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A STUDY ON INLAND WATER TRANSPORTATION IN KOCHI CITY REGION

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Centre for Public Policy Research (CPPR) is a think-tank dedicated to intensive research on economic, social, and political issues. We study public policies with a dedicated, objective, and unbiased approach. We strive to initiate policy changes by publishing our research and framing policy debates and discussions on the issue. Our research areas include Governance, Education, Health, Law, Livelihood, and Urban Reforms. We have carried out research projects and policy papers for government bodies, private institutions, and academic; many of which have had a profound impact at the governance level.

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Thanks.

ABBREVIATIONS USED

NATPAC	National Transportation Planning and Research Centre
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
NUTP	National Urban Transport Policy
IWTP	Inland Water Transport Policy
UMTA	Urban Metropolitan Transport Policy
IWAI	Inland Waterways Authority of India
GCDA	Greater Cochin Development Authority
GIDA	Goshree Islands Development Authority
KSWTD	Kerala State Water Transport Department
KSINC	Kerala Shipping and Inland Navigation Corporation
CPT	Cochin Port Trust
CoC	Corporation of Cochin
KSRTC	Kerala State Road Transport Corporation
IWT	Inland Waterways Transportation
KCR	Koch City Region
DDP	Draft Development Plan
Ppha	persons per hectare
MMR	Mumbai Metropolitan Region
CMA	Chennai Metropolitan Area
CBD	Central Business District
ITES	Information Technology Enabled Services
IDP	Interim Development Plan
CDP	City Development Plan
PPP	Public-Private Partnership
BOT	Build-Operate-Transfer
TOD	Transit Oriented Design
MRTS	Mass Rapid Transit System
DTPS	Detailed Town planning Schemes
UMTC	Urban Metropolitan Transportation Committee

ABSTRACT

The following research work aims to highlight the problems ailing the water transportation sector in Kochi. It relies upon extensive review of secondary data, people's observations about the ferry system recorded through primary surveys, focus group discussions and perception studies to suggest feasible measures towards addressing those problems.

Aims and objectives

The study seeks to highlight the many hurdles faced by the very people for whom the water transportation system of Kochi is meant. It strives to achieve this through the accomplishment of the following objectives:

- To review existing studies and policies that have been conducted on Kochi and its surroundings with reference to water transportation in particular.
- To understand the roles and limitations of various agencies that operate in the domain of water transportation in Kochi.
- To seek and appreciate the concerns of the ordinary users of ferry transport and understand the role it plays in their life.
- To suggest possible solutions towards improving and thereby revitalizing the ferry transportation sector in the region.

The study ends with suggestions to make water-based travel more appealing to the average user of various modes of transportation in Kochi City Region.

Methodology

The study begins with setting the context of the city followed by review of planning initiatives in the region. This is done with the purpose of understanding how the water transportation sector has been perceived in the past and what direction has it been offered by planners. A review of the various policies concerning water transportation throws light on the incentives offered to the sector from the policymakers over the years and the possible voids due to which the sector has failed to take-off as expected. Stakeholders in the field of water transportation have been identified and their views have been recorded in order to understand the perceived failures of the state with respect to the sector. Their roles have

been outlined in detailed and issues have been brought forward as a result of this exercise. A major part of this study consisted of seeking public perception about the ferry service in Kochi. This was sought to be achieved through focus group discussion, interaction with passenger associations and primary survey with a hundred samples spread across various sectors on which the ferry services operate. The questionnaire for the primary survey was prepared with due diligence and after the preliminary questionnaire was put through several rounds of testing and pilot surveys. The inputs gathered from these were then used to bring in more objectivity and several questions were modified to suit the profile of the interviewees.

The final questionnaire had questions which enabled the collection of data regarding the age, income, occupation, origin, destination, last-mile travel modes, frequency of travel, problems, suggestions for improvement and willingness to pay for improved services among others (Refer Annexure-A). The sample size was set as one hundred and these were identified as a geographically spread sample based upon the recorded passenger traffic at various jetties (Refer Item no. 6, Annexure-B). Field-work was done in the months of May and June 2012 by the author. Detailed analysis of the results of this survey helped formulate suggestions for the various stakeholders in order to bring the water transportation sector back into the prominence it deserves in transportation realm of Kochi. This is the output of this academic exercise.

Limitations:

Due to constraints of time and manpower, the primary survey was done with a geographically-dispersed sample (Refer Item no. 6, Annexure-B) of one hundred only and is assumed to be representative of the general public opinion about the ferry system.

1. Introduction

The city of Kochi is located on the western coast of India in Ernakulam district of Kerala. It is bound by Thrissur on the north, Idukki on the east and Kottayam and Alappuzha to the south (Figure 1). It has historically been the ancient trade gateway to the hills of Kerala which were revered by the traders for the spices it produced. It is, by all accounts, the commercial and industrial capital of Kerala. Blessed with natural beauty and good climate, the city also boasts of good road, rail and air connectivity with other Indian metropolises such as Mumbai, Chennai and Bengalooru. The development of Kochi has been mainly on account of the political, administrative and commercial importance it has enjoyed over the centuries. The discovery of the ancient port of Muziris[1] has confirmed the importance of ancient Kochi as a major link on the maritime circuit for trade and business. There are many evidences of trade links between Kochi and China and ancient Rome in the form of Chinese fishing nets and seals found at several locations.

FIGURE 1: LOCATION OF KOCHI

The rulers of this region had their capital at Tripunithura and the present-day Ernakulam was a flooded basin. The port of Cochin was formed due to siltation accompanied by heavy floods in the fourteenth century as a result of which the trading activity shifted from the Muziris port to the new port. The earliest settlement around the new port occurred around Mattancherry. This was on account of there being a protected harbour for fishing and inland navigation. The rest of the Kochi region was well-connected to the port through water-bodies and transportation was predominantly water-borne. Industrious communities with a knack at business, including Jews and Gujaratis had made Mattancherry their home and contributed to the trade. By the sixteenth century, European traders had found their way to Kochi and established a Fort there. These included the Portuguese, Dutch and English colonial powers who established several schools, colleges and warehouses in Fort Kochi. There were numerous conflicts among the foreign powers on the subject of monopoly over the spices trade. Fort Kochi became a municipality in 1866 AD.

[1] near present-day Kodungallur

Ernakulam developed only in the nineteenth century on account of overcrowding in Fort Kochi and Mattancherry areas which were now municipalities. The arrival of the railways in 1905 AD enhanced the trade in the region. The present day Willingdon Island was formed as a result of the dredging of the sea channel in order to enable larger ships to enter the port from the industrial revolution driven European countries. This gave a further fillip to the status of Kochi as a major port city. Kochi Municipal Corporation was formed in 1967 by merging the municipalities of Fort Kochi, Mattancherry, Ernakulam and the Island.

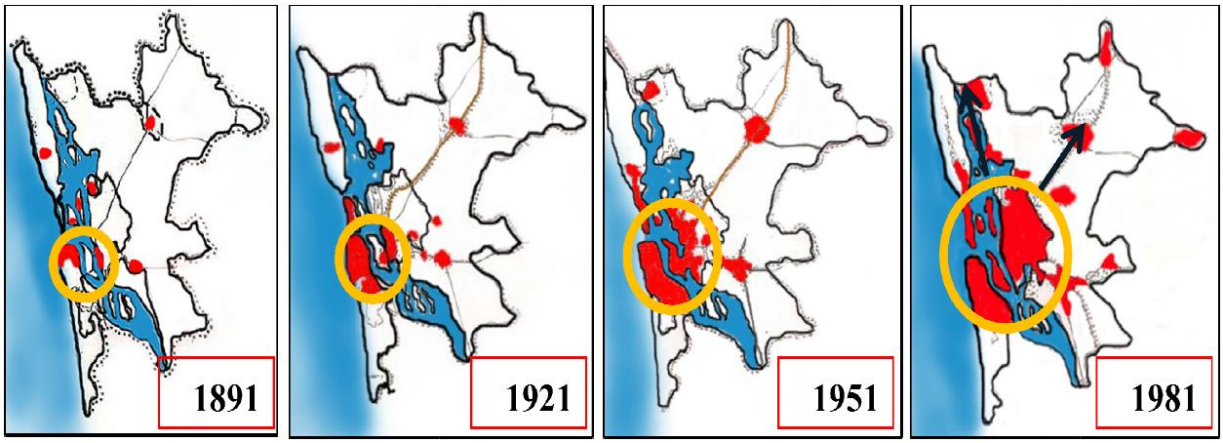


FIGURE 2: EVOLUTION OF KOCHI OVER TIME FROM A TRADING OUTPOST TO A MARKET CENTRE
Source: Prageeja K (2011) Alternative strategies for mass transportation; An Indigenous way

Kochi City Region (KCR) is a contiguous region of land consisting of the areas under the Corporation of Kochi and sixteen other local bodies, including five municipalities in the form of Tripunithura, Kalamassery, Maradu, Eloor and Thrikkakkara. The remaining units are panchayats and their individual areas, population and gross density are as listed in Table 1. The concept of KCR first found recognition in the *Draft Development Plan (DDP) for Kochi, 2031* although there was talk of formation of such a metropolitan area for planning purposes in the previous attempts at evolving a development plan for the city and its immediate surroundings. The DDP also mentions the formation of planning divisions within the KCR towards facilitating easier planning for these constituent areas. There are eleven such planning divisions formed out of the various panchayats and municipalities governing these areas. Besides, potential constituent areas to be integrated later into KCR were also identified and earmarked. The KCR occupies an area of only 369.72 square kilometres and accommodates a population of above one million with a gross density of around 31 persons per hectare (ppha) in the year 2001. This is comparatively low when compared to other metropolitan areas in India. For instance, the Mumbai Metropolitan Region (MMR) and Chennai Metropolitan Area (CMA) have gross densities of 56 and 62 ppha respectively. While the MMR extends over an area of 2588 square kilometres, CMA has an area of 1189 square kilometres.

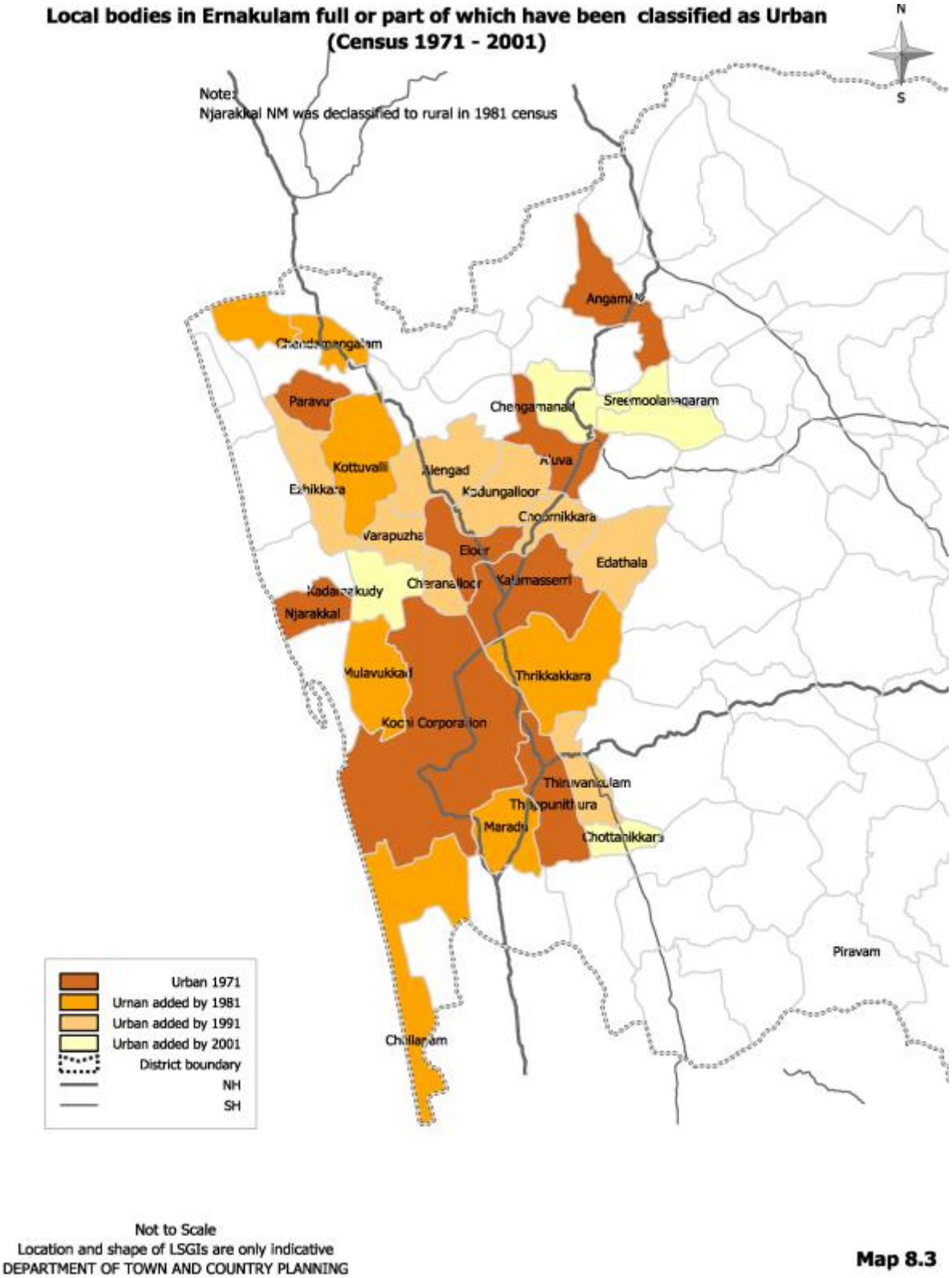


FIGURE 3: THE VARIOUS URBAN CENTRES IN KOCHI CITY REGION

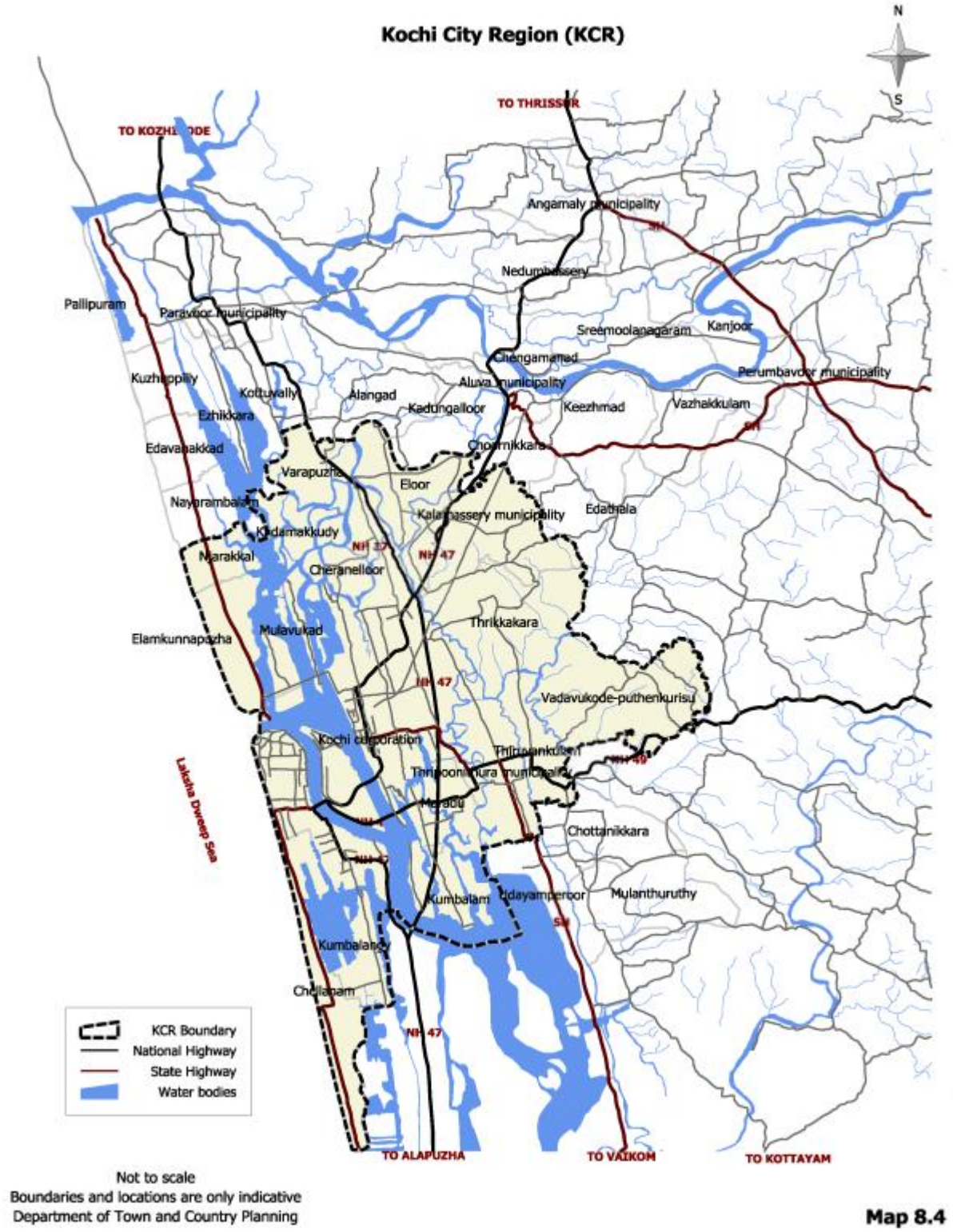


FIGURE 4: THE KOCHI CITY REGION AND ITS CONSTITUENTS

TABLE 1: POPULATION OF VARIOUS CONSTITUENTS OF KCR AS PER THE 2001 CENSUS

Sl. No.	Name Of Local Body	Area	Population (2001)	
		Area (Sq Km)	Population	Density (ppha)
1	Corporation Of Kochi	94.88	5,95,575	62.77
2	Tripunithura Municipality	18.69	59,884	32.04
3	Kalamassery Municipality	27.00	63,116	23.38
4	Maradu[2]	12.35	41,012	33.21
5	Thiruvankulam	10.49	21,717	20.70
6	Thrikkakkara[3]	27.46	65,984	24.03
7	Cheranelloor	10.59	26,316	24.85
8	Eloor[4]	14.21	35,573	25.03
9	Varapuzha	7.74	24,524	31.68
10	Kadamakkudy	12.92	15,824	12.25
11	Mulavukadu	19.27	22,842	11.85
12	Elamkunnapuzha	14.47	50,563	34.94
13	Njarackal	8.60	24,166	28.10
14	Kumbalam	20.79	27,549	13.25
15	Kumbalanghi	15.77	26,661	16.91
16	Chellanam	17.60	36,209	20.57
17	Vadavukode-Thenkurisu	36.89	26,710	7.24
	Total	369.72	11,64,225	31.49

Source: Census Of India, 2001

The population of KCR is not spread uniformly across the various constituent units, but is concentrated in few pockets. This is explainable on the basis of the availability of employment, schools and other social infrastructure. The Cochin Corporation area, a centre of urban and commercial activities, has the highest density of 63 ppha whereas the Vadavucode panchayat, an upcoming suburb, has the lowest density of 7 ppha. The municipalities of Tripunithura and Kalamassery, of largely industrial character, have densities of 32 and 23 ppha respectively, whereas the panchayat areas of Maradu and Elamkunnapuzha have above average densities of 33 and 35 ppha respectively (Table 1).

Another significant trend that comes to light is the mismatch between the areas and the population accommodated in the various constituent units (Figure 5). While the area under the Corporation is only around 25.2 percent of the total area under the KCR, it holds over 51.2 percent of the total population. A study in contrast is the case of Vadavucode-Puthenkurisu area which accounts for 10 percent of KCR but accommodates only 2.3 percent

[2] Maradu is no longer a Panchayat and has been a municipality since 2010.
[3] Thrikkakkara is no longer a Panchayat and has been a municipality since 2010.
[4] Eloor is no longer a Panchayat and has been a municipality since 2010.

of the population. Similar trends are seen in the cases of Thrikkakkara, Kadamakkudy, Mulavukadu and Kumbalam. This indicates the uneven nature of the spread of population across the KCR with more population concentrated in the economic centres of Kochi, Tripunithura, Thrikkakkara and Kalamassery. Another important factor that needs to be considered is the unique case of West Kochi that accommodates a large population but is short on land thanks to its unique geographical circumstances. West Kochi (also known as Fort Kochi) is where most of the poorer sections of KCR's urban areas live. They depend on the mainland mostly for their employment needs and make use of the ferry system and bus services to commute to the mainland in the morning and evening.

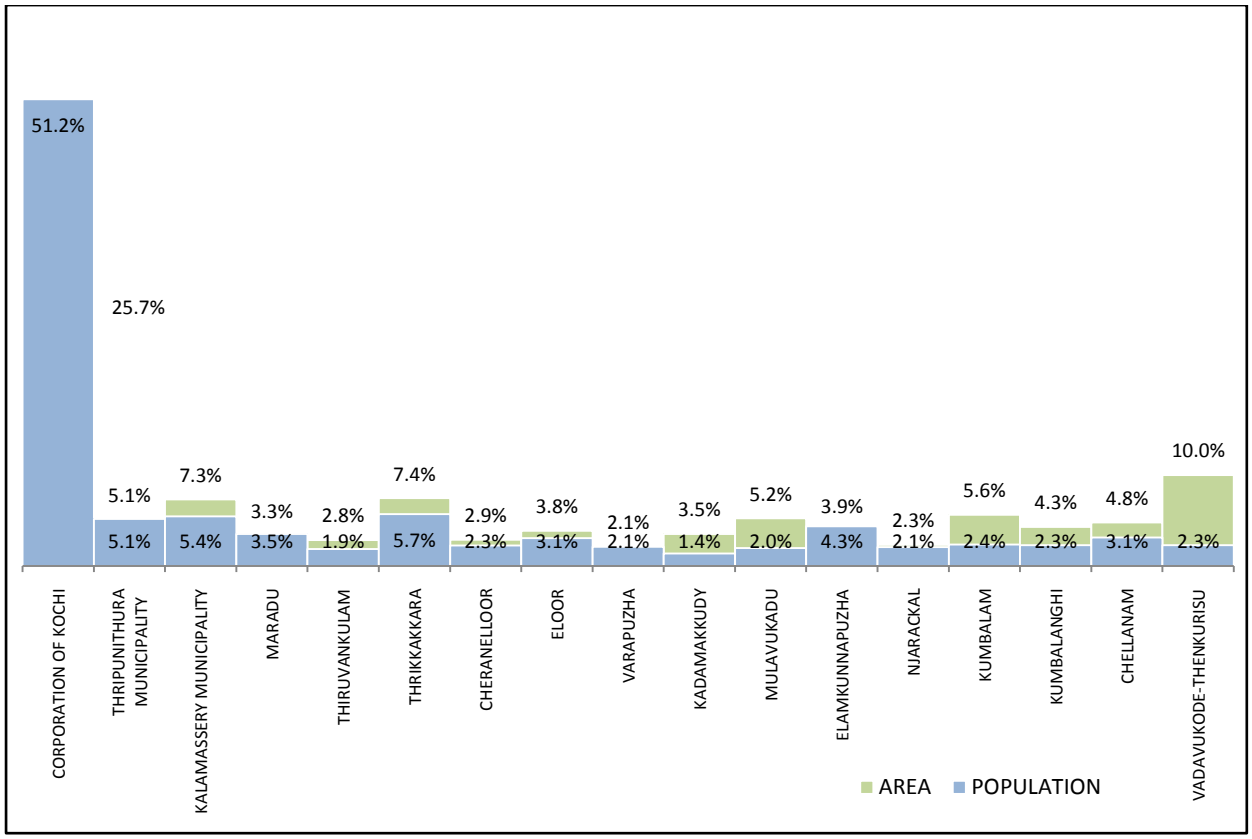


FIGURE 5: COMPARISON BETWEEN AREAS AND POPULATIONS OF VARIOUS CONSTITUENTS

There is immense pressure on the available infrastructure in the Central Business District (CBD) areas of KCR leading to signs of failure visible in the form of frequent traffic snarls and complaints of lack of solid-waste collection and management. There is thus ample scope for redistribution of population within the KCR by identification of new nodes and incentivising the setting up of employment garnering enterprises in such nodes. This would, however, make it imperative to put together basic infrastructure in such areas such as road connectivity and civic services to attract people away from the already clogged CBD.

2. Review of Planning Initiatives in Kochi City Region

After the formation of Kerala state several planning initiatives aimed at the developing hub of Kochi were pursued. These are as listed below:

- Interim Development Plan for Kochi (1966-81)
- Development Plan for Cochin Region (1976-91)
- Structure Plan for Central City, Kochi (1991-01)
- City Development Plan for Kochi, 2006
- The Draft Development Plan for Kochi City Region, (2011-31)

While the interim development plan of 1966 resulted in the institution of the Town and Country Planning (T&CP) department, it did not have much to offer on the water transportation sector. The Development Plan for Cochin region of 1976 adopted a more transit-oriented way of looking at the region for planning purposes and constituted the Greater Cochin Development Authority (GCDA). It also recognized the immense potential for water-based transport in Kochi. The Structure Plan of 1991 resulted out of the realization that the city had not grown as anticipated in the earlier plans and sought to accelerate the development of transportation based infrastructure. It had specific references to water transportation by way of recommendations to develop traffic terminals, boat jetties and inter-change points between various modes. The City Development Plan (CDP) was prepared as per the requirements of the JNNURM which had a vision period of 2006-12. It recommended emphasis on water front development planning including rehabilitation of encroachers on the public land, beautification of specific water front areas directly or on Public Private Partnership (PPP) basis, water-based recreational facility creation and enhancement of the use of waterways for tourism and inland navigation.

The Draft Development Plan for KCR, 2011-31, talks of developing Kochi as a major hub for economic and industrial activity on the lines of a 'global city'. It recognized that Kochi city had grown in a manner least anticipated in the previous decades and as a result there is immense pressure on the infrastructure. Strengths and weaknesses of the city were weighed in the light of the opportunities and threats that the city present and thereby a detailed concept for the city was worked out. The objectives of the Development Plan are listed as follows:

- Kochi City and the urbanizing peripheral areas shall be planned as a single unit for planning purposes exploiting the development potentials.
- The scope for densification of the city both in terms of population and activities shall be utilized to the optimum.
- Integrated fast transit corridors shall be developed linking the major development centres to support the 'global city'
- Kochi shall exploit its vast potential for water front development. Quality urban spaces and landmarks shall be developed, especially in newly developing areas.
- Promote Mass Transport and make Kochi a pedestrian friendly city and integrate different modes of transport viz. road, rail and IWT.
- Hierarchy of facilities and amenities shall be ensured in the planning area.
- Activities of the informal sector shall be accommodated at specific designated areas within the planning areas.

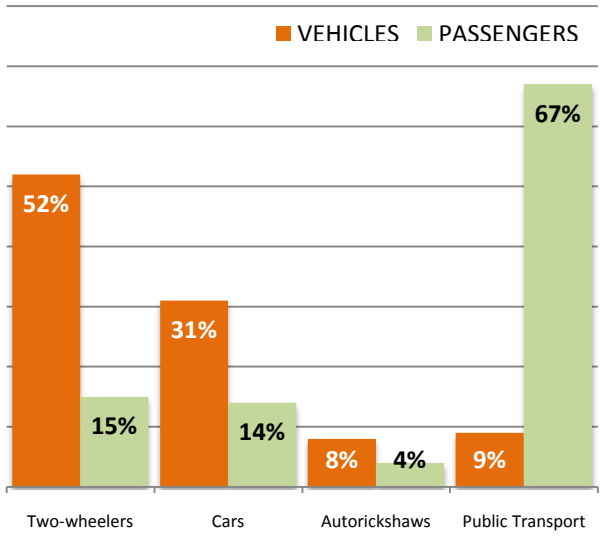
To achieve these objectives, the following set of strategies were proposed:

- To develop Kochi as a global city by building on its diversified economic base and by accommodating the burgeoning population in the nearby village and upcoming urban areas just outside the central area.
- Development of major urban centres in the hinterland of Kochi city within Ernakulam district by using the distinct individual potential of each of these upcoming centres that are in the influence area of Kochi city.
- Promoting Transit Oriented Development (TOD) by identifying corridors feasible for the introduction of Mass Rapid Transit Systems (MRTS) in the future.
- Strengthening regional connectivity by integrating the surrounding towns to the city by means of road and rail connectivity and through the efficient use of waterway linkages.

As can be seen, the earliest planning initiatives had, at best, only a passing mention to the concept of utilization of the water-sheet available in plenty in Kochi to advantage. It is only in the DDP 2011-31, that serious thought is given towards the utilization of the water-bodies for solving Kochi's transportation woes. However, even there, one can't find any consideration given to the problems faced by the lakhs of commuters who depend on the water transportation network for their daily needs. Besides, there is no roadmap available for improving the services and bringing it back to the prominence it enjoyed historically.

3. Transportation in Kochi City

The Traffic and Transportation System for Cochin City, 2008 study conducted by the NATPAC, Thiruvananthapuram indicates that in the base year around 1.49 lakh inter-city passenger trips were conducted in Kochi. The modal split as shown in figure 6 indicates that Kochi is greatly dependent on public transportation for its mobility needs with over sixty-seven percent passengers opting for public transport which accounts for only nine percent vehicles on the roads. There is thus a great importance of public transport including buses and ferries in the transportation sector of the city. There is however no mass transportation system in Kochi city at present. The lack of a suburban rail system despite the presence of a feasible North-South alignment of urban nodes is crippling the city's road network with unmanageable numbers of vehicles. There is a metro-system in the pipeline. However its success will greatly depend on its ability to draw the average commuter who may be put off due to lack of last mile connectivity and pricing issues.



Source: NATPAC-Traffic and Transportation System for Cochin City, 2008

FIGURE 6: MODAL SPLIT OF VEHICLES AND PASSENGERS IN KOCHI CITY

An analysis of the present and proposed transportation corridors against the settlement densities is presented below (Figure 7). There are at least seven major railway stations within the KCR including Kalamassery, Edappally, Ernakulam Town (ERN), Ernakulam Junction (ERS), Tripunithura, Ernakulam Goods (ERG) and Cochin Harbour Terminus (CHTS). Similarly several new stations have been proposed on the proposed Metro rail project as well (Refer Figure 7). From the analysis, it becomes evident that the present corridors are not aligned to the prevailing population densities in various divisions of the KCR. While the central Ernakulam region is catered to by the rail network and the proposed metro rail project, other high density areas such as Elamkunnapuzha, Fort Kochi and Mattancherry have not been considered in the catchment areas of these corridors at all. Therefore, the people of these regions have to depend on other modes such as private vehicles, buses and ferries to reach the employment centres of Ernakulam. It is a point to be pondered on that despite the availability of vast rail network within the city, there are no suburban services.

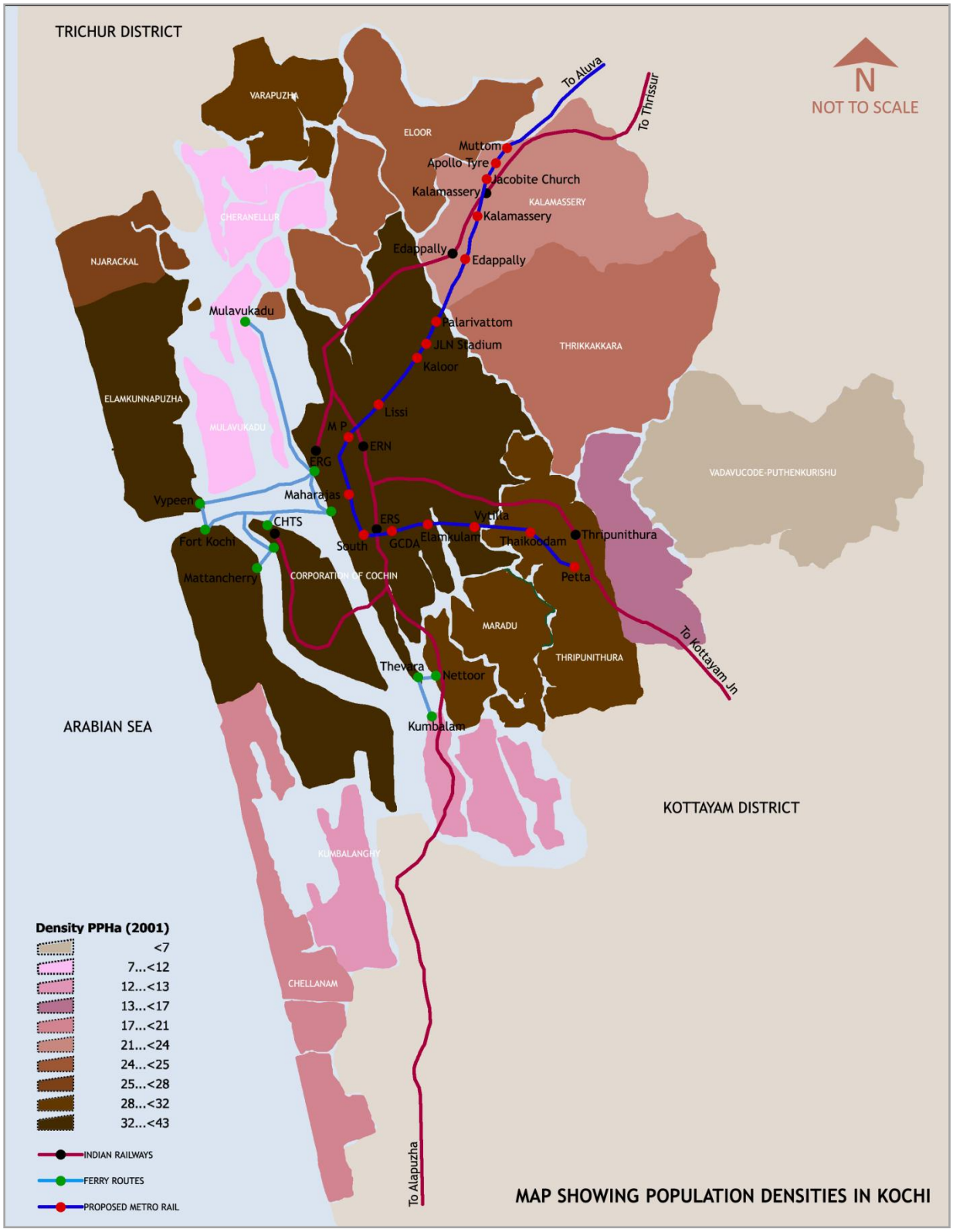


FIGURE 7: POPULATION DENSITIES MAPPED AGAINST TRANSPORTATION CORRIDORS

The suburban services could have greatly reduced the dependence of Kochi on its congested roads for mobility. Besides, there seems to be a lack of inter-modal transit points in the existing and proposed network with passengers having to depend on autorickshaws if they were to catch a metro after having arrived at a point using the railways or bus services. Planning for the mobility needs of the western parts of KCR, somehow, seems to have escaped the attention of the city's planners. This gap can be taken care of by the ferry system, if the city were to invest faith in its most natural mode of transport.

According to the Private Bus Owners Association (PBOA), there are around 630 intra-city buses operating on 160 routes. In addition there are 2,300 inter-city buses and 466 state buses, There are two bus terminals within the city. The bus station for private buses is at Kaloor on the Banerjee road and for state-run buses, there is a bus station near Ambedkar stadium off Rajaji road. As a result there is great congestion on these arterial roads at all times of the day. The recent addition of the mobility hub located off the National Highway 47 (NH-47) at Vytilla is aimed at relieving the city centre of some of the inter-city buses that need not touch the city. Inspite of this, congestion on Kochi's roads remains a major issue since the carriageway on most roads is not wide enough to take the ever-increasing load of private vehicles coming into the city. A high number of floating population that comes to the city from surrounding districts everyday adds to the traffic. Facilities are largely absent for the pedestrians with high levels of pedestrian-vehicle conflict on most roads and ever-increasing tolls of accidents. Despite the presence of a natural waterway, benefits have not been well exploited with the share of ferry transportation being only around one percent and which continues to decline.

3.1. Water transportation in Kochi

As in the whole state of Kerala, Kochi is abundantly blessed with waterways with over 1,100 kms of waterways available. However, only forty kilometres out of these are considered navigable for motor boats since, according to the Inland Waterways Authority of India (IWAI) regulations a minimum depth of 2m is mandatory for their operations. As in the case of the road network, the waterways in Kochi also have a predominantly grid iron pattern. Proper maintenance of these waterways could help develop a majority of the available areas into waterway-accessible areas and thus develop an alternative mass rapid transit system for the city, thereby taking some load off the already congested roads.

FIGURE 8: KSWTD FERRY SERVICE ROUTES CURRENTLY IN OPERATION IN KOCHI CITY REGION

The reasons for the decline of water transportation are many. The commissioning of bridges, most notably the Goshree bridges that opened in the 2000s has led to people choosing road-based transportation modes over water transportation. There seems to be a preference among the citizens for door to door connectivity in this area where rains are a constant possibility. The levels of service delivery in the ferry system have failed to keep up with the expectations of the general public. Some of these reasons have found credence in the primary survey conducted as part of this study. As of 2012, only 59 services are operated by the Kerala State Water Transport Department (KSWTD) from Ernakulam to Fort Kochi, Vypeen, Mattancherry and Mulavukadu. This figure was as high as 166 in 2005 (Table 2). More services appear to be on their way out according to the general perception among the public.

TABLE 2: NUMBER OF TRIPS OPERATED FROM THE JETTIES BY STATE OPERATORS

		Trips in 2005	Trips in 2010	Trips in 2012
High Court Jetty	Varapuzha	15	0	0
	Mulavukadu	22	0	6
	Bolghaty	31	0	0
	Fort Kochi	21	48	0
Ernakulam Jetty	Mattancherry	49	25	53
	Mulavukadu	2	9	
	Vypeen	26	17	
Total		166	99	59

Source: KSWTD, Prageeja K (2011) Alternative strategies for mass transportation; An Indigenous way

Apart from the KSWTD, the other significant player in the field of water transportation in Kochi was Kerala State Inland Navigation Corporation (KSINC) which has withdrawn its services from the passenger transportation sector and concentrates exclusively on cargo, ship fuelling and drinking water supply to remote islands. The cargo operations of KSINC have also started dropping as is evident from the data shown in table 3. The reasons being attributed to this are the emergence of competing private operators, commissioning of bridges and operational losses suffered by the company.

TABLE 3: CARGO OPERATIONS OF KSINC

Year	No. of trips	Cargo carried (in MT)
2004-2005	11	8,78,548
2005-2006	11	7,43,145
2006-2007	11	5,92,137
2007-2008	11	5,18,627
2008-2009	11	4,97,526

Source: KSINC Annual Reports

3.2. The Writing on the Wall

The statistics from tables 2 & 3 prove that the number of passenger and cargo services have declined significantly. The constant addition of new road connectivity through bridges to the islands of Mulavukadu, Vallarpadom and Vypeen has further endangered the existence of the water transportation sector, despite the inherent advantages of water transportation over road transport.

4. Policy Review

Of all the policies in force regarding water transportation in Kerala, the two important policies are:

- The Inland Water Transport Policy, 2001
- The National Urban transport policy, 2006.

4.1. The Inland Water Transport Policy

The Inland Water Transport Policy (IWTP), 2001 was prepared by the Union government with the core objective of developing the inland waterway transportation sector into an attractive alternative for road transportation wherever possible. It encouraged the bringing in of private participation into the realm of infrastructure provision and maintenance with significant contributions from the government reduced to around 40 percent in Build-Operate-Transfer (BOT) projects.

- The Inland Waterways Authority of India (IWAI) incorporated as a result of the 1985 IWAI act was permitted to raise bonds to raise money in order to fund its projects.
- The IWAI was also permitted to enter into joint ventures with interested private entities in order to take up infrastructure development projects in the inland water transportation sector. The government would limit its exposure to equity funding and would not involve itself in raising debt sources to finance the project and it would fall under the private entity's scope. Additional subsidies or grants from the government would also not be entertained.
- In case of BOT projects the maximum ceiling fixed for the government's participation shall stand and such projects shall be developed in consultation with the Planning Commission.

- Having granted the status of infrastructure to Inland Waterways, 100 percent tax exemption, as in the case of National Highways, shall be accorded for fixed period of time to the agencies involved.
- Section 14 of the IWAI act empowers the authority to set up infrastructure for this purpose. Section 17 of the Act permits the authority to levy fees and user charges at rates fixed in consultation with the Central Government.

The IWTP, therefore, lays down the roadmap for proceeding with projects concerning inland water transportation of goods and people. It recognizes that the government by itself is incapable of providing all the infrastructure required for giving IWT a push. Therefore, it encourages private sector participation in the sector for infrastructure provision, which is keeping in line how other infrastructure is being perceived in the country by policymakers.

4.2. The National Urban Transport Policy

The National Urban Transport Policy (NUTP), 2006 was prepared by the Union government with the intention of guiding the development of sustainable urban transportation systems in the country. This was in response to the realization that our cities are ill-equipped to meet the mobility-needs of the burgeoning urban and immigrant population. The vision statement of the NUTP recognized the fact that the people occupy centre-stage in cities and aimed at transforming our cities into engines of economic growth. It aims at helping our cities evolve into an urban form that is best suited to their unique geography. The objectives of the NUTP are to ensure safe, affordable, quick, comfortable, reliable and sustainable access to jobs, education, recreation and such other needs within our cities by:

- Incorporating urban transportation as an important parameter at the urban planning stage.
- Encouraging integrated landuse and transportation.
- Improving access of business to markets and factors of production.
- Encouraging greater use of public transport and Non-motorized Transport (NMT).
- Encouraging focus on multi-modal public transport systems with seamless travel across modes.
- Establishing effective regulatory mechanisms for management of transport systems.

It advocated the achievement of its objectives through the following measures:

- Integrating landuse and transportation: This would help channel the city's growth along pre-identified channels, thereby controlling the urban sprawl.
- Encouraging public transport: This would help control the congestion on city roads and also bring down pollution levels. Here, the policy stretched on developing sustainable mass transportation systems with government participation including the use of available waterways. Comprehensive city mobility plans would be encouraged and private transportation would be discouraged. Regulatory authorities shall be set up to control pricing and quality.
- Adopting suitable technologies: It was understood that no one solution would fit the needs of all cities uniformly. Therefore, each city was to identify the solution that would suit it most on basis of its character and needs. Cities like Kochi, which have an abundance of waterways could explore the possibility of a waterway-based transport system. Several modes of transport may co-exist in a city and be woven together to form an multi-modal transportation system. There shall be seamless integration between these various modes.
- Financing the projects: The projects shall be financed through public-private participation with the government pitching in to fill the viability gap alone. Once the system is put in place, the users themselves will have to bear the operational and maintenance expenditure. Funds shall be raised through development charges and dedicated taxes. Realizing the commercial value of locked-in land shall be encouraged.
- Administration of such projects shall be managed by the setting up of Urban Metropolitan Transportation Agencies (UMTA).
- Parking areas shall be encouraged and on-street parking slots shall be at a premium.
- Freight traffic shall be routed through the exterior regions of the cities through by-passes.

The NUTP, therefore, strongly advocates the development and use of indigenous and sustainable modes of transport such as the ferry system since they would help in reducing the dependence of the public on the already clogged roads, besides being low on expenditure relating to setting-up and maintenance. It also propagates the adoption of technologies that are best suited to the city's geographical traits. In the case of KCR, where a large part of the city has easier access to a waterway than a road or a rail-link, it would be natural to encourage a water-based transportations system over any other mode. Therefore, water-based transportation options should be explored in Kochi’s context.

5. Stakeholders in Inland Water Transportation in Kochi City Region

There are several government and non-government agencies that have a stake in the operation of waterway transportation in Kochi. Coordination among these agencies is, therefore, a major requirement for the smooth functioning of this sector.

TABLE 4: STAKEHOLDERS IN IWT IN KOCHI CITY REGION

Agency	Centre/State/Local	Functions
IWAI[5]	Centre	• carry out surveys and investigations for the development, maintenance of the national waterways and the appurtenant land. • setting up of infrastructural facilities for national waterways. • provide for the regulation of navigation and traffic. • regulate the construction or alteration of structures on national waterways. • ensure co-ordination of IWT on national waterways with other modes of transport. • establish and maintain pilotage on national waterways.
GCDA[6]	Regional	• guiding the development in Greater Cochin region. • preparation of structural plan for Cochin and vision documents for the region. • identifying projects in order to attract development in certain parts of the region. • to maintain and collect rent from its shopping complexes at various locations.
GIDA[7]	Regional	• to guide the development in the Goshree group of islands. • to help bridge the gap between the islands and the mainland, in terms of infrastructure.
KSWTD[8]	State	• operates passenger services on majority of routes. • takes care of ticketing and maintenance of its vessels.

[5] Inland Waterways Authority of India
[6] Greater Cochin Development Authority
[7] Goshree Islands Development Authority
[8] Kerala State Water Transport Department

KSINC[9]	State	• once operated both cargo and passenger services. • has now backed away from passenger services, citing continuous operational losses. • supplies Goshree islands with drinking water on its barges. • operates cargo services for FACT industries.
CPT[10]	Regional	• takes care of licensing and administrative issues in the Willingdon Port channel. • is responsible for dredging and other maintenance in these stretches.
DoI, GoK[11]	State	• takes care of dredging and desilting at the individual jetties. • is also responsible for maintenance of navigation channels that don't come under the National Waterway 3.
CoC[12]	Local	• issues permits for ferry services in its jurisdiction through competitive bidding process. • keeps a tab on the fares being collected from passengers on leased routes. • is responsible for the maintenance of artificial canals that could be used in future to help spread the waterway network.
Passengers Association	Local	• bring to public attention the issues suffered by the passengers. • seek to build pressure on the authorities to get grievances heard and acted upon.

5.1. The Inland Waterways Authority of India

The Inland Waterways Authority of India (IWAI) is the statutory agency in charge of the waterways in the country. It was constituted as per the Inland Waterways Authority of India Act of 1985. After the setting-up of this authority important stretches of waterways were accorded the status of national waterways, with an eye on providing much needed impetus to their development and thereby the water transportation sector. These are:

[9] Kerala Shipping and Inland Navigation Corporation
[10] Cochin Port Trust
[11] Department of Irrigation, Government of Kerala
[12] Corporation of Cochin

- NW-1: Ganga-Bhagirathi-Hooghly River System
- NW-2: River Brahmaputra
- NW-3: West-coast Canal along with Champakkara and Udyogmandal Canals (Figure 9)
- NW-4: Kakinada-Puducherry Canal System integrated with Rivers Godavari and Krishna
- NW-5: East Coast Canal integrated with River Brahmani and Mahanadi delta rivers
- Proposed NW-6: Bhanga to Lakhipur in Assam.

A large portion of the waterways in KCR fall under the National Waterway-3 and therefore come under the purview of the IWAI. According to Mr. N Sivaraman, Regional Director IWAI, Kochi Region, much of IWAI's work in Kerala relates to maintaining the required minimum draft of 2m in the channels that are part of NW-3. IWAI also facilitates cargo movement on the water channels from Alappuzha to Cochin Port at Willingdon Island. The authority has acquired and maintained dredge-boats specifically for the purpose of maintenance of the water channels. However, the port channel near the Cochin Shipyard and the Willingdon Island are not within its scope since they are administered directly by the Ministry of Shipping, Government of India. The IWAI has provided for twenty-four hour navigation through the channels by the provision of navigational aids such as buoys, clearly marking the navigable stretches for safe operation of vessels. Besides IWAI also publishes navigational charts and river atlases to help the vessel operators. The NW-3 is faced with the problem lack of linkage in the Alappuzha-Kollam sector and is therefore limited from Kottapuram to Alappuzha due to connectivity issues. The land acquisition process between Alappuzha and Kayankulam for completion of the NW-3 is stuck due to the non-cooperation from the local populace and their representatives. Once the process of acquisition and dredging to the minimum requirement of 2m is completed, cashew and coir from Kollam can also be transported to the major port of Kochi.

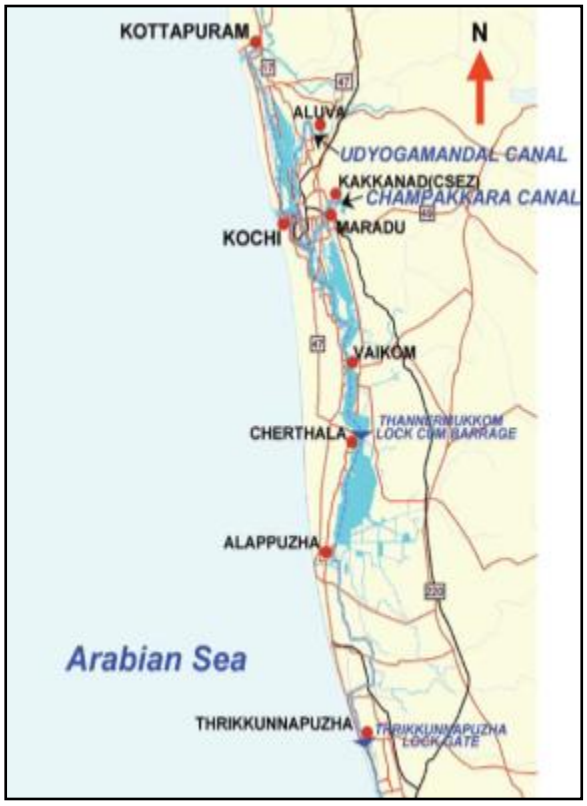


FIGURE 9: NATIONAL WATERWAY-3

5.2. Greater Cochin Development Authority

Greater Cochin Development Authority (GCDA) was formed according to the provisions of the Madras Town Planning Act, 1920 and Travancore Town Planning Act, 1932 to plan for Cochin. Its mandate was to oversee and guide the development of Cochin and its surrounding areas. GCDA has its jurisdiction spread from areas under the Municipal Corporation of Cochin, surrounding municipalities of Tripunithura, Thrikkakkara, Aluva, Kalamassery, Maradu, Eloor, North Paravur, Angamaly and Perumbavoor and twenty-five intervening panchayats. The total area under GCDA adds up to 632 square kilometres.

The GCDA had through its Structural Plan for Cochin, 2001 proposed the integration of the waterways into the comprehensive transportation network of the city. It had also proposed the establishing of boat jetties at several prominent locations to facilitate the same. Other proposals included improvement of junctions, creation of grade separated foot paths and cycle lanes, allocation of parking space, two central bus stations (one for KSRTC and another for all the private buses to be located close to each other), city service stations, transit stations at interchanges road, rail and water ways wherever they are integrated, truck terminals and proposals for improvement of inland water ways and renovation of canal system.

However, in the event of the implementation of the 73rd and 74th amendments of the constitution aimed at decentralization and empowerment of the planning functions of the urban local bodies, many of the powers of the GCDA, which were not well-defined in the first place have been taken away from the authority and given to the Corporation. It is another matter that these local bodies have no manpower or skill-base to undertake large-scale activities such as preparation of development plans and are therefore dependent on external agencies who are hired as consultants. As a result, a body which could have positively taken up more initiative in the field of water transportation is taken out of the picture altogether. The present debate on the role of GCDA in the larger context of planning of KCR is unclear and the authority has been relegated to an agency that prepares vision documents and tries to stay afloat by collecting rents on its properties and implementing small projects such as canal bridges and maintenance of its properties. It would be in the best interests of the city that the authority be strengthened through legislation and upgraded to the role of a Metropolitan Planning Committee (MPC).

5.3. Goshree Islands Development Authority

The Goshree Islands Development Authority was carved out of the GCDA in 1994 for the planning of Goshree islands including Vypeen, Vallarpadom, Mulavukadu-Bolghaty, Thannonithuruthu and several other small islands. The major achievement of this authority has been the commissioning of the Goshree bridges that provided much needed road connectivity from the mainland to the Goshree islands. It has also implemented small projects towards the beautification of the bay areas of Vypeen with the provision of paved walkways. There are plans to develop a coastal ring road in the Vypeen island. The authority also has plans to start a ferry service connecting these islands. However, these plans are still at a nascent stage.

5.4. Kerala State Water Transport Department

FIGURE 10: STEEL BOATS BEING OPERATED BY KSWTD

The Kerala State Water Transport Department operates passenger boats from jetties in Ernakulam to Vypeen, Fort Kochi, Mulavukadu, Willingdon Island and Mattancherry. Around fifty-nine services are operated daily from the Ernakulam jetty. Most of the boats being operated are steel boats manufactured from a private boat building company in Kannur. A few services are also operated using old wooden boats. The steel boats have a seating capacity of one hundred only. According to the KSWTD staff, more than one and half times that number jostle for space on the boat during peak hours. Each boat requires at least five staff for operations. This team of five is made up of one srank at the steering wheel, one man at the gearbox and three more to help the boat land at the jetty and allow the passengers to get on and off the boat. The average monthly collection from the operation of the boat services has been around a steady 8 lakh rupees for the past five years according to the KSWTD regional office functioning at the Ernakulam boat jetty. However, the operational costs have gone up due to increase in fuel costs and administrative costs. As a result the department has been incurring losses and continues to operate as a government service for the people with state subsidies to the tune of crores per year. The department has not yet been able to monetise the advantages of owning a prime piece of

land in the heart of Ernakulam's CBD where its regional office is located. The Superintendent of the department, Mr. Joseph Xavier indicated that several proposals had been sent to the government for construction of a multi-modal hub and shopping complex in order to help bridge the losses incurred by the department towards operating the loss-making boat services.

5.5. Kerala Shipping and Inland Navigation Corporation

The Kerala Shipping and Inland Navigation Corporation (KSINC) was formed by merging Kerala Inland Navigation Corporation (KINCO) and Kerala Shipping Corporation (KSC) in 1974. Their objectives are:

- to establish, maintain and operate shipping services and to purchase, charter, hire, build ships, tankers and other vessels.
- to establish, maintain and operate transportation services for the transport of goods and passengers in inland water in the state of Kerala or elsewhere.
- to run, organise, conduct and manage in the state of Kerala or elsewhere workshops, repair shops, service stations for repair and maintenance of marine vessels.
- to establish, provide, maintain and conduct research and training institutions and lab centres.

Accordingly, they are involved in the transportation of bulk raw materials, petroleum products and water cargo through inland waters. They were also involved in the docking and repair of marine vessels besides construction of steel and wooden crafts. Till recently, KSINC also operated passenger ferry services in KCR and was a competitor to KSWTD operated boats. However, mounting losses prompted KSINC to withdraw from the sector and the fibre-boats were transferred on government orders to KSWTD which failed to use their services citing safety concerns. Currently, KSINC also operates cruise ferries for tourists and is in talks with Kerala Tourism Development Corporation (KTDC) to launch more packages. It is also associated with the Muziris heritage tourism project.

FIGURE 11: KSINC JETTY AT HIGH COURT JUNCTION

5.6. Cochin Port Trust

Since a major portion of the water sheet near the Ernakulam boat jetty falls under the purview of the Cochin Port, a major port under the aegis of the Ministry of Shipping, Government of India, clearances have to be obtained from the Cochin Port Trust (CPT) for operation of passenger or tourist boat services in this area. Apart from the registration of the boats with the motor vehicles department, boats have also to be listed with the CPT before operating in this stretch.

5.7. Department of Irrigation, Government of Kerala

The Department has the responsibility of maintenance of all the water channels that do not come under the purview of IWAI. Desilting and dredging of the channels and maintaining a steady minimum depth of 2m is the responsibility of the irrigation department. They play a major role in ensuring that all jetties are usable throughout the year. With the low tides, it often becomes difficult for the boats to be brought near the jetty especially in places like Mattancherry, Thevara, Mulavukadu, Nettoor and Kumbalam. This is due to the steady deposition of silt at such locations. Dredging is required at least once in six months.

5.8. Municipal Corporation of Cochin

The Corporation of Cochin (CoC) has interests in operation of ferry services from Fort Kochi and Vypeen to Ernakulam as a significant area of these locations comes under its purview. In stretches such as Vypeen-Fort Kochi the CoC gives licenses to private operators to operate Jungar and boat services. With frequent requests coming from the public, the CoC also had plans to launch its own boat service on several sectors. However, owing to lack of funds and the fact that the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) does not provide for water transportation projects, such ideas were put on a backburner. The opportunity to participate in a future enterprise in this sector still stands for the Corporation.

5.9. Passengers Association

There are several passenger associations in Fort Kochi and Vypeen. These have been active over the years and have contributed greatly in helping the people voice their concerns and bring their difficulties to the notice of the authorities. These associations meet regularly and

IMAGE 1: PASSENGERS USING THE ERNAKULAM-VYPEEN BOAT SERVICE

submit petitions to the relevant authorities. However, according to Sameer, one of the executive members of the Fort Kochi Boat Users Association most of them have gone unheeded. One of the major problems faced by the passengers in his opinion is the problem of accessibility to the boat jetty. Since the Ernakulam jetty is built on reclaimed land, even a slight downpour results in slush and mud. Besides, the access path from the main road to the jetty is not well laid with many obstacles and unnecessary level differences as a result of which women and senior citizens find it inconvenient to reach the jetty. The lack of lighting and the presence of bushes in the vicinity makes the use of the jetty unthinkable of at night. The levels of hygiene in the jetty are deplorable with minimal maintenance and upkeep. There are complaints of the staff behaving rudely with the passengers on many occasions. The cancellation of trips due to unexplained reasons is a regular feature and is a blot on the dependability of the ferry service. Despite the availability of enough space, no provisions have been made for the parking or public amenities. The vast amount of floor area available within the boat jetty itself has not been utilised properly. Electrical fittings are purely namesake and do not function on most days. The dispute over the ownership of the building between two government departments is cited as the probable reason for the neglect towards the jetty. The lack of enough boats especially during peak hours is another plaint the passengers have against the ferry service. Similarly, the huge time gaps between services during off-peak hours discourage people from using the ferry. The poor quality of jetties at Fort Kochi and Vypeen are a major cause of concern with some organizations attributing the reason for the neglect as state apathy towards the poorer sections of the society. Passengers to Mattancherry face problems of silting frequently as a result of which the boats are unable to be brought near to the jetty. No steps have been taken to ensure regular dredging of the Mattancherry jetty region. The average passenger would appreciate if the authorities were to improve the quality of service delivery even if it were at a slightly higher cost than at present.

6. The Viability of Inland Water Transportation

Inland Water Transportation is, by all means, the most economical of all modes for transportation of people and cargo. One of the major components of the expenses incurred while providing infrastructure like roads and rail links is the component of land acquisition, rehabilitation and resettlement of the affected and laying of roads. However, in the case of waterways, such expenses are eliminated as the waterways are naturally available and only maintenance costs related to dredging are incurred. The amount of energy spent in manufacturing vessels required for transportation of specific tonnage of cargo or people is far lesser than that spent for developing roads and road carriers or rail and wagons. Besides, the issue of safety is taken care of better in IWT as compared to road or rail transport. The amount of pollution caused by inland vessels is only a fraction of that accounted by road or rail traffic.

6.1. Physical viability of IWT

The basic requirements for IWT include water to a minimum depth of 2m that is available all through the year. Depending upon tidal currents, there will be need to ensure that the channel is properly dredged so as to afford the least available depth at all times. Since only forty percent of the available waterways in Kochi are currently considered navigable by motor boats, it is necessary to bring more waterways under this category through dredging depending upon the need and demand for waterway transportation. Similarly, when bridges are constructed over waterbodies, it must be ensured that there is enough clear height for vessels to go under the bridges.

6.2. Operational viability

The IWT sector is an investment-sensitive sector. The costs involved are cost of the vessels, fuel costs, crew salaries and maintenance costs. In order to keep the ferry services, assured patronage from the general public is pre-requisite. In most cases, people will opt for ferry services if they have a choice since the ride quality and comfort are better than that offered by road transport. However, last mile connectivity is a major determinant and must be provided for people to travel from the original point of start of trip to the ferry station and from the station to the trip destination. Hence, while cost estimates are prepared for the travel by ferry, the cost of last mile connectivity must also be accounted for. Since, the

travel cost by waterways is comparatively less and only a fraction of the total money spent towards bridging the last mile gap. Another important factor is the availability of access to feeder networks from the ferry station without getting exposed to the elements of weather. Intermodal coordination and integration is therefore a significant factor.

6.3. Commercial viability

The commercial viability of the IWT is based greatly on the apparent advantages that using the waterways has on the other modes available to the users. Within KCR, there are obvious advantages of using the waterways since there is a natural grid iron pattern of waterways. As a result of this and geographical limitations for roads, travel by waterways works out to be easier and thus preferable for the average user.

TABLE 5: TRAVEL DISTANCES BETWEEN VARIOUS NODES BY WATER AND ROAD RESPECTIVELY

BY WATERWAY

O/D	Vallarpadom	Mulavukadu	Vypeen	Thevara	Ernakulam Jetty	High Court Jetty	Mattancherry
Thevara	9.04	12.60	9.60	-	-	-	-
Ernakulam Jetty	3.50	6.10	4.10	5.50	-	-	-
High Court Jetty	2.90	5.40	3.40	6.20	0.70	-	-
Mattancherry	3.44	9.60	2.50	6.20	3.60	4.20	-
Fort Kochi	1.44	9.00	0.80	8.30	3.20	3.60	2.10

BY ROAD NETWORK

O/D	Vallarpadom	Mulavukadu	Vypeen	Thevara	Ernakulam Jetty	High Court Jetty	Mattancherry
Thevara	12.50	15.00	12.90	-	-	-	-
Ernakulam Jetty	5.90	8.40	6.30	6.60	-	-	-
High Court Jetty	4.60	7.10	5.00	7.90	1.30	-	-
Mattancherry	18.90	19.90	16.00	10.30	11.50	12.80	-
Fort Kochi	22.90	22.90	20.00	13.30	14.50	15.80	4.00

Source: Prageeja K (2011) Alternative strategies for mass transportation; An Indigenous way

As seen in table 5, the travel distances between various important nodes are far lesser via waterways than roadways. For example the distance between Vallarpadom and Fort Kochi is about twenty times more by road than by waterways. This inherent advantage of waterways over road transport can be used to attract the road users to use waterways for mobility and transportation of goods.

6.4. Cost of development

The cost of development of waterways is comparatively lesser than that required for the development of road or rail infrastructure. Studies have concluded that development of waterways takes only about ten percent of the cost required to develop roadways. Similarly the costs associated with maintenance for waterways is only about twenty percent of that required for roadways. In terms of efficiency of transportation, it has been found that IWT is far more fuel-efficient than transportation by roads or railways. One litre of fuel can move 24 tonne-km of cargo by road, 85 tonne-km by rail and 105 tonne-km by waterways. This assumes all the more importance in the wake of economy and environment concerns that govern the global discourse on transportation currently. Considering the fact that land acquisition is a tedious affair in Kerala, the importance of using the IWT assumes even more significance.

Through detailed calculations, it has been established that the cost of developing IWT in KCR would take around 434 crore rupees, considering a dredging cost of two lakh rupees per thousand cubic metres. In contrast the cost of constructing flyovers at major intersections amounts to 7289 crore rupees and the provision of widened roads at 2001 rates would come to 7384 crore rupees (Traffic and Transportation Study for Cochin City, NATPAC, 2008). All these figures tilt the balance overwhelmingly in favour of IWT over other modes.

7. The public perception

Transportation systems are designed to help people achieve mobility in order to reach their points of work, education or offices from their places of residence. One of the major factors responsible for the success or failure of any mass transport system is the way in which it is perceived by the public it is intended for. Hence, after the stakeholders were interviewed to know the various administrative, legal and policy level constituents of the ferry system, it was considered necessary to understand the role played by the ferry in the daily lives of the average citizen. Public perception about the ferry services was gauged using a primary survey conducted with one hundred samples spread across various locations in Kochi city region. Samples were randomly chosen and asked about their experiences on the system and their expectations from it. The questionnaire for this purpose was designed with the purpose of extracting relevant information without seeming to be too intrusive.

IMAGE 2:PASSENGERS WAITING FOR THE MULAVUKADU FERRY

Additionally, representatives of passenger associations were heard for their perspective and individual old-timers were also sought for their views on how the transportation system had changed over the years. Ernakulam-Fort Kochi, Ernakulam-Willingdon Island and Ernakulam-Vypeen routes are among the busiest travel routes and hence maximum number of samples were chosen on these routes. The Ernakulam-Mulavukadu sector is a special case because of the unique circumstances of the latter. Before the commissioning of the Goshree bridges, the ferry services used to be the only connectivity that residents of Mulavukadu could use to reach Ernakulam. Old-timers recount that in its heyday over fourteen boats conducted trips in the Ernakulam-Mulavukadu-Varapuzha sector. However, with the bridges in place, the number of boat services operated to Mulavukadu underwent a steady decline. This resulted in a loss of confidence in the service altogether and residents started to patronise autorickshaws and private vehicles for commuting to the central business district (CBD). The

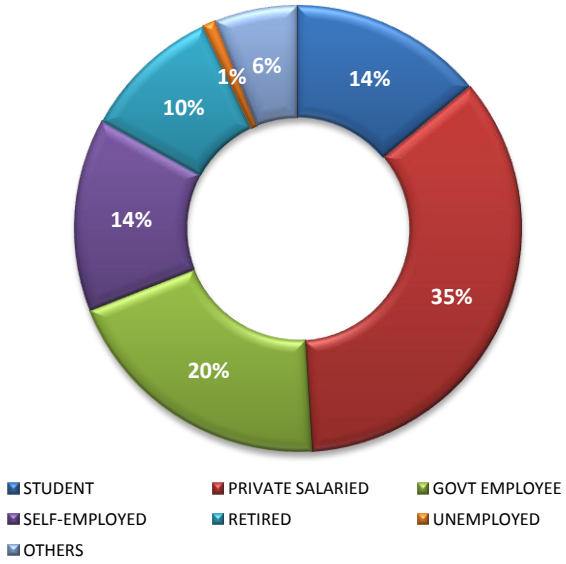


FIGURE 12: OCCUPATION OF THE INTERVIEWEES

boat services to Mulavukadu from High Court jetty and Ernakulam jetty have now been reduced to mere namesakes, with poor frequency of operation and therefore, occupancies as well.

7.1. The ferry system plays a very important role in the daily lives of office-goers and students:

An overwhelming sixty-nine percent of the sample were found to be workers in addition to another fourteen percent who were found to be students making their trip to better avenues of education, which more often than not were located in the mainland and were thus a short boat-ride away from their homes (Figure 12). Similarly, fifty-seven percent of the sample fell in the age group between twenty-six to fifty-nine years of age. Another twenty-six percent fell in the age group of ten to twenty-five years of age. In a following question, it is revealed that over fifty-eight percent made the ferry trip more than ten time a week which implies that they are eternally dependent on the ferry service for their daily travel needs, either to the place of work or for education. Of all the trips being made, a figure as high as sixty-one percent was attributed to work trips. These figures establish beyond doubt the important role played by the ferry system in the lives of the daily commuters comprised of office-goers and students in KCR.

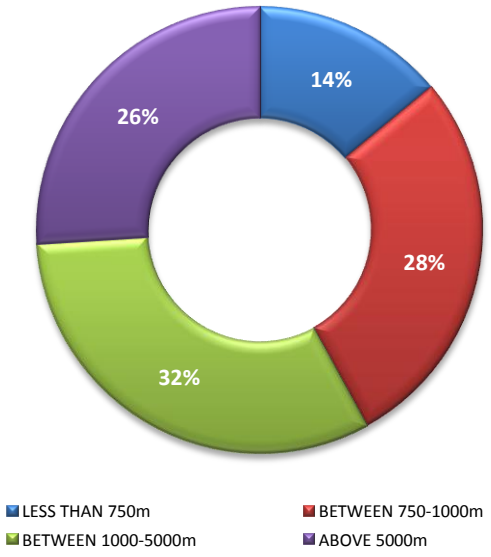


FIGURE 13: DISTANCE FROM TRIP ORIGIN TO JETTY

7.2. People closest to the boat jetties are most-likely to avail the services of the ferry system:

Over forty percent of the ferry users began their trips closer than one kilometre away from the jetty, which is considered to be walkable in Indian conditions. Similarly, more than fifty percent users head to a destination less than one kilometre away from the jetty.

Even more importantly, thirty-two percent of the interviewees came from a distance between one and five kilometres away from the jetty. Likewise, thirty-four percent indicated that they were heading to a destination at a distance of one to five kilometres from the jetty. These figures could have been slightly higher, had there been enough incentive for the people to use the ferry system in-lieu of private vehicles. It was also found that while fifty-two percent of the interviewees walked from the point of origin, forty percent depended on public transport to reach the jetty. Similarly, fifty-nine percent walked from the jetty to the trip destination, whereas twenty-eight percent took public transport for this purpose. Last-mile connectivity is therefore a major concern as far as ferry users are concerned. The administration may therefore pay more attention to people-responsive design of walkways and feeder services to the boat jetties.

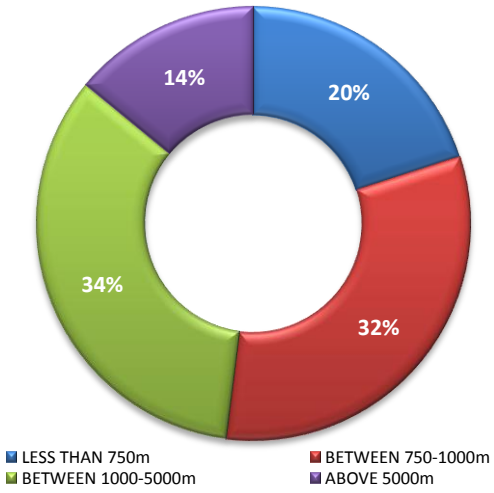


FIGURE 14: DISTANCE FROM JETTY TO TRIP DESTINATION

7.3. The poorer sections of the citizenry depend on the ferry services the most:

A sizeable sixty-eight percent of the ferry users interviewed had less than ten thousand rupees as their monthly family income. this includes nineteen percent passengers whose monthly income fell below five thousand rupees (Figure 15). Also forty percent of the interviewees vouched that they did not own any vehicle with another thirty-one percent owning just a cycle. The remaining twenty-nine percent owned either motorbikes or cars or autorickshaws. Similarly, forty percent of the sample spent less than ten rupees a day on transportation with another forty percent spending between eleven to thirty rupees on transportation to reach their offices or schools daily. All these suggest that it is the poor who depend on the ferry service more than the privileged. This is in agreement with the wide trend

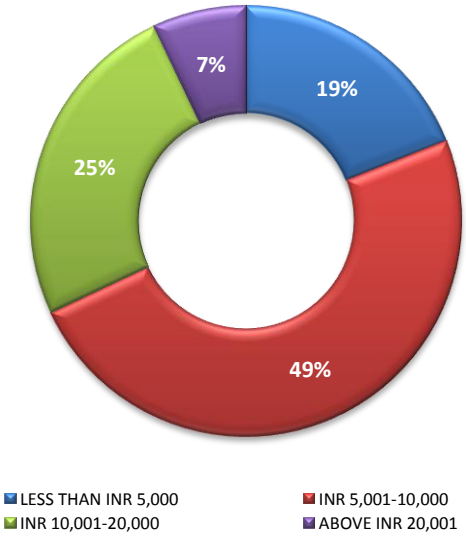


FIGURE 15: AVERAGE MONTHLY INCOME

across the country. While the well-heeled and the affluent can afford to own and spend on their own private vehicles, it is often the poor and the economically weaker sections that are left to fend for themselves with the lack of attention towards public transportation.

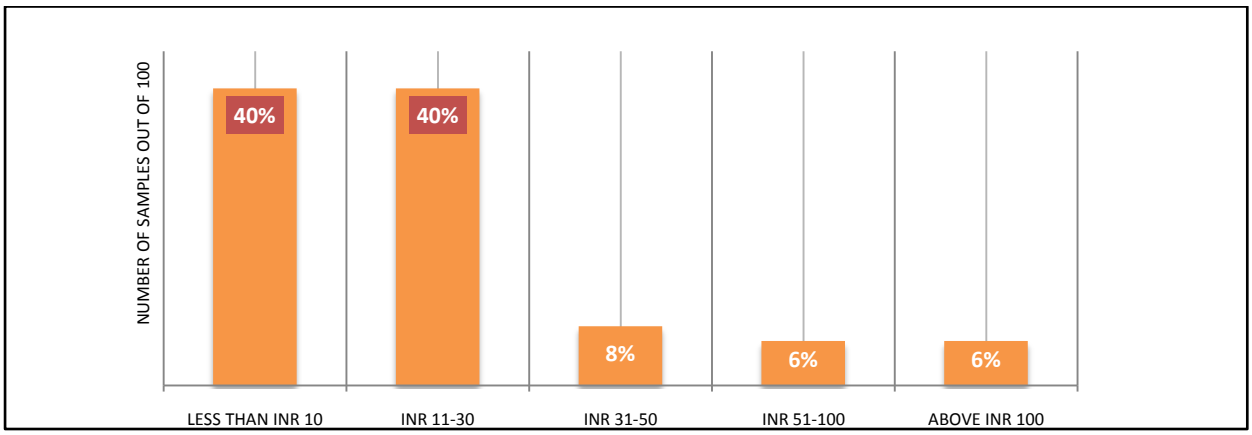


FIGURE 16: AVERAGE DAILY EXPENDITURE ON TRANSPORTATION

Needless to say, any changes considered with respect to making the ferry service more attractive to the general public must find their focus in this constituency that has always been overlooked in the general planning process.

7.4. Major motivation for ferry users is that it helps them save time and is inexpensive:

The major reasons behind people patronising the ferry system inspite of its many obvious shortcomings are that it takes lesser time to travel between Ernakulam and Fort Kochi, say, by the ferry than taking a bus or private vehicle due to the heavy traffic on the city roads especially during peak hours. The same would also apply to sectors such as Ernakulam-Willingdon Island, Vypeen-Willingdon Island and Vypeen-Fort Kochi.

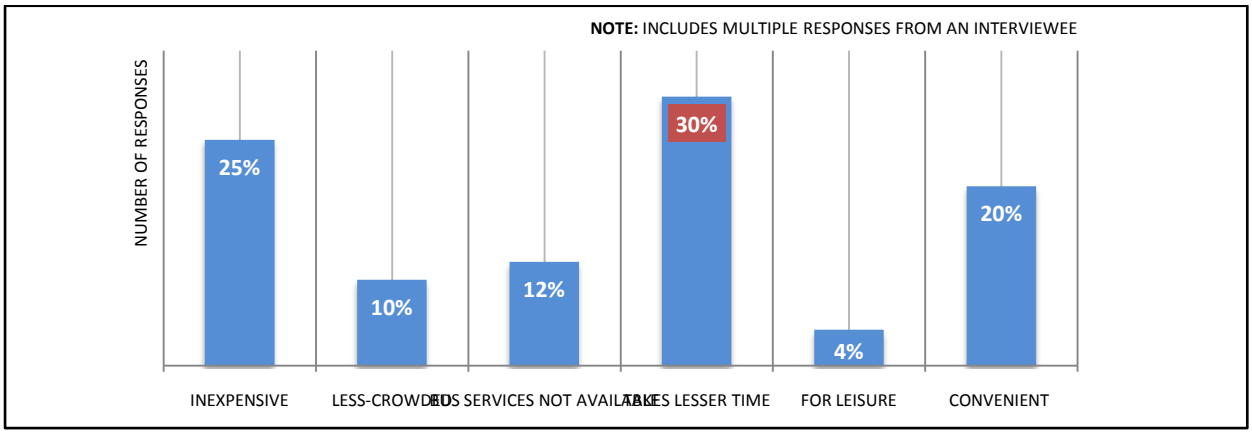


FIGURE 17: REASONS FOR CHOOSING THE FERRY OVER OTHER MODES

Another important factor is clearly the low fares on the ferry system in comparison to bus transport or private vehicle. While a ferry trip from Ernakulam to Fort Kochi costs a mere two rupees and fifty paise, a bus trip costs as much as eleven rupees (as on June 30, 2012).

Therefore, savings on time and money could be used as the moot points to attract more people to the ferry system. This, besides the other advantages of a ferry ride being many times more comfortable and enjoyable than a bumpy bus ride.

7.5. The ferry users are not happy about the quality of their commute:

Around fifty-six percent of the passengers interviewed for the study expressed their dissatisfaction with the quality of the ferry service. This includes five percent who were extremely dissatisfied with their experience on the ferry system. Another twenty-nine percent conceded that they were dissatisfied with the level of service delivery on the ferry system. Another twenty-two percent chose to remain neutral.

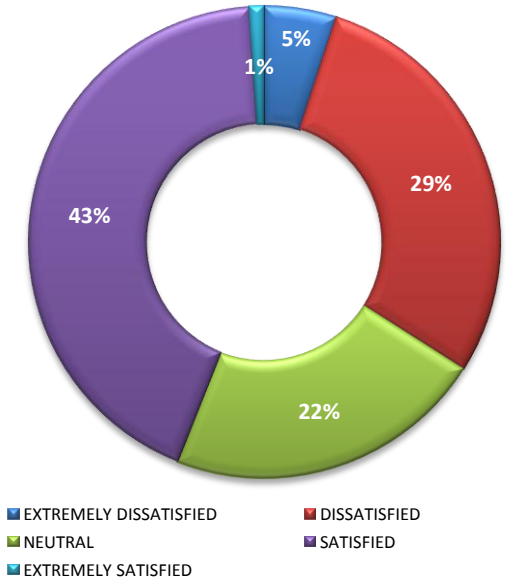


FIGURE 18: LEVEL OF SATISFACTION WITH THE FERRY SYSTEM

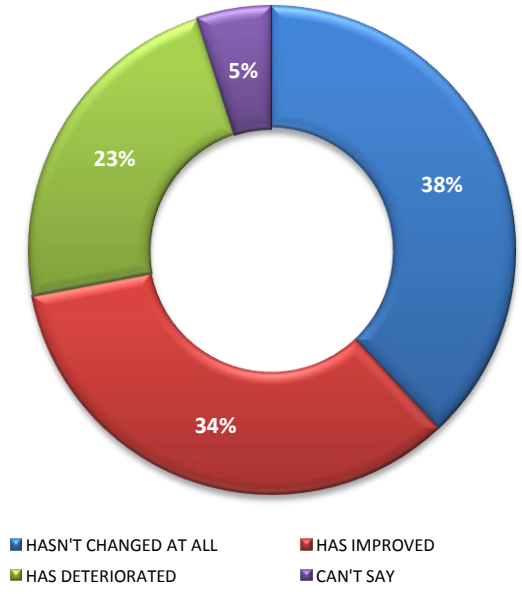


FIGURE 19: PERCEIVED CHANGE IN QUALITY OF FERRY SERVICES OVER THE PRECEDING FIVE YEARS

Another twenty-nine percent conceded that they were dissatisfied with the level of service delivery on the ferry system. Another twenty-two percent chose to remain neutral. Another twenty-nine percent conceded that they were dissatisfied with the level of service delivery on the ferry system. Another twenty-two percent chose to remain neutral. Another twenty-nine percent conceded that they were dissatisfied with the level of service delivery on the ferry system. Another twenty-two percent chose to remain neutral. Another twenty-nine percent conceded that they were dissatisfied with the level of service delivery on the ferry system. Another twenty-two percent chose to remain neutral. Another twenty-nine percent

conceded that they were dissatisfied with the level of service delivery on the ferry system. Another twenty-two percent chose to remain neutral.

7.6. The interviewees feel that the frequency of services on several sectors is grossly inadequate:

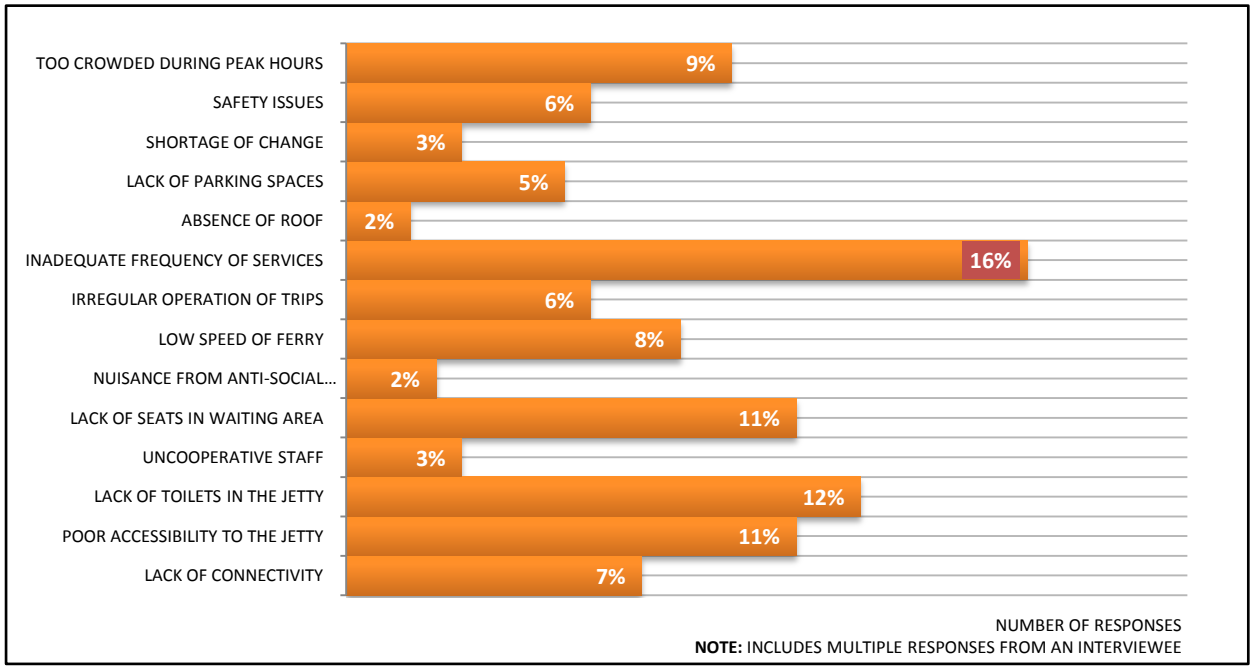


FIGURE 20: PROBLEMS FACED BY THE FERRY USERS

Around fifty-three responses from amongst the interviewees contended that the frequency of services on various sectors was inadequate and far lesser than the existing demand. They were also of the opinion that it was the lack of adeqaute number of services, especially during the off-peak hours, that was killing people's confidence in the ferry system altogether leading to modal shift among the users. The authorities explanation for this was that since there were not enough passengers for frequent services, some of them had been curtailed. As a result, people who turned up at odd timings had to wait for as much as half an hour to forty-five minutes to take the next ferry. Additionally, lack of basic services such as toilets, seating and poor accessibility were the other major issues cited by the passengers. The muddy and dirty approach to the Ernakulam boat jetty that also suffers from lack of proper lighting and proper connectivity from the main road is a classic example of how to make a well-invested public place inaccessible to the public. Many were quick to point out that they had tripped while attempting to reach the jetty at nights. Some others also claimed to having seen snakes roam around in the vicinity. Official explanations were centred on the lack of clarity on whose responsibility it was to maintain the premises.

On further examining the sector-wise trends, it was found that over seventy percent of the interviewees on the sparsely operated Ernakulam-Mulavukadu sector felt that the frequency of operation of ferry services on that sector was insufficient. It was widely accepted by the travelling public that the ferry-transport was far more comfortable and enjoyable than the road connectivity to Mulavukadu.

TABLE 6: SECTOR WISE PERCENTAGE OF USERS WHO FELT THAT THE FREQUENCY OF FERRY SERVICES WAS INADEQUATE

Ernakulam-Willingdon Island	50%
Ernakulam-Fort Kochi	58%
Ernakulam-Mattancherry	0%
Ernakulam-Vypeen	56%
Vypeen-Fort Kochi	67%
Thevara-Kumbalam	22%
Thevara-Nettoor	25%
Ernakulam-Mulavukadu	70%
Willingdon Island-Vypeen	67%
Willingdon Island-Fort Kochi	0%
Vypeen-Fort Kochi [Jungar]	50%
Vypeen-Fort Kochi [Private]	100%

7.7. The ferry service needs to improve on counts of cleanliness, reliability and accessibility in order to retain the current user group and attract new passengers:

From the responses obtained from the travelling public, it was understood that the ferry-system needs to undergo a gradual make-over from the utilitarian quality of service delivery that is being offerred presently to a more professionally managed and operated system.

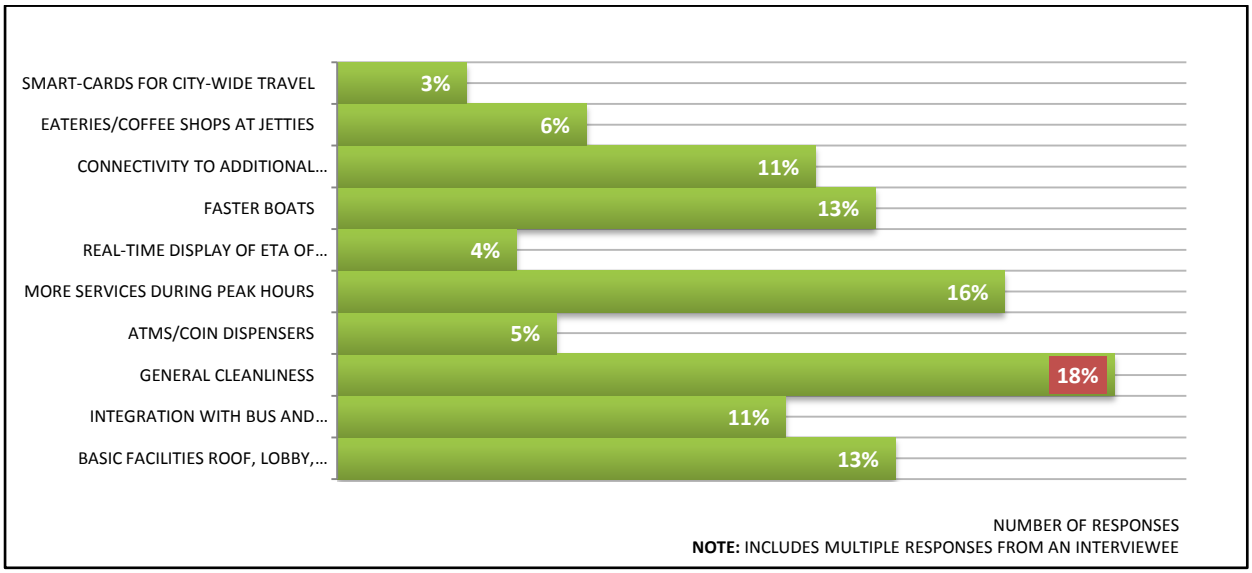


FIGURE 21: IMPROVEMENTS SOUGHT IN THE FERRY SYSTEM AS A WHOLE

A whopping seventy-eight responses from the interviewees wanted to see a major improvement in the level of cleanliness at the ferry stations and jetties. The current apathy towards this issue from the authorities was seen as a major letdown. People were of the opinion that since the travelling public are from the economically lower sections of the society, the state and its organs were ignoring even basic neccessities such as cleanliness and accessibility to the jetties. Another sixty-seven responses wanted to see more services, especially during the peak hours. Some fifty-six responses were for basic facilities such a stoilets and clean lobbies at jetties and another fifty-four responses were for the introduction of faster boats to save on time. Additional connectivity to new locations were also sought by a considerable section of the respondents.

7.8. The on-board ride quality and image of the ferry vessel needs to be improved greatly to attract new passengers:

On-board services on ferry vessels also required great improvement in the eyes of the respondents with over seventy-five interviewees hoping to see better and more comfortable seating being provided on board the ferry itself. Another sixty-two respondents hoped to see newspapers being provided on board for the benefit of the users who travel to their offices and institutions in the morning. This was followed by a request for general cleanliness on board the ferry vessel with over sixty-one respondents backing the proposal.

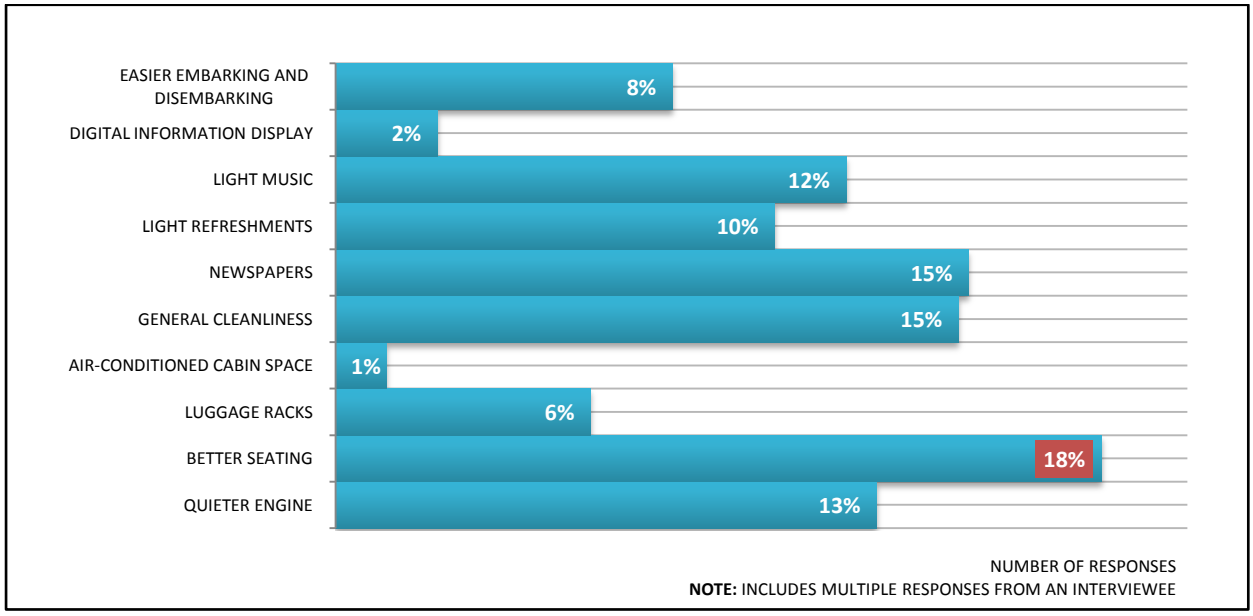


FIGURE 22: IMPROVEMENTS SOUGHT IN THE FERRY VESSEL

Other improvements sought in the ferry vessel were the induction of quieter engines, installing light music systems and easier embarking facilities, especially for the aged.

7.9. The ferry users are willing to pay as much as double the current fares in-lieu of a major improvement in the quality and levels of service-delivery :

Improvements in service-delivery will require pumping in a significant amount of equity from the stakeholders. The KSWTD currently operates under losses and survives largely on the subsidies offerred by the state government, which is again the taxpayers money. Hence, the question of raising the current fares on the various sectors obviously crops up. Contrary to expectations, the people are willing to cough up a higher amount of money as fare, if only the services were to improve to their expectations. Around forty-three percent of the respondents were found to favour a two-fold hike in the current fare structure so that a two-way trip on the Ernakulam-Fort Kochi sector would cost ten rupees instead of the five rupees prevailing currently (Figure 25). this would still be only half as much as the cost of bus tickets for the same trip. Other advantages include the savings on time and comfort.

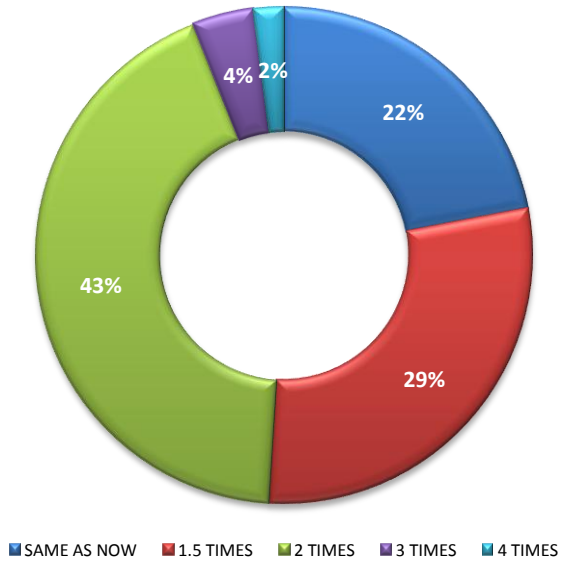


FIGURE 23: WILLINGNESS TO PAY AS COMPARED AGAINST THE CURRENT FARES

TABLE 7: WILLINGNESS TO PAY ACROSS VARIOUS INCOME GROUPS

Income Group	Same As Now	1.5 Times	2 Times	3 Times	4 Times
Less Than INR 5,000	47%	32%	21%	0%	0%
INR 5,001-10,000	20%	35%	43%	2%	0%
INR 10,001-20,000	8%	24%	56%	8%	4%
Above INR 20,001	14%	0%	57%	14%	14%

Table 7 reveals that the majority of the people across various income groups favour a two-fold increase in the fares subject to a corresponding improvement in the service delivery levels. People whose monthly income does not fall below twenty thousand rupees would not mind even a three-four fold increase in the fares. However, a section of the passengers whose income falls below five thousand rupees would like to see the fares remain at where they are and feel that the government must provide for the improved services.

8. Suggestions

From the primary survey conducted on the sample, several issues and obstacles faced by the existing users of the ferry system came to the fore. Based upon those, the following suggestions are put forward to make the ferry system appealing to the users.

- **Provide basic facilities:** As an immediate step, basic facilities such as seating, leak proof roof, clean toilets for both sexes and lighting and drinking water facilities may be provided at the ferry stations.
- **Timely dredging:** Ensure all-round-the-year approach to jetties for boats by frequent dredging of the channel and by understanding the natural factors that contribute to this phenomenon.
- **Improving accessibility:** The approach roads to the ferry stations shall be well-laid with minimum level differences to make access easier for the old and women in particular.
- **Monetization:** The various government agencies must immediately take proactive measures towards monetizing the market value of several prime plots of land under their occupancy in the heart of the city. The revenues earned as rent from such property may then be used to subsidize ferry ticket fares for the common people.
- **Improve facilities:** Rebrand the ferry system and change the public image of the ferry service in tune with the aspirations of the new generation. Make available light refreshments, newspapers and light music within the ferry as well as changing the seating pattern to enable face to face interaction can help the passengers in socializing and make the twenty-thirty minute trip as enjoyable and productive as the Mumbai suburban experience.
- **Fare-revision:** The fares may be raised to help ease the financial crisis suffered by the operating agency and the remaining deficit in the operation of the ferry services may be cross subsidized by raising funds from land-monetization.
- Promote the concept of pay-park-and-go system at ferry stations so that people from the upwardly mobile classes also feel attracted to using the ferry station.
- Introduce technological advances in the field of water transportation such as faster boats, double-hulled catamarans and amphi-bus.
- Provide end-to-end connectivity for passengers from their doorstep to the intended destination. Feeder buses or share-autos may take the passengers from their neighbourhood to the ferry station and back.

- Reroute buses and other modes of transport including the proposed metro-rail in a manner that they touch ferry stations so that the ferry users can have assured last-mile connectivity.
- Introduce the concept of suitably subsidized season tickets with benefits for daily and frequent travellers. Extend the concept of smart cards for the benefit of daily travellers. Similarly daily and weekly passes can be encouraged for the benefit of the tourists.
- Reduce turnaround time for ferries by encouraging circular services (clockwise and anticlockwise) connecting Ernakulam, High Court, Vypeen, Fort Kochi, Mattancherry, Willingdon Island, Ernakulam.
- Facilitate easier embarking and disembarking from the vessels by use of appropriate technologies. This will benefit the aged and women who depend on the ferry services more than anybody else.
- At the very outset, identify proper roles of various agencies in this sector and make them responsible for the delivery of these duties through necessary administrative and legislative measures and reforms, wherever needed to facilitate greater cooperation amongst KSWTD, KSINC etc.
- Involve the citizenry more actively in the planning and rebranding of the ferry system and solicit views on their aspirations and expectations from the new ferry system.

These measures, along with a paradigm shift in the approach of the authorities and planners towards the public transportation system by adopting a people-first approach only can help in rescuing the water transportation sector in the Kochi city.

9. Conclusion

It is indeed a matter of grave concern that despite the presence of such a vast network of waterways in the city, we have been unable to make use of it by positively integrating it into our city mobility plans. This is as serious an offence as the fact that despite copious rains, several parts of Kerala are still subjected to severe water crisis, especially in the period just before the monsoons' arrival. While cities across the globe are competing with each other on how to make best use of the natural advantages available to them, thanks to lack of foresight and planning, Kochi has found refuge in merely aping the west or the oriental. The severe crisis in transportation sector witnessed by our city today is an opportunity to set a few wrongs right and head in the direction of a sustainable and environment friendly model of

transportation. On these counts, IWT scores heavily against other available modes. In accordance with the established provisions of the National Urban Transport Policy, 2006 and Inland Waterways Transportation Policy, 2001 we must address the concerns of the poorest of the poor who are most dependent on public transportation and set up this highly efficient and inexpensive mode of transportation in a financially-sound business model and technically feasible manner as early as possible.

ANNEXURES:

Annexure-A: Questionnaire Format

A Study on Inland Water Transportation in Kochi City Region — Ferry Users Survey

For Official Use Only

DD MM YY DAY TIME

RESPONDENT NO

Dear Sir/Madam,

Please be kind enough to spare a few minutes of your time to participate in this academic exercise aimed at gauging people's perception about the ferry services in Kochi City Region. Your cooperation in this exercise would help contribute towards the preparation of a report on '**Inland Water Transportation in Kochi City Region**' that would reflect the concerns of ordinary citizens of this city who depend on public transportation. Rest assured that none of the information thus collected would be used for a purpose other than that mentioned above. Thanking you for your co-operation.

1. **Name:** Mr/Ms/Dr .....

2. **Age-group**

☐ Under 10 yrs ☐ 10-25 yrs ☐ 26-59 yrs ☐ Above 59 yrs

3. **Sex**

☐ Male ☐ Female

4. **Occupation**

☐ Student ☐ Private Salaried ☐ Govt Employee ☐ Self-employed ☐ Retired
☐ Unemployed ☐ Others

5. **Which among these administrative units does your locality fall under?**

☐ Corp of Kochi ☐ Kalamassery Mun ☐ Tripunithura Mun ☐ Thrikkakkara Mun ☐ Maradu Mun
☐ Eloor Mun ☐ Kadamakkudy Pan ☐ Cheranallur ☐ Mulavukadu ☐ Varapuzha
☐ Elamkunnapuzha ☐ Thiruvankulam ☐ Njarackal ☐ Kumbalam ☐ Kumbalangi
☐ Chellanam ☐ Nearby Districts ☐ Other States

6. **On which sector is the ferry trip being taken?**

☐ Ekm-W. Island ☐ Ekm-F. Kochi ☐ Ekm-Mattancherry ☐ Ekm-Vypeen ☐ Vypeen-F. Kochi
☐ Thevara-Kumbalangi ☐ Thevara-Nettoor ☐ Ekm-Mulavukadu ☐ .....

7. **Which among these categories best describes the purpose of your trip?**

☐ Work ☐ Education ☐ Business ☐ Leisure ☐ .....

8. **Origin of the trip**

☐ Corp of Kochi ☐ Kalamassery Mun ☐ Tripunithura Mun ☐ Thrikkakkara Mun ☐ Maradu Mun
☐ Eloor Mun ☐ Kadamakkudy Pan ☐ Cheranallur ☐ Mulavukadu ☐ Varapuzha
☐ Elamkunnapuzha ☐ Thiruvankulam ☐ Njarackal ☐ Kumbalam ☐ Kumbalangi
☐ Chellanam ☐ Nearby Districts ☐ .....

9. **How far is the jetty from the place of origin of the trip?**

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A Study on Inland Water Transportation in Kochi City Region — Ferry Users Survey

☐ Less than 750m ☐ Between 750-1000m ☐ Between 1-5km ☐ More than 5km

10. What mode of transport do you take from the place of origin to the jetty?

☐ Walk ☐ Cycle ☐ Autorickshaw ☐ Bike ☐ Car ☐ Public transport

11. Destination of the trip

☐ Corp of Kochi ☐ Kalamassery Mun ☐ Tripunithura Mun ☐ Thrikkakkara Mun ☐ Maradu Mun
☐ Eloor Mun ☐ Kadamakkudy Pan ☐ Cheranallur ☐ Mulavukadu ☐ Varapuzha
☐ Elamkunnapuzha ☐ Thiruvankulam ☐ Njarackal ☐ Kumbalam ☐ Kumbalangi
☐ Chellanam ☐ Nearby Districts ☐ .....

12. How far is the trip's destination from the jetty?

☐ Less than 750m ☐ Between 750-1000m ☐ Between 1-5km ☐ More than 5km

13. What mode of transport do you take from the jetty to the destination?

☐ Walk ☐ Cycle ☐ Autorickshaw ☐ Bike ☐ Car ☐ Public transport

14. Which among these categories does your monthly income fit into?

☐ Less than INR 5,000 ☐ INR 5,001-10,000 ☐ INR 10,001-25,000 ☐ Above INR 25,000

15. Do you own a vehicle? If yes, what type of vehicle?

☐ Do not own any vehicle ☐ Cycle ☐ Bike ☐ Car ☐ Heavy Vehicle

16. Which among these categories does your average daily expenditure on transportation fit into?

☐ Less than INR 10 ☐ INR 11-30 ☐ INR 31-50 ☐ INR 51-100 ☐ Above INR 100

17. What makes you choose the ferry over other means of transport?

☐ Inexpensive ☐ Less-crowded ☐ Bus services not available ☐ Takes lesser time ☐ For leisure
☐ Convenient ☐ ..... ☐ ..... ☐ ..... ☐ .....

18. How often do you take the ferry in a week?

☐ Once or less ☐ 2-5 times ☐ 6-10 times ☐ More than 10 times

19. How satisfied are you with the ferry service?

☐ Extremely dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Extremely satisfied

20. What problems do you encounter while using the ferry system?

☐ Lack of connectivity ☐ Poor accessibility to the jetty ☐ Lack of toilets in the jetty
☐ Uncooperative staff ☐ Lack of seats in waiting area ☐ Nuisance from anti-social elements
☐ Low speed of ferry ☐ Irregular operation of trips ☐ Inadequate frequency of services
☐ Absence of roof ☐ Lack of parking spaces ☐ Shortage of change
☐ Safety issues ☐ Too crowded during peak hours ☐ .....

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21. How has the quality of the ferry service changed over the past five years?

☐ Hasn't changed at all ☐ Has improved ☐ Has deteriorated ☐ Can't say

22. Which among these facilities and improvements would you like to see in your ferry system? Please rank them from 1 to 10 (1 being most preferred and 10 being least preferred).

☐ Basic facilities roof, lobby, toilets	☐ Integration with bus and metro system	☐ General cleanliness
☐ ATMs/Coin dispensers	☐ More services during peak hours	☐ Real-time display of ETA of ferries
☐ Faster boats	☐ Connectivity to additional places	☐ Eateries/coffee shops at jetties
☐ Smart-cards for city-wide travel	☐	☐ .....

23. Which among these facilities and improvements would you like to see on-board your ferry? Please rank them from 1 to 10 (1 being most preferred and 10 being least preferred).

☐ Quieter engine	☐ Better seating	☐ Luggage racks
☐ Air-conditioned cabin space	☐ General cleanliness	☐ Newspapers
☐ Light refreshments	☐ Light music	☐ Digital information display
☐ Easier embarking and debarking	☐	☐ .....

24. If your concerns are addressed, how many times the present fare would you be willing to pay?

☐ Same as now ☐ 1.5 times ☐ 2 times ☐ 3 times ☐ 4 times

25. What other suggestions would you propose towards the improvement of the ferry system?

Annexure-B

Study on Inland Water Transportation in Kochi City Region

KEY TO RESPONSES

2. AGE		NO. OF RESPONSES	PERCENTAGE
0201	UNDER 10 YEARS	0	0%
0202	10-25 YEARS	26	26%
0203	26-59 YEARS	57	57%
0204	ABOVE 59 YEARS	17	17%

3. SEX		NO. OF RESPONSES	PERCENTAGE
0301	MALE	82	82%
0302	FEMALE	18	18%

4. OCCUPATION		NO. OF RESPONSES	PERCENTAGE
0401	STUDENT	14	14%
0402	PRIVATE SALARIED	35	35%
0403	GOVT EMPLOYEE	20	20%
0404	SELF-EMPLOYED	14	14%
0405	RETIRED	10	10%
0406	UNEMPLOYED	1	1%
0407	OTHERS	6	6%

5. ADMINISTRATIVE UNIT		NO. OF RESPONSES	PERCENTAGE
0501	CORP OF KOCHI	29	29%
0502	KALAMASSERY MUN	1	1%
0503	TRIPUNITHURA MUN	0	0%
0504	THRIKKAKKARA MUN	0	0%
0505	NARADU MUN	3	3%
0506	ELOOR MUN	1	1%
0507	KADAMAKKUDY PAN	0	0%
0508	CHERANALLUR PAN	0	0%
0509	MULAVUKADU PAN	12	12%
0510	VARAPUZHA PAN	0	0%
0511	ELAMKUNNAPUZHA PAN	21	21%
0512	THIRUVANKULAM PAN	0	0%
0513	NJARACKAL PAN	2	2%
0514	KUMBALAM PAN	9	9%
0515	KUMBALANGI PAN	1	1%
0516	CHELLANAM PAN	0	0%
0517	NEARBY DISTRICTS	10	10%
0518	OTHER STATES	2	2%
0519	OTHER AREAS IN ERNAKULAM DISTRICT	9	9%

6. FERRY TRIP SECTOR		NO. OF RESPONSES	PERCENTAGE
0601	ERNAKULAM-WILLINGDON ISLAND	14	14%
0602	ERNAKULAM-FORT KOCHI	24	24%
0603	ERNAKULAM-MATTANCHERRY	1	1%
0604	ERNAKULAM-VYPEEN	18	18%

Study on Inland Water Transportation in Kochi City Region

0605	VYPEEN-FORT KOCHI	3	3%
0606	THEVARA-KUMBALAM	9	9%
0607	THEVARA-NETTOOR	4	4%
0608	ERNAKULAM-MULAVUKADU	10	10%
0609	WILLINGDON ISLAND-VYPEEN	12	12%
0610	WILLINGDON ISLAND-FORT KOCHI	2	2%
0611	VYPEEN-FORT KOCHI [JUNGAR]	2	2%
0612	VYPEEN-FORT KOCHI [PRIVATE]	1	1%

7. PURPOSE OF TRIP		NO. OF RESPONSES	PERCENTAGE
0701	WORK	61	61%
0702	EDUCATION	14	14%
0703	BUSINESS	5	5%
0704	LEISURE	20	20%
0705	OTHERS	0	0%

8. TRIP ORIGIN		NO. OF RESPONSES	PERCENTAGE
0801	CORP OF KOCHI	64	64%
0802	KALAMASSERY MUN	1	1%
0803	TRIPUNITHURA MUN	0	0%
0804	THRIKKAKKARA MUN	1	1%
0805	NARADU MUN	2	2%
0806	ELOOR MUN	1	1%
0807	KADAMAKKUDY PAN	0	0%
0808	CHERANALLUR PAN	0	0%
0809	MULAVUKADU PAN	3	3%
0810	VARAPUZHA PAN	0	0%
0811	ELAMKUNNAPUZHA PAN	12	12%
0812	THIRUVANKULAM PAN	0	0%
0813	NJARACKAL PAN	1	1%
0814	KUMBALAM PAN	9	9%
0815	KUMBALANGI PAN	0	0%
0816	CHELLANAM PAN	0	0%
0817	NEARBY DISTRICTS	1	1%
0818	OTHER AREAS IN ERNAKULAM DISTRICT	5	5%

9. DISTANCE OF JETTY FROM TRIP ORIGIN		NO. OF RESPONSES	PERCENTAGE
0901	LESS THAN 750m	14	14%
0902	BETWEEN 750-1000m	28	28%
0903	BETWEEN 1000-5000m	32	32%
0904	ABOVE 5000m	26	26%

10. MODE OF TRANSPORT FROM TRIP ORIGIN TO JETTY		NO. OF RESPONSES	PERCENTAGE
1001	WALK	52	52%
1002	CYCLE	3	3%
1003	AUTORICKSHAW	0	0%
1004	BIKE	3	3%

Study on Inland Water Transportation in Kochi City Region

1005	CAR	2	2%
1006	PUBLIC TRANSPORT	40	40%

11. TRIP DESTINATION		NO. OF RESPONSES	PERCENTAGE
1101	CORP OF KOCHI	63	63%
1102	KALAMASSERY MUN	0	0%
1103	TRIPUNITHURA MUN	0	0%
1104	THRIKKAKKARA MUN	0	0%
1105	NARADU MUN	2	2%
1106	ELOOR MUN	0	0%
1107	KADAMAKKUDY PAN	0	0%
1108	CHERANALLUR PAN	0	0%
1109	MULAVUKADU PAN	7	7%
1110	VARAPUZHA PAN	0	0%
1111	ELAMKUNNAPUZHA PAN	19	19%
1112	THIRUVANKULAM PAN	0	0%
1113	NJARACKAL PAN	1	1%
1114	KUMBALAM PAN	4	4%
1115	KUMBALANGI PAN	1	1%
1116	CHELLANAM PAN	0	0%
1117	NEARBY DISTRICTS	2	2%
1118	OTHER AREAS IN ERNAKULAM DISTRICT	1	1%

12. DISTANCE OF TRIP DESTINATION FROM JETTY		NO. OF RESPONSES	PERCENTAGE
1201	LESS THAN 750m	20	20%
1202	BETWEEN 750-1000m	32	32%
1203	BETWEEN 1000-5000m	34	34%
1204	ABOVE 5000m	14	14%

13. MODE OF TRANSPORT FROM JETTY TO TRIP DESTINATION		NO. OF RESPONSES	PERCENTAGE
1301	WALK	59	59%
1302	CYCLE	6	6%
1303	AUTORICKSHAW	3	3%
1304	BIKE	2	2%
1305	CAR	2	2%
1306	PUBLIC TRANSPORT	28	28%

14. MONTHLY INCOME		NO. OF RESPONSES	PERCENTAGE
1401	LESS THAN INR 5,000	19	19%
1402	INR 5,001-10,000	49	49%
1403	INR 10,001-20,000	25	25%
1404	ABOVE INR 20,001	7	7%

15. VEHICLE OWNERSHIP		NO. OF RESPONSES	PERCENTAGE
1501	DON'T OWN	39	39%
1502	CYCLE	31	31%
1503	BIKE	22	22%

Study on Inland Water Transportation in Kochi City Region

1504	CAR	5	5%
1505	HEAVY VEHICLE	2	2%

16. DAILY EXPENDITURE ON TRANSPORTATION		NO. OF RESPONSES	PERCENTAGE
1601	LESS THAN INR 10	40	40%
1602	INR 11-30	40	40%
1603	INR 31-50	8	8%
1604	INR 51-100	6	6%
1605	ABOVE INR 100	6	6%

17. CHOICE OF FERRY OVER OTHER MODES		NO. OF RESPONSES	PERCENTAGE
1701	INEXPENSIVE	63	25%
1702	LESS-CROWDED	24	10%
1703	BUS SERVICES NOT AVAILABLE	29	12%
1704	TAKES LESSER TIME	75	30%
1705	FOR LEISURE	10	4%
1706	CONVENIENT	50	20%

18. NO. OF FERRY TRIPS PER WEEK		NO. OF RESPONSES	PERCENTAGE
1801	ONCE OR LESS	7	7%
1802	2-5 TIMES	18	18%
1803	6-10 TIMES	17	17%
1804	ABOVE 10 TIMES	58	58%

19. SATISFACTION WITH THE FERRY SYSTEM		NO. OF RESPONSES	PERCENTAGE
1901	EXTREMELY DISSATISFIED	5	5%
1902	DISSATISFIED	29	29%
1903	NEUTRAL	22	22%
1904	SATISFIED	43	43%
1905	EXTREMELY SATISFIED	1	1%

20. PROBLEMS FACED ON FERRY SYSTEM		NO. OF RESPONSES	PERCENTAGE
2001	LACK OF CONNECTIVITY	23	7%
2002	POOR ACCESSIBILITY TO THE JETTY	35	11%
2003	LACK OF TOILETS IN THE JETTY	40	12%
2004	UNCOOPERATIVE STAFF	9	3%
2005	LACK OF SEATS IN WAITING AREA	35	11%
2006	NUISANCE FROM ANTI-SOCIAL ELEMENTS	7	2%
2007	LOW SPEED OF FERRY	26	8%
2008	IRREGULAR OPERATION OF TRIPS	19	6%
2009	INADEQUATE FREQUENCY OF SERVICES	53	16%
2010	ABSENCE OF ROOF	5	2%
2011	LACK OF PARKING SPACES	17	5%
2012	SHORTAGE OF CHANGE	9	3%
2013	SAFETY ISSUES	19	6%
2014	TOO CROWDED DURING PEAK HOURS	30	9%

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21. CHANGE IN QUALITY OF FERRY SERVICE OVER LAST FIVE YEARS		NO. OF RESPONSES	PERCENTAGE
2101	HASN'T CHANGED AT ALL	38	38%
2102	HAS IMPROVED	34	34%
2103	HAS DETERIORATED	23	23%
2104	CAN'T SAY	5	5%

22. IMPROVEMENTS SOUGHT IN FERRY SYSTEM		NO. OF RESPONSES	PERCENTAGE
2201	BASIC FACILITIES ROOF, LOBBY, TOILETS	56	13%
2202	INTEGRATION WITH BUS AND METRO SYSTEM	45	11%
2203	GENERAL CLEANLINESS	78	18%
2204	ATMS/COIN DISPENSERS	22	5%
2205	MORE SERVICES DURING PEAK HOURS	67	16%
2206	REAL-TIME DISPLAY OF ETA OF FERRIES	18	4%
2207	FASTER BOATS	54	13%
2208	CONNECTIVITY TO ADDITIONAL PLACES	48	11%
2209	EATERIES/COFFEE SHOPS AT JETTIES	25	6%
2210	SMART-CARDS FOR CITY-WIDE TRAVEL	13	3%

23. IMPROVEMENTS SOUGHT IN FERRY VESSEL		NO. OF RESPONSES	PERCENTAGE
2301	QUIETER ENGINE	53	13%
2302	BETTER SEATING	75	18%
2303	LUGGAGE RACKS	25	6%
2304	AIR-CONDITIONED CABIN SPACE	5	1%
2305	GENERAL CLEANLINESS	61	15%
2306	NEWSPAPERS	62	15%
2307	LIGHT REFRESHMENTS	43	10%
2308	LIGHT MUSIC	50	12%
2309	DIGITAL INFORMATION DISPLAY	10	2%
2310	EASIER EMBARKING AND DISEMBARKING	33	8%

24. WILLINGNESS TO PAY		NO. OF RESPONSES	PERCENTAGE
2401	SAME AS NOW	22	22%
2402	1.5 TIMES	29	29%
2403	2 TIMES	43	43%
2404	3 TIMES	4	4%
2405	4 TIMES	2	2%

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