



GOVERNMENT OF KERALA
KERALA STATE PLANNING BOARD

**THIRTEENTH FIVE-YEAR PLAN
(2017-2022)**

**WORKING GROUP ON
INLAND WATER TRANSPORT
REPORT**

INDUSTRY AND INFRASTRUCTURE DIVISION

KERALA STATE PLANNING BOARD
THIRUVANANTHAPURAM

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PREFACE

In Kerala, the process of a Five-Year Plan is an exercise in people's participation. At the end of September 2016, the Kerala State Planning Board began an effort to conduct the widest possible consultations before formulating the Plan. The Planning Board formed 43 Working Groups, with a total of more than 700 members – scholars, administrators, social and political activists and other experts. Although the Reports do not represent the official position of the Government of Kerala, their content will help in the formulation of the Thirteenth Five-Year Plan document.

This document is the report of the Working Group on Inland water Transport Sector. The Chairpersons of the Working Group were Shri V. J. Kurian IAS and Shri R.M.Nair. The Member of the Planning Board who coordinated the activities of the Working Group was Dr Ravi Raman K. The concerned Chief of Division is Shri N. R. Joy.

Member Secretary

FOREWORD

Inland Water Transport is a fuel efficient and environment friendly mode of transportation. In order to promote Inland Waterways in Kerala, Government has made adequate financial support for the development of this sector. The Government agencies engaged in the development of Inland Water Transport in the State are Coastal Shipping and Inland Navigation Department (CSIND), State Water Transport Department (SWTD) and Kerala Shipping and Inland Navigation Corporation Ltd. (KSINC).

The State Planning Board has constituted a Working Group on Inland Water Transport Sector for evolving suitable strategy and approach for the 13th Plan under the Co Chairmanship of Sri V J Kurian IAS, Additional Chief Secretary to Government, Water Resources Department, and Shri R.M.Nair, Former Member, Technical (IWAI), Govt of India. The Committee made three sittings and detailed deliberations were made for proposed policies and programmes needed for the IWT sector development during the 13th Plan period. The 13th Five-Year Plan lays stress on the development of potential stretches of West Coast Canal and its feeder routes to increase the volume of passenger/cargo traffic and to achieve a modal shift in inland cargo to water transport sector coupled with related boost in tourism sector.

We are grateful to all members for their participation and valuable suggestions / recommendations in bringing up the report. Special mention needs to be made for Dr. B.G. Sreedevi, Director NATPAC and Shri. G.Prasanth Nair, Consultant NATPAC for taking the lead role in drafting and formulation of the report. Particular mention needs to be made for the support and whole hearted co-operation of Dr Ravi Raman, Member, State Planning Board right from the constitution of the working group to the finalisation of the report. Special reference is mentioned for the service rendered by Shri. N.R. Joy, Chief & Convener and Smt. Deepa Sivadasan, Asst Director & Co Convener, Industry and Infrastructure Division, State Planning Board for conducting meeting and coordinating the materials from different members for the preparation of the report.

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EXECUTIVE SUMMARY

Inland Water Transport (IWT) is a fuel efficient, environment friendly and cost effective mode of transport having potential to supplement the overburdened rail and congested roads of the country. In India only 3.5% of domestic surface transport is accounted for by IWT even though India is richly endowed with navigable waterways comprising rivers, canals, backwaters, creeks, lagoons etc. It is necessary that IWT mode is developed with public funding at least to a threshold level to attract private sector for their investment and involvement in development of infrastructure facilities and operations.

Till 2016 only 5 waterways were declared as national waterways. In April, 2016, Government of India has declared another 106 waterways spreading all over the country as National Waterways, which include 3 more waterways in Kerala. A 2% growth in GDP is anticipated with the development of these waterways to the NW standard, which will ultimately result in a quantum jump for the IWT share in India. This has necessitated a need for faster developments in IWT sector using modern techniques. Simultaneously it is the need of the hour that the State Govt has to develop or revive the non declared waterways and feeder routes for navigation in order to tap its full potential. Keeping this in view the State Govt. has formulated an action plan for taking up systematic development of IWT sector during 13th Plan period.

There are about 1687 km. of IWT route network in the State consisting of the National Waterway- 3 from Kollam to Kottapuram which is maintained by IWAI, and other feeder canals maintained by the Coastal Shipping and Inland Navigation Department/ State Irrigation Department. Cargo transportation through mechanized barges exists in NW-3. Most of the feeder canals and waterways suffer from navigational constraints like shallow depth and narrow width of channel during dry weather, siltation, bank erosion, absence of infrastructural facilities like jetties/ terminals and inadequacy of navigational aids.

List of achievements during 12th Plan period is given below:

The total financial outlay provided for the Inland Water Transport sector in the 12th Plan period comes to Rs 72600 lakh with a break up of Rs 4854 lakh for the State Water Transport Department, Rs 6002 lakh for the Kerala Shipping & Inland Navigation Corporation and Rs 61744 lakh for Coastal Shipping and Inland Navigation Department. During the 1st four years the allotment comes to Rs 56866 lakh from which Rs 14364.93 lakh were expended. Table given below shows the year- wise outlay and expenditure of the 1st four years of the 12th Plan.

Year wise Outlay and Expenditure (Rs in Lakh)										
Sector	2102-13		2013-14		2014-15		2015-16		Total	
	Outlay	Exp	Outlay	Exp	Outlay	Exp	Outlay	Exp	Outlay	Exp
SWTD	609	544	725	559	760	452	760	331	2854	1886
KSINC	1200	1200	1200	1202	1200	0	1200	0	4800	2402
CSIND	11530	1947	11718	3079	12382	3479	13582	1573	49212	10077
Total	13339	3691	13643	4840	14343	3931	15542	1903	56866	14365

CSIND has completed deepening / formation of 27 km of waterway in different reaches of West Coast Canal. Besides, they have completed canal improvement works in 16 number of feeder canals. Also constructed 47 jetties during this period. Canal improvement work and canal formation is in progress in other reaches.

The State Water Transport Department transports about 150 lakhs of passengers per annum using wooden/steel and fibre Glass Passenger Boats. Presently it operates 51 schedules per day including tourism services. Approximately 40,000 people use their service per day. Operating distance per day is 700 km approximately. A dry dock with modern equipments for fastening the repair of all kind of boats was constructed. Catamaran Double hull and single hull vessels are the ongoing projects. Solar powered passenger boat, which is first of its kind in India will be inaugurated shortly. Passenger services in Parassini- Mattool, Ernakulam- Varappuzha and Vyttila –Kakkanad routes were started. Alappuzha-Kumarakam-Kottayam and Vaikom-Ernakulam A/C tourist services will be commenced soon.

The Kerala Shipping and Inland Navigation Corporation at present have fleet strength of seven barges carrying various cargo, two tourist boats and two Jhankars. For the purpose of starting passenger boat operation in Kochi, 4 high speed boats are under construction. A 200 PAX mini cruise ship is under construction for tourist operation. A 500 MT cargo barge is under construction for transportation of bulk raw materials.

The following are the target set for the 13th Plan period:

1. To develop potential stretches of West Coast Canal and its feeder routes- approximately 800 km (265 km of West Coast Canal + 535 km of feeder routes) of waterway with a target of 160 km/ year ie Kovalam- Kollam stretch (74 km) & Kozhikode- Neeleswaram (Kooliyanganicut) (191 km) stretch of WCC along with its feeder routes and that of NW-3.
2. To increase the volume of passenger traffic from the present level of 150 lakhs/ annum to 300 lakhs/ annum
3. To achieve 12% modal shift in inland cargo to water transport sector (both coastal shipping & IWT) from the present level of 7%.

For achieving the above targets the following strategy is envisaged during the 13th Plan period:

Fairway development

1. Full-fledged waterway development by IWAI (for NWs) and CSIND (for SWs)
2. Comprehensive Master Plan for development
3. Use modern technology for fairway development
4. Adopt modern dredging techniques

Transport Infrastructure

1. IWT terminals to be developed as cargo/ passenger multimodal hubs
2. Deploy modern cargo handling equipment at terminals
3. Use modern navigational aids and communication systems
4. Use hybrid vessels with green concept (solar, CNG etc)– for SWTD & KSINC
5. Set up vessel banks

6. Set up adequate vessel repair facilities

HR/ Training Institutions

1. Trained manpower to be made available for terminal & vessel operation
2. Business & Tourism promotion experts to be made available
3. Crew training and Logistic training centres/ institutes to be set up

Policy Matters

1. Constitute State Maritime Board
2. Integration of coastal shipping with IWT
3. Incentivise movement of cargo/ passenger through water transport mode- both coastal shipping & IWT
4. Mandatory movement of hazardous cargo and certain percentage of bulk cargo through waterway mode, wherever waterway exists.

Funding

1. Major projects under KIIFB funding
2. Explore Sagarmala funding for integration of IWT and coastal shipping- to make IWT connectivity to all major and minor ports.
3. PPP funding for terminal construction & operations, vessel operations etc
4. Subsidy scheme for building new IWT vessels
5. Alternate source of funding like WB/ ADB/ KINFRA
6. VGF scheme for PPP projects

The recommendations for the 13th Plan period are given below:

1. A Comprehensive development Master Plan to be prepared for the development/ classification and operation of State waterways and potential feeder routes correlating specific cargo oriented (O-D pair) study through agencies like NATPAC.
2. For integrated IWT operation, State waterways and potential feeder canals to be identified, classified and developed facilitating movement of vessels of reasonable size/ capacity based on the Comprehensive Master Plan.
3. Constitute Kerala State Maritime Board as the apex regulatory body and to bring all the activities of IWT and coastal shipping under its regime.
4. Constitute State and District Levels Monitoring Committees consisting of representatives from Revenue department, IWAI,LSGD, CSIND/ Irrigation Deptt, people's representatives etc. to monitor and facilitate inland waterway development works.
5. Pilot PPP projects for long term cargo/ passenger movements in waterways.
6. Integration of coastal shipping and inland waterways at feasible locations. Integration of Minor Ports with IWT under Sagarmala or other funding options.
7. Development of tourism activities linking IWT.
8. Subsidy schemes for building new IWT vessels
9. Viability Gap Funding for PPP projects
10. Legislation to be made for compulsory movement of hazardous cargo and certain percentage of bulk cargo by IWT mode, wherever feasible.

11. A review study on the operation of Kerala Shipping and Inland Navigation Corporation (KSINC) to be carried out to make its service to optimum level. Long term and short term vessel procurement plans to be drawn considering due importance to self-loading type container barges
12. Government to incentivize setting up of new industries along NWs/ State waterways, preferably within 2 km radius of IWT terminals.
13. Central Government to be requested to extend NW-3 from Kozhikode to Kasaragod in the north and Kollam to Vizhinjam in the south.
14. IWT ferry operation within urban area to be covered under JNNURM and the matter to be taken up with Central Govt.
15. Model rules for construction of Inland Vessels (prepared by IWAI) and River Sea Vessels (prepared by DG (Shipping)) to be adopted and implemented in the State

For implementing the above recommendations, an estimated outlay of Rs 4166 crores is proposed during 13th Plan period.

LIST OF ABBREVIATIONS

1	IWT	Inland Water Transport
2.	CSIND	Coastal Shipping and Inland Navigation Dept.
3	IWAI	Inland Water Authority of India
4	SWTD	State Water Transport Department
5	KSINC	Kerala State Inland Navigation Corporation
6	KIIFB	Kerala Infrastructure Investment Fund Board
7	WB	World Bank
8	ADB	Asian Development Bank
9	KINFRA	Kerala Industrial Infrastructure Development Corporation
10	VGF	Viability Gap Fund
11	JNNURM	Jawaharlal Nehru National Urban Renewal Mission
12	DPR	Detailed Project Report
13	CIAL	Cochin International Airport Ltd
14	TEUs	Twenty Foot Equivalent Unit
15	WCC	West Coast Canal
16	POL	Petroleum Oil & Lubricant
17	LSGD	Local Self Government Department
18	NWs	National Waterways
19	SWs	State Waterways
20	DWT	Dead Weight Tonnage

CHAPTER 1
INTRODUCTION

General

1. Inland Water Transport (IWT) is a fuel efficient, environment friendly and cost effective mode of transport having potential to supplement the overburdened rail and congested roads of the country. India has an extensive network of rivers, canals, creeks, lagoons and backwaters of about 14,500 km, of which 5700 km are navigable with mechanized vessels. The global experience offers interesting comparisons. In several countries, IWT accounts for a substantial share of inland transportation as a percentage of the total: 47% in China, 40% in Europe, 44% in Japan and Korea, 35% in Bangladesh and 14 % in the U.S (source: Speech by Hon'ble Minister of Shipping while introducing new National Waterway Bill 2015 in Parliament). In China, much of the increase has occurred in recent decades in tandem with its phenomenal industrial-agricultural growth. By contrast, in India only 3.5% of domestic surface transport is accounted for by IWT even though India is richly endowed with navigable waterways comprising rivers, canals, backwaters, creeks, lagoons etc. It is necessary that IWT mode is developed with public funding at least to a threshold level to attract private sector for their investment and involvement in development of infrastructure facilities and operations.

Inland Water Transport in India

2. In the 19th century and first half of 20th century, IWT an important mode of transport and navigation by power crafts and country boats played significant role in development of trade and commerce along several rivers and canals. The advent of railways and extension of its network made a dent in water transport in India. Rapid growth of roads coupled with inadequate development of IWT sector over the years gave a decisive set back to IWT and in the later years of 20th century except in a few areas namely Assam, Goa, Kerala, Mumbai, West Bengal, and some other coastal areas (where it has natural advantages and no developmental intervention was needed), the IWT sector was marginalised.
3. However, considering its inherent advantages, the need for systematic development of this sector was always felt which is evident from the fact that since independence several Committees studied IWT system of the country from time to time and advocated systematic development of this mode. National Transport Policy Committee in its report (1980) accordingly recommended for setting up of a national level Authority for development and regulation of inland waterways, which led to the formation of Inland Waterways Authority of India (IWAI) in 1986. As per constitutional provisions, only those waterways which are declared as National Waterways come under the purview of Central Government while rest of the waterways remain in the purview of the respective State Government.

Classification of Inland Waterways

4. Inland Waterways Authority of India (IWAI) has already made classification of inland waterways in India through Inland Waterways Authority of India (classification of inland waterways in India) Regulation 2006. According to this waterways are classified in to seven classes depending up on its characteristics and type of vessels to be operated through it. The gist of classification is given in the table below:

Table 1 *Classification of Inland Waterways in India*

Class	Depth (in m)		Bottom Width (in m)		HC (in m)		VC (in m above HFL)	Bend radius (in m)	Vessel size (SPV)/ Comb (in Tonnes)
	River	Canal	River	Canal	River	Canal			
I	1.2	1.5	30	20	30	20	4	300	100/ 200
II	1.4	1.8	40	30	40	30	5	500	300/ 600
III	1.7	2.2	50	40	50	40	7	700	500/ 1000
IV	2.0	2.5	50	50	50	50	10	800	1000/ 2000
V	2.0	-	80	-	80	-	10	800	1000/ 4000
VI	2.75	3.5	80	60	80	60	10	900	2000/ 4000
VII	>2.75	-	100	-	100	-	10	900	2000/ 8000

5. National Waterway-3 (NW-3) in Kerala is classified as Class-III waterway and accordingly IWAI is developing it in a phased manner. Probably the new NWs of Kerala are also to be developed as Class-III waterway to ensure seamless movement of vessels from one NW to the other. However, confirmation to this will be obtained only after completing the ongoing DPR study being undertaken by IWAI through an expert firm of Consultant.

National Waterway

6. Till 2016, Govt. of India has declared 5 waterways as National waterways, details are given below:
1. Allahabad- Haldia stretch of Ganga-Bhagirathi- Hooghly river system for a length of 1620 km is the National Waterway- 1 (NW-1).
 2. Dhubri- Sadiya stretch of River Brahmaputra for a length of 891 km is the National Waterway- 2 (NW-2)
 3. Kollam- Kottapuram stretch of West Coast Canal along with Champakkara&Udyogmandal canals for length of 205 km is the National Waterway- 3 (NW-3)
 4. Kakinada- Puducherry stretch of canals along with Kaluvelly tank and Bhadrachalam- Rajahmundry stretch of River Godavari &Wazirabad- Vijayawada stretch of River Krishna for a length of 1078 km is the National Waterway- 4 (NW-4)
 5. Geonkhali- Charbatia stretch of East coast canal and Matai river along with Talchar- Dhamra stretch of Brahmani- Kharsua- Dhamra river system &Mangalgadi- Paradeep stretch of Mahanadi Delta Rivers for a length of 588 km is the National Waterway- 5 (NW-5).

New Waterways

7. In April, 2016, Government of India has declared another 106 waterways spreading all over the country as National Waterways. A 2% growth in GDP is anticipated with the development of these waterways to the NW standard, which will ultimately result in a quantum jump for the IWT share in India. This has necessitated a need for faster developments in IWT sector using modern techniques. Preparation of feasibility report and DPR is underway to assess the potential & project components of these new waterways.

8. In the last few years, movement of cargo in India by IWT mode in organised sector has shown upward trend and increased from 4.416 billion tonne km (btkm) in 2009-10 to 4.770 btkm in 2011-12 but thereafter reduced to 2.522 btkm in 2014-15 (Source: IWAI website) due to decrease in movement through Goa waterways due to mining ban by Supreme court. But it still forms insignificant part of the total transport network. In terms of tonne kilometre of total inland cargo movement, its share is about 0.34% only, (considering total inland cargo of about 1,000 billion tonne- km). The target of Ministry of Shipping is to increase the modal share of IWT to 20 btkm ie. 5% of the inland cargo by 2030.

CHAPTER 2
TRANSPORT SCENARIO IN KERALA

9. *Roads:* Kerala has a vast network of over 1.62 lakh km of roads but only 1524 km come under National Highway and 24024 km come under Public Works Department which includes 4650 km. of State Highways and 19374 km. of Major District Roads. Even large portions of NH 17 and the State Highways have only single or intermediate lane width. Kerala has been neglected in the recent central highway development projects such as the Golden quadrilateral project, port connectivity projects and the East-West, North-South corridors which is covering around 14162 km.
10. *Rail:* The present rail transport system in the State is weak and exhausted the installed capacity and there is already excess demand resulting in long queues and associated discomfort in travel. The average speed of Express trains running in the State is below 60 km/hr. Railway should device plans to introduce Mainline Electrical Multiple Units (MEMU), between major intercity routes with latest electronic passenger information system and engines on both sides so as to enable it to start like bus.
11. *Air transport:* There are three airports already operating flight services in the State. About 27 airlines are operating flights through these airports. Over 8 lakh domestic passengers and 50 lakh international passengers are using these airport facilities in the State every year. About a lakh tonnes of export and import cargo are also handled by these airports every year. A new airport is coming up in Kannur which is fully owned by the State as in the case of CIAL. The airport will give much awaited boost to the economic development of North Malabar region. The government policy in aviation sector would be to promote easier and faster air transport facility for the business, tourist and emergency traffic by constructing medium sized airports in all 14 districts and helipads in Municipal towns and major tourist locations in the State. This will encourage inter-city air taxi services both in public and private sector using smaller aircrafts and helicopters for faster connectivity especially to the eastern hill locked regions for emergency needs as well as commerce and tourism.
12. *Coastal Shipping:* Transportation by coastal shipping is the cheapest mode especially for bulk commodities and for those long haulage traffic. Kerala has advantage of 585 km. coast line through which bulk cargos can be transported if multi-modal transshipment logistics is built up at intermittent points along the coastline. However, the development in port sector in the State has been stymied by the constraints of port and logistic capacity, custom procedure and labour problems. Kerala has one major port at Kochi and 17 non-major ports. Kochi port handles around 12 million tonnes of import cargo and 3 million tonnes of export cargo average per annum. The Vallarpadam container terminal at Kochi has been commissioned recently. A second major port is presently under construction at Vizhinjam through private participation which will be a deep water international container transshipment terminal. This terminal would be able to cater to container vessels upto 8000 TEUs in the initial phase and up to 12000 TEUs in the final phase.

13. *Inland Waterways*: The Inland water transport in Kerala includes rivers and backwaters. This has played a major role in the transportation right from the olden period. Inland waterways have got its own natural advantages compared to the railways and roadways. There are 41 rivers in Kerala that flows towards west clubbed with and numerous backwaters. All these are part of the inland water transport system having a length of approx. 1895 km. It is the inland canals that connect the rivers from one to another. Important places which are commercially needed are situated on the banks of these rivers. Here we have the West Coast Canal (WCC) system which has a length of about 560 kms. It starts from Kovalam in the south and extends up to Hosdurg in the north. Of this, the Kollam- Kottapuram stretch (168 km) is already declared as National Waterway-3 (NW-3) along with Champakkara (14 km) & Udyogamandal canals (23 km) by the Central Government in 1993 and is almost made fully functional. Recently Central Govt has declared the extension of NW-3 between Kottapuram and Kozhikode (160 km). Besides, four canals viz. Alappuzha- Changanassery (28 km), Alappuzha-Kottayam- Athirampuzha (38 km) and Kottayam- Vaikom (42km) have also been declared as national waterway by the Central Govt in April, 2016.
14. The State Water Transport Department with headquarters in Alappuzha is providing the much-needed connectivity to the populace of water logged areas of Kuttanad with over 50 boats. Apart from the stretches of NW-3, State Water Transport Department (SWTD) is operating boat services in and around Kollam, Alappuzha, Nileswaram near Kannur and Kasaragod, primarily meant for passenger transportation. Kerala Shipping and Inland Navigation Corporation Ltd (KSINC) and other few private operators are operating barge services in and around Kochi area.
15. There are about 1687 km. of IWT route network in the state consisting of the National Waterway- 3 from Kollam to Kottapuram which is maintained by IWAI, and other feeder canals maintained by the Coastal Shipping and Inland Navigation / State Irrigation Departments. Cargo transportation through mechanized barrages exists in NW-3. Most of the feeder canals and waterways suffer from navigational constraints like shallow depth and narrow width of channel during dry weather, siltation, and bank erosion, absence of infrastructural facilities like jetties / terminals and inadequacy of navigational aids. Kerala Shipping and Inland Navigation Corporation is also engaged in IWT freight and passenger transport with 12 barges, 11 boats and 2 Jhankars. Over 10 lakh tonnes of cargo (mainly imported cargo for the use of Eloor- Ambalamugal industrial belt) was transported to the hinterland per annum.
16. IWAI has already set up 8 cargo terminals with allied infrastructure facilities in NW-3, the 9th one is under construction at Alappuzha. Besides, Ro-Ro jetties were constructed at Bolghatty and Willgdon Island aimed at movement of containers at ICTT, Vallarpadam. However, these terminals remain underutilized due to non-availability of adequate cargo movement through NW-3. Besides, non-availability of adequate number of vessels, especially specialized vessels is also a reason for lack of expected momentum in IWT operation. Systematic development of potential waterways based on classification keeping long term perspective is the need of the hour to achieve the expected modal shift /

traffic along the identified routes. Since the waterways provide enormous tourism opportunity, a judicious planning of development coupled with tourism initiatives will certainly enhance the overall potential of the waterways. Similarly, providing last mile connectivity and integration with other modes of transport will boost up the prospects of cargo transportation manifold.

New National Waterway Bill & New NWs of Kerala

17. The government in May 2015 introduced the National Waterways Bill, 2015, which seeks to develop 106 waterways across the country, as a cheaper mode of transport. The new bill envisioned integrated development of inland waterways, saying waterways were lagging behind road and rail transport modes. The new 106 inland waterways will be in addition to the five existing National Waterways. After the inclusion of 106 additional inland waterways to the existing five national waterways, the total number of national waterways goes up to 111. The legislation provides conversion of 15 rivers in West Bengal, 14 each in Assam and Maharashtra, 11 in Karnataka, 12 in Uttar Pradesh, 9 in Tamil Nadu and 6 each in Bihar and Goa and 5 each in Gujarat, Meghalaya, Odisha and Telangana, among others.
18. *New NWs in Kerala:* Kollam- Kottapuram stretch of West Coast Canal is further extended to the north upto Kozhikode (160 km) and made part of NW-3.
19. Alappuzha-Changanacherry canal is 28 km which is designated as NW-8. Alappuzha - Changanacherry Canal route passes from Alappuzha to C Block linking Kavalam to Changanacherry. This route has better revenues prospects in the transportation of paddy, hay, manure and other agricultural products, coconuts and allied products, construction materials, lime shell etc. and serving the labour movements. The length of this route is 28 km. Only 1.3 Km (Chainage 5.9 to 7.2) of the entire length passes through Vembanad Lake.
20. Alappuzha- Kottayam- Athirampuzha canal is 38 km in length and is designated as NW-9. The canal route starts from Alappuzha via Munro lighthouse between C and SB locks and continues between Q and R Blocks to Kottayam. The Alappuzha- Kottayam canal also passes a cultivated area reclaimed from the Vembanad Lake where the paddy fields are located in 'Blocks' surrounded by artificial canals and embankments. Agricultural labour is scarce in the locality and requires the transport of labourers to the reclaimed blocks via the Waterway, which is the only route available. Only 3 km (Chainage 3 to 6) of the entire length of the A-K passes through the Vembanad Lake. The Athirampuzha canal starts from Athirampuzha (Chandakkulam). The Canal is 15 km in length and passes through Athirampuzha, Mannanam and Cheppunkal. The canal from Athirampuzha joins the Kottayam- Vaikom Canal at Maniyamparambu near Pulikkuttissery.
21. Kottayam -Vaikom canal is 42 km in length is designated as NW-59. It starts from Kottayam, Kodimatha new terminal, continues along the A- K canal until Kanjiram Junction from where it takes a sharp right angle turn towards Vaikom passing Illikal, Prappuzha, Pulikutticherry, Mania Parambu and enters Vembanad lake at Cheepunkal. It continues on the inner route between the mainland and the reclaimed coconut plantation (Swamikkalle)

joining the National Waterway-3 in Vembanad Lake before Thannermukkom barrage. The total length of Kottayam- Kanjiram stretch is about 3.5 km. The reach from Cheepumkal to Vaikom is 14 km is part of the National Waterway-3. The actual K-V waterway construction work will be confined to 24.5 km only between Kanjiram and Cheepumkal.

22. Anantha Victoria Marthandom Canal (AVM canal) is designated as NW-13. The canal has a length of 11 km between Poovar and Erayimmanthurai (Thengapatinam) of which 3 km is in Kerala and the rest 8 km is the Tamil Nadu portion.

Waterway and Tourism

23. The coastal regions of Kerala have a network of waterways, inlets, estuaries, lakes and natural canals connecting coastal towns. This interlinked body of waterways is known as the backwaters in Kerala, over 900 km of which is navigable. Travelling in traditional houseboats along these backwaters to enjoy the scenic landscape is a wonderful experience and extremely popular among foreign visitors.
24. The leisurely cruise along the famous backwaters of Kerala gives one a firsthand experience of the village life style in the State and its rustic activities like coir-making, paddy cultivation and prawn farming. It will also give a breath-taking view of the water, land, birds and human habitation on the water side, coexisting peacefully.
25. The hub of backwater tourism in Kerala, Alleppey or Alappuzha means land between the sea where a network of rivers flows into it. Backwater by definition means “a part of a river not reached by the current, where the water is stagnant” and Kerala showcases a great deal of its picturesque backwaters in Alappuzha. The houseboat rides along these backwaters and canals can prove exhilarating experience to the tourists as they take them through Kottayam, Alappuzha, Kollam, Kumarakom and Kuttanad area.

CHAPTER 3
PERFORMANCE OF IWT DURING 12TH FIVE-YEAR PLAN

26. The 12th five-year plan approach paper was formulated to capture the performance of programmes, projects and activities implemented under various development sectors after critically analysing their financial as well as physical status, of the 11th five-year plan.
27. *Administrative and Implementing Mechanism:* State Water Transport Department, Kerala Shipping & Inland Navigation Corporation Ltd and Coastal Shipping & Inland Navigation Directorate are the agencies involved in the transportation and development activities of the inland water transport sector of the State.
28. *Comparative Outlay and Expenditure:* The total budgeted outlay for the sector in the 11th Plan was Rs 45888 lakhs and the expenditure incurred was Rs 17878.17 lakhs (38.96 %). But during 12th Plan total budgeted outlay for the sector was Rs 72600 lakh (58.21 % increase over 11th Plan). The Budgeted Outlay of 12th Plan till 2015-16 is Rs 56866 lakh, out of which an amount of Rs 14364.93 lakh is expended (25.26%).
29. *Approach, Strategy and Thrust Areas of 12th Five-Year Plan:* During the 12th Plan it was proposed to provide adequate infrastructure support for the development of coastal waterways and inland waterways for cargo and passenger transportation. The focus areas were land acquisition, removal of fishing nets, dredging, side protection of canals, construction of barges etc. The State had prepared an approach plan for the sector during 12th Plan as follows:
 30. In the 19th century and first half of 20th century, IWT an important mode of transport and navigation by power crafts and country boats played significant role in development of trade and commerce along several rivers and canals. The advent of railways and extension of its network made a dent in water transport in India. Rapid growth of roads coupled with inadequate development of IWT sector over the years gave a decisive set back to IWT and in the later years of 20th century except in a few areas namely Assam, Goa, Kerala, Mumbai, West Bengal, and some other coastal areas (where it has natural advantages and no developmental intervention was needed), the IWT sector was marginalised.
 31. However, considering its inherent advantages, the need for systematic development of this sector was always felt which is evident from the fact that since independence several Committees studied IWT system of the country from time to time and advocated systematic development of this mode. National Transport Policy Committee in its report (1980) accordingly recommended for setting up of a national level Authority for development and regulation of inland waterways, which led to the formation of Inland Waterways Authority of India (IWAI) in 1986. As per constitutional provisions, only those waterways which are declared as National Waterways come under the purview of Central Government while rest of the waterways remain in the purview of the respective State Government.
 1. Adequate infrastructure support to be provided for the development of coastal waterways and inland waterways for cargo and passenger transportation

2. A time bound plan of action for the development of all possible waterways with the support of Inland Waterways Authority of India
3. PPP ventures to be supported
4. Evolving suitable strategy for integrated development of this sector or integrate it with Tourism, CSIND and water transport which required restructuring of policies.
5. The canal officers / Irrigation Department made responsible for the canal / waterway maintenance.
6. Establishing a training institute for water transport
7. Developing the connectivity to the western side of Vembanad Lake through rivers.

32. Physical Targets and Deliverables

1. Promote goods and tourist traffic through inland navigation by linking the inland feeder canals in central Kerala with National Waterway -3.
2. Develop intermodal container transshipment yards at selected locations on the feeder canal system network in Kollam- Alappuzha – Kochi region for transportation and distributing industrial and consumption goods
3. The West Coast Canal system has three stretches namely Kovalam-Kollam sector, Kollam- Kottappuram and Kottappuram – Kasaragod segments. Only the development work in Kollam – Kottappuram stretch is in progress, which is expected to be completed by March, 2017.

33. *Overall Financial Performance during the 1st four years of the 12th Five-Year Plan.* The total financial outlay provided for the Inland Water Transport sector in the 12th Plan period comes to Rs 72600 lakh with a break up of Rs 4854 lakh for the State Water Transport Department, Rs 6002 lakh for the Kerala Shipping & Inland Navigation Corporation and Rs 61744 lakh for Coastal Shipping and Inland Navigation Department. During the first four years the allotment comes to Rs 56866 lakh from which Rs 14364.93 lakh were expended. Table 2 given below shows the year-wise outlay and expenditure of the 1st four years of the 12th Plan.

Table 2 *Year-wise outlay and expenditure in rupees lakh*

Sector	2102-13		2013-14		2014-15		2015-16		Total	
	Outlay	Exp	Outlay	Exp	Outlay	Exp	Outlay	Exp	Outlay	Exp
SWTD	609	544.24	725	558.71	760	452.18	760	330.63	2854	1885.76
KSINC	1200	1200	1200	1201.77	1200	0.00	1200	0.00	4800	2401.77
CSIND	11530	1947.01	11718	3079.07	12382	3478.75	13582	1572.58	49212	10077.40
Total	13339	3691.25	13643	4839.55	14343	3930.93	15542	1903.22	56866	14364.93

Physical and Financial Performance (Scheme-wise)

State Water Transport Department (SWTD)

34. *Land, building, and terminal facilities.* The scheme is for the enhancement of the terminal facilities. The total budgeted outlay for the scheme till 2015-16 was Rs 505 lakh and the amount expended is Rs 286.75 lakh (56.78%). During the period the department has

purchased 2022 life jackets, purchased and installed ladies bio toilets at 7 boat jetties and constructed a new store house Thevara dock yard. Extension of the building at the Directorate is under progress

35. *Acquisition of fleet and augmentation of ferry Services.* The scheme is for the procurement of new boats. The total budgeted outlay for the scheme till 2015-16 was Rs 1140 lakh and the amount expended is Rs 660.87 lakh (57.97%). Purchased 5 rescue boats and one 120PAX passenger cum tourist boat. One solar boat was commissioned.
36. *Workshop facilities.* This scheme is for the improvement of workshop facilities. The total budgeted outlay for the scheme till 2015-16 was Rs 700 lakh and the amount expended is Rs 631.98 lakh (90.28%). Erection of dry dock facility at Alappuzha completed and erection of slipway at Ponjikkara, Alappuzha, Ayattian and Payyanur are nearing completion. Modification of two existing dockyards at Alappuzha and Ernakulam are in progress.
37. *Purchase of new engines and reconstruction of old boats.* This scheme is for the purchase of marine engines, steering and gear boxes for old boats and also for the procurement of timber for the repair and maintenance of wooden boats. The total budgeted outlay for the scheme till 2015-16 was Rs 509 lakh and the amount expended is Rs 306.16 lakh (60.14%). Purchased 25.39 m³ teak wood and 39.54m³ timber for the repair of old boat. Supply order issued for the purchase of 16 nos OC Chemical toilets, Hydraulic Steering System and parts worth Rs 10.28 lakhs. ALM 400 Engine spare amounting to Rs 4.78 lakh were procured.

Coastal Shipping and Inland Navigation Department (CSIND)

38. *Inland Canal Schemes.* Under this scheme development works, construction of cross structures, jetties etc in the State Waterways were mainly carried out. 48 works were sanctioned of which 11 are completed, 7 works are progressing 6 were dropped, 23 works are under process of tendering and one work is suspended due to stay from the High Court. The total budgeted outlay for the scheme was Rs 12412 lakh and the amount expended is Rs 1223.21 lakh (9.85%). The major physical achievements are given at Annexure-1.
39. *13th Finance Commission.* For the improvement of existing main canals and feeder canals for Inland Water Transport, 29 works were sanctioned and 17 completed, 6 works are in progress. The total budgeted outlay for the scheme was Rs 20000 lakh and the amount expended is Rs 4364.51 lakh (28.22%). Major physical achievements are given at Annexure-2.
40. *NABARD Assisted works.* For the development of feeder canals connecting the National Waterway-3, 26 works were sanctioned, 18 works completed, 4 works are in progress and 2 works were dropped. The total budgeted outlay for the scheme was Rs 16800 lakh and the amount expended is Rs 4489.68 lakh (26.72%). Major physical achievements are given at Annexure-3.

Kerala Shipping & Inland Navigation Corporation (KSINC)

41. *Construction of a POL tanker barge and a container barge with crane.* The scheme is to construct a 200-metric ton oil tanker for the movement of fuel oil/diesel oil within the inland waterways. The total budgeted outlay for the scheme is Rs 600 lakh and the amount expended is Rs 600 lakh (100%). 650 tonne oil barge for Rs 5.52 Cr put to service in December 2013.
42. *Commencement of a Fast Ferry Services.* The scheme envisaged construction of ferry boats to meet the needs of the present-day travellers. The total budgeted outlay for the scheme is Rs 250 lakh. Two fast ferry boats at Kochi is under construction.
43. *Construction of Sagararani-3 and introduction of theme based cruises.* The scheme intended to introduce a new and bigger Sagararani with attractive features. The total budgeted outlay for the scheme is Rs 850 lakh. Construction of theme cruise vessel for Rs 14 Cr for sea cruise is in progress. Work is expected to be completed by December 2016
44. *Renovation and reconstruction of the ferry/tourist terminal.* The scheme aimed to build a new jetty office as well as a new jetty to accommodate bigger tourist boats. The total budgeted outlay for the scheme is Rs 100 lakh. The tender for construction of ferry terminal building is in final stages, expected to be completed by March 2017.
45. *Construction of a small dry dock for repair of larger vessels.* Under this Scheme it was proposed to build a new dry dock for repair of larger vessels. The total budgeted outlay for the scheme is Rs 1500 lakh. The project was dropped as the location selected for the project found to be unviable/ non-suitable.

Achievements in the Sector

46. During 12th Plan period many works were arranged in various reaches of West Coast Canal so as to make the entire reaches navigable at state waterway standard. Though there were many impediments including protest from encroachers and local public many works were completed and most of these canal reaches have been made fully or partially navigable as per state waterway standards. Details in Table 3.

Table 3. *Achievements during 12th Five-Year Plan*

Sl.No	Reach	Chainage	Remarks
1	Kovalam to Kollam	(0.00-74.18 kms)	Work in progress
2	Kollam to Kottapuram (National Waterway-3)	(74.18-242.18 km)	Navigable
3	Kottapuram to Kozhikode (Extension of National Waterway-3)	(242.18-402.18 km)	Partially navigable
4	Kozhikode to Vadakara	(402.18-450.08 km)	Partially navigable
5	Vadakara to Mahe	(450.08-467.69 km)	Work in progress
6	Mahe to Valapattanam	(467.69-526.20 km)	Investigation stage

47. CSIND has completed deepening / formation of 27 km of waterway in different reaches of West Coast Canal. Besides, they have completed canal improvement works in 16 number of feeder canals. Also constructed 47 jetties during this period. Canal improvement work and canal formation is in progress in other reaches.
48. The State Water Transport Department transports about 150 lakhs of passengers per annum using wooden/steel and fibre Glass Passenger Boats. Presently it operate 51 schedules per day including tourism services. Approximately 40,000 people use their service per day. Operating distance per day is 700 km approximately. A dry dock with modern equipments for fastening the repair of all kind of boats was constructed. Catamaran Double hull and single hull vessels are the ongoing projects. Solar powered passenger boat, which is first of its kind in India will be inaugurated shortly. Passenger services in Parassini- Mattool, Ernakulam- Varappuzha and Vyttila –Kakkanadroutes were started. Alappuzha-Kumarakam-Kottayam and Vaikom-Ernakulam A/C tourist services will be commenced soon.
49. The Kerala Shipping and Inland Navigation Corporation at present have fleet strength of seven barges carrying various cargo, two tourist boats and two Jhankars. For the purpose of starting passenger boat operation in Kochi, 4 high speed boats are under construction. A 200 PAX mini cruise ship is under construction for tourist operation. A 500MT cargo barge is under construction for transportation of bulk raw materials.

Shortfalls during the Implementation of 12th Five-Year Plan

1. The Budgeted outlay in the 12th Plan was 58.21% more than the amount earmarked in the 11th Plan. However the development in the sector is not satisfactory. The percentage of expenditure is also low (24.8%)
2. CSIN department could not spent the fund properly due to delay in getting approval, tendering etc and also due to local problems while implementing the projects
3. SWTD also could not utilize the fund properly due to delay in taking up the projects.
4. KSINC had attained cent percentage expenditure in the year 2012-13 but has booked nil expenditure in the next three yearsevnthough some works are under progress.

Issues and Challenges in the Sector

1. Development works are not taking place in a comprehensive manner to meet the requirement of the stakeholders' viz. shippers/ operators.
2. Low productivity, non-participation of private shipping and insufficient infrastructure.
3. Land available on the sides of navigation canals were encroached long back and eviction is not possible without effective measures for rehabilitation.
4. Protest of local public against pile & slab type bank protection works and deepening work.
5. Protest of local pubic against acquisition of their land in uncut portions.
6. Non-availability government land for depositing huge quantities of excavated earth.Conflicts of interest between traditional fish folks and navigation operation.
7. Friction between Road-IWT operators.
8. Insufficient navigational clearance at lock/bridge
9. Lack of maintenance of fairway and bank protection.
10. Lack of modern inland terminals and cargo handling system.
11. Lack of end user incentivisation.
12. Insufficient plan fund allocations, delay in project execution and poor fund utilization.

Gaps

1. SWTD- could not complete construction of its office building, partially procured the required ferry boats, partially completed procurement of new engines and reconstruction of old boats.
2. CSIND- out of 48 works sanctioned under inland canal scheme only 11 were completed.Out of 29 works under 13th Finance Commission scheme only 17 completed.Out of 26 works under NABARD scheme only 18 works completed.
3. KSINC- Construction of 2 fast ferry boats, construction of cruise vessel andre- construction of ferry terminal are yet to be completed.

CHAPTER 4
PROGRAMMES FOR 13TH FIVE-YEAR PLAN

Approach and Strategy

51. Water transport is to be harnessed by developing the waterway system in the State with adequate infrastructure facilities with a view to develop it as an alternative mode of transport. For achieving this, a system approach shall be adopted during 13th Plan period. The Strategy can be broadly divided into five core areas viz. fairway development, setting up of transport infrastructure, HR/ training institutions, policy matters and funding. Details are given below:

Fairway Development

1. Full-fledged waterway development by IWAI (for NWs) and CSIND (for SWs)
2. Comprehensive Master Plan for development
3. Use modern technology for fairway development
4. Adopt modern dredging techniques

Transport Infrastructure

1. IWT terminals to be developed as cargo/ passenger multimodal hubs
2. Deploy modern cargo handling equipment at terminals
3. Use modern navigational aids and communication systems
4. Use hybrid vessels with green concept (solar, CNG etc) – for SWTD & KSINC
5. Set up vessel banks
6. Set up adequate vessel repair facilities

HR/ Training Institutions

1. Trained manpower to be made available for terminal & vessel operation
2. Business & Tourism promotion experts to be made available
3. Crew training and Logistic training centres/ institutes to be set up

Policy Matters

1. Constitute State Maritime Board
2. Integration of coastal shipping with IWT
3. Incentivise movement of cargo/ passenger through water transport mode- both coastal shipping & IWT
4. Mandatory movement of hazardous cargo and certain percentage of bulk cargo through waterway mode, wherever waterway exists.

Funding

1. Major projects under KIIFB funding
2. Explore Sagarmala funding for integration of IWT and coastal shipping- to make IWT connectivity to all major and minor ports.
3. PPP funding for terminal construction & operations, vessel operations etc
4. Subsidy scheme for building new IWT vessels
5. Alternate source of funding like WB/ ADB/ KINFRA
6. VGF scheme for PPP projects

Thrust Area during 13th Five-Year Plan

57. The following are the thrust area identified during the 13th Plan period

1. Development of all potential State Waterways and its feeder routes as per the Comprehensive Master Plan.
2. Make waterway connectivity with minor ports/ major ports, wherever possible so that integration of IWT and coastal shipping can be made a reality.
3. Provide last mile connectivity at terminals/ jetties and integrate IWT with other modes of transport.
4. Identify PPP projects for long term cargo movement through waterways by entering into tripartite agreement between shipper, operator and facilitator ie IWAI/ CSIN (in line with the NTPC coal movement in NW-1).
5. Promote movement of hazardous goods through waterway, wherever feasible, and create adequate infrastructure facilities at terminals for its handling.
6. SWTD and KSINC to be equipped with adequate number of modern boats/ barges and ensure its optimum utilisation.
7. Development of tourism activities linking IWT.
8. Adequate vessel repair facility (passenger boats, house boats and barges) to be set up at south, central and north Kerala (eg. Kollam, Alappuzha, Kochi and Azheekkal). Private Sector participation may also be explored.
9. Strengthening the existing maritime training facility at Neendakara and Kodungallur and setting up of Crew Training/ Logistic training facility at northern Kerala also (Kozhikode or Azheekkal)
10. Constitution of Kerala State Maritime Board as the apex regulatory body and bringing all the activities of IWT and coastal shipping under its regime.
11. Constituting State and District Levels Monitoring Committees consisting of representatives from Revenue department, IWAI, LSGD, CSIN/ Irrigation Deptt, people's representatives etc. to monitor and facilitate inland waterway development works.
12. Subsidy schemes for building new IWT vessels
13. Viability Gap Funding for PPP projects
14. A review study on the operation of Kerala Shipping and Inland Navigation Corporation (KSINC) to be carried out to make its service to optimum level.
15. Government to incentivize setting up of new industries along NWs/ State waterways, preferably within 2 km radius of IWT terminals.

16. Central Government to be requested to extend NW-3 from Kozhikode to Kasaragod in the north and Kollam to Vizhinjam in the south.
17. Model rules for construction of Inland Vessels (prepared by IWAI) and River Sea Vessels (prepared by DG (Shipping)) to be adopted and implemented in the State

Targets for 13th Plan

1. To develop potential stretches of West Coast Canal and its feeder routes- approximately 800 km (265 km of West Coast Canal + 535 km of feeder routes) of waterway with a target of 160 km/ yearie Kovalam- Kollam stretch (74 km) & Kozhikode- Neeleswaram (Kooliyangalanicut) (191 km) stretch of WCC along with its feeder routes and that of NW-3.
2. To increase the volume of passenger traffic from the present level of 150 lakhs/ annum to 300 lakhs/ annum
3. To achieve 12% modal shift in inland cargo to water transport sector (both coastal shipping & IWT) from the present level of 7%.

CHAPTER 5
ACTION PLAN

Waterway

58. Primarily it is proposed to develop the West Coast Canal system between Kovalam and Kasaragod along with its potential feeder routes in a phased manner. Phasing has been considered keeping view of the existing condition of the canal/ river, land acquisition/ widening requirement, technical as well as practical constraints in development and its merits based on continuity of fairway and tourism/ passenger/ cargo transportation prospects. CSIN shall take proactive measures in developing the waterways in a systematic manner with a view to achieve a paradigm shift in cargo transportation to IWT mode ie at least 12% inland cargo shall move through IWT and coastal shipping modes by the end of 13th Plan. Accordingly it is proposed to develop the waterway in three phases with a view to make it fully functional, as per the details given below.

1st Phase (2017- 18)

1. Comprehensive development Master Plan study for State waterway development
2. Full-fledged development of Kollam- Kottapuram stretch of WCC along with Champakkara & Udyogamandal canals (by IWAI/ Central Govt)
3. Development of new NWs in Alappuzha viz Alappuzha- Changanassery canal, Alappuzha- Kottayam canal, Vaikom- Kottayam- Athirapuzha canal (by IWAI/ Central Govt)
4. Development of Kottapuram- Cherai stretch of NW-3 (by IWAI/ Central Govt)
5. Completion of work in Varkala- Kollam stretch
6. Completion of work in EK canal near Kozhikode
7. Completion of work in Vadakara- Mahe stretch
8. Integration with other modes of transport at the jetties/ terminals in the above stretches
9. Development of feeder canals in the above stretches

2nd Phase (2018-2020)

1. Development of Cherai- Kozhikode stretch of NW-3 (by IWAI/ Central Govt)
2. Development of Parvathypathanar (Akkulam- Kovalam)
3. Development of Mahe-Valapatnam stretch
4. Integration with other modes of transport at the jetties/ terminals in the above stretches
5. Making IWT connectivity at minor ports Kollam, Neendakara, Kayamkulam, Kodungallur, Ponnani and Azhikkal
6. Development of feeder canals in the above stretches.

3rd Phase (2020-2022)

1. Development of Akkulam- Varkala stretch including renovation of two tunnels at Varkala
2. Development of Valapatnam-Nileswaram (Kooliyangalanicut) stretch
3. Development of Nileswaram- Kasaragod stretch (spill over to 14th Plan)
4. Development of Kovalam- Vizhinjam- Poovar stretch (spill over to 14th Plan)
5. Integration with other modes of transport at terminals/ jetties in the above stretches
6. Making IWT connectivity to Vizhinjam, Beypore and Kasaragod ports (spill over to 14th Plan)
7. Development of feeder canals in the above stretches

Vessel Operation

1. A review of trip operation shall be conducted for SWTD and KSINC (for passenger and tourists) and effective steps to be taken for increasing revenue generation.
2. Based on the outcome of the Comprehensive/ Master Plan study, KSINC to rationalize barge operation considering O-D pair (sector-wise) and also to explore long term cargo assurance with shippers for which tri-partite agreement shall be entered into with shippers and IWAI/ CSIN
3. SWTD and KSINC to periodically maintain their existing fleet, procure modern vessels and ensure its optimum utilization

Long-term Perspectives

1. The above recommendations are proposed for the 13th Plan period. However, a long term perspective plan also needs to be formulated as Vision 2030 for making the future road map of IWT in Kerala, as detailed below:
2. A modal shift of 20% of inland cargo to coastal shipping and IWT to be achieved by the year 2030 from the present level of 7%.
3. All the navigable waterways (both SWs and NWs) to be developed as Class- IV waterway with a view to ensure seamless movement of minimum 1000 dwt self-propelled vessels or a barge-tug flotilla combination carrying 2000 tonnes. Then only IWT will become economically viable
4. Containerisation shall be given top priority and encourage procurement of self-loading container barges as it will be the future of cargo transportation.
5. Set up exclusive IWT berths within the major ports (finger jetty concepts) premises adjacent to the offshore berths so that transshipment would be made easy.
6. All the major ports (Kochi & Vizhinjam) and minor ports (Valiyathura, Kollam, Neendakara, Kayamkulam, Alappuzha, Kodungallur, Ponnani, Beypore, Azheekkal and Kasaragode) should have IWT connectivity so that evacuation of cargo can be done through waterways to various destinations of Kerala
7. Fiscal and tax concession shall be considered for setting up of industries near the IWT terminals or on the side of the waterways. Raw materials/ products of such industries shall be mandatorily moved through waterways for which incentives to be considered.

8. All the IWT terminals and inland ports shall be provided with custom clearance facilities.

59. The following are the Department-wise project proposals proposed during 13th Plan period:

State Water Transport Department (SWTD)

1. *Purchase of New Engine and Reconstruction of old Boats.* The schemes is meant for procuring Timber, Marine engines, steering, Gear boxes Machinery and Technical components essential for converting department vessels into CNG mode and other routine repairs.Desiltation of mud in front of slipways at yards also included under this scheme. An aggregate budgetary outlay of Rs. 10 crores is proposed for the 13th Plan.
2. *Acquisitions of Fleet and Augmentations of Ferry Services.* The scheme is for building new vessels. The Department , in a drive to extract the potential of water tourism utilizing the new national waterways, gears up to introduce new passenger-cum- tourist services by building high speed(up to 20 knot miles) advanced type of tourist and cruise vessels, water taxi and so on. In addition the department mulls the operation new boat services covering certain key water routes namely Mattoor – Azhikkal, Bakel – Neeleswaram and Ashtamudi – Valapattanam. For all these, an aggregate budgetary outlay of Rs. 110 crores is proposed for the 13thFive-Year Plan period.
3. *Workshop Facilities.*The scheme is meant for the revamp and renovations of workshop facilities. The existing department dock yards at Thevara and Alappuzha are to be renovated and modernized and additional works at Ayitti are some of the major projects propose to be implemented during the 13thFive-Year Plan period expecting an aggregate budgetary out lay of Rs. 10 crores for the whole period.
4. *Land, Building and Terminal Facilities.* The scheme is for the construction of new building and terminal facilities. During the 13thFive-Year Plan, it is geared up to execute the following projects. Work includes renovation of Alappuzha dock, Thevara yard and dock at Ayitti, renovation of existing Regional office at Ernakulam, procurement of marking buoys and floating jetties in new waterways For all these, an aggregate budgetary allocation of Rs.10 crores is proposed for the 13thFive-Year Plan period.

60. Thus, the total estimated cost of projects of SWTD during 13th Plan is Rs 140 cr.

Coastal Shipping and Inland Navigation Department

61. The WCC starting from Kovalam down south near Thiruvananthapuram to Neeleswaram in Kasaragod is at present not fully serviceable due to certain bottle necks. The filled up canal near Kovalam, Varkala Tunnels, the Kollam thodu, all these in south and the uncut portion from Vadakara to Mahe, then the three uncut portion from Mahe to Valappatanam etc. are the main bottlenecks to make a continuous waterway from Kovalam to Kasaragod. Once this work is completed, cruise vessel and cargo vessels can move right from Kovalam to Kasaragod.This will also facilitate evacuation of container cargo from various ports

enroute viz Vizhinjam, Neendakara, Kayamkulam, Kochi, Kodungallur, Ponnani, Beypore and Azheekkal to other destinations in Kerala.

State Sector Schemes

62. There are 9 projects proposed under the State Sector Scheme primarily for the development of balance work in Varkala- Kollam stretch, Kozhikode- Vadakara, Vadakara- Mahe stretch and Valapattanam- Neeleswaram stretch and development of some feeder canals in these stretches. The total estimated cost of work is Rs 628 crores. Besides, a comprehensive study to be taken up to assess the feasibility of State waterways and its potential feeder routes. The study shall also include quantification of possible divertible cargo (O-D pair), its forecast and sector. A provision of Rs 5 cr is estimated for this purpose.

State Sector Large Schemes under KIIFB

63. This include 5 major projects viz. development of Parvathyputhanar (Akkulam- Kovalam) in Thiruvananthapuram district, beautification of canals in Alappuzha, revival of E-K canal in Kozhikode, modification of two tunnels in Varkala, development of Mahe- Valapatnam stretch. The total estimated cost of work is Rs 2590 crores.

NABARAD-RIDF-XXII- Development of Feeder Canals

64. This include 15 projects mainly aiming at development of feeder canals to NW-3 or to the West Coast Canal including provision to create infrastructural facilities like boat jetties, modification of bridges, locks, regulators etc. The total estimated cost of work is Rs 377 crores.
65. The total estimated cost of schemes of works of CSIN during 13th Plan period is Rs 3600 cr. Details of all the proposals is given at Annexure-4

Kerala Shipping and Inland Navigation Corporation Ltd (KSINC)

66. *Construction of new bulk cargo barges.* In the 13th Five-Year Plan period the company proposes to introduce four more dry bulk cargo barges. One of this is planned for the year 2017-18, two more in 2018-19 and last one in 2021-22. These barges will be of 500 -700 MT capacity and will supplement existing fleet of barges which are operating mainly for FACT. The estimated cost of this work is Rs 19.50 cr.
67. *Construction of new POL tanker barges (IV vessel).* A new petroleum tanker barge is proposed for the year 2019-20, which is mainly aimed to replace the existing one in the fleet. It will be of 300 MT capacity. The estimated cost of this work is Rs 6 cr.
68. *Construction of acid tanker barge (IV vessel).* A new Acid tanker barge is proposed for the year 2020-21 which is aimed to replace existing one in the fleet. It will be of 300 MT capacity. The estimated cost of this work is Rs 6 cr.

69. *Renovation of existing Slipway at Thoppumpady.* The existing slipway does not have the capacity to haul up large vessels. So the company is now propose to install a new hauling up mechanism (slipway) at the southern part of the existing slipway where vacant land is available. The project will be spread over the financial years 2017-18 and 2018-19. The estimated cost of this work is Rs 10.5 cr.
70. *1200 MT POL tanker barge (MS class – sea going vessel).*The company proposes to build two sea going tanker barges for bunkering operations in the outer sea. One was already approved in the financial year 2012-13 but the actual cost was higher than what was approved by the Government. Hence the proposal was re-submitted for approval to meet the approved cost. Hence the balance cost is now submitted for funding in the year 2017-18 and a new one is proposed for 2021-22. The estimated cost of this work is Rs 29 cr.
71. *Fast ferry boats.* KSINC is building four fast ferry boats to improve the ferry services in and around Kochi. Construction of the first batch of two boats is in progress at the builder's yard in Goa. If the service is successful, it is proposed to procure two more boats each in the year 2018-19 and 2019-20. The estimated cost of this work is Rs 10 cr.
72. *New tourism vessel (sea going).* KSINC is very active in back water tourism and its vessels are being used by the tourists especially for offshore visits. Besides the two IV vessels presently under operation, another sea going vessel having 200 PAX capacity is under construction. Based on the success of its operation KSINC is planning to build one more sea going vessel (preferably with sleeping accommodation) to increase business. The estimated cost of this work is Rs 35 cr.
73. The total estimated cost of schemes of KSINC during 13th Plan period is Rs 116 cr.

CSIN Department

74. The following proposals are to be taken up by the CSIN Department as part of administrative/ policy decisions:
1. *IWT subsidy:* Presently Re1/- per tonne- km has been given as subsidy for movement of cargo through inland waterways. This shall be continued for the 13th Plan period also for which a provision of Rs 10 cr is proposed.
 2. *Subsidy for procurement of IWT vessels:* 20% subsidy to be considered for procurement of new barges, boats, cruise vessels etc which is being built in Indian yards. The vessel should be operated in Kerala inland waters or coastal waters for a minimum period of 5 years. A corpus fund to the tune of Rs 200 cr may be catered for this purpose during 13th Plan period.
77. *VGF for creating IWT facilities.* For encouraging PPP projects in the field of IWT, 20% Viability Gap Funding may be considered by the State Govt. A corpus fund to the tune of Rs 100 cr may be catered for this purpose.

78. Thus the total outlay proposed for IWT sector during 13th Plan is Rs 4166 cr

ANNEXURE-1

Major Achievements under Inland Canal Scheme (CSIN)

1. Deepening and side protection to the Tanur - Koottayi Canal - Vettom to Poorappuzha from Ch:342.10 to 343.06 km (for a length of 0.96 km from Ch:343.06 km towards south) completed
2. Protecting the eroded bank at T.S canal from Amritha Boat Jetty to Pannithodu in Kulasekharapuram Grama Panchayath in Karunagappally Taluk in Kollam District completed
3. Improvements of Parvathy Puthanar near Kunnumanal area from Ch.4140 m to 4440 m by desilting the canal completed
4. Protecting the side of Changanassery-Alappuzha boat route canal near Changanassery boat jetty in Changanassery Municipality completed
5. Fabrication and supply of 2 nos lock shutters and 1 no regulator shutter in BM canal at Moozhikkal completed
6. Protecting the right bank of Palakkode river in Valapattam-Kotti navigation route at Moolakeel Kadavu in Madayi Panchayath completed
7. Construction of Jhankar Jetty side protection works and maintenance of existing jetty at Sambranikodi in Thrikkaruva Panchayath completed
8. Construction of Jhankar Jetty and "A" Type boat Jetty at Vathikattu in Perumbalam Panchayath complete
9. Renovation works of Kannety feeder canal completed
10. Development of TS canal from Eravipuram kayal to Ashtamudi Kayal (Kollamthodu) is in progress.
11. Renovation works of small tunnel at Varkala and 3 km canal portion is in progress.
12. In Kollam district work of 43 jetties were taken up and completed..

ANNEXURE-2

Major Achievements under 13th Finance Commission Scheme (CSIN)

1. Development of feeder canal connecting KannettiKayal at Karunagapally to National Waterway-3 completed.
2. Modernisation and improvement to Kotti-Kottapuram Waterway –dredging in between Ch: 570 km to 575 km access to the boat jetties completed.
3. Improvement to Kottapuram – Hosdurg Waterway – Neeleswaramriver –dredging from Kottapuram to Nambiarkalcompleted.
4. Mechanical works including purchase of water hyacinth, replacement of locks, rejuvenation of dredgers completed
5. Formation ofVadakara - Mahecanal from Ch 454.080 km to 457.380 km completed
6. Renovation work of three reaches of PC canal in Malappuramdistrict were arranged and completed.

ANNEXURE-3

Major Achievements under NABARD Scheme (CSIN)

1. Improvements to canal from Chuzhalakuzhy to Vembanadu lake in Kottayam District
2. Improvements to canal from Cheepumkal to NW-3 in Kottayam District
3. Improvements of Kaippuzha Vechoorputhenkayal in Vaikomin Kottayam District
Improvements to Valiyappuzha river in Vaikom Taluk
4. Improvements to Perunchillathodu in Vaikom Taluk
5. Improvements to feeder canal to NW- 3 in Kottayam District completed
6. Improvements to Appanchira Canal in Kaduthuruthy Panchayat
7. Improvements to Chullithode in Kaduthuruthy Panchayat
8. Improvements to Valiyathode in Kaduthuruthy Panchayat
9. Improvements to Valachira canal in Kaduthuruthy Panchayat
10. Improvements to Athirampuzha-Mannanam canal from Athirampuzha to Mannanam Boat Jetty
11. Improvements to Kottayam -Alappuzha boat route canal
12. Improvements to Meenathara River
13. Improvements to Kodoor River from Peruveli bridge to Moonnattumugham in Puthuppally Panchayat
14. Improvements and dredging the waterway completed in Kannur Dist between Ch:491.500 km and 493.000 km in Erencholi River in Thalassery Municipality, Kadirur and Erencholi Panchayat between Ch:559.750 km and 567.900 km in Palakkode and Perumba River between Ch:527.000 km and 533.900 km in Valapattanam River between Ch:500.800 km and 503.480 km in Anjarakandy River in Dharmadam and Pinarayi Panchayat
15. Development of Inland Waterways and canals completed Protecting the bank of feeder route of Kotti-Kottappuram waterway at Kokkalkadavu in Padanna Panchayat
16. Improvements to the navigation route between Kotti and Kottappuram- construction of two boat jetty at Randuthengukadavu and Mouval Thazhattukadavu in Ramanthali Panchayat.
17. Renovation work of 2 reaches of Beypore- Kallayi canal and 1 reach of E.K.canal in Kozhikode district were arranged and completed.
18. First reach of Vadakara- Mahe canal arranged and canal formation completed as per state waterway standards. Work foreclosed due to technical reasons.
19. Dredging works of 3 reaches in between Valapattanam and Kottappuram including construction of boat jetties was arranged and completed.

ANNEXURE 4

13th Five-Year Plan
Inland Navigation Directorate, Kollam

Sl No	Project Name	Project Amount in Crores	2017-18	2018-19	2019-20	2020-21	2021-22	Remarks
III.NABARD RIDF XXII- DEVELOPMENT OF FEEDER CANALS								
1	Improvements to the feeder canal of PC canal- Improvements to Chettuva canal in Thrissur District including construction of Boat Jetty at Chettuva.	3.00	3.00					
2	Construction of Terminal Boat Jetty and walk way at Parassinikadavu in Thaliparamba Municipality.	4.00	4.00					
3	Construction of Boat Jetty cum cargo terminal at Kakkad	3.50	3.50					
4	Improvements to the feeder canal of PC canal - Improvements to Karuvanthala canal in Thrissur Distirct.	1.00	1.00					
5	Development of Water ways and canals – Construction of Steel Lattice Bridge at Sarovaram Park in Kozhikkodu Corporation	1.50	1.50					
6	Dredging and Deepening the feeder canal connecting Neendakara to Dalavapuram, at NWIII	3.50	3.50					
7	Construction of Regulator – cum bridge	30.00	30.00					

at Karingalimukku						
8	Improvements to feeder canal to NW-III – Improvements of Ezhumankayal and Ezhumanthuruthu in Kaduthuruthi Panchayath in Kottayam District.	4.50	4.50			
9	Improvements to the feeder canal to NW- III Improvements to Meenachil river in Kidangoor Panchayath in Kottayam District.	5.00	5.00			
10	Construction of approach road to Moozhikkal Lock cum Bridge	8.50	4.00	4.60		
11	Construction of Lock cum Bridge at Karingalimukku	20.00	10.00	10.00		
12	Construction of Lock cum Bridge at Veliyamcode	22.50	10.00	12.50		
13	Development of Feeder canals	90.00	30.00	30.00	30.00	
14	Constructyion of Road bridges and foot bridges	160.00	40.00	60.00	40.00	
15	Construction of boat jetties and cargo terminals	20.00	5.00	10.00	5.00	
Total		377.00	155.00	127.10	75.00	0.00

ANNEXURE-5

Recommendations of the Stakeholders meeting held on 17th November, 2016 at Kochi (both IWT & Port)

1. Long term plan shall envisage movement of loaded container/ empty container between Kasaragod and Kolachal through the inland waterway network in Kerala
2. More clarity is required in dealing legal aspects- who should deal what
3. Since we have 5 National Waterways now in Kerala there is a necessity of better coordination between State and Central governments for a strategic and judicious development of NWs with a view to make it as an alternative mode of transport
4. A detailed study shall be carried out through an expert firm to assess the funding possibilities (ie Central, External, VGF) to meet the emerging scenario to tap the potential of IWT development keeping view the long term cargo assurance in line with that Jindal JTF coal movement between Sagar and Farakka in Ganga (NW-1) for NTPC, Farakka Thermal power station
5. State government has given top priority for coastal shipping and IWT development with a view to achieve a modal shift of 20% by 2020 and 50% by 2050.
6. Existing minor ports at Vizhinjam, Kollam, Kodungallur, Beypore and Azheekkal needs to have waterway connectivity for integration of Coastal Shipping and IWT. DPR study shall be taken up for making IWT connectivity for Vizhinjam, Kollam and Beypore ports.
7. Vessel repair facilities are not available at minor ports. Dry docking facility to be created at least in two places viz Azheekkal and Kochi or Ashtamudi near Kollam. PPP possibility can be explored.
8. At present boat repair facility is only available at Alappuzha, not for house boats. If house boat owners association helps government in identifying a suitable land, government can consider a proposal for setting up of repair facilities there, even with PPP.
9. STP to be set up at Alappuzha and Kollam for collecting wastes from house boats. Mobile waste collection mechanism shall also be explored. Floating jetties to be provided for safe mooring of house boats between Punnamada and Finishing point.
10. NW-3 should be made fully functional in a time bound manner- left over impediments like widening of narrow canal near Chavara, reconstruction of Kovilthottam foot bridge and widening of Trikkunnappuzha lock to be taken up on top priority basis. State Govt may impress upon IWAI/ Central Govt to expedite these works.
11. IWAI has set up 10 IWT terminals in NW-3 which remain unutilized. State Govt and IWAI shall jointly explore the possibility of its optimum utilization. Long term leasing to private parties may also be explored.
12. Canal side facilities like jetty construction and laying of pipelines at KMML, Chavara shall be completed in a time bound manner to facilitate early commencement of movement of hydrochloric acid and furnace oil from TCC and BPC, respectively. PPP route possibility can be explored between BPCL, TCC, KMML and IWAI.

13. All the minor ports in Kerala should have 6 m draught so that coastal vessels of 8000 dwt can be handled there. Since container movement is expected, these ports shall be equipped with container handling equipment.
14. Kochi shall be developed as the major container hub for coastal shipping and IWT modes
15. Matter may be taken up with Ministry of Shipping for re-introducing Vessel building subsidy scheme. Till that time State Govt may create a Corpus fund for providing VGF to the operators for procurement of barges to be operated in Kerala waterways (both NWs and designated SWs)
16. More financial institutions shall come forward to give funding for procurement of vessels as per government directives. Similarly more people shall involve in business- not only carriers but shippers too.
17. Encourage port based and waterway based industrialisation. Incentives to be provided for setting up of industrial estates and parks at these locations.
18. Kerala being a consumer State, priority shall be given to movement of consumer goods for which small barges are ideal.
19. At present other than FACT, no major PSU has come forward for movement of cargo through IWT. If PSU industries are located by the side of waterway, Govt to make legislation/ directives for mandatory movement of certain % of cargo (either raw material or products) through waterway.
20. Hazardous cargo should be moved only through waterways wherever it exist. It should not be consider on cost aspects but on safety aspects.
21. At Azheekkal port only a 200 T capacity warehouse is there even though dredging is done. Adequate port infrastructure to be created at all minor ports.
22. Declared feeder routes should be dredged by CSIN department for smooth and effective operation of house boats in and around Alappuzha
23. Revival of Alappuzha port to be considered
24. Canals in Alappuzha shall be revived, particularly the Cherthala canal
25. 17 house boats are available at Kottapuram (in Malabar area), however, they could operate only during high tides. Necessary dredging needs to be done for deepening the channel for making all time operation (day time)
26. At Ponnani difficulty is faced by vessel operators for entry into Chamravattom side in Beyem canal due to low level bridge and erosion/ encroachment of banks. Removal of encroachment and dredging is required to maintain the fairway for smooth and safe navigation.
27. Vessel operators should be involved/ consulted in studies being conducted by CSIN or any other agencies.
28. As per existing rules, dry dock checking to be done once in every 2 years for motor boats. Suitable yards are not available in Kochi for testing. Hence this may be made once in 5 years. More centres for survey & registration to be set up.
29. Elamkunnappuzha canal link to be developed for making connectivity between Vypeen channel and Udyogamandal canal
30. At present NW-3 is notified as Class-III waterway. For better utilization and keeping long term perspective at least the main West Coast Canal to be re-notified as Class- IV waterway so as to accommodate bigger vessels.

31. Development of feeder canal also to be given top priority aiming at tourism development. As far as possible it shall be developed to the same Class.

**PROCEEDINGS OF THE MEMBER SECRETARY
STATE PLANNING BOARD
(Present: Sri. V. S. Senthil IAS)**

Sub: Formulation of XIII Five Year Plan (2017-2022) – Constitution of Working Group –
Inland Water Transport Sector -reg.

Ref: Note No. 260/2016/PCD/SPB dated 06.09.2016 of the Chief (i/c), PCD, SPB

ORDER No. SPB/295/2016/I&I (WG-8)

Dated: 20.09.2016

As part of formulation of XIII Five Year Plan, the State Planning Board has decided to constitute Working Groups to formulate draft proposals in the various major development sectors and sub sectors. Resource persons including Professionals, Administrators and experts connected with the sectors were identified as members of the Working Groups. Accordingly, the **Working Group on Inland Water Transport Sector** is hereby constituted with the following members.

Co-Chairpersons

1. Sri. V. J. Kurian IAS, Additional Chief Secretary, Transport (Aviation and Airports) & Water Resources Department, Government Secretariat, Thiruvananthapuram.
2. Sri. R.M. Nair, Formerly Member (Tech), IWAI, 304/28, East End Apartments, MayoorVihar, Phase II, Extension, New Delhi- 110 096

Members

1. Sri. Tom Jose I A S, Managing Director, Kerala Shipping Inland Navigation Corporation, Gandhi Nagar, Kochi -382020
2. Smt. TinkuBiswal IAS, Secretary, Water Resources & CSIND, Government Secretariat, Thiruvananthapuram
3. Sri. V. K. Mahanudevan, Chief Engineer, (I & A) Public Office, Thiruvananthapuram
4. Smt. Suresh Kumar S. Director, Inland Navigation Directorate, Kollam.
5. Sri. N. Unni, Director, Inland Water Authority of India, National Waterway Road, KannadiKadu, Marad, Ernakulam 682304
6. Sri. Shaji V. Nair, Director, Kerala State Water Transport Department, Directorate, Alappuzha
7. Sri. Dileep Krishnan, Emeritus Professor, Department of Ship Technology, CUSAT, VI/670, Santhi, Thrikkakkara, Kollamkudimukal Road, Kochi, Kerala 682 021
8. Prof. P. Rajendran, Vice Chancellor, Kerala Agricultural University
9. Sri. Shine K. George Kuttickattu House, Thottampally, Alappuzha - 688013

Convener

Sri. Joy N.R. Chief, Industry & Infrastructure Division, State Planning Board.

Co- Convener

Assistant Director (Inland Water Transport Sector), Industry and infrastructure Division,
State Planning Board

Terms of Reference - Inland Water Transport

1. To review the development of Inland Water Transport sector with emphasis as to progress, achievements, present status and problems under its jurisdiction during the 11th and 12th Five Year Plan periods.
2. To evaluate achievements with regard to the plan projects launched in the Inland Water Transport sector both by the State Government and by the Central Government in the State during these plan periods.
3. To list the different sources of data in regard to the Inland Water Transport sector and provide a critical evaluation of these data sources, including measures for improvement.
4. To identify and formulate a set of output and outcome indicators (preferably measurable) for the Inland Water Transport sector and base the analysis of the previous plans on these indicators.
5. To outline special problems pertaining to the Inland Water Transport sector.
6. To suggest, in particular, a set of projects which can be undertaken during the 13th Plan period in the Inland Water Transport sector.

Terms of Reference (General)

1. The Chairperson is authorised to modify Terms of Reference with the approval of State Planning Board. The Chairperson is authorised to invite, on behalf of the Working Group, experts to advise the Group on its subject matter. These invitees are eligible for TA and DA as appropriate.
2. The Working Group will submit its draft report by 1st December 2016 to the State Planning Board
3. The non- official members of the Working Group will be entitled to travelling allowances as per existing government norms. The Class I Officers of GOI will be entitled to travelling allowances as per rules if reimbursement is not allowed from Departments.

(Sd/-)
MEMBER SECRETARY

To
The Members concerned

Copy to:-
The Accountant General, Kerala (A&E) with C/L
The Sub Treasury Officer, Vellayambalam.
The PS to the Hon. Vice Chairman, State Planning Board.
PA to Member Secretary
CA to Member (KRR)
All Divisions, State Planning Board.
The Sr. Administrative Officer, State Planning Board.
Stock File

Forwarded by Order

Sd/-
Chief, (Industry & Infrastructure Division)

**PROCEEDINGS OF THE MEMBER SECRETARY
STATE PLANNING BOARD
(Present: Sri. V.S Senthil IAS)**

Sub: - Formulation of XIII Five Year Plan (2017-2022) – Working Group on **Inland Water Transport** Sector - Re- constituted – Orders Issued - reg.

Ref: - 1.This Office order of even number dated 20.9.2016

2 This office .Email dated 15.10.2016 agreed by the Co-Chairpersons.

ORDER NO.SPB/295/2016/I&I (WG-8) DATED: 17 .10 .2016

As part of formulation of XIII Five Year Plan, the Working Groups on Inland Water Transport has been constituted vide order 1st read above. As per the 2nd reference decision has been taken to reconstitute the Working Group on Inland Water Transport Sector by including two new members viz . Sri P.I Sheik Pareeth IAS and Dr B.G Sreedevi.

In this context, the working group on Inland Water Transport sector is hereby re-constituted by including two new members as follows.

Co-Chairpersons

1. Sri. V. J. Kurian IAS, Additional Chief Secretary, Transport (Aviation and Airports) & Water Resources Department, Government Secretariat, Thiruvananthapuram.
2. Sri. R.M. Nair, Formerly Member (Tech), IWAI, 304/28, East End Apartments, MayoorVihar, Phase II, Extension, New Delhi- 110 096

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4. Dr B.G. Sreedevi, Director, NATPAC, Thiruvananthapuram
5. Sri. V. K. Mahanudevan, Chief Engineer, (I & A) Public Office, Thiruvananthapuram
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Convener

Sri. Joy N.R. Chief, Industry & Infrastructure Division, State Planning Board.

Co- Convener

Assistant Director (Inland Water Transport Sector), Industry and infrastructure Division,
State Planning Board

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(Sd/-)
MEMBER SECRETARY

To
The Members concerned

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Chief
(Industry & Infrastructure Division)