

Carrying Capacity Based Conceptual Master Plan for Cochin City

Presentation by

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Cochin (Kochi) City – the commercial capital of Kerala – Physical Features

Kerala – the picturesque destination listed among the 10 ‘must sees’ by the National Geographic magazine.

Cochin – Biggest urban conglomeration in Kerala.

Location – 9deg 55’ N & 76deg 15’ East.

Mean height above sea level – less than one metre towards West and 7.5m towards East.

Characteristic physical feature – expanse of backwaters and low lying wetlands.

Typical soil strata – alluvial soil laden with fine silt & clay to depths up to 50m.

Hot humid climate with max. temp of 34 deg & min of 22 deg.

Average annual rain fall – 3000 mm from two monsoons.

Relative Humidity – 70 – 87 %



Cochin City – Political/ Administrative set up



Cochin Metropolitan Region:

Comprising of Corporation of Cochin, 3 Municipalities and 17 Panchayats.

Area: approx. 270 sq.km

Population: approx. 1.56 million.

Corporation of Cochin:

Area – 94.88 Sq.Km

Population – 0.58 million (2001 Census)

Population Density – 6250 / Sq.Km (62.5 persons per hectare).

66 Electoral Wards

Cochin City – Economic Status

Kerala's population density at 819 persons per km² is three times the average density of population of India; however, Kerala's population growth rate is India's lowest.

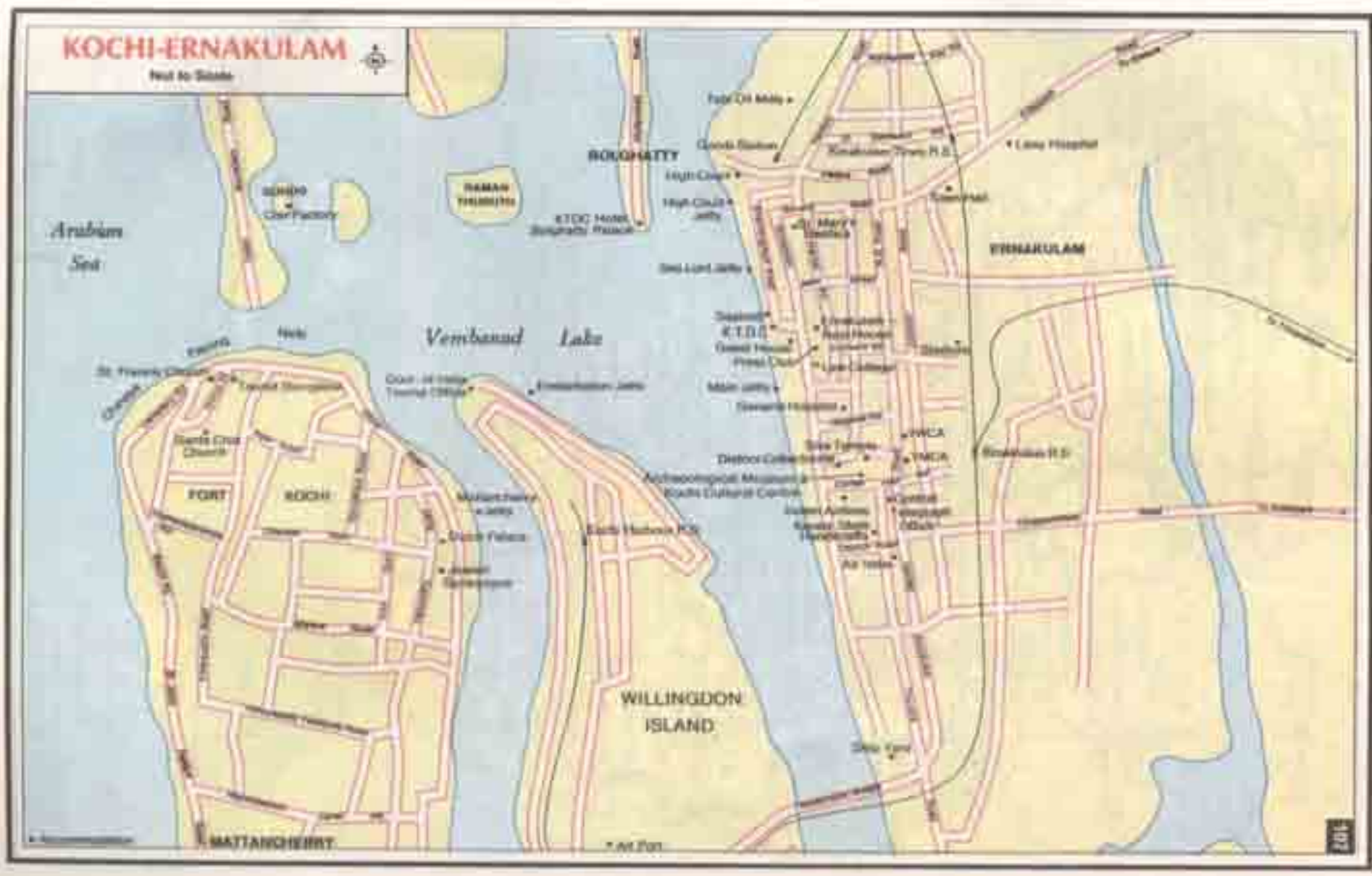
- The service sector (including tourism, public administration, banking and finance, transportation, and communications — 63.8% of statewide GDP in 2002–2003) along with the agricultural and fishing industries (together 17.2% of GDP) dominate Kerala's economy

Cochin's – the commercial capital of Kerala - economy driven by

- Seaport.
- Tourism.
- Skilled human resource export.
- IT and ITES.
- Airport.

KOCHI-ERNAKULAM

Not to Scale



Some of the major developments expected in Cochin over the next 10 years include..

- Rs. 7000 crore Vallarpadom Trans-shipment terminal
- Smart (IT) City project.
- Special Economic Zone at Kakkanad and at Nedumbassery (Airport).
- Rs. 2000 crore elevated rail from Kalamassery to Tripunithura via Ernakulam.
- 3 major flyovers at Edappally, Palarivattom and Vyttila.
- Rs. 1000 crore Desalination plant at Vypeen.
- Rs. 3000 crore LNG terminal.

Flip side of unplanned urbanization in Cochin.

- drinking water shortage owing to poor supply network.
- drinking water shortage due to shortage of water at source during peak summer.
- water pollution due to poor sullage and sewage disposal
- poor storm water (and tidal water) drainage network.
- air, land and water pollution due to inadequate solid waste disposal.
- destruction of natural heritage features like mangrove eco-systems.
- destruction of built heritage.

Flip side of unplanned urbanization in Cochin

- lack of buffer zone for hazardous chemical storage areas.
- poor and unsafe transport network.
- energy shortage and inefficient supply systems.
- lack of community open spaces like parks, playgrounds etc.
- lack of community amenities like community halls, markets, schools, hospitals etc. for the low income group population.
- lack of land for housing within the city for low income group population.
- air pollution, noise pollution and inadequate green cover.

Inadequacies of present Centralized approach towards planned solutions to these problems

- centralized approaches need massive capital outlay, for which local bodies will have to take large loans from banks, financial institutions etc. incurring large expenses towards repayment and interests for years to come.
- centralized solutions often nullify/ ignore existing/ possible much simpler decentralized solutions, making the whole population dependant on it.

Inadequacies of present Centralized approach towards planned solutions to these problems

- centralized solutions often mean creation of new growth centres in the suburbs of the existing city leading to a large urban sprawl, larger commuting distances and multiple new problems. These new growth centres often mean total neglect of old cities.
- owing to competition for economic allocation from different sectors such as transport, energy etc, basic needs like waste management, sewage treatment, ecology, conservation and essential facilities for economically weaker sections of the population will get the least priority.

An example of Centralized Vs Decentralized infrastructure component – Sewage Collection and Treatment

Conventional system

Centralised collection through underground sewers

Large diameter pipes in 1 in 100 slope to carry solids and liquids

Sewage pumps at frequent intervals.

Treatment plants

:Aerobic Activated sludge process

:Disinfection

:Sludge disposal

Dewats approach

Household/ building level interceptors/ settlers.

Small diameter pipes laid in shallow gradient to carry only liquid effluents.

Minimum pumping since systems are decentralised and close to source of discharge.

Cluster level DEWATs system Planted drains/ soak pits as tertiary treatment.

Centralised desludging and sludge drying facility

An example of Centralized Vs Decentralized infrastructure component – Sewage Collection and Treatment

Centralised Sewerage and Treatment Plant

**Projected cost by Kerala
Water Authority – INR Rs.
1000 crores (on availing
loans – Rs. 3363 crores)**

Monthly usage charge of INR Rs.
910.00 per house

Connection charges of INR
Rs.3000.00 per house

Unaffordable for 95% of
population of Kochi

DEWATS Approach

House level settlers	0.80 cr
Sewer lines	1.20 cr
Anaerobic treatment	1.51 cr
Total	3.51 cr
Total cost for for 0.78 million population	302.91 cr
Land Cost (Rs.0.5 cr per acre)	37.50 cr
Miscell. civil works	5.00 cr
Desludging/ sludge drying	3.00 cr
Total	348.41 cr
Overheads -15%	52.26 cr
<u>Total</u>	<u>400.67 cr</u>

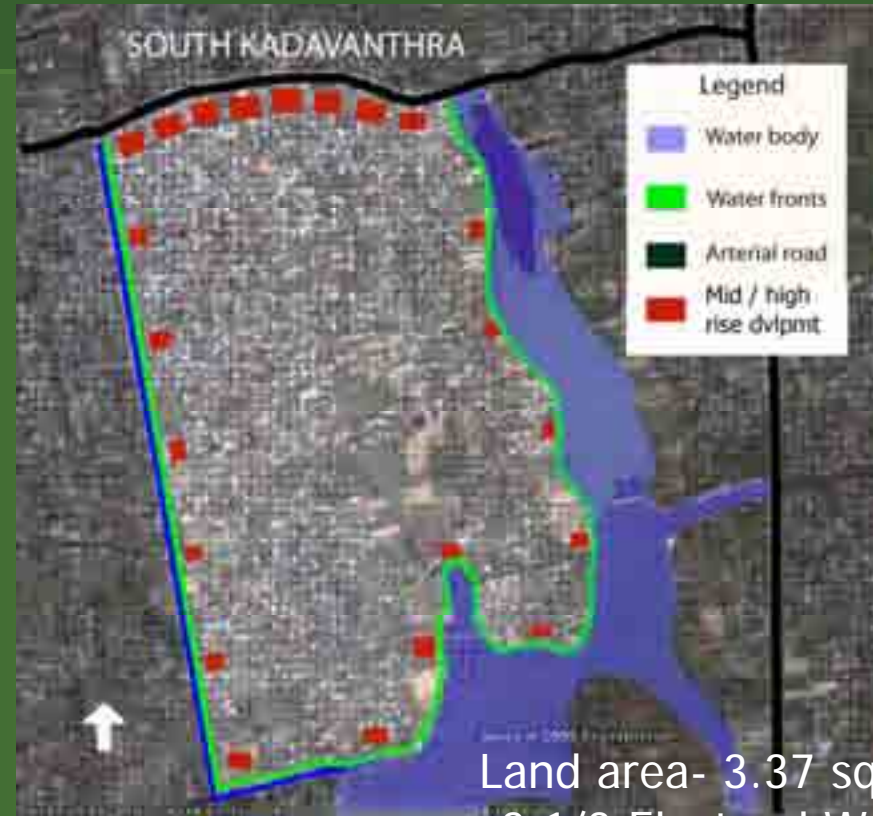
Is a paradigm shift possible?

- Indian economy is currently growing at around 8%.
- Direct manifestation is the higher purchasing power of mid and high income segment of the population.
- A subsequent result is the higher demand for quality housing, work spaces, leisure and entertainment spaces of this segment.
- **Economic activity generated out of this demand can be channelised so as to address the basic needs shortfall if proper planning tools, decentralized approaches/ technologies and service providers are in position.**

A Cochin case study on how this can be possible. South Kadavantra, a small sector in Cochin as a case study area.



Present land use



Land area- 3.37 sq.km.

3 1/3 Electoral Wards.

Present Population-around 28,000 persons.

Big buildings along arterial road; small scattered development in inner areas.

Expected increase in population-upto 38,500



Currently there is unplanned growth on the arterial road side and on the water front

Presently growing at random

Difficult to service with roads, drains, sewage etc.

No conservation possible.



Concept - Investment, Conservation and Regulations driven desirable model

Number of developed countries are now mooting the idea of inner city revitalization by pedestrianizing city cores as against the urban sprawl.

In the case of developing cities perhaps we now have a possibility to design and build high density pedestrianized core to absorb the impacts of new development ; simultaneously revitalize the other areas.

Cities That Have Recently Closed Downtown Streets

Bern, Switzerland

Bogota, Colombia

Curitiba, Brazil

Manaus, Brazil

Cartajena, Col.

New York, NY

Barcelona, Spain

Burlington, Vt, USA

Oxford, UK

Edinburgh, UK

London, UK

Frankfurt, Germany

Freiburg, Germany

Munich, Germany

Zurich, Switzerland

Shanghai, China

High Density Pedestrianised Core (HDPC)

The basic assumption of a HDPC is that all daily activities of at least 60% of the people in the core, such as going to work, going to school, shopping for essentials, everyday essential services, recreation facilities such as sports or cultural activities should all be within a walking distance of say less than 500m from the place of residence

To facilitate this, a mixed land use of commercial spaces, residential spaces, recreational spaces etc are all given a high FAR of 4 or 5, coverage of less than 25%, thus interspersed with large open landscaped areas - within this less than 500m distance.

Within this compact core, there need be only bicycle and pedestrian movement, -making it automobile unfriendly. Ample parking facilities have to be provided in the periphery.



- There can be HDPCs of area 20 acres where around 12000 persons can stay and around 3000 can work (especially in IT or ITES sectors or commercial offices and even some select institutions).
- A 150 acre HDPC can accommodate up to 75,000 people and around 15,000 to 20,000 people can work here.
- In South Kadavantra it is proposed that a 30 acre HDPC is developed with an FAR of 4 to 5.

Land Acquisition needed in South Kadavantra = 70 acres

- **30 Acres land for HDPC (4.30 million sq.ft built up area at 4 FAR)**
- **14 Acres land for Economically Weaker Section housing (Assuming 7 Acres is already available)**
- **10 Acres land for critical Water Storage Reservoir**
- **3 Acres for Solid Waste Composting and DEWATS along with buffer zone**
- **4 Acres for Road widening**
- **5 Acres for Parks, Playgrounds and other open spaces etc**
- **Land for creating buffer zone for hazardous chemical storage facility (4 Acres per ward Average)**
- **Total: 70 acres.**

South Kadavantra – Proposed FAR & TDR

- FAR of 1.5 for total sector of 3.37 sq.km
- HDPC – mixed use development with FAR 4 to 5.
- Housing for economically weaker section with FAR -2.
- NDZ (No Development Zone) along water front (natural heritage) with FAR -0.
- Builders who want to build at 4 to 5 FAR in the HDPC will have to buy Development Rights from the NDZ land owners by concept of TDR.

South Kadavanthra



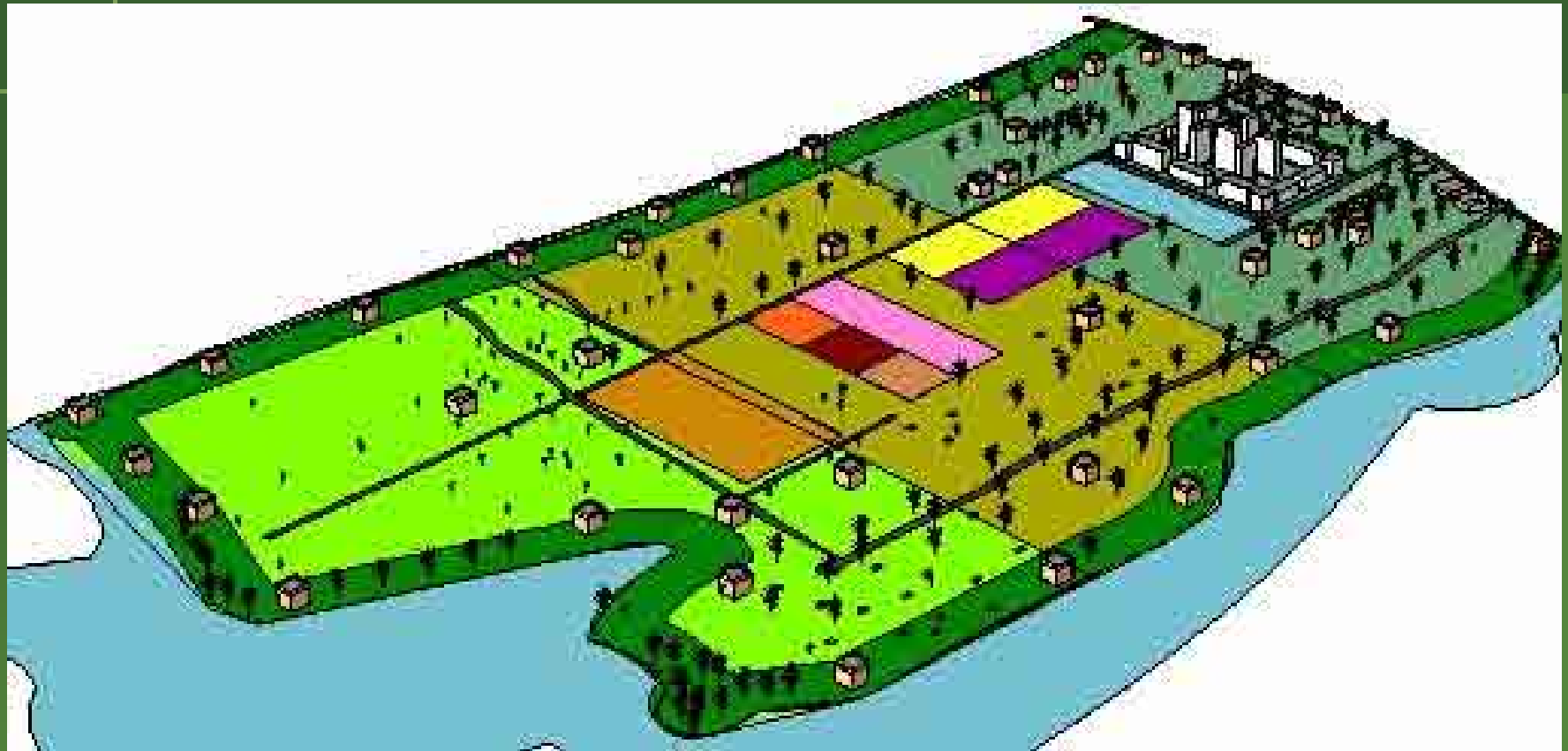
Legend

- Solid Waste Treatment using composting pits
- Liquid Waste Anaerobic System
- EWS Housing (15% of population)
- NDZ (for natural heritage conservation)
- KSEB + KWA (for water distribution)
- Transport
- Rain water harvesting
- Buffer zone for hazardous chemical storage
- Open spaces (parks, gardens)
- Community spaces (markets, halls etc)
- High Density Pedestrianized Core (HDPC)
- Mid / high rise developments

South Kadavanthra – Schematic layout plan



HDPC showing Elevated MRT line



Schematic Perspective – South Kadavantra Sector
and HDPC

Cost And Revenue Recovery – South Kadavantra

- Total infrastructure cost for the whole of South Kadavantra including drainage, sewage treatment, a 10 acre water storage reservoir, essential roads to HDPC and around including street lighting, electricity distribution and transformer for HDPC, tree planting and landscaping of 20 acre land including 5 acre open spaces and play grounds, solid waste management yard with buffer space around. : 30.00 crores
- Land Acquisition – 70 acres @Rs. 1.00 crores per acre : 70.00 crores
- Total ~ 100 crores
- **SALE PRICE OF DEVELOPED LAND IN HDPC – 30 ACRES @ RS. 3.35 CRORES PER ACRE**

Inferences:

Our studies have shown that by selling developed land in SK to builders to develop as mid and high end housing and other facilities, local bodies can meet the cost of

- land acquisition at market price for 30 acres for HDPC, essential area for economically weaker section housing, basic services area for solid waste and liquid waste treatment, critical water storage reservoir area, internal road widening areas, areas for playgrounds and parks, buffer areas for hazardous chemical storage etc.
- actual capital expenses of facilities for basic needs such as sewage treatment , solid waste treatment and disposal, critical water storage reservoir, essential sub-surface drainage together with rain recharge pits and tree planting in the sector for green cover.
- top class infrastructure facilities in HDPC such as good roads from main road and parking facilities all around, transformers, water supply mains and pumps, street lighting, playgrounds and landscaping.

Inferences:

Our studies have also shown that with proper regulations and planning tools like transfer of development rights (TDR),

- **natural heritage areas like waters edge and mangrove areas can be conserved as no development zones (NDZs).**
- **builders can be required to buy development rights from NDZs to develop beyond 1.5 FAR in HDPC. Thus those owning land in NDZ are not adversely affected.**
- **Still apartments, commercial and other spaces in HDPCs can be sold at current market rates accounting for a fair profit margin for the builders.**

Inferences:

This win-win situation in SK can be repeated in similar 21 sectors in Cochin.

The only capital required will be a small corpus amount for initial land acquisition, after which advance for land from builders can be procured and the project can roll and get completed in its own money.

The government spending then need be restricted to

Arterial Roads / ROBs, Bus stands, Railway stations, boat jetties and other interchanges,
Main Water supply lines and pumping mains.
Main Electrical power distribution lines.

Centralised component of solid waste treatment plant.

Communication links.

EWS housing excluding land and infrastructure costs.

Setting up and running of Social Welfare Institutions.



- **This scenario is, with some changes in some cases, applicable for most Class 2 , Class 3 and Class 4 Indian (and probably many other third world) cities. The current economic growth can be taken as a wonderful opportunity to address the basic needs.**
- **The fundamental requirements for affecting this change include**
 - **right kind of planning tools and policies.**
 - **right kind of information dissemination and publicity to convince that this is a win-win situation for everyone and no one need panic.**
 - **Right choice of technologies and approaches.**
 - **Right team of service providers.**

Thank You

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