area into two parts. One part drains towards east into the Thane Creek and the other one drains towards west into the Panvel Creek.

[3] Source : New Bombay Development Plan of 1973.

amenities available to the different sections of the population

- to provide an environment which would permit the citizens of New Bombay to live fuller and richer lives in so far this is possible, free from the physical and social tensions which are commonly associated with urban living.

To fulfil the above objectives, planning has been used as a tool. More specifically the concept of poly-centric development, and the planning norms including land-use, population-job ratio and Development Control Regulations etc. and plan implementation, have all been used to develop an ever sustaining city. In the remaining part of this section, the planning concept and planning norms are described in greater detail.

PLANNING OF NEW BOMBAY

The main problems facing Bombay can be attributed to its peculiar physical form and the concentration of jobs at one single place. These lacunae necessitated that a different planning concept should be the basis for the city of a New Bombay. Thus the fundamental concepts of spatial planning adopted for New Bombay are: polycentric pattern of development; spatial dispersal of employment centres; and use of land-use zoning and development controls as tools for better environment creation.

Availability of this infrastructure and the lessons learnt from the Bombay situation gave rise to the concept of polycentric pattern of development. New Bombay was conceived as a series of Nodal Concentrations strung out along Mass Transport axis. There were to be 14 such centres, referred to as 'Nodes', each having restricted size and separated from the next by open spaces. Each node is planned to contain accommodation for all the income groups. The planned city commercial zones were to integrate the TBIA with the emerging Complex.

While each node is planned to have its own residential accommodation, depending upon the location of major employment centres, each node is also planned to be a self-contained township with all necessary urban amenities. Nodes are subdivided into sectors that are delineated along roads which are further divided into residential condominiums. Each node is planned to have a complete set of social facilities such as schools, community centres, religious facilities, hospitals, gardens and play grounds, etc. and public utilities such as fire stations, police stations, transport terminus, post offices, water storage reservoirs, sewage treatment plants, electricity and telephone substations, etc.

DISPERSED WORK CENTRES

While planning for the decongestion of Bombay, industrial location policy in Maharashtra was seen as a tool to disperse industrial jobs throughout Maharashtra. However, the office jobs couldn't be dealt with so easily, for the simple reason that a lot of prestige is attached to such areas. Hence, the office jobs needed to be redistributed in BMR itself, in regions like New Bombay, Bandra-Kurla complex, etc. Again, the extent of their shifting would depend on how prestigious these areas become. Thus, a very attractive location was to be chosen in New Bombay, and the choice was the prestigious Water Front Development. The Central Business District (CBD) of New Bombay is planned around the Waghivali lake encompassed by land. This area is planned to be accessible by the inner and outer ring roads, the commuter rail corridors, and also by Water Transport.

The employment centres as described above are spatially well dispersed to:

a) avoid uni-directional flows of traffic during peak hours, as experienced in Bombay, causing traffic congestion, and

b) to place the work centres in close proximity to residential areas, thereby reducing work trips and travel time.

Locations, while dispersed spatially, are also chosen with reference to the existing and future availability of infrastructure, location of Port and ONGC, and keeping in view the economies of agglomeration.

NEW BOMBAY DEVELOPMENT PLAN (NBDP)

Land-use zoning was used as a tool for creation of better environment in New Bombay. There was perceived to be a possibility of serious error while translating the objectives of New Bombay into land-use plan, the effect of which could be disastrous. For this reason, it was planned to keep as many options open as possible, instead of laying down prescriptions for the entire plan area at one time. Thus, a Development Plan, indicating the broad land-use zones with the uses permitted therein was prepared for New Bombay (Fig. 9.2). This approach also allowed freedom & flexibility in planning to suit the changing circumstances.

THE CITY STRUCTURE

The basic form of New Bombay evolved with a circular and intense development around the Waghivali lake and with four transport corridors emanating towards Thana, Nhava-Sheva, Taloja and Panvel. Residential areas are centrally placed to serve the three industrial employment centres of TBIA, Taloja, and the Port near Uran. Developments are also proposed along the four mass transit corridors around the lake. Closed circular loop form of transportation is considered very efficient, and fortunately for New Bombay, the Waghivali lake allowed such a development to be proposed. The possibility of creating a large lake using the extensive areas of Panvel Creek including the low lying Waghivali island by putting up a dam is still

under consideration, to achieve high intensity water front development. The presence of Hills and water bodies offered a striking opportunity for the development of the new city.

The NBDP, as first published in October of 1973 and having undergone five subsequent minor modifications till date, is the main statutory framework for guiding the development of New Bombay, supported by the General Development Control Regulations (GDCR) and the Land Disposal Policy, all of which are amended from time to time.

Detailing out of the nodal plans is based on planning norms with respect to densities, land-use distribution and provision of amenities. While the GDCR of New Bombay prescribes building bye-laws in detail, it does not prescribe many land subdivision regulations except those related to provision of open space (15% of layout) and means of access.[4] However, the planning norms are in-built in the process of planning. The norms as thought of in the NBDP of 1973 are explained below.

Planning Norms as followed in the Planning of New Bombay

Schools: For the expected population of two million, with 16,000 Pre-primary school pupils, 200,000 Primary School pupils, 171,000 Secondary school pupils and 69,000 College going students, 100, 360, 257 and 40 institutions are planned respectively.

Hospitals: No. of beds required per 1000 population are 4.5 & 0.86 (maternity). The built-up area per bed assumed is 52 sq.m and 45 sq.m with and without staff quarters. Hospitals of minimum economical size of 100-200 beds are assumed.

Town amenities:

a) Police - One post for every 15,000 population, one Station for every node and Central Station of New Bombay.

b) Banks - One bank branch per 10,000 population

c) Markets - One site of 2000 sq.m per 20-25,000 population with an average area of 20 sq.m/shop.

d) Hotels & Restaurants - As per actual demand.

e) Social - Big community halls in each node.

Cinema Halls

f) Cinema Halls - One cinema seat per 50 people, with a minimum of 20,000 population

g) Public Convenience- At a rate of 1 unit per 2000 population.

In addition to the above space specific norms, thought was also given to the following:

a) Social Welfare Institutions such as Remand Homes for boys & girls, Night Shelters near Railway Stations and Wholesale Markets, Institutes for Physically Handicapped and the Blind, Schools for Mentally Retarded Children, Leprosy Homes, and Shelters for Destitute Children.

b) Libraries and Reading Rooms;

c) Auditoria for Cultural, Linguistic and other groups;

d) Swimming pools; two by CIDCO at Vashi & Belapur anticipated and the rest from private sector;

e) Hostels for working women;

f) Jail as and when appropriate;

g) Crematoria: Crematoria to be located near sea and burial grounds on the periphery near the hills. Those existing to be brought to CIDCO standards;

h) Hawkers' Zones to be resolved;

i) A large Urban Data Bank or Information System useful for entire BMR, consisting of information on land Ownership, Use, Suitability, Physical Development, Socio-Economic data, Transportation details, Air Pollution data, details of Services & Utilities.

HOUSING

The approach to housing provision adopted by CIDCO has been a complete package of urban amenities. The households wishing to move to New Bombay are offered all their daily necessities within walking distance. Every sector was provided with a Commercial Complex where all the facilities such as Provision Stores, Flour Mills, Hardware & Electrical Shops, Ration Shops, Post Offices, etc were made available. The actual provision of houses has been in the form of Built Houses, Plotted Development for Row & Bungalow plots, development of Sites & Services, developed plots for Co-operative Housing Societies, plots for Corporate & Government Bodies for housing their employees, and now, large plots for Developers.

[4] This is so because the major development is expected to be undertaken or prescribed by CIDCO itself and also because till date the responsiblity of provision of social amenities is vested with CIDCO.

During the initial years of development of New Bombay, there had been a need to offer ready-for-occupation houses to attract residents to New Bombay. The socio-economic survey (CIDCO, 1987) reveals that the reason cited by a majority of residents who moved to New Bombay, was ready availability of ownership houses. However, with development picking up, co-operative housing societies as well as the private sector were encouraged to build houses. Large scale development by housing co-operatives took place during the late 70s and the 80s. Simultaneously CIDCO provided plotted development for Bungalow sites (New Panvel) & row house plots (Vashi & Belapur). The average size of private houses in New Panvel is 95 sq.m, while this figure is 65 sq.m for other nodes (ibid).

With the inauguration of first railway line to New Bombay in 1992, need for inducement diminished as the city started attracting population on its own. This led to great appreciation of land values. Further, the recommendations of the National Housing Policy that Public Agencies should act as facilitators rather than providers of housing, prompted CIDCO to limit its involvement in direct provision of housing, but to continue the same for the lower income groups. Development of houses for the other income groups is primarily left to the private sector. By now, government agencies and large companies have taken up the work of housing their employees. They were given preferential allotment of land. However, since the areas demanded are large, CIDCO evolved the mechanism of granting gross FSI[5], which has the following advantages:

a. Less burden on CIDCO for laying infrastructure at individual building level, as now only plot level connections are given (cost of internal development works including roads and open spaces is borne by the plot owners) resulting in saving in cost and effort by CIDCO;

b. for the plot owners, this meant additional build-up-area, because otherwise FSI would have been available only on net residential area after reserving land for amenities, roads & open spaces; and easily manageable properties.

During 1993, a new scheme of participatory developers was announced for 12 plots of 3 ha. each, where development was expected to be carried out under prescribed conditions. However, the conditions pertaining to the planning aspects are mentioned below:

Scale of these plots for sale to developers, is now being increased to 50 ha. in Ulwe node, where a fixed number of houses are to be built and returned to CIDCO by the developers.

During 1995, a new scheme of registering the demand for Corporate sector offices in New Bombay has been carried out, for Kharghar & New Panvel nodes. Considerable interest was shown by corporate bodies in this development. Two main features of this scheme are:

1. The companies wishing to shift, establish, and expand their operations in New Bombay, with a minimum annual turnover of Rs.1000 Million each in the last three years, and those employing not less than 100 persons are considered eligible to apply under the scheme.

2. By way of incentive, residential plots at a rate of 50 sq.m per employee is offered on demand, and 25% of the FSI is permitted to be sold to other parties (as built premises) to raise finances for the construction of the office complexes.

3. The office plots are offered at market price, and the residential plots at differential price (depending on the percentage of employees for whom residential plot is demanded), varying from 250% of reserve price[6] to 1000% of reserve price (or the market price, whichever is higher).

This method of attracting corporate sector has the following advantages;

- it is need-based;
- development is not fragmented as happens in case the plots are sold to developers;
- housing for the employees of the corporate bodies is assured in New Bombay and as far as possible is located closest to the respective offices, reducing trip generation.

SOCIAL INFRASTRUCTURE

In New Bombay, development of social infrastructure is ensured by fixing norms for various amenities such as schools, poly-clinics, creches, community buildings, etc and then providing for the same by land reservations. As against the policy of calling upon large plot holders like housing co-operatives to develop the local amenities, CIDCO itself undertakes these works either directly or through institutions already working in concerned fields.

PHYSICAL INFRASTRUCTURE

Physical infrastructure consisting of roads, storm water drains, solid waste management and sewerage for the city of New Bombay is planned and executed by CIDCO. To spread the costs, however, it is executed in stages. The expenditure on these infrastructure items is enormous due to the land characteristics. As most of the land was originally low-lying flat land, area development as well as foundation costs are higher. Due

[5] Floor space Index is the ratio of the total built-up-area (of all floors together) to the area of the plot.

[6] Reserve price is the break-even cost of the development of land per sq. m.

to very poor gradients available, sewerage network has a high cost involving laying of sewerage pipes at depth and consequent pumping to Sewage Treatment Plants (STPs).

Over 50% of the annual total expenditure on New Bombay Project is on account of infrastructure & amenities. It is estimated that at current price, per capita infrastructure investment of Rs. 15,000 & Rs. 1200 for residential & commercial area development is needed.[7]

On an average, the percentage break-up of various infrastructure components out of the total on-site physical infrastructure cost works out to be:

Infrastructure item		% cost
a. land development including site clearance, cutting & filling, and levelling	:	20%
b. Storm water drainage	:	25%
c. Roads & pathways	:	25%
d. Water supply	:	12%
e. Sewerage	:	18%
Total	:	100%

TRANSPORTATION SYSTEM IN NEW BOMBAY

The transportation system in New Bombay is planned to achieve easy accessibility, reduction in travel time to reach destinations, and reduction in use of multiple modes of transport for reaching a single destination. To achieve the above objectives, Railway is taken as the mode of Mass Transit, which is supplemented by road transport by Public Buses, hired taxis and privately owned vehicles. For the development of railway mass transit, its linkage with transport nodes of Bombay, i.e. Victoria Terminus and Bandra, were taken as essential. For road transport, besides the existing highways, very high capacity arterial roads have also been planned. For inter-urban travel, in addition to the above, Hovercraft and Catamaran services across Bombay Harbour, and Boeing 737 type Aircraft for inter-city travel are also envisaged. Basic framework for adopting innovative modes of transportation is, thus, established.

COMMERCIAL COMPLEXES OVER THE RAILWAY STATIONS

For the first time in India, an effort has been made to utilise the air space above railway stations. The objectives of this concept are:

1. to build commercial complexes above the railway stations, spreading both over the tracks as well as on both sides of the tracks, for providing intensive commercial place which will reduce the dependency on secondary travel;
2. to accelerate shifting of offices from congested areas of Greater Bombay to New Bombay. The general development pace has speeded up phenomenally after the commissioning of railway, with real estate prices going up; and
3. to partly meet the cost of railway infrastructure from the surplus generated from these commercial complexes.

The construction of commercial complexes has already been taken up by CIDCO, over the railway stations of Vashi, Sanpada, Juinagar, Nerul and Belapur, which will give rise to saleable built-up commercial spaces of 60,000, 8000, 2000, 6000 and 70,000 Sq.Km. respectively. Each railway station-cum-commercial complex is a complete public building with all public amenities, shops and offices.

The financing method adopted for the first time in the history of railway development in India is a fine example of co-operative effort of the Ministry of Railways, Government of Maharashtra and CIDCO for providing urban rail commuter service. Mankhurd (Bombay) - Belapur (New Bombay) railway, is a unique example of a joint **Public-Public** venture. The cost for this line is shared by CIDCO (Government of Maharashtra) and the Ministry of Railways (Government of India) in the proportion of 67% and 33% respectively. For raising finance for CIDCO's share, it was allowed to float rail bonds with the approval of the Government of India. The Central Railway also levies a surcharge on passenger tickets for travel between Bombay & New Bombay, and the amount so collected is being deposited with CIDCO, to enable it to repay the bonds with interest over a period of 15 to 20 years.

Thus CIDCO's share of the contribution is proposed to be recovered from :

a. the appreciated land-values in the areas served by the railway line;

b. the surplus from disposal of the commercial complexes on the railway stations;

c. collection of surcharge levied on railway tickets.

LAND ASSEMBLY

Almost at the same time when the project was being notified, a scheme was launched by the Government of Maharashtra,

[7] With reference to the specific infrastructure investment needs, employment areas in New Bombay are classified into 3 categories such as, (1) MIDC developed areas (with no investment need by CIDCO), (2) the incidental employment arising out of the general development of nodes, (wich again doesn't require special investment by CIDCO), (3) the areas designed as major employment centres (to be developed by CIDCO requiring major infrastructure investments by CIDCO).

which prevented further sub division of units and also provided for consolidation of holdings of individual land owners. In the project area this task was started early and was completed covering considerable area in a number of villages. While this did result in some consolidation of holdings and in greater regularity of shape of a holding, the land still was not sufficiently assembled to enable proper planning. Besides the size and shape of a holding, the issue of ownership of land was also crucial for proper and effective planning. It was felt necessary that the ownership of the land should vest in the New Town Development Authority (NTDA). In 1970s the large scale land acquisition of private lands and transfer of Government land to the NTDA was the only option available. Accordingly all the private lands were notified for compulsory acquisition.

DELAY IN LAND ACQUISITION

Though the first set of notifications was issued in 1970, land measuring about 4000 ha. is not yet in possession of CIDCO after 25 years. The delay was caused by stiff opposition from land-owners, inadequacy of infrastructure in the area, lack of logistical support to the land acquisition officers and extreme inaccessibility of some of the lands particularly the salt pan lands. Issue of land acquisition was further complicated by an amendment to the Land Acquisition Act in 1984, which made it obligatory to acquire the lands involved in ongoing cases within two years from the commencement of the amendment, i.e. September 1984. Failure to do so will mean automatic lapse of the original notification and the process will have to start de-novo. In view of this, a decision was taken by the CIDCO in 1984, to focus on those lands which were urgently required and to let the notification lapse in respect of those lands which were not so urgently needed. The latter were the lands earmarked for regional parks or no-development zones. This meant that on September 1986, notification in respect of about 5160 ha. of lands lapsed. Delay in land acquisition is exhibited by the fact that as on 1st January 1995, nearly 4050 ha. of land is still to be acquired, i.e. over twenty percent of the total land to be acquired.

DISPUTES ABOUT COMPENSATION

Land Acquisition Act provides for a reference to the Civil Court for determination of proper compensation in the event a dispute is raised. A large number of land acquisition awards declared end up in Civil Courts. Civil Courts have enhanced the compensation on the average by about 300% to 400%. This has affected the project in two ways. Firstly unforseen costs have to be now loaded on to the project, thereby affecting, though marginally, its financial viability. Secondly, it has meant large amount of extra administrative work.

SOCIAL COSTS OF ACQUISITION

In the project area, so far, a large number of families have been affected by land acquisition. Land was their only source of income. Situation is further compounded by the fact that land mostly belongs to uneducated and unskilled people, who were far removed from the culture of cities. Though large numbers of rehabilitation projects (as will be discussed later), particularly the returning to the original owners the developed land equivalent to 12.5% of the acquired land, has mitigated the adverse effect on the affected families, but the resentment against the project continues.

ALTERNATIVES TO COMPULSORY LAND ACQUISITION

Over the last two decades, some other alternative methods of land assembly have become available. The Land Acquisition Act has been amended to provide for "Consent Award", wherein the acquiring authority can negotiate with the land owner to arrive at an agreed amount of compensation. More important than this is the amendment of the Maharashtra Regional Town Planning Act (MRTP Act). This amendment provides for direct negotiation, without the authority of land acquisition officers, with the land owners. This process, if judiciously followed, can save on time and also eliminates the local resistance to the project.

Besides the alternative method of attaining total ownership, there are, also new innovations providing for a participative approach to land development. In one of the methods adopted by Bombay Municipal Corporation, the owners are provided with Transferable Development Rights (TDRs). In this, an owner of land, whose land is acquired for a public purpose gets a TDR, which permits him to use equivalent FSI on any other piece of land of his own ownership or to transfer the TDR to any other land holder. Success of this depends on the efficiency with which it is administered and the extent of TDR market development.

Yet another alternative is to acquire only a certain percentage of land from all owners and use the acquired land for providing public services and also for compensating the owners whose lands have to be per-force fully acquired due to their location etc.

Thus, CIDCO has demonstrated that land could be used as a resource for development with alternatives of total land acquisition (land banking), partial acquisition (Participatory development)and even no acquisition (Transferable Development Rights).

HOUSING FOR URBAN POOR

AFFORDABILITY CRITERIA

Affordability Criteria adopted by CIDCO are threefold. First is the criterion for conventional houses which are given to EWS/LIG on hire purchase basis. In this the purchaser is expected to pay 20% to 33% of the total cost as down payment and the rest as equated monthly instalments (EMI), which are not more than 18% of his monthly income. This criterion is in line with

the one prescribed by HUDCO. Second is the criterion for the serviced sites of CIDCO. Under this, the cost of sites is very low, but the buyers contribution is higher at 33% to 40%. Equated monthly instalments are limited to 13% of the monthly income. Third is the criterion for "Sites & Services" under the BUDP Phases I, II & III. The criterion is as follows:

1. Buyer's initial contribution should not exceed 1.5 to 2 times the mean monthly household income;

2. the EMI should not exceed 15% of the mean monthly income for purchase of a serviced site, and 25% including repayment for optional construction loan.

Income criteria for different size units as applicable since 1993-94, for the BUDP Sites & Services schemes are as follows:

Plot Area (Sq.M)	Household income(Rs/Month)
24	up to 915
28	916 to 1465
32	1466 to 2306

SOURCES OF FINANCE

Housing for urban poor needs subsidy in some form or the other. Low interest loans from HUDCO and under BUDP is one form of the subsidy. For example, up to 1995, HUDCO has provided Rs. 163.6 million in loans at annual interest rates varying between 5 to 9% for EWS category, and Rs.524 million at annual interest rates ranging from 7 to 12% for the LIGs. These loans are not by themselves sufficient to provide affordable housing, considering the criteria as above. An important form of subsidy is through provision of developed plots for EWS/LIG housing at below the break even rate. CIDCO charges only 25 to 50% of the break even (RP) rate of land for EWS/LIG houses, depending upon the size of the plot.

HOUSING PROVISION

A recent socio-economic survey conducted by CIDCO (1995) specifically for the residents of BUDP schemes at Airoli and Kopar Khairane bring out certain interesting trends. There is an incidence of 45% resale of plots in Airoli (occupied for nearly 10 years) and of 15% in Kopar Kharane. Forty per cent of the houses are built with locally available material, proving that the provision of Building Materials Markets in BUDP schemes are necessary. Thirty three per cent and twenty per cent respectively of the families in Kopar Khairane and Airoli moved in from Bombay while the remaining moved in from the rest of New Bombay indicating the predominance of local residents mostly working in the TBIA. About 40% of the families cited the reason for shifting as easy availability of ownership houses while about 10% moved because the houses were nearer to their work place. The average household size of 4.0 and the average earners per household of 1.3 are the same as for the nodes. The average monthly earning of households is Rs.3500 as against the Rs.5000 in the nodes.

NEW OPTIONS

A new option of providing built-housing to the lower income groups is through the Participatory Developers Schemes. With this, while playing the role of facilitator as per the recommendation of the National Housing Policy, CIDCO can actually involve the private sector in housing the poor. Under this scheme, the entire 35% built-up-area component of CIDCO's can be utilised for housing the low income groups. Since these houses will be handed over to CIDCO at pre-determined rates, they can be sold to the target groups at affordable prices.

However, it is being increasingly felt that conventional form of built housing is going outside the affordable limits of the urban poor.[8] Hence, the recent housing policy paper of CIDCO proposed that 50% of the new housing to be created for the lower income groups be created by the serviced sites method, and the remaining by in-fill housing of three-storeyed buildings, where partial tenements are constructed and handed over to people. This is expected to bring down the initial cost of the houses by 50% to 60%. This, in essence, is a vertical incremental house, while the serviced sites continue to be the incremental horizontal housing option. Both, by virtue of their being incremental, are perceived to allow more options to the target groups along with total participation, and at the same time spread the expenditure on the house over a much longer period than a conventional built house.

PROXIMITY OF HOUSING TO INFRASTRUCTURE

The Study Group appointed by the Government of Maharashtra to formulate a scheme for shelter for 4 million slum dwellers in Bombay[9] recommended that, as far as possible, the rehousing of slum dwellers should be done at the same site considering the economic linkages. In any case, relocation has to be within a distance of 10 kms. and the new site should be equally accessible (Government of Maharashtra, 1995).

Appreciating the economic condition of EWS/LIG, CIDCO planned its Sites & Services programme accordingly. Four locations where EWS/LIG houses or the programme of sites and services have been undertaken have had the locational advantage.

[8] The cost ceiling on LIG housing fixed by HUDCO is Rs. 80,000/- and it is not any more possible to contain the cost of an 18 sq. m. house within this amount.

[9] The Slum Redevelopment Scheme (SRD) envisages on-site redevelopment of slums in Greater Bombay. This is planned to be made possible by grant of additonal FSI, which gives the redeveloper extra saleable apartments for cross subsidising the free housing to the slum dwellers.

Besides proximity to rail head and to the job centres, these sites also have as good an access to social infrastructure as the MIG & HIG housing sites. Such prime locations have related problems of efficiency of the schemes.

High value sites closer to job centres and infrastructure, are always being cornered by organised housing developers and builders. Even if by regulations, intensive development of such sites can be avoided so as to keep away builders & developers, sale by the beneficiaries is almost impossible to stop. An EWS/LIG family can always be lured, particularly at times when the need for ready cash for such a family is high (e.g. at the time of major illness or social obligations like marriage of daughters, etc). In most cases these transfers are illegal, because the Government does not permit such transfers. This problem though not systematically studied in New Bombay, is nevertheless present, but its magnitude is less as compared to Bombay.[10]

GAOTHAN EXPANSION SCHEME (GES)

Gaothan (village site) Expansion Scheme was formed to accommodate natural growth of pre-existing village settlements within the project area of New Bombay. This was exclusively a rehabilitation effort, but has, as a bye-product, served as a method to provide housing to EWS/LIG. A total of about 50 ha. of land has been distributed under this scheme, providing over 8000 dwelling units generally of a size fitting the needs of EWS/LIG.

PUBLIC-PRIVATE PARTNERSHIP

CIDCO'S ROLE AS A FACILITATOR

Except in the initial years,when it was necessary to provide the nucleus of growth, CIDCO has encouraged participation of Private Sector in the provision of housing. Sale of large area plots, by tender, to the highest bidder is one such approach. A total of about 715 ha. of land had been disposed in this way upto September 1994. It will provide about 33,000 tenements in all. While this method has high efficiency, both in realisation of true value of the land and in ensuring speed and quality of provision of houses, it fails to fulfil the social equity criteria. These houses are high priced and are of larger size, i.e. mainly targeted at the upper MIG/HIG groups. To mitigate this and to retain the benefits of private sector efficiency, CIDCO allots large plots to Co-operative Housing Societies promoted by persons belonging to specific target groups. Under this, a total of 377 plots have been allotted, which will provide about 11,000 tenements. Another way to achieve social equity in the provision of housing is direct participation, but in a modified manner. This is discussed in the next paragraph.

MASS HOUSING SCHEME OF 1987

In the year 1987, CIDCO announced a Demand Registration Survey, to assess the demand for housing in New Bombay and to plan for meeting this demand. Nearly 55,000 applications were received, which were classified into three priorities., It was decided to provide houses to all the 19,500 applications falling in priority I and II. To meet this requirement, without increasing the size of the Corporation,many innovative approaches were adopted.

Three types of consultants were engaged by CIDCO for designing & executing these projects. a) Architects selected through a national Architectural Design Idea Competition, b) pre-qualified Architects, c) selected Developers quoting on turn key basis with their own designs. All these consultants had to prepare their schemes based on the detailed design brief[11] and as per the specifications laid down by CIDCO. The Architects together designed and executed about 10,000 houses out of the total of 19,500, that were divided into units of 1000 to 1500 houses. Responsibility of these Architects included all architectural works in respect of the schemes, selection of Project Management Consultants (PMC), and execution of project through CIDCO designated contractor. They were also responsible for the defect liability. Supervision during construction time for the developers schemes was to be carried out by CIDCO appointed PMCs. The Developers were invited to primarily build houses with pre-fabricated technology.

However, the lessons learnt from the housing schemes by demand registration and through planning consultancies are:

- Even though nodal and area preferences were enumerated, actual construction programme had to be modified due to various unforeseen reasons. This, together with the changes in locational preference of customers intimated from time to time, have resulted in mis-matches between what was registered and what was finally allotted.

- Lack of consistency in actual carpet area available under various schemes due to different technologies used resulted in lot of embarrassment to CIDCO and unhappiness to the customers[12]. For the post-DRS mass housing schemes such as PDS, it is being stipulated that tenements having same built-up area shall have same carpet area as well. The architectural design innovations experimented by the various architects, without taking into consideration the impact of these on the space utilisation pattern in Bombay region has again led to similar dissatisfaction.

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[10] In these EWS/LIG housing schemes in Bombay i.e. Oshiwara, Dindoshi & Majaswadi, the distribution of EWS/LIG at time of allotment was 90%, 35% & 58% respectively. The same was only 34,26 & 48% after about 5 to 7 years (Oberoi, op.cit)

[11] The design briefs specifided the number of tenements to be built of various area categories, and the areas to be put to various land-use.

[12] For example, the ratio between the carpet to built up areas of tenements varied from 20% to 40% in respect of pre-fab & architects schemes. Since the customers are charged according to the built-up area, it was felt to be unfair.

- Differential methods adopted by different consultants for calculation of areas have led to estate problems.

- Delays in actual handing over possession of the houses, and the resulting price escalation, led to unhappiness and court cases at times. Even though the demand was registered in 1987, the first batch of houses were handed over only in 1993[13].

The experience is a lesson for efficient handling of such schemes in future.

PARTICIPATORY DEVELOPERS' SCHEME

Architects and Developers' schemes described in the preceding paragraph had some limitations such as lack of incentives to the developer to ensure quality and early completion. This scheme also hindered innovation on part of the developer, thereby losing one of the major benefits of Private Participation, i.e., cost effective alternative approach to accomplish the task. These limitations were sought to be removed in the Participatory Developers' Scheme. Salient features of this scheme are:

a. Builders & Developers of repute, with a minimum turnover of Rs.30 million per year in construction and with a minimum construction of 30,000 Sq.m. in the last three years, were pre-qualified;

b. Each pre-qualified developer was given 3 ha. of developed land. Thirty five percent FSI of the plot was to be used for providing houses as per CIDCO's specifications, at pre-determined rate to be paid by CIDCO. These houses will be marketed by CIDCO.

c. Balance 65% FSI will be used by the developer to plan, design and construct houses as per his perception of the market demand. Out of this, he will be entitled to use 5% for commercial purpose;

d. Work of construction of 35% of built-up-area is to be supervised by the PMC appointed by CIDCO and chosen from a panel, agreeable to the developer.

This scheme has many advantages:

1. It successfully allows private sector initiative;

2. It meets the Development Authority's obligations of providing low-cost houses by inducing the developer to cross-subsidise;

3. It relieves the Development Authority of the need for direct intervention in housing provision so that it can focus on land development.

This scheme has such obvious benefits that CIDCO is proposing to enhance its scope by increasing the plot size upto 50 ha.

PRIVATE PARTICIPATION IN MUNICIPAL SERVICES

In the absence of any local authority till January 1992, and thereafter due to lack of financial resources with the newly created NMMC, CIDCO has been providing all kinds of municipal services in New Bombay. NMMC has recently taken over the provision of municipal services in the village site (gaothan) areas, which fall in both New Bombay project area as well as outside it, but within NMMC area. Out of a total population of 535,000 (1991), NMMC provides municipal services to a population of about 156,000. Area wise, the percentage covered by NMMC will be even less, because of high density in village site areas, and more congested development. For the provision of municipal services, CIDCO has relied completely on the process of "contracting out". Broadly, the method is to prepare cost estimates on the basis of predetermined norms and levels of services, and inviting quotations. The most competitive bidder is given the work. This procedure and some of the problems which are encountered in administering the scheme are detailed in the following paragraphs.

CONTRACTING OUT OF PUBLIC HEALTH WORKS

Three major contracts administered by the Public Health Department (PHD) of CIDCO are Sanitation Contracts;including operation and maintenance of Dumper placers; and bulldozing work at dumping sites. For the purpose of sanitation contracts, the entire area is divided into sectors, each covering approximately a population of 30,000 and responsible for handling of about 20 tonnes of garbage daily. General norm is that for each one km. of road length the Contractor should employ three sanitation workers.

Collection and dumping of garbage is entrusted to two contractors, who are provided with 14 refuge compactors and six dumpers placers. They are responsible for transferring garbage from 550 dust bins of 1 Cu. Mtr. volume each and 50 nos of 5 Cu.Mtrs. volume each to the dumping site. At the dumping site, bulldozing contractor levels the garbage. One important aspect of this contract is the operation and maintenance of vehicles. Contract also specifies the labour per vehicle, the route of the contract and the supervision methodology.

COST-EFFECTIVENESS OF PUBLIC HEALTH CONTRACTS

This brings us to the basic issue of cost-effectiveness of public health contracts vis-a-vis the in-house provision of services. Before attempting comparison, it should be borne in mind that there are large number of variables whose values must be known and quantified for any meaningful comparison between

[13] The speed with which a recent housing scheme for affluent Non-Resident Indians (NRIs) was built (in two and a half years), has raised apprehensions about CIDCO's commitment to the DRS schemes.

the two approaches. These variables include the levels of output in physical terms, quality of output, frequency of service, characteristics of the area like density of housing, and extent and type of open spaces, etc. These variables can't be exactly similar in any two areas so as to set a test project. Therefore, though very approximate, the only way to determine cost-effectiveness of "contracting out" vs "in-house provision of service" is to compare the operation of the first in New Bombay with the operation of the second in the adjoining local authority areas.

For Panvel Municipal Council (PMC), the expenditure for same service in 1991-92 was Rs. 1.15 Million, giving a per capita expenditure of Rs.48. In another adjoining local authority of Thane Municipal Corporation, over 2500 persons were employed for public health works which accounted for 47% of its total staff. Per capital current expenditure on same service by the authority in 1990-91 was Rs. 64. Another authority, though not adjoining, Pimpri Chinchwad Municipal Corporation (PCMC) employed 44% of its total staff on this service and spent Rs.78 per capita in 90-91, on provision of the service (ORG, 1992), while the per-capita cost of Public Health Contract in New Bombay was Rs.29.10.

LEGAL PROVISIONS AFFECTING PUBLIC HEALTH CONTRACTING

Minimum Wages Act and Prevention of Unfair Labour Practices Act (PULP Act), provide for regulation of contracting out of services. The Minimum Wages Act prescribes a minimum wage for different types of workers. It also provides for a contractual levy of 44% on account of contributory provident fund, bonus, leave salary, allowance for uniform etc. Since the legislation puts these limits, there is very little scope of competition in bidding. Further, since the estimates are prepared keeping in view these provisions, prospective contractors can compete only on the element of profit in the total estimates.

In practice, however, the contractors, particularly incumbent ones, quote very low to get the contract and then try to renegotiate. The incumbent contractors, since they have better access to information, are better placed to quote. The PULP Act, has a provision which prohibits contracting out of those services which are permanent in nature. CIDCO, however, is able to overcome this by the fact that these services will ultimately be transferred to local authority and are, therefore, not a permanent item of work, so far as CIDCO is concerned. Nonetheless, this provision is very restrictive and is a remnant of the socialistic era.

RESIDENTIAL CONDOMINIUMS

Dwelling units in New Bombay are organised in the form of residential condominiums, each accommodating 100 to 200 units. It is mandatory to form and register condominiums associations with elected representatives. These condominiums are responsible for maintaining the common built-up and open areas as well as the physical infrastructure within their boundary. A monthly subscription is collected from association members and special contributions are arranged when periodic building repairs or area development works are taken up. A room of 20 to 30 Sq.m., depending on the number of tenements within a condominium, is permitted to be constructed as condominium office, free of FSI. Thus, ensuring participation by the residents in the maintenance of infrastructure at a decentralised level, condominiums have also proved to be cohesive social units where innovative ideas can be introduced. A fine example is being set in this direction in Vashi where women members of resident condominiums have taken the lead to propagate waste segregation at source and vermi-composting.

OTHER AREAS OF PRIVATISATION

Contracting out of services is not limited to Public Health only. Services like maintenance of sewerage treatment plants (STPs), collection of CIDCO's dues, maintenance of water supply, development and maintenance of parks & gardens have all been contracted out.

LESSONS OF PRIVATISATION

After enumerating in detail the instances of privatisation, it will not be out of place to list out here the specific lessons and benefits of privatisation. These are:

i. It has helped to keep the Corporation lean and therefore more professional. Since 1990-1991, there has been less than 5% annual growth in manpower whereas growth in turn-over (measured by expenditure on works alone) is over 63%. This has been possible by appointment of PMCs for construction works and of contractors for municipal and other recurring items of works and service delivery.

ii. This has freed the Corporation professionals to focus on Planning and Land Development work, which, as recommended by the National Housing Policy, is the legitimate work of a Development Authority.

iii. This has helped to provide indirect employment to a large number of Project Affected Persons (PAPs). There are 24 PAP contractors in Public Health works and over 75 in maintenance of parks & gardens. These contractors in turn employ large number of PAPs as workers.

iv. This has also led to development of an entrepreneurial cadre amongst the PAPs as is evidenced by the number of independent labour and civil work agencies floated by them.

v. Method has also been more cost-effective, atleast so far as contracting of municipal services is concerned.

vi. Legal framework, unfortunately, is not conducive to more effective performance due to limitation on con-

tracting out regular works, restrictions on regulation of employment of workers etc. For Security Contracts, the employment has to be through State Security Guard Board, which takes away employer's ability to enforce conditions of contract fully.

vii. Propensity of public agencies to accept lowest tender may mean acceptance of unsuitable tenders. Therefore, it is necessary that tender documents are carefully worked out with clear indication that unsuitable tenders will not be accepted.

INNOVATIVE APPROACH TO THE REHABILITATION OF PROJECT AFFECTED PERSONS (PAPS)

Rehabilitation is an essential element of all major projects. In the New Bombay Project, the entire land under private ownership measuring about 166 Sq.km. was notified for acquisition which affected a large number of families in 86 villages. Besides rehabilitation of affected families, there was also the issue of integration of these families into the city culture, as they had led, till the arrival of the project, a rural life in its truest sense. Though no socio-economic survey of the villages affected was carried out, it is, in retrospect, now felt that such a survey is essential in all major projects. Not deterred by this initial lapse, however, CIDCO has taken up a comprehensive programme of PAP rehabilitation. This can be divided into:

1. Individual Oriented Programmes like stipend for Education, Skill Upgradation through Technical Training Programmes, Employment in CIDCO and other public and private sector organisations, etc.;

2. Village Oriented Programmes like Grant-in-Aid for strengthening the village infrastructure;

3. Compensating by "developed land" for "virgin land" under the Gaothan (Village site) Expansion Scheme (GES) and 12 1/2% Scheme.

INDIVIDUAL ORIENTED PROGRAMME

The main problem for the PAPs was the mis-match of their skills, with the skills required in the urban context. Main activities of the village folk were, of course, rice cultivation, fishing and salt-making. Being in the Coastal belt, fishing has been the major activity which was undertaken in addition to agriculture. Even within this profession, there were a number of sub-divisions. There were 'Kalav Kolis' i.e., those fishing by impounding sea-water by erecting mud embankments on the high-tide flat lands. Then there were 'Vana Kolis' i.e., those who caught fish by spreading nets in the creek lands. And of course, there also were those fishermen who fished in high-seas with the help of trawlers, etc. Besides this, there were village artisans, who were collectively called 'Bara-Valute-dars', which literally translated means, '12 artisans paid in kind for their 'service'. They were Carpenters, Blacksmiths, hair-cutters, cobblers, etc. In view of this very diverse occupation of the PAPs, their education, training, and upgradation of skills was very important.

Besides encouraging college and technical education through stipends, effort has also been to upgrade various skills amongst the PAPs. Short term training in disciplines like driving, plumbing, gardening, carpentry, computer works, electrical works, etc. was given to about 650 persons. Compared to this, persons who benefitted by way of stipend number about 8520. This heavy stress on formal college education, has led to a situation of large number of white-collar job seekers. On the other hand functions like plumbing, electrical works, etc. which are in high demand in a developing city, are not being properly attended to.

In retrospect, lessons have been learnt to stress skill development training more than formal education. Besides this, PAPs are also encouraged to take up petty work contracts from CIDCO. Sanitation & Horticulture contracts are exclusively awarded to PAPs. In the works contracts, works up to Rs.200,000 are given only to registered PAP contractors. To increase the scope of PAP contractors' involvement in development works, 20% of large works (i.e., costing more than 200,000) is also given to PAPs, with a price preference of 10% over the lowest tender for balance 80% of works. This has been possible in land reclamation works and road embankment works. So far 2810 contracts have been given to the PAPs.

STRENGTHENING OF VILLAGE INFRASTRUCTURE

Villages within the project area are provided Grant-in-aid (GIA) for building school rooms, community halls, approach roads, village tanks, toilet blocks, crematoria, storm-water drains, balwadis (creches), drinking water provision, etc. Since these villages are located within various nodal areas, this scheme also integrates their villages into urban life from the infrastructure point of view.

GAOTHAN EXPANSION SCHEME (GES)

Village sites were exempted from acquisition, with the objective of protecting the culture of their inhabitants, as well as also to provide for accommodating natural growth of these families. As the city developed, the pressure on gaothan sites kept increasing not only due to increasing family size of original residents, but also mushrooming of informal housing to accommodate low-income migrants to the city. With a view to accommodate natural growth of affected families not only up to first generation, but even beyond, in 1978, a Gaothan Expansion Scheme was approved by the Government. Salient features of this scheme were:

- 10% of the total acquired land of the village, will be reserved for this scheme. This land will be in close

proximity to the existing sites. Out of this, 50% land will be used for giving housing sites to PAP families and the balance 50% will be used for provision of facilities.

- Each land owner, from whom atleast 100 Sq.m. land is acquired will be given a site equal to 5% of his acquired land, subject to a minimum of 100 Sq.m. and maximum of 500 Sq.m.[14]

- Land given will be charged at twice the acquisition cost plus Rs.5/Sq.m. towards development cost.

- In cases where less than 100 Sq.m. land is acquired from land owners and PAPs who had no land, 40 Sq.m. will be given.

- There was restriction on transfer of this land by the original allottees.

12.5% GES SCHEME

Due to increasing pressure by PAPs for a share in the enhanced value of acquired lands, in 1990, Government further amended the GES, to provide for new scheme of returning to the original owner developed land equal to 12.5% of the land acquired from him. At this stage this scheme was to be applied only to those land owners whose lands were acquired and taken into possession after February 1986. In October 1994, the scheme was further liberalised and was also applicable to all land owners.

IMPLICATIONS

Both the schemes (GES & 12.5% GES), have meant very effective transfer of benefits of city development to PAPs. Nearly 1400 ha. of land is to be transferred to PAPs under both the schemes. Even at the average break even rate of Rs.1200 per Sq.m., the value of the land so transferred comes to a staggering figure of over Rs. 150 billion. While transfer of such benefits before the acquisition of lands would have facilitated the acquisition process and also avoided project delays, these benefits at a later stage are not much beneficial to the project. On the other hand, it has some adverse impacts. Such unexpected costs on the project in its late stage of implementation obliterate the project economics. Low level of infrastructure to be provided for these lands may create sub-standard environmental conditions in the area. Restriction on transfer of the lands by allottee means encouragement to unauthorized transactions, leading both to insecure titles and loss of stamp duty revenue.

ENVIRONMENTAL IMPLICATIONS

As discussed earlier, the very location of New Bombay site entailed two major environmental problems: (a) a vast development area is in the coastal stretch necessitating massive land-reclamation and (b) vast stretch of north New Bombay is sandwitched between the TBIA and the Chembur-Govandi Industrial area and is vulnerable to the effect of industrial pollution. At the same time, building a new town, especially with CIDCO owning the entire land, has facilitated planning of New Bombay in an environment friendly manner and adoption of measures for environmental upgradation. The environmental considerations for New Bombay can be discussed at two levels, those which are within the control of CIDCO and those for which multi-organisational effort is necessary.

CIDCO'S RESPONSIBILITY

The environmental factors under CIDCO's control are broadly the factors concerning the Planning of New Bombay, providing transport & infrastructural facilities, shifting of wholesale markets to New Bombay, land reclamation methods, and lastly, adoption of direct environmental upgradation measures.

NEW BOMBAY PLANNING

The NBDP has been prepared with the following objects, namely (a) to create 14 nodes, each being self-contained in terms of availability of urban amenities, (b) to disperse the work centres and fill the intervening areas with residential pockets each separated from the other by green buffers, (c) to designate and preserve all major green and forest areas as regional parks, and (d) to reserve a minimum of 15% of alal nodal areas as green spaces in addition to the city level green areas. Housing is provided as a package of all amenities, at the time of occupation of the houses. Integrated planning has thus ensured environmental safeguards at macro level and also helped to provide good ambience at household level.

SHIFTING OF WHOLESALE MARKETS TO NEW BOMBAY

It was in the late seventies that the idea of shifting of wholesale markets to New Bombay took shape as a part of the planned effort of decongestion of Greater Bombay, by moving them from congested south Bombay to a more centrally placed New Bombay within BMR. This was sought to be carried out through legislative measures. As part of this, 13 major Agriculture Produce Markets (APM) are shifted from congested Masjid Bandar to Vashi[15] to a 160.0 ha APM complex. As a second step, shifting of the wholesale iron and steel market from

[14] Later on norms were revised to provide that joint holders of land will be allowed up to 100 sq. mtrs. individually but subject to upper limit of 20% of their acquired land. Similarly joint land owners having more than 1 ha. of land will get up to 500 sq. mtrs. of land, subject to 5% of total land acquired.

[15] Under the Maharastra Agriculture Produce Marketing (regulation) Act of 1963.

Carnac Bundar and Darukhana areas to Kalamboli is planned[16]. This market which occupied an area of 30 ha. in Bombay is planned on a sprawling 320 ha. site, combined with the facility of bulk warehousing and railway siding. It is estimated that every day a minimum of 5000 trucks to APM and 3000 trucks to Steel market will be moving. This is also expected to lead to significant economy in the distribution costs of produce with an estimated trade turn over of over Rs. 15,000 million annually. While relocating the markets in New Bombay, supporting infrastructure has been provided.

Adequate planning for and provision of supporting infrastructure is expected to facilitate the bearing of the load of market activities in an environmentally safe manner. Simultaneous plans have not, however, been drawn up for the redevelopment of areas vacated by these two markets in Bombay. The land ownership still vests with private parties. However, controls are exercised to the extent that the uses which are shifted and those similar to them, are prohibited to be conducted from these areas. This relevant safeguard has been provided for by way of an amendment to the Development Control Regulations for Greater Bombay. Thus the traders continue to also operate from their offices at their earlier locations, while the operation of handling of goods has been shifted to New Bombay.

INFORMAL SHOPPING

The 750,000 jobs planned for in New Bombay in the formal sector are expected to create the potential for a great number of informal jobs. During the initial years of planning for various nodes in New Bombay, not adequate thought was given to this aspect, with the result that encroachment on wider roads, especially near the planned shopping complexes and transport termini, became a common phenomenon. The impact on citizens has been that the prices of all goods was higher in New Bombay as compared to that in Bombay, as they had to be sold only in big shops. There were mini-markets planned during these years, but shops in these markets soon became unaffordable to the petty hawkers. However, there is now a conscious effort to fulfill these needs by planning for stalls, daily bazars, markets for hawkers/impulse shopping zones and mini-markets. These are located especially near the job centres, railway and bus-stations and in the residential areas. Road sections are now being planned to accommodate linear stretches of markets, considering the preference of traders as well as the buyers for this form. A good example of this is the 5 m. wide reservation on one side of all 35 m. wide roads in Kharghar node. Similar proposal is also on for Dronagiri node. In addition, all sectors are now being planned with space for daily bazars and stalls. Efforts are, however, being made to bring these facilities to a scale matching with the needs.

TRANSPORTATION CONSIDERATIONS

Traffic is a major cause of pollution and thereby of environmental degradation. The report of MEIP brings out the fact that the traffic pollution is the major cause of concern in the areas around TBIA and Chembur, where the study was conducted, and not industrial pollution. However, measures have been adopted to minimize this form of pollution largely by:

a. Planning for mass rapid commuter rail network in the early planning period. The large number of commuters travelling by the suburban trains would have required much more road length which would have caused more traffic related polluted on the additional roads. Water transport carrying the affluent that would have otherwise used cars extensively, will also help reduce similar pollution.

b. Integrating the commercial spaces with the railway stations, CIDCO has been able to utilize the air space above the railway stations, thus creating highly accessible 6 to 7 ha. of built up space at each of the two bigger railway stations and about 7 ha. at smaller stations. Twenty six railway stations in New Bombay at the ultimate stage would, thus, create at least 68 ha of built-up-space for jobs[17]. A potential of 68,000 jobs (at a rate of 10 m /office job) is thus expected to be created in the railway station-cum-commercial complexes. Location of jobs in these complexes means avoiding secondary mode of transport that is normally resorted to from suburban railway stations in Bombay and other places.

LAND RECLAMATION IN NEW BOMBAY

Given the land characteristics, there were two main options for reclamation, namely,

a. extensive conventional reclamation, involving quarrying and transport of huge amounts of earth; and

b. the dutch method of polders and dykes, wherein dykes are built around the periphery of low-lying areas (polders).

The second method as the name suggests is extensively used in The Netherlands. Its application in this project is different on the count that reclamation is sought for the purpose of urban development, in a heavy rainfall-intensity area, with unreliable energy availability for pumping. Secondly, no active navigation is being considered in the canals. CIDCO has, however, adopted a via-media wherein partial reclamation up to or above the high tide levels is necessary. This system necessarily needs:

a. Storm water from developed areas to be carried to holding ponds near the creeks through drains and open channels, where it will be held for some time before being let off into the creeks at a slower rate and under more favorable conditions of low tide; and

[16] Under the Bombay Metropolitan Region Specified Commodities Markets Act of 1983.

[17] Assuming that 30% of the stations are going to be big, and assuming an employment rate of 10 sq.m./person.

b. Storm water from the numerous hills and other catchment areas, to be collected and detained at the foot of the hills in detention ponds before being let off into the creeks through regular system of channels and holding ponds.

The latter option, though necessitates utilisation of 10% of the entire developable land in New Bombay for such ponds, reduces environmental degradation and improves environmental quality by adding holding ponds to the planned open spaces. This method also creates ponds at foothill areas for collection of rainwater from the larger catchment areas. The concept of detention ponds itself is relatively new in New Bombay, but is favoured as it enables reduction in size of storm water diversion channels, by regulating the flow from the catchment areas at an upstream location and providing damping effect. Storage of rain water in these detention ponds offers the possibility of utilising the same at least for secondary purposes of gardening. Possibility can also be explored of using this water for drinking purpose, which is under consideration in the new nodes of Kharghar and Ulwe.

SOLID WASTE MANAGEMENT

Thirty to forty five per cent of all solid waste generated in the region of Bombay is bio-degradable, as per statistics available. It is estimated that a total of nearly 325 MT/day of solid waste, including debris is generated in New Bombay. There are two dumping sites one each at Kopar Khairane and Kalamboli. Solid waste is collected by 14 garbage compactors and six dumpers working on one shift basis. Small scale vermi-composting is carried out in Vashi. Otherwise, unprocessed waste is dumped and levelled by bull dozers. CIDCO's expenditure on solid waste management is Rs. 48/capita/year, which is 40% of what BMC spends. The total approachability of plots and the daily and efficient collection systems result in economical collection and disposal methods.

STORM WATER DRAINAGE (SWD)

The storm water drainage system adopted in each node is based on reclamation levels, tidal levels and ground levels of existing villages. The systems comprise gravity drainage, holding & detention ponds with channels and partial pumping as well.

In New Bombay, the SWD system is designed for no inundation and for the highest intensities forecast for the next 100 years. To the extent possible, natural stable drainage courses are retained and strengthened. Storm water is collected through covered drains as part of the road sections, and carried to the open channels of widths up to 60 m. stored in the holding ponds and let off ultimately into the creeks during favorable conditions. The open channels at times are converted into covered box type RCC drains, to economise on the land requirement, and where point accesses are to be given to large number of plots.

Separate SWD systems are designed for villages at local levels[18] and additional holding ponds are created. CIDCO maintains a record of specific needs of each node and also carries out regular pre-monsoon checks of all SWDs with the help of a detailed maintenance manual. The MEIP report finds the SWD methods adopted in the region to be generally adequate. It appreciates the SWD manual and maintenance practice of CIDCO and suggests that other organisations should follow this good practice. A proposal for installation of auto rain gauges by CIDCO, also a suggestion by the study, is already in the pipeline for selected locations in New Bombay.

SEWERAGE

Sewerage is designed as a distinct system for each node, again based on the above mentioned criteria. The designs are made with the assumption of generation of sewage as 100% of water consumption and rate of seepage of 20-25%. The underground sewerage system is run on gravity as well as intermediate pumping mechanism when depths exceed 6 m. below ground level. Sewage is treated at the Treatment Plants (STP) located close to creeks. The standards of MPCB are met before treated effluent is discharged into adjoining creek inlets, such as BOD levels brought down to 100 ppm.

However, the need for recycling of this treated water for gardening purpose has been recognised and there are few examples such as the use of treated sewage from STP of Belapur node for watering the plantation under the transmission corridor nearby. Another fine example is use of treated effluent from London Pilsner Beer factory near Nerul for irrigating the tree belt along the Sion-Panvel Expressway. It is now felt that centralised STPs are not suitable for certain areas where the water table is high or where the treated water is sought to be recycled locally. Thus, the concept of decentralised Package Treatment Plants (PTP) emerged for using the treated effluent for gardening and watering the plantation areas.

WATER SUPPLY

In New Bombay, ground water is not potable, and hence can be used only for secondary purposes such as gardening and irrigating plantation areas, etc. The system is designed for a supply rate of 180 ltrs/capita/day for residential use. The system for each node has been designed separately, like other infrastructure systems in New Bombay. A hierarchy is planned, of Master Balancing Reservoir (MBR), Ground and Elevated Storage Reservoirs (GSR & ESR) or Hill Storage Reservoir (HSR), and distribution is made by dividing the node into water districts. Water is presently supplied through two existing sources of Barvi dam and Patalganga river receiving the tail water of Khopoli Hydro Power station of Tata Electric Company. Together they supply about 100 MLD/day. Three new sources of Morbi (100 MLD), Hetwane (350 MLD) and Balganga (350 MLD) have been identified for future needs. CIDCO also

[18] This is because the existing villages are at lower level than the designed reclamation levels of the node, and the same cannot be raised due to dense habitation in the villages.

makes available funds to Maharashtra Water Supply & Sewerage Board (MWSSB) and MIDC for meeting the capital cost of developing water sources.

DIRECT MEASURES FOR ENVIRONMENTAL UPGRADATION

Development of Green Spaces

Apart from all the above mentioned environmental considerations having been given due attention while planning for New Bombay, developed green spaces have immensely contributed to the environmental quality of New Bombay.

The reservations of Regional Parks in the New Bombay Development Plan have been carefully chosen to be taken up for afforestation, or developed as planned open spaces within the nodes or outside.

The question of urban poor

The inevitable question of the urban poor along with their employment and housing needs arises. It has been the general experience that affordable housing options need to be created for the weaker sections of society, and if not, the most vulnerable areas for encroachment are going to be:

- the hill slopes,
- the lands below high tension lines,
- the undeveloped coastal no-development zones

Keeping the above in view, CIDCO has tried to cater to the housing needs of the lower income groups. Forty seven per cent of its housing stock created so far has been for this group including 20,000 developed plots (with or without core houses). Under the World Bank financed Bombay Urban Development Project (BUDP), Sites & Services Schemes are developed for the economically weaker sections in three phases. These are at Airoli (5000 core houses), Koparkhairane (5000 core houses and core plots) and at Nerul, New Panvel, Kalamboli and Kharghar (10,000 core plots together).

Protection of encroachable lands

However, plans have been simultaneously made and are being made to protect the unsafe lands mentioned above from being encroached, by converting them into environment friendly greens. The various measures adopted are:

- the hill slopes are planted under afforestation programme. In addition, the hill slopes are also leased out to Institutions engaged in research and development of Ayurvedic medicine for growing medicinal plants;
- the coastal zones are developed as promenades wherever developments run close to the coast, as active public recreational open spaces along with plantation.

Private sector participation in the environmental measures

Bulk of the funds required for these measures comes from CIDCO's own resources. However, efforts are also made to rope in private and institutional financial resources:

- leasing out gardens, parks and traffic islands to Corporate bodies for development and maintenance on the condition that they be kept open to the public;
- leasing out open spaces in difficult areas/situations (areas that are prone to be quarried etc) to private individuals for development and maintenance, again on the condition to keep them open to the public;
- In the past, CIDCO developed active gardens under the corridors of transmission lines. However, under a new scheme, Corporate bodies and individuals are invited to develop productive and passive green areas on the lands reserved below these transmission line.

MULTI-ORGANISATIONAL RESPONSIBILITY

The external factors contributing to the present environmental status of New Bombay considered for the purpose of this study are:

1. environmental conditions in New Bombay, created by TBIA &Chembur Industrial areas;
2. multiple agencies being responsible for the current status and maintenance of environment of New Bombay.

INDUSTRIAL AREAS OF TBIA & CHEMBUR

TBIA is one of the largest Industrial Estates in India housing over 1200 industrial units and having an annual turnover of Rs.40 billion. Forty percent of its 2500 ha. area is put to industrial use. There are slums in the area accommodating about 50,000 population. Most of the data used here is from the MEIP reports.

Water Pollution

Ninety per cent of waste water from TBIA is generated by 43 out of the 1200 industrial units, and that of Chembur from nine units. MEIP Report finds that the industrial effluent is treated below the prescribed norm, and hence is causing water pollution through contamination of soil and ground water, rendering well water unpotable.

Air Pollution

The major source of air pollution is transport rather than industrial emissions. Other sources are found to be quarrying, construction works, burning of garbage, rubber, etc. For some considerable time, it is inconceivable that the quarrying and construction works will lessen in New Bombay. As a result there is large scale incidence of respiratory problems in New Bombay. It is felt that there are not enough escape routes in case of industrial disasters such as emission of toxic gases, explosions, leakages on the roads or accidents to vehicles carrying hazardous chemicals. This is so because of the peculiarity of the site of these nodes, having only one major road leading towards Kalwa and Belapaur. The proposed bridge connecting Airoli to Mulund will give a new direction of escape and evacuation.

ORGANISATIONAL COORDINATION

One of the reasons for the present state of affairs in the residential areas trapped between the TBIA and Chembur industrial area, is the multiplicity organisations that are responsible for the welfare of these areas. Three major Organisations engaged in providing basic infrastructure in New Bombay are CIDCO, MIDC and NMMC. As mentioned in the MEIP report that brought the environmental status of New Bombay to date, the levels of efficiency with which CIDCO, NMMC and MIDC are managing affairs in their respective jurisdictions, are varied. The 74th constitutional amendment has given the planning powers to Municipal Corporations. MIDC is now vested with planning functions as well. However, in course of time, co-ordinated effort is expected to be made to resolve matters of common interest such as physical infrastructure, pollution and disaster management.

An example of the result of the multiplicity of functional areas is the sprawl of slums in TBIA, which otherwise is not a common phenomenon in New Bombay. The availability of industrial employment, non-availability of affordable formal sector housing to a matching scale and the fact that MIDC is not a competent authority to demolish the unauthorised constructions have together compounded the problem. While the main reason for growth of slums is not making legal housing affordable to the urban poor, providing affordable shelter options was not within the purview of MIDC until recently. Plans are currently being drawn to rehabilitate the 50,000 and odd squatters presently living on the hill slopes and other MIDC areas. CIDCO, MIDC, NMMC and others are now making a conscious effort in this direction by co-ordinating their respective roles. Each of these organisations is taking up responsibility of rehabilitating some of the squatters. There is now a beginning in the right direction.

FINANCING THE DEVELOPMENT OF NEW BOMBAY

Government decision to acquire for CIDCO the entire private land of 166 sq.kms. and 27 sq.kms. of salt pan land within the notified area of New Bombay and, to transfer to it free of cost the Government lands measuring about 54 sq.kms., provided its main asset base (other than the meagre seed capital of Rs.39.5 million). Land was identified as the main resource for financing the multifaceted development projects in New Bombay Project area. However, the value of land at that point of time was very meagre, due to its physical disposition and low agricultural productivity. Its urban potential was minimal too due to lack of linkage with Bombay and virtual absence of other infrastructure such as roads, telecommunications, schools, hospitals, etc. Thus, though there was an impressively large area of land made available to CIDCO, it was not of much financial consequence in its then existing raw and undeveloped form. The land acquisition awards had valued the land at rates ranging from Rs. 4 per Sq.m. to Rs. 30 per Sq.m. On this basis the total value of land was not considerable. It was essential for CIDCO to enhance the value of its assets so that they could be a lucrative source of finance for development expenditure. This section examines how the process of value-addition was stressed, and how it has finally become the major and only source of finance.

Till 1980, the major source of funds for financing the public housing schemes of CIDCO, particularly for EWS, LIG & MIG, was loan from HUDCO and financial assistance under the BUDP. For infrastructure works, finance was provided through the meagre sales of land. This had led to the creation of a kind of a vicious circle in the development process of New Bombay Project i.e. low demand for land leading to less income generated from land sale, and therefore, less capital expenditure on infrastructure development which in turn, resulted in low demand for land. The cumulative capital expenditure of CIDCO till 1980 was only about Rs.400 million. However, 1980s witnessed a remarkable change in the development scenario of New Bombay. The success achieved in the efforts to shift the agriculture produce markets from South Bombay to Turbhe (within Vashi Node) and, to some extent, the shifting of warehousing activities of steel trade from South Bombay to Kalamboli marked the heralding of this development. During this period, new nodes like Airoli, Kopar khairane, Nerul, Kalamboli and Dronagiri were also taken up for development. Large scale housing schemes for different income groups were taken up too. This was followed by planned development of office complexes in the CBD at Belapur through sale of plots.

The subsequent boost to development can be attributed to the construction of Mankhurd-Belapur commuter railway line and the goods railway line between Kalwa and Turbhe. Physical shifting of a large number of wholesale agriculture produce markets to Vashi and the construction of large commercial complexes above the railway stations of Vashi, Sanpada, Jui Nagar, Nerul and Belapur further hastened the process of urbanisation and helped to build up a strong and broad economic base for further rapid growth. The housing development by CIDCO and also by private developers to whom CIDCO sold the plots have consolidated the process. This has set a self-

sustained momentum of overall growth which is vividly reflected in rising land value.

During the period 1980-90, the appreciation in land values for predominant uses, such as residential, shop-cum-residential and commercial has shown a steadily rising trend, which has enabled CIDCO to mobilise the funds required for taking up various infrastructure projects within the identified nodes as well as major projects at city level. After 1990, the commissioning of wholesale agriculture produce markets at Vashi and commissioning of commuter railway line from Mankhurd to Vashi in May 1992 has provided a sudden spurt in economic activities and population growth. The demand for land for residential and commercial uses has shown a manifold increase. In fact, the market price of land for these uses has shot up to be almost at par with rates in well developed suburbs of Bombay. The trend of faster development of New Bombay has thus really set in from 1990 and has continued to grow at a progressively faster pace.

SYSTEM OF LAND PRICING

Land being the most precious resource to finance multi-sector urban development projects, the pricing of land in each node is done by CIDCO with great care, in the form of a well structured Project Report for each node. CIDCO works out the Reserve Price of land for each node almost every year by taking into account the compounded value of net past expenditure, year-wise, and the discounted value of the future year-wise estimated cost. While doing so, CIDCO takes into account the comprehensive cost details covering on-site, off-site and city level infrastructure as well as non-saleable social infrastructure, etc. The Reserve Price is fixed based on the present worth of the project cost covering total net compounded value of the past year-wise net expenditure and the discounted value of future year-wise expenditure -the sum total of the two is divided by the available saleable area of land in a node, to determine the Reserve Price of land. The Reserve Price of land in New Bombay varies from Rs.1050/sq.m. to Rs.2800/sq.m. the latter being prevalent in the most developed nodes like Vashi.

Along with the policy of determination of the Reserve Price of land, CIDCO has formulated a clear cut land pricing policy for different uses of land, in a well structured form, depending on the affordability of the end users and the market value for particular land use. The policy stipulates that for weaker sections like EWS & LIG housing and sites and services type of development, price of land should be charged between 25%-50% of the Reserve Price. The subsidy given to this wide spectrum of end uses is recovered by charging market price of land for commercial uses and prices higher than Reserve Price for MIG & HIG group housing.

In the first five years of the project, CIDCO had to incur substantial expenditure far in excess of receipts from the sale of land. But this was the preparatory stage which is inevitable considering that CIDCO had initiated development in a totally virgin area. In subsequent years, the project started showing a surplus of receipts over expenditure, even though the scale of expenditure too had become much larger.

In the process of development of a planned node, care was taken to give a healthy environment to its potential residents. Through land use and density controls, CIDCO has been able to achieve the required environment. Land use plan accordingly provides for proper system of roads, pathways, open spaces, gardens, playgrounds, parks, fountains, schools, hospitals, community centres and various other social amenities. Out of the total nodal area of 1146.40 Ha., the saleable area is only 516.60 Ha. or 44.55%. This means that a large component of the area goes for public amenities. An outstanding example of this is the environmental improvement through provision of large number of gardens and parks in Vashi-Sanpada area and also providing a number of plots for future development.

Land under the transmission lines is also developed for the purposes of horticulture through private sector participation. This provided green cover and also prevents unauthorised slums below the power transmission lines. Another important input for environmental improvement is the density norm. Provision of a better environment entails costs due to diversion of land from saleable to non-saleable component. This can be sustained only if the market forces are favourable. CIDCO has been able to sustain this demand by value addition to its lands.

CIDCO has so far sold 340 Ha. of land in Vashi-Sanpada Node. The balance land available for sale is 177 Ha. The average land price realised by CIDCO has increased from a mere Rs.56/sq.m. till 1978 to a high of Rs.1600/sq.m. during 1988-89 to 1992-93 even after considering land sales at affordable rates, for social amenities and for shifting of trades. The rate has further gone up after 1992-93. This has been possible through sale of selected land for commercial use by competitive tender system after 1990.

In the initial stages of the project, it was essential to offer land at lower prices which the market was ready to bear. This was necessary to attract public participation in the development, since CIDCO could not take on its shoulders the entire load of construction of houses, shopping, offices, social facilities, etc. It was only after development was well under way and basic infrastructure had been laid, that CIDCO could command terms more favourable to itself. In a sense, CIDCO has to evolve and strike the best possible balance in its land disposal strategy as would be consistent with attaining the desirable speed of development and also meet the need for resources at any given time.

To sum up, Vashi Node is an interesting case study in the arena of New Town Development, which demonstrates how a large township project planned on a totally virgin/marshy land can be made self-financing/self-sufficient over a period of time, without compromising either the speed of development or the gamut of planned social requirements of a growing but balanced

community. There were periods when this project looked rather dismal because of strong popular resistance or lack of demand. But farsightedness and flexibility combined with firmness, its multifaceted activity style coupled with judicious land use planning with an eye on environment quality and bold land disposal policies have helped in reaping rich dividends. Capturing of market price for land under commercial and other uses have helped CIDCO to meet the deficit in M & R account without overloading the poorer or the social utility users.

Vashi is now considered by many as the prime residential area of the future and also a vibrant nodal centre for economic activities. Shifting of wholesale trading activities with warehousing and transport has been a major breakthrough and probably has happened for the first time in the country. It is said that the final barometer of development is market response, reflecting the law of supply and demand. The spot land prices as indicated above are really an eye opener and provide important tips on financing multifaceted urban development projects. Integrated approach was thus successfully adopted by CIDCO, wherein development of infrastructural services guided urban growth in a desired manner, nurturing in the process, partnerships between public and private sectors in various fields.

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