



DEVELOPMENT PLAN FOR KOCHI CITY REGION 2031

(Draft)



VOLUME II

DEVELOPMENT CONCEPTS AND DEVELOPMENT STRATEGIES



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CHAPTER 1

MAJOR DEVELOPMENT ISSUES OF KOCHI CITY REGION

The various Studies and Analysis carried out (partly primary surveys carried out by the Department of Town and Country Planning, Kerala as part of the Master Planning exercise and partly collected from secondary sources based on earlier studies carried out by various agencies) bring out the fact that in spite of the earlier development actions having been guided and regulated through many successive Urban Development Plans for part of the city region, the present development activities lack a comprehensive perspective and that the city region suffers from many deficiencies. Such a development trend may lead to haphazard and chaotic urban situation, ultimately collapsing to the point that Kochi no longer may be an investment destination, as it is today.

The immediate region around the city has witnessed unprecedented growth during the past two decades especially at locations adjacent to major transport corridors. New major investment proposals at certain locations triggered off developments in those locations attracting huge private investments. Major public investments during the last two decades which had a telling effect on such private sector investments had been I.T. Sector development at Kakkanad, in Thrikkakara Panchayat, construction/improvement of a few major road corridors like Airport – Sea port Road, S.A. Road, Kaloor- Kadavanthara road and the road connectivity to Vypeen Islands, Export Processing Zone, Special Economic Zones, Port related developments etc. The highest private sector investment in residential estates in the State was seen in Kochi city region. The first private sector international airport in India was developed in Kochi region. However with all such development trends which catapulted Kochi as the most attractive investment location and economic activity centre, the infrastructure developments based on a Master Plan did not take place in tune with the development aspirations of Kochi. When every project activity remains an ad-hoc project based plan lacking a comprehensive approach, the related sectors fail to cope with the demands generated by that specific single activity. The result is that instead of infrastructure development preceding establishment of any major economic activity, the infrastructure improvements are attended to after the demand is generated and when the existing systems fail. This kind of urban development trend may break down when demands increase and when there is no planned approach to promote infrastructure development.

Urban land use continually undergoes transformations in proportion to development pressure and varying requirements for built spaces. Higher order uses invade into the lower order uses, which are pushed outside of the central areas. Since land value also is a product of land use, with the invasion of higher order uses land values also increase. Such a process shall not result in pushing out the people who cannot compete in the private land market out of the city area. Planning shall be for inclusive development. Such a planning process need to be in place for a city region which experiences a fast rate of change.

Development Plan for Kochi City Region need to be based on broad development concepts and specific area wise and sector wise development strategies. These shall form the basis for the Development Proposals to be made part of the Development Plan. Considering the importance of this, the Development Concepts and Development Strategies are organized into a separate Volume of the Development Plan. Even when the Development Plan proposals are reviewed periodically and revised, whenever necessary, such a process shall be undertaken within the framework of this Volume of the Development Plan.

In order to evolve Development Concepts and Development Strategies, it is necessary to reiterate here the major development issues which necessarily shall be reflected in Development Strategies. Perhaps these issues may also be the first impressions that an outline study of Kochi Region gives to a Planner or Urban Administrator.

A few of the **Specific Issues** which need to be considered in evolving future Development Strategies for Kochi City Region (KCR) are noted below:

- **Urban Sprawl:** Kochi is facing an unprecedented urban sprawl, mostly unplanned. The surrounding panchayats and towns face spurt in building activities and the local governments find it difficult to cope with infrastructure problems. These development activities do not have adequate support services in the vicinity and therefore dependence on the city increases. These developments are not adequately integrated with city level activities rather. More than 40 percent of the city jobs are availed by commuters from outside and therefore traffic converging to the city from the region around has considerably increased recently. Symbiotic relationships between the city and the region around need to be developed.
- **Traffic:** The city roads and the regional road corridors are overstressed due to increasing traffic volume. Roads are not developed network based, every road carries all sorts of modes; mixed traffic meanders through the roads especially during peak hours causing time delays, vehicle pollution, increasing traffic accidents etc. Only about 40% of all travels are shared by public mass transport facilities. Public Mass Transport facility is not well organized. Level of service of road infrastructure is low. Roads rarely have side drains and footpaths. Pedestrian facilities are rather poor. With dominance of vehicles on the roads, pedestrians receive low priority.

- **Infrastructure:** Water supply, sewerage, surface water drainage and solid waste management are services which are noted as highly deficient. WS improvement plan is under implementation at a cost of Rs. 250 Crores; however, this is inadequate considering the service levels expected for the whole city region (the CDP has estimated an investment of Rs. 1200 cr, for improvements in WS). In spite of the present investment of Rs. 180 Cr. for sewerage the coverage may be only 15% of the city area- whereas the CDP has anticipated an investment of Rs.2600 cr. for city level coverage). Sewage disposal remains a major issue since the present arrangements pollute the water bodies and the soil leading to vector borne diseases. Because of the flat terrain and high water table in most parts of the city area, surface water drainage is a problem contributing to stagnation of water pools, bad quality of roads, polluting etc. Inefficient SW collection and disposal arrangements cause pollution and degradation of environment.
- **Water bodies:** Nearly one fourth of the city area is covered with water bodies. These have not been subjected to planning and development and perhaps not utilized adequately for the benefit of the city, as navigable waterways, as recreational areas and/or as waterfronts to enhance the quality of urban life. Studies have shown that development of water transport in Kochi can have a telling effect on reduction of congestion on roads.
- **Economic potential:** The potential of the city and the surrounding areas to attract large scale investments in production sector has to be planned and explored. Every major investment decision is taken in isolation without much regard to the development activities related to that. Therefore the multiplier effects expected of those investments are constrained.
- **Supplies:** The city consumes substantial quantity of agricultural produces every day, for which the city and environs depend on import from the other states. The hinterland regional development has not been oriented to avail of this opportunity for economic gains. The symbiotic relationships noted above are relevant in this context also
- **Construction Activities:** Kochi city region is attracting large scale construction activities. Substantial labour force (skilled/semi-skilled and unskilled) is required which largely come from outside the region/state. Same is the case with supply market for materials. Large scale wholesale depots/yards for construction materials have not been established to meet the demand.
- **Escalating Land Value** With minimal level of Government interventions in land market, the private land market causes escalation of land prices within the city. About 50 percent of the people who cannot compete in this land market and afford to own land within the city are forced to leave the city to reside far away from the city. This not only compounds the transportation problems but also affects the tenets of equity.

- **Informal Sectors:** The booming economic opportunities in Kochi and the region around attract quite substantial informal sector activities. Most of these activities happen in public land leading to unplanned insanitary conditions and sufferings for both those engaged in these sectors and for the people at large. The last decade has seen a steady increase in the number of immigrant labour force. These workers do not have adequate housing, sanitation facilities or working conditions.
- **Environment:** The urban environment in Kochi is deteriorating at a fast rate. A few issues like solid waste collection and disposal, sewage disposal, storm/surface water drainage, lack of public toilets etc. are identified and actions are being initiated to mitigate these problems. However, there are many other issues which contribute to environmental degradation. Urban environmental quality needs to be improved considerably to retain the city and area around as good habitable areas.

These and a few other obvious pronounced characteristics of Kochi city and environs need to be considered and borne in mind when evolving Development Concepts which guide the formulation of Development Plan for the area.

CHAPTER 2

SWOT ANALYSIS OF KOCHI CITY REGION

Item		STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
Location and Regional linkages	Location	Strategically located by the Arabian sea in central Kerala			
	Highways	Kochi is well connected to other parts of the Country through three major National Highways (NH 47, NH 17 and NH 49) and to other parts of the state through various state highways	NH 47 and NH 17 are over stressed with heavy traffic. NH 49 requires considerable improvement in alignment and width within the city region. NH47 by-pass has become a city road now.	There is scope for the development of a new by-pass to the Urban Agglomeration for the NH 47. NH 49 within the city region can be improved.	Improvement of regional roads could encourage further city sprawl if developments in the region are not effectively guided. It could also attract more traffic to the city.
	Railways	Two major railway lines (Thiruvananthapuram – Thrissur railway line via Kottayam and Kayamkulam-Thrissur via Alappuzha) connects Kochi to other major urban centres of the State	The railway lines pass through the middle of the city and together with the waterbodeis divide the city into many parts.	There is scope for upgradation and integration of national level transit systems with the city region.	Policy decisions relating to railways are usually taken at the National level and consultation with local planning authorities are rare.

	Shipping	Kochi is in strategic location along shipping routes between Europe, Asia and the Middle East. The location, all weather port, related facilities and the upcoming ICTT make Kochi one of the most important Port facilities in India. Cochin Port is the only major port in Kerala state with an ISO 9001-2000 certification.	Insufficient dedicated facilities for Cargo movements in land especially through roads.	Development of ICTT and other port facilities would boost up the economic activities and the developments in the region.	If exclusive facilities for cargo movements are not developed, it could affect the entire traffic pattern in the city region.
	Inland water ways	National waterway No. 3 connecting Kollam and Kottappuram pass through the region	Water transport facilities are not fully developed.	If properly developed, the IWT would provide an environment friendly, cost effective and efficient transport option for the region.	Many agencies are involved in the development of IWT and if not properly coordinated can not deliver desired results.
	Airport	Cochin International Airport at Nedumbassery, 28 km from the city, is well connected by many international & national carriers	Existing connectivity to the airport from the city is through congested highways and roads. Airport facilities are not fully developed.	Rail and IWT could be integrated with roads to provide better access to the airport. The location offers scope for further expansion of the facilities in the airport. The airport would be an important element in the role recast of the city to a Global city.	

Demography	Population	Largest Urban Agglomeration in Kerala with population over 1 Million, as per 2001 Census. Population size to sustain a Global city.	The floating population to the city is exponentially increasing there by putting pressure on infrastructure.	Other urban centres in the region could be developed and new development corridors can be opened up.	Planned population distribution in the region require commitment from the part of administrators and the decision makers.
	Human resources	Kochi possess an abundant reserve of professionals and semi skilled / unskilled manpower . High literacy rate.		Potential to attract investments which require skilled manpower.	If the potential is not tapped locally, invaluable manpower would migrate to other places or may trigger off social unrest.
	Population growth	Low growth rate of population in the city area Youth and middle aged population constitute a major portion of total population which reflects a healthy social condition due to the possibility of greater manpower utilization	Higher growth in the peripheral areas and the resulting city sprawl.	New subcentres within the city region can be developed.	Communication strategy is critical.
	The commercial capital	Kochi is the 'Commercial , Economic and Industrial Capital of Kerala'. More than 60 percent of the tax revenue of the State comes from Kochi.	Major economic activities are largely concentrated in the corporation area there by putting pressure on the available infrastructure.	Projects being undertaken at the Kochi Port would further bolster economic development potential of Kochi.	Balanced development of Kochi as a Region is essential and this requires policy and investment decisions in line with the spatial plan.
Economic base					

	Diversified economic base	A number of small, medium and large scale industries are located in the region. Kochi is the gateway through which more than 80% of the hill produces of Kerala get exported to other nations. National as well as international banking, financial services and insurance (BFSI) sector are established within the city. Tourism and IT industry are thriving.	Inadequate supply of land and infrastructure to support further development.	The ongoing JnNURM led initiatives could sustain the growth of Kochi. Global investment opportunity in various sectors such as IT, Tourism, Industry, Infrastructure and Education.	Infrastructure development would require substantial mobilization of resources. Implementation of projects and Management of facilities created are critical.
	Other factors	Cheaper real estate costs compared to other metros in India, good communications infrastructure, low labour costs and Government of Kerala's initiatives to promote IT/ITES.		An integrated and comprehensive development strategy could exploit the conducive factors for further development of Kochi as a Global City.	

Infrastructure	Transportation	Multi modal transport facilities - road, rail, water	<p>There is no integration among the different modes. The city roads and the regional roads are overstressed due to increasing traffic volume, mixed traffic, improper traffic junctions, insufficient carriage way width, encroachment of street vendors, narrow bridges and inadequate number of railway over bridges. Absence of single agency to co-ordinate integrated transport. IWT is under exploited.</p>	<p>A single agency for the coordination and management of different modes could be setup in line with the National Transportation Policy. Preparation and operationalisation of an integrated multi-modal transportation and traffic plan comprising road, rail, water and air network could make the system efficient, economical and environment friendly.</p>	<p>Policies are to be translated to actions.</p>
			<p>Number of bridges constructed across the canals, and the encroachment in many areas limit the potential of the waterways in transportation.</p>		<p>Clearing encroachment and rehabilitation may require substantial effort and resources.</p>

			Exponential increase in personal vehicles and Intermediate Public Transport (IPT). chronic parking problems in core areas, road side parking etc cause traffic block	Efficient public transport facilities could reduce the dependence on personal and IPT vehicles. MRTS could be introduced in select corridors.	
			Scope for widening of roads or laying of new roads are limited because of the densely built up nature of the city	Encourage public mass transport through provision of additional stations, park and ride facilities, introduction of single multi-modal ticketing system etc. Suburban rail system could be developed.	Land acquisition and rehabilitation issues are often difficult to tackle.
			The rail and road traffic are directed to the city centre and then outwards again causing congestion in the city centre. The two railway stations within the city are located in congested areas and hence access and public parking are often difficult.	A railway line by-passing the core area could be developed as envisaged in the Structure Plan for central city 2001. A new railway station could be located in this route with provision for interchange.	Decision has to be taken and implementation started at the earliest to ensure minimum and dislocation and rehabilitation.

	The proposed metro rail from Aluva to Thrippunithura would considerably easeup travel to the city from peripheral areas.	The proposed alignment within the city is through heavily built up area and may require considerable rehabilitation.	Transit oriented development could be promoted within the city region.	Finance, Land Acquisition and Rehabilitation issues are to be sorted out. It may take years for the completion of the project.
Water Supply System	Periyar and Moovattupuzha river have sufficient water for the region for the planning period.	Distant perennial sources - makes water supply costly. Non-availability of local spot sources due to salinity, especially in coastal areas. Water bodies such as canals and backwaters in the city area are polluted. Entire planning area has to depend mainly on protected water supply of KWA.	Prioritizing sewage and sanitation systems would reduce ground and surface water pollution. Integrated with conservation, reuse and rain water harvesting strategies, the source would be sufficient for a long time.	The availability of water in the 2 rivers may not be sufficient in the long run. A comprehensive water management strategy has to be evolved and implemented to supplement and sustain the present system.
	KWA system covers the entire city region in terms of distribution network.	The supply is intermittent in many areas, especially the coastal stretches and newly developed areas. Existing treatment and supply capacity of the KWA system is not sufficient to meet the future demand.	Augmentation being undertaken under JnNURM would go a long way in meeting future water supply demand.	Augmentation of the existing system and the maintenance of the same would require considerable investment and management capabilities.

Sewerage		<p>The existing sewerage system covers only 5% of the Kochi Corporation area . High water table and hence septic tanks, two pit latrines, etc. do not function properly ; and within the urban areas, residential and other activities are so densely located, that the septic tank system does not work leading to water and soil pollution. Flat terrain makes natural gravitational flow difficult - the soil is mainly loose sand and clay, making open cutting difficult - high water table necessitates sewage-pumping stations at frequent intervals.</p>	<p>The existing sewerage system covers only 5% of the Kochi Corporation area . High water table and hence septic tanks, two pit latrines, etc. do not function properly ; and within the urban areas, residential and other activities are so densely located, that the septic tank system does not work leading to water and soil pollution. Flat terrain makes natural gravitational flow difficult - the soil is mainly loose sand and clay, making open cutting difficult - high water table necessitates sewage-pumping stations at frequent intervals.</p>	<p>Decentralised options and technologies that require less land for treatment are to be introduced. If considerable attention is paid and resources mobilized, the issue could be tackled. JnNURM and ADB funded projects would considerably improve the situation.</p>	<p>Implementation and maintenance of a proper collection, transportation, treatment and disposal of sewage demand huge investment and management capabilities.</p>
	Solid Waste Management	<p>Kochi has a major SWM treatment and disposal site at Brahmapuram.</p>	<p>Poor waste collection and transportation. No segregation of waste at source. Treatment and disposal facilities are to be stabilised. Difficulty in getting disposal sites for decentralised option.</p>	<p>The ongoing JnNURM supported comprehensive SWM project would improve the situation.</p>	<p>Public awareness critical. Centralised disposal site has only limited life. Alternate sites or options have to be identified and developed.</p>

			Waste dumped into natural drains cause stagnation of water in drains, water logging and mosquito menace.			
	Storm Water Drainage	Excellent network of natural canal system supplemented by man made drains.	Decreased carrying capacity of the system causes frequent floods and water logging. encroachment, conversion of canals to roads, waste dumping, obstruction due to utility lines and silting contribute to this. Only 60% of the Kochi Corporation area is covered by storm water drains leading to frequent flooding of roads. Incidences of discharge of septic tank overflows/ effluents into open drains is high.	With the increased importance now given to IWT, primary canals would be conserved and improved. Sewerage and SWM projects being implemented would contribute to reducing pollution levels in the canal system. A comprehensive drainage plan could be prepared and implemented.	Flat terrain of the region make drainage planning difficult. Public awareness is critical. Maintenance of the system demand high level of coordinated management.	
Water bodies		Kochi has a good network of inland waterway system consisting of backwaters, canals and lagoons. The lakshdweep sea together with the inland water bodies can play a vital role in the socio-economic and	Canals are polluted - more than 200 mld of urban sewage directly enters the estuary - 260 mld of trade effluents reach the Periyar estuary from the industrial belt.	The ongoing sewerage and MSW projects and the proposed IWT developments would improve the situation.		

Environment		environmental aspects of the region.	culverts and bridges across the canals have been constructed with reduced water way		
			The vast water front has not been utilised as a public asset. Poor access to inland waterbodies and encroachment.	Waterfront if properly developed would improve the environmental, recreational and tourist facilities in the region.	
		General local environment quality is Good.	Extensive encroachment and illegal occupation and conversion of land and water space. Unscientific reclamation in many places is causing flooding.	If new areas are opened up for development, pressure on wet lands for conversion could be reduced. Better land use control, promotion of Mass Transport Systems, implementation of Sewerage and SWM systems, waterfront development and development of wetland parks could considerably improve the system.	The coastal line from Chellanam to Munambam is very sensitive to erosion.
			Kochi exhibits a comparatively low level of ambient air quality with respect to the presence of SO ₂ , NO ₂ , & SPM		Community participation is minimal in environmental conservation.
			Natural wetlands, which were supporting the local ecosystem, are retained only marginally.		Awareness creation and focused action on Environment improvement are essential.

Heritage and Tourism		Kochi can boast of rich Architectural, Natural and Cultural heritage. Mattancherry and Fort Kochi heritage areas exhibits great monuments, structures and settlements of outstanding heritage value. The Wellington Island has many heritage structures. Thrippunithura is rich in cultural heriatge. Mangalavanam, the backwaters and the mangroves add diversity to the rich natural heritage of the region.	Urban degeneration in Mattancherry and Fort Kochi area. Pulling down and unauthorized modification of valuable heritage structures and public spaces. Lack of development guidelines in heritage areas.	Importance being given to heritage tourism and the conservation projects being undertaken under JnNURM would facilitate conservation efforts.	Awareness creation, formulation of development guidelines, working out incentives for conservation and effective implementation of regulations are critical.
			Public spaces of intense use such as streets and markets are choked with traffic jams resulting unfriendly public areas.	Effective implementation of Environment protection Act and the Paddy land and Wetland conservation Act 2008 and the proposed Master Plan would help conserve the sensitive natural heritage areas.	
		Excellent regional linkages, educated people and reasonably good awareness level.	Mangalavanam is polluted by many industries and motor vehicles around. Absence of planning for the Natural Heritage and marine habitat.		

CHAPTER 3

DEVELOPMENT CONCEPTS AND DEVELOPMENT STRATEGIES

3.1 DEVELOPMENT CONCEPTS

3.1.1 CONCEPT OF DEVELOPMENT OF THE REGION

Kochi is the fastest growing region in the State. The influence of the developments in the city of Kochi and the immediate surroundings is experienced in a wider region around, extending even beyond the District boundary. Studies on the developments that have taken place in the above wider region around Kochi, during the last two decades, show that the influence region around the city (depending on the activities in the area which have immediate dependence on the city and the activities that directly affect the development of the city and the area around) extends up to the towns of North Parur and Kodungallur in the north, Angamali town (transcending the towns of Kalamassery and Aluva) in the north-east, Muvattupuzha town (including Kothamangalam town situated close to Muvattupuzha) in the east and Cherthala town, in Alappuzha district, in the south. Major towns around Kochi City are shown in Map .1

Map 1

The broad development concepts of the region around Kochi city are as follows:

1. Kochi city can be developed as a Global City, as a destination for investments from across the country and from abroad, exploiting its diversified development potentials in port related activities, industries, information technology, tourism, health care, trade etc. The planning area may become a Metropolitan City in the plan period, which may necessitate review of the Development Plan.
2. Planned efforts shall be adopted to address the requirements of the floating population in the city, which shall include reduction in the need for the commuting population to commute daily for work and services within the city region.
- Major urban centres in the district other than Kochi city shall be given impetus for development to arrest the influx of floating population to Kochi city and also to provide opportunities for the other towns in the region to develop.

Kochi city attracts a huge influx of floating population. This floating population converges to the city for availing of job opportunities, education and health facilities, trade and commerce and other higher order amenities/facilities (travel & recreational facilities etc.). This trend points to the need for stimulating the growth of 'second order' urban settlements around the city to provide the much needed facilities and better job opportunities. This may also partly reduce the stress due to the floating population on the infrastructure within the city.

- New transit oriented development corridors shall be opened up to stimulate growth of other growth centres, to attract more population and thus to reduce dependency to Kochi City
3. Unplanned urban sprawl which is being experienced in and around Kochi City needs to be arrested / regulated.
 - The urbanizing peripheral areas immediately surrounding Kochi City need to be developed giving thrust on their development potentials. The Planning area shall include Kochi City and these peripheral areas; and shall be planned as a single unit.
 - Separate strategy needs to be devised for the development of the area immediately outside this planning area.
4. Regional transport corridors should be strengthened and better mass transport facilities need to be promoted.

3.1.2 CONCEPT OF DEVELOPMENT OF THE PLANNING AREA (KOCHI CITY REGION)

1. Kochi City and the urbanizing peripheral areas shall be planned as a single unit for planning purposes exploiting the development potentials
 - Kochi City Region which is the planning area shall be developed to grow as a Global City. This may require attracting investments in very many higher order and new functions. Since it may be difficult to accommodate all such distinct functions within the city limits, the urbanizing peripheral areas of the city are also to be considered along with the city to meet these varied challenging requirements. This calls for planned development of the peripheral areas too.
 - Diversification of economic base in the Kochi City Region shall be encouraged. Port based activities, IT sector, tourism, industrial and commercial activities etc shall be promoted wherever there is potential.
 - The planning divisions shall be identified considering potential for development, physiography, contiguity and homogeneity and access to mass transit systems.
 - There shall be a varied approach in the development of the different planning divisions and new major job activities shall be permitted only on a selective basis.
2. The scope for densification of the city both in terms of population and activities shall be utilized to the optimum.
3. Integrated fast transit corridors shall be developed linking the major development centres (I.T., tourism, industries, trade) to support the 'global city'
4. Kochi shall exploit its vast potential for water front development. Quality urban spaces and landmarks shall be developed, especially in newly developing areas.
5. Promote Mass Transport and make Kochi a pedestrian friendly city and integrate different modes of transport viz. road, rail and IWT
6. Hierarchy of facilities and amenities shall be ensured in the planning area.
7. Activities of the informal sector shall be accommodated at specific designated areas within the planning areas

3.2 DEVELOPMENT STRATEGIES

The development concepts evolved for the region as well as for the planning area need to be translated to proposals through specific strategies to be devised. These strategies are intended to be tools to detail out and translate the concepts into proposals. The development strategies to be adopted are detailed below:

3.2.1 DEVELOPMENT STRATEGY FOR THE REGION

1. Developing Kochi as a Global City:

- Kochi city has a diversified economic base with thrust on Industries, Information Technology, Port related activities, Tourism, Trade etc. Studies on urbanization of the district reveal that Kochi city will continue to serve as the first order centre of the Region. Kochi has the potential to function as a Global City exploiting the diversified economic base together with the strategic location advantages. Diversified economic base is a positive factor which needs to be strengthened, for a City to function as a sustainable Global City. Thus Kochi City needs to be further developed offering facilities and services of international standards to meet the requirements of a Global City.
- The present Kochi City however is nearing a saturated situation in terms of development. Huge floating population, excessive traffic on roads, subsequent problems of congestion and pollution, inadequacy in water supply system and in the management of solid waste, lack of proper sewerage system, limited land availability for new developments, small land holdings and that too under private ownership, high land value, limited scope for urban renewal due to huge cost component etc. are some major indicators to uphold this view . Thus for further sustainable development of the city new development areas have to be considered.
- The urbanizing peripheral areas of the City comprising the Municipalities of Thripunithura and Kalamassery, and the Panchayats of Maradu, Thiruvankulam, Thrikakara, Vadavukode-Puthencruz, Cheranallore, Eloor, Varapuzha, Kadamakudy, Mulavukadu, Elamkunnappuzha, Njarackal, Kumbalam, Kumbalangy and Chellanam, have the potential to accommodate the multifarious functions of the City and have to be considered as constituent units of the Global City and as a single entity for planning purposes.

2. Development of other Major Urban Centres in the District:

- Kochi city, the first order urban centre in Ernakulam District, has a wide hinterland, spreading across the district to the neighbouring districts of Thrissur,

Alappuzha and Kottayam. The influence of Kochi on its hinterland is so huge that the floating population in the city is almost half of the population of the city, which is likely to exceed double the city population by the year 2031. This is putting severe stress on the existing infrastructure whereas up-gradation of urban facilities in the heavily built-up city is very expensive rather. In order to address this issue, second order urban centres have to be strengthened, promoting development of certain higher order facilities and supporting services therein, which would attract some of the floating population who depend on Kochi city. This alternative is expected to accommodate a good share of the future urban population in the region and at the same time would relieve Kochi city of congestion to a certain extent.

- The Towns of Angamaly, Perumbavoor, Parur, Aluva, Kodungallur, Moovattupuzha and Kothamangalam shall thus be strengthened as major second order urban centres. These centres are expected to accommodate, major facilities viz. Centres of Excellence, super specialty hospitals, non polluting hi-tech industries, major employment centres, tourist attractions and uses ancillary to these uses apart from other facilities expected of a second order centre. Growth of other major centres in the district shall also be given impetus for the balanced development of the region.
- All the above major urban centres possess distinct potentials for development which shall be identified separately while devising packages for inducing developments there.

3. Promoting transit oriented development:

- Developing new areas contiguous to Kochi city shall also take care of arresting the urban sprawl which the city experiences now. As part of arresting the urban sprawl and opening up new areas for development in the region, a new development corridor shall be promoted, with reduced dependency on Kochi city. The corridor connecting centres viz. Kodungallur, Angamaly, Perumbavoor, Kolenchery, Piravom, Thalayolaparambu, and Cherthala shall be developed as a transit oriented development corridor to accommodate major developments without stressing the available infrastructure in Kochi. This corridor shall be developed with higher focus on Angamaly in the north and Cherthala in the south followed by Kodungallur, Kolenchery, Piravom and Thalayolaparambu, providing facilities and support services for the growth of other smaller centres too in the corridor. Intense development shall be permitted around the transit centres along this corridor. The road linkage connecting the above centres would also function as a bypass to the Kochi Urban Agglomeration, in tune with the draft Kerala Road Development Policy, 2009; and shall be developed in such a way that MRTS could be introduced in this corridor at a later stage.

The Angamaly – Perumbavur- Kolenchery - Piravom corridor shall be developed in the first phase followed by the corridors of Cherthala - Thalayolaparambu and Thalayolaparambu - Piravom respectively. The east west linkages connecting Kochi city with the proposed development corridor shall be developed in accordance with the development of the corresponding Transit oriented corridor.

- The stretch linking Angamaly – Nedumbassery – Aluva – Kalamassery - Kochi - Tripunithura – Mulamthuruthy- Piravom shall also be promoted for transit oriented development to complement the development of the proposed Kodungallur-Angamaly- Cherthala corridor. Intense development shall be promoted along Angamaly -Thripunithra - Piravom corridor in the first phase to induce development along Kodungallur- Angamaly - Kolenchery - Piravom- Cherthala corridor, with the main focus on Angamaly.
- The above two transit corridors could be connected by a link road from Arookutty to Mulanthuruthy via Poothotta-Kanjiramattom ,across Perumbalam Island.
- To elevate the development potential of the region it is necessary to upgrade the quality of infrastructure in a planned manner

Higher order facilities may not be encouraged in the immediate outer periphery of Kochi City Region (Planning Area). Permission for any such facilities in these areas shall be given only after ensuring availability of adequate infrastructure and shall in no way affect the concept for development of Kochi City Region, envisaged in this Plan. Detailed planning of the entire wider region around Kochi city is not possible in this Development Plan for Kochi City Region. The development concepts of the wider region around Kochi shall be addressed in the Ernakulam District Development Plan.

4. Strategy for developing major centres:

While preparing development plans or any development package for these major second order centres viz. Angamaly, Perumbavoor, Parur , Aluva, Kodungallur, Moovattupuzha and Kothamangalam and other centres viz. Kolenchery, Piravom, Thalayolaparambu, Cherthala (town), Nedumbassery and Mulamthuruthy, the issue of promoting development through provision of facilities and supporting services, adequate connectivity to ensure smooth traffic and transportation etc need to be addressed. Strengthening of the linkages connecting these centres shall be taken up through the various agencies involved in implementation including the three tier Panchayats and state and central government departments.

5. Communication strategy:

Apart from incorporating suitable provisions in the development plans, for attracting investments, concerted effort, especially in the form of a communication strategy supported by pursuance, has to be put in place to get these proposals materialized. The implementation strategy of the development plan for Kochi city region shall also incorporate and detail out the communication strategy suitably for proper enforcement.

6. Strengthening regional linkages:

The regional transport corridors are overstressed due to the commuting traffic. These corridors mainly include the following viz. Chellanam –Fort Kochi road, Vypeen-Munambam road, National Highway-47 connecting Aroor and Angamaly, National Highway-17 connecting Edappally and Calicut, National Highway 49 connecting Kochi and Madurai via Muvattupuzha, Thripunithura – Vaikom road, Edappally –Perumbavoor road, Kochi - Munambam via GIDA Bridge, Palluruthy - Kumbalangy road etc. It is necessary to strengthen these corridors, augment the existing transport facilities and open out new transport facilities.

The planning concept is summarized in Map.2

Map.2

3.2.2 DEVELOPMENT STRATEGY FOR THE PLANNING AREA

1. Identification of planning divisions based on potentials for development of the planning area:

The planning area comprising Kochi City and the constituent units shall be treated as a single unit for planning purposes but with different planning divisions for formulating land use proposals and detailed zoning regulations.

The planning area thus identified shall be subjected to distinct planning interventions to enable them to exercise the desired function exploiting the potentials as summarized below:

Sl. No.	Constituent area	Specialized Development Potential
1	Fort Kochi and Mattanchery	Heritage and Tourism
2	Wellington Island	Port operations
3	Kochi Main land	Subject to provision of Infrastructure - Commerce, Institutional, Transport related, Recreation
4	Chellanam and Kumbalangi	Fishing, Tourism
5	Maradu, Kumbalam	Residential
6	Thrippunithura, Thiruvankulam	Residential, heritage
7	Vadavucodu-Puthen cruz	Industries
8	Kalamassery, Thrikkakara	Industries, Commerce, Transport related, IT, Institutional
9	Eloor	Industries, Transport related
10	Cheranallur, Varapuzha	Recreation, water front development
11	Elamkunnappuzha, Mulavukadu, Njarakkal, Kadamakkudy	Port related activities, Fishing related

Map 3 illustrates this strategy.

Map 3

2. Planning divisions need to comply with the following:

- The land use proposals and detailed zoning regulations for each of the planning division shall be formulated strictly within the framework of the concepts and development strategies for the planning area and also complying with those at the regional context.
- The planning area shall have all facilities and amenities that a major city should possess as per planning standards. The hierarchy of such facilities and amenities shall be well maintained in the planning area and while preparing proposals and zoning regulations for the planning divisions the detailing can be addressed.
- Planning area shall follow a poly nodal approach in planning and development with the concept of 'city within a city' which shall be addressed in the constituent planning divisions. Planning divisions shall be self contained units to the extent possible.
- The detailed proposals for the planning division comprising the Panchayats of Elamkunnappuzha, Njarackal, Mulavukad and Kadamakudy which are included within the jurisdiction of the Goshree Island Development Authority (GIDA) shall be formulated by GIDA within the framework of the concepts and strategies for the development of the planning area taken as a single entity and also complying with those at the regional context.

3. Densification of the present Kochi city:

The present Kochi city area shall be densified only subject to imposing strict conditions in respect of availability of adequate infrastructure. The city area itself has scope for densification in population and in activities. By partly relieving the city of the convergence of the district population for their immediate necessities and by relieving the resultant release of stress on city infrastructure, it should be possible to accommodate new developments in the city.

4. Traffic and Transportation:

- Prepare and operationalise an integrated multi-modal traffic and transportation plan comprising road, rail, water and air network and link areas of future development to this integrated transport network
- Constitute a Unified Transportation Management Authority (UTMA) in tune with the National Urban Transport Policy ,2006 to coordinate proper integration of different modes of transport such that mutual accessibility , timely availability of each mode in

a sequential manner, proper maintenance of the entire system etc are fully ensured under the control of a single agency.

- Promote mass transport system in the planning area:
 - Identify and improve road stretches along which mass transport has to be promoted in the planning area.
 - Encourage reliable and efficient multi modal mass transport system through provision of additional stations, park and ride facilities, introduction of multi-modal single ticketing system etc and utilise the potential of water bodies also in the integrated transport system. The coverage of mass transport facility in the city shall be enhanced.
 - As part of promoting mass transport system, along the narrow congested roads in the planning area the use of minibuses shall be adopted. Simultaneously pedestrianisation of internal roads and / or provision of pedestrian facilities shall also be promoted identifying such roads in a manner that mass transit corridors are accessible within walking distance. Use of personal vehicles shall be discouraged as well.
 - Provide exclusive lanes for mass transport and container movement where ever possible; and develop goods and passenger terminals with adequate infrastructure.
 - Fast corridors need to be developed linking the airport and the major potential job centres in the urbanising peripheral areas in Kochi city region integrating well with the road, rail and canal system.
 - Informal sector shall be promoted providing organized space for informal sector activities thereby relieving encroachment by street vendors on roads and foot paths. Separate strategy shall be devised to promote informal sector development in select areas
 - Suitable strategy for off street parking of vehicles shall be devised and parking facilities shall be developed at the planning division level. The feasibility of making available these facilities through PPP shall be explored
 - Optimal utilisation of the existing road network through short term traffic management measures including prohibition of on street parking in identified stretches, regulatory measures for controlling mixed traffic, traffic management plan for specific areas, and rationalization of bus routes and bus stop locations etc shall be tried under a proper evaluation and monitoring system

- The potential of water bodies and canals in the planning area shall be fully utilised for transportation of goods and people, both passengers and tourists.
- Effective linkages among various planning divisions shall be established
- Restricted direct access to main arterial roads shall be provided through service roads
- The grid iron pattern network of roads within the City shall be strengthened and maintained
- Sub urban rail network shall be developed utilising the existing rail network and also extending the coverage to unserved areas in the City Region.

5. Housing:

- Ensure effective housing and shelter options, focusing the poor, marginalised and disadvantaged in the planning area by creation of adequate housing stock on either rental or ownership basis and delivery of serviced land, through Public Private Partnership.
- Convergence of all development programmes for the poor shall also be ensured.
- Develop new housing areas around the transit stations proposed
- The planning area shall have designed density pattern in different planning divisions so that it would be possible to redensify the existing built up areas within. Such redensification may not be uniform within the planning area but may vary according to the nature of present development and proximity to mass transport corridor.
- Proposing higher density and high rise developments within a specified area shall be with due consideration for augmenting the capacity of infrastructure within that area
- Introduce systems for incentivising and disincentivising for densification
- Land being a limited and costly resource needs to be planned to provide for rationalised and optimum density use. Innovative planning techniques like land pooling schemes, transferable development rights, accommodation reservation etc could be tried.

- Augment supply of land for housing by opening up new areas of development and providing adequate infrastructure
- Evolve innovative approaches for Affordable housing for EWS/LIG , MIG and Public housing schemes for migrant labourers
- Slum Improvement Programmes for upgrading the services, amenities, hygiene and environment shall be taken up to make Kochi City Region a slum free one in a decade
- Improve coverage of public transport to areas of EWS/ LIG concentration.
- Ensure supply of affordable land through approaches such as reservation of specified amount of land in new developments for EWS/ LIG as envisaged in JnNURM reforms.
- Incentivise participation of private sector in affordable housing
- Promote availability of cheap building materials; skill development programmes to ensure supply of skilled workers in construction industry; improve access to finance.

6. Environment:

- Conserve, develop and manage the Natural Resources and the related environmental infrastructure and services in a manner that would lead to optimization of use of natural resources and reduction/abatement of pollution and also with a view to enhance their environmental value
- Develop and conserve open spaces, lung spaces, greens and landscape, recreational areas and heritage sites.
- Conserve the wetland system through comprehensive conservation plans and promote non-destructive use
- Enforce strict land use control in and around environmentally sensitive areas.
- Extent sewerage or a combination of sewerage and other sewage disposal systems to the whole of the planning area to reduce polluting of ground water and the wetland.
- Implement and maintain a comprehensive Solid Waste Management system for the whole of the planning area.

- Promote Mass transport and pedestrian movements. Facilitate reduction in the dependency on motorised vehicles especially personalised vehicles and Intermediate Public Transport to reduce traffic and pollution levels.
- Promote heavy industries in designated zones.
- Promote further intense developments in the core Corporation area only after ensuring adequate infrastructure.

7. Infrastructure:

a. Water Supply

- Explore the feasibility of supplying raw/ partly treated water for non potable purpose
- Explore the feasibility of recycling of treated wastewater with separate lines for potable water and recycled water
- Ensure rainwater harvesting in Public Buildings, ground water recharging through rain water harvesting, conserving water bodies and controlling groundwater extraction
- Achieve 24X 7 Water Supply in the Planning Area in a decade

b. Sewerage

- Extend the coverage of sewerage system or suitable alternate options in the Planning Area
- Awareness building on the need for the sewerage system in lieu of the existing septic tank system and the conservation of water bodies

c. Storm Water Drainage

- A comprehensive drainage plan to be prepared and implemented integrating the primary and secondary canals and the drains. Due consideration to be given to the conservation of wetland system.

d. Solid Waste Management

- Awareness creation; and Implementation of a comprehensive system of collection, transportation, treatment and disposal of solid waste

- Promote decentralised disposal options
- Integrate the SWM system with other infrastructure

8. Subject plans and detailing of framework proposals to facilitate implementation:

Detailed plans on identified priority subjects / areas and detailing of framework proposals indicated in the Development plan shall be prepared to come out with proposals for implementation. These shall include detailed road alignment plan in tune with the proposals envisaged in the Development Plan for Kochi City Region , comprehensive drainage plan for Kochi City Region, plan for conservation of wet land and paddy land, Plan for promoting IWT identifying canals for improvement such as desilting and deepening of canals ,water front development and development of organised green space, detailing of sub centres etc.