GOVERNMENT OF KERALA
KERALA STATE PLANNING BOARD

THIRTEENTH FIVE-YEAR PLAN
(2017-2022)

WORKING GROUP ON

DRINKING WATER AND SEWERAGE

REPORT

SOCIAL SERVICES 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 Drinking water and Sewerage. The Chairpersons of the Working Group were Shri VJ Kurian IAS and Dr Vijayakumar K. The Member of the Planning Board who coordinated the activities of the Working Group was Dr B Ekbal. The concerned Chief of Division was Smt Shila Unnithan.

Member Secretary

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CHAPTER 1
OVERVIEW OF THE ELEVENTH AND TWELFTH FIVE YEAR PLAN

1. Drinking water sector is given much importance in Kerala as water remains pivotal for sustainable development and is linked to a number of global challenges. The basic objective of the 11th Planwas to redefine the role and relationship of the State in efficiency, productivity and technologies of water use in Kerala. The allocation and expenditure of water supply and sanitation during the 11th Five-Year Plan is summarised below.

Table 1 *Outlay and expenditure of drinking water –Eleventh Plan (2007-2012)*

Year	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Outlay	91295	96960	102300	105800	90897.00	487252
Expenditure	75812.34	56003.77	65080.75	38780.56	47116.61	282794
% Expenditure	83.04	57.76	63.62	36.65	51.84	58.04

2. An Overview the 12th Plan in a way should be looked at as the first step towards the achievement of the vision- Development with Care and Compassion' capturing the goals indicated above for the development of the State by 2030. 12th Plan is people-centric, based on the needs of the citizen and aimed at improving the status of each individual and each group of people. Focus is on a bottom-up approach, starting from the people in the lowest strata to achieve the objective of inclusive growth. The allocation and expenditure of water supply and sanitation during the 12th Five year plan is summarised below.

3. The total outlay for the first year of five year plan was Rs 75600 lakhs of which Rs 62211 lakhs was the expenditure,(82.3 %)and during the second year of plan, the expenditure was only 35.98 %, though there was an increased outlay of Rs 930 lakhs than the first year,(Rs84900 lakhs) During the third year of plan, the total outlay was Rs77400 lakhs and the expenditure was Rs 53687 lakhs (69.36 %). The percentage of expenditure during the fourth year of plan was better than the previous year (76.17%) from an outlay of Rs 90042 lakhs. During the last and final year of the 12th plan the total outlay for the drinking water sector is Rs 99692 lakhs.

4. At present, Kerala Water Authority is the major stake holder in the water sector and KRWSA is also implementing drinking water projects with a participatory approach. The activities of these two organizations in the drinking water sector are detailed below.

Table 2 *Outlay and Expenditure of Drinking Water Sector in Kerala from 2012-13 to 2016-17 (as on 13/12/2016)*

Name of Agency	2012-13		2013-14		2014-15		2015-16		2016-17	
	Outlay	Expenditure	Outlay	Expenditure	Outlay	Expenditure	Outlay	Expenditure	Outlay	Expenditure
Kerala Water Authority	63416	57409.34	65108	19976.39	56880	37943.32	63180	43653.87	67250	13851.98
KRWSA	12184	4802	19792	10578	20520	15743.42	26862	24933.29	32442	18150.45
Total	75600	62211.34	84900	30554.39	77400	53686.74	90042	68587.16	99692	32002.43
% of expenditure		82.29		35.99		69.36		76.17		32.10

Kerala Water Authority – an Overview

Introduction

5. The KWA was constituted by the Government of Kerala through the Kerala Water Supply and Waste Water Ordinance 1984 converting the then existing Public Health Engineering Department. The ordinance was replaced by the Kerala Water Supply and Sewerage Act 1986 (Act14of 1986) and the organization was deemed to have come into force on the 1st day of March1984.The Act provides for the establishment of an autonomous Authority for the development and regulation of water supply and waste water collection and disposal in the state of Kerala and for matters connected there with.

Organisational Structure

6. The KWA has its headquarters at Jalabhavan, Vellayambalam, Thiruvananthapuram.It has three regional offices, 15circles, 51Divisions, 136 Sub Divisions and 293 Sections spread across Kerala. The major functional units are:

    1. Operation &Maintenance
    2. Projects
    3. Project Planning and Development
    4. Consultancy(WASCON)

7. The KWA has elaborate water quality control setup with a State ReferralInstituteatKochiandhas14districtlabsand33subdivisionallabs.Inheadofficetheoperations of existing schemes including O&M, Revenue Collection, Non-Revenue Water loss, etc. are also been monitored in addition to the on-going schemes progress. During the previous year, the severe summer and resultant waters scarcity could be managed smoothly through timely interventions, fast decisions and close monitoring. The objective is improved customer satisfaction through better service delivery.

Water Supply Coverage

8. There are 1078 water supply schemes in operation as on31.3.16, with a total installed capacity of 3367.13mld, which means the average per capita availability of piped water is 100.79 liters per day. However the lpcd is varying in different habitations in all districts. But after accounting for the high percentage of Non- revenue water, the per capita availability is much less and also the schemes are mostly located in urban areas. The details of coverage of local bodies with water supply are presented in the table below.

Table 3

Local Body	No. of L.B	Coverage		
		Through WTP	To be covered by Ongoing Schemes (WTP)	Without WTP

Panchayath	941	471	211	259
Municipality	87	66	8	13
Corporation	6	6	0	0

9. At present there are 13 municipalities and 259 panchayats which are not covered with water from water treatment plants. However of these, 12 municipalities and168 panchayats have coverage from non WTP schemes of KWA. KWA distributes water through House Service Connections (HSC) and street taps. The total number of HSCis18, 12,528 and that of street taps is 2, 08,034 as on 31.3.16. In the financial year 2015-16, KWA has given 112016 new house service connections and 1350 street taps were added. As per data available, 52.30% population of Kerala (50.80% of rural population and 53.96% of urban population are covered by piped water supply.KWA aims to cover 100% population with100 lpcd for rural and 150 lpcd for urban areas. On completion of the projects under execution the installed capacity will be enhanced by 1328.21mld making the total installed capacity to 4695.34 mld.

Habitation Coverage

10. As per IMIS data, out of 11883 rural habitations, 938 partially covered habitations were converted to fully covered habitations in the financial year 2015-16 with piped water supply by commissioning the schemes in the area. Also the total numbers of quality affected habitations have been reduced from 751 to 656 habitations during the financial year 2015-16.There are no arsenic affected habitations in Kerala presently.

Sewerage

11. The coverage of sewerage in the state is negligible. Thiruvananthapuram city has 37% coverage with about 90,000 connections. Ernakulam has a small system with 1000 connections. Two projects for Kollam and Kozhikkode under KSUDP are in progress. Wastewater collection and disposal are of equal importance to that of protected water supply in maintaining public health and much attention is needed in this sector.

Revenue

12. The major income for KWA is from the sale of water and KWA is the only state in the country with 100% metered water connections. The water tariffs uniform across the state with block tariff structure (increasing rate with increasing consumption). The last revision in water tariff was on 01.10.2014. The total revenue collected during 2015-16 was Rs 460.25 crores.

13. The major sources of income for KWA are from the following sources:
    1. Revenue from sale of water
    2. Non Plan Grant from GoK
    3. Plan fund from GoK
    4. NRDWP funds from GoI
    5. NABARD

Capital Works

14. Currently the KWA undertakes projects under various heads. During the financial year 2015-16, 48 projects were completed and thereby increasing the coverage and benefitting about 21 lakh more people with safe drinking water. The list of works/schemes completed during the financial year 2015-16 is enclosed as Table-1.

15. The JnNURM and UIDSSMT are GoI projects and have already been wound up. The JICA loan assistance has also been closed. The central assistance is showing a diminishing trend, the allocation for the year 2015-16 being Rs45.28 crores.

16. Various schemes are being implemented by Kerala Water Authority considering the need for extending the coverage of protected water supply in the state. A summary of projects being executed in the main heads during the financial year 2015-16 are given below.

National Rural Drinking Water Programme (NRDWP)

ARWS Schemes

17. During the financial year22 water supply schemes and one work under sustainability category for a total amount of Rs 260.40 crores were sanctioned under this head. The state share for this is in the ratio 50:50.The central assistance is showing a diminishing trend, the allocation for the year 2015-16 being Rs45.28 crores. During the above period40 schemes were completed in various districts benefitting a population of about 17lakh. There are 212 ongoing schemes as on 30.9.16 under this head.

"Varsha"-Rain Water Harvesting

18. The scheme is proposed to collect rain water from the roof top and store it in a tank from where water will be drawn by the beneficiaries. After completion, the project shall be handed over to the beneficiaries. Kerala Water Authority had completed 5748 units of Varsha schemes in the districts of Thiruvananthapuram, Alappuzha, Kottayam & Ernakulam from 2002 onwards. The works of 221 units of Varsha schemes are going on in Idukki and Kottayam districts.

WSS to Rural Schools

19. As per the Government of India directive, all the rural schools and anganwadies having no drinking water facilities are to be provided with such facilities. The expenditure for this purpose should be shared by the Central and State Government on 50:50 basis from the funds allocated for ARWSP. Kerala Water Authority has provided water supply to 1944 schools under this scheme and works of 9 schemes are under various stages of implementation. At present water supply is provided to schools from existing schemes based on the demand.

Technology Mission Schemes/Revised Submission Schemes

20. Government of India provides assistance under Technology Mission or implementing schemes in water quality affected areas. Upto20% of the ARWSP funds are to be earmarked for new projects designed to address water quality issues. Fifteen schemes have been sanctioned so far for a total estimated cost of Rs14081.00 lakhs. Out of this, all schemes except one namely, ARWSS to 8 panchayaths of Ambalapuzha taluk in Alappuzha has been completed. The funding pattern of between Government of India and Government of Kerala is75:25.

Support Activities

21. 5%oftheNRDWPfundisprovidedforsupportActivities.The funding pattern of support activity is 60:40between Central and State. Under support Activity, training, MIS etc. are taken up. In Kerala CDDU (Water) and Suchitwa Mission are also implementing various awareness activities utilizing the support fund. During the year 2015-16Government of India provided an amount of Rs173.00 lakh for support Activities. The State had utilized an amount of Rs186.00lakh including the opening balance for the same.

Water Quality Monitoring and Surveillance Programme (WQM&SP)

22. 3% of the NRDWP fund is provided for Water Quality Monitoring and Surveillance Programme (WQM&SP).Under WQM&SP water quality monitoring of drinking water sources, formation and modernization of water quality testing labs, Water quality test using Field Test Kit by CCDU (Water) etc. are taken up. The funding pattern is 60: 40 between Central and State. During the year 2015-16 Government of India released an amount of Rs103.81 lakh to the State. The state had utilized an amount of Rs 241.68 lakh opening balance for the above programme.

NABARD loan assistance for Rural Water Supply Schemes

23. Based on loan assistance from NABARD, KWA implement water supply schemes in rural areas of Kerala. The summary of schemes under various Tranche sanctioned so far is shown in table below.

Table 4

Sanction	Tranche	Schemes	Completed Schemes	(Crores)
2003	IX	8	8	48.68
2008	XIV	36	30	670.16
2010	XVI	1	0	0.89
2011	XVII	2	0	51.57
2012	XVII- Endo	52	21	25.81
2013	XVIII	10	0	216.39
2014	XIX	8	0	128.54
2015	XX	9	0	93.39
2016	XXII	6	0	57.26
Total		**132**	**59**	**1292.69**

24. All the schemes under RIDF IX have been completed. For Tranche XIV 30schemesoutof36hasbeencompletedand3schemesnamelyPallichal, Balaramapuramand Vilavoorkkal Pt. and RWSS to Kunnathukal in Thiruvananthapuram and RWSS to Karukutty and Mookkannoorin Ernakulam District has been partially commissioned. The other 3 schemes are in final stages of completion. The claim period of this Tranche has been closed and hence the further expenditure is being booked under State plan.

25. The scheme– WSS to Mattini in Kannur District sanctioned under Tranche XVI could not be started as land required was not handed over by the local bodies and it is proposed to drop the above scheme. In addition for replacement of obsolete pumps and motors for water supply system, an amount of Rs34.10 crores was sanctioned under this Tranche, with Rs 2898.32 lakhs by NABARD and with State Government contribution of Rs 511.47lakhs. The claim period of this Tranche will be closed by 30.6.17. The installation of most pumps have been completed in final stage.

26. Under Tranche XVII, 2 schemes, WSS to Kattur, Padiyur & Poomangalam villages in Thrissur District and WSS to Mananthavady, Edavaka & Nalloornadu villages in Wayanad District were sanctioned and the work is progressing well. In addition, 52 water supply schemes mostly mini schemes were sanctioned under Integrated Package for Endosulphan affected Pts. in Kasargod District under this Tranche. Most of the schemes were completed. Some schemes could not be taken up due to lack of sufficient yield.

27. Ten schemes sanctioned under Tranche –XVIII and 8schemes sanctioned under RIDF–XIXareprogressingandareindifferentstagesofimplementation.

28. Nine schemes sanctioned under RIDF –XX during2015, and 6 schemes sanctioned recently under Tranche-XXII in 2016 are in the initial stages

JICA Assisted Kerala Water Supply Project

29. JICA assisted Kerala Water Supply Project envisages the implementation of five water supply projects in Thiruvananthapuram, Meenad, Cherthala, Kozhikode and Pattuvam for a total estimated cost of Rs 1787.45 crores. As per G.O. (RT) No.751/2003/WRDdated19.06.2003,Governmentof Kerala approved the proposal for awarding the consultancy contract for the implementation of the JBIC aided Kerala Water Supply Project to the TEC Consortium. The consultants have commenced the consultancy service from 1st September 2003.The project cost have been subsequently revised to Rs2987.40 crores vide G.O.(RT)No.1175/09/WRD dated 20.10.2009. Of these Cherthala and Pattuvam scheme has already been completed and commissioned. For Thiruvananthapuram Scheme and Meenad schemes, all components except part of Distribution System has been completed and expected to complete this financial year itself. The schemes are already in operation presently. All components except part of Distribution System have been completed for Kozhikode Scheme. The above scheme has been partially commissioned and expected to commission fully by December 2017. By commissioning the above 5 schemes under JICA, the production capacity has been enhanced by 51mld.It also benefits a population of about 41 lakhs in the scheme are as in the 5 districts.viz– Thiruvananthapuram, Kollam, Alappuzha, Kozhikodeand Kannur. The details are given below.

Table 5

Scheme	Water Treatment Plant capacity (MLD)	Envisaged total population benefitted on completion (in lakhs)	Benefited area
Trivandrum	74	10.7	Thiruvananthapuram Corporation & adjoining 3 Panchayaths
Meenad	71	5.26	Paravoor Municipality and 13 Panchayaths.
Cherthala	107	6.53	CherthalaMuncipality and 18 Panchayats
Kozhikode	174	13.03	Kozhikode city and 16 Panchayaths
Pattuvam	90	5.3	Thaliparamba Municipality and 11Panchayaths
Total	**516**	**40.82**	

30. The rehabilitation works in Thiruvananthapuram and Kozhikode districts are in progress and expected to complete during 2017.Institutional Strengthening activities mainly comprise construction of Centralized Central Unit building, Installation of bulk flow meters, ERP activities, Asset Management etc. The construction of Centralised Central Unit building, a 10 storied one is almost complete and expected to be inauguratedbyJanuary2017.

31. The JICA fund has been closed from July 2015. The further expenditure is being booked under the state plan. An amount of Rs150croreswasallocatedforthe financialyear2016-17forcompletingthebalanceworks.

Completion of Ongoing UWSS–Special package

32. UnderthisheadanamountofRs30 crores was sanctioned for completing 17 ongoing urban water supply schemes. Out of the 17schemes 6 schemes namely UWSS to Chevoor, Marathekkara CT, Augmentation of Palakkad WSS, and UWSS to Vadakkekara census town in Ernakulam district, WSS to Chelakkara in Thrissur district, UWSS to Manjeswaram in Kasargod district and Augmentation of UWSS to Pala Municipality are already completed. The other works are in various stages of completion.

New Capital Schemes–SAARK–2010-11

33. Proposal for 2 water supply schemes namely; WSS to Parassala and adjoining villages and MarukilMaranalloor villages in Thiruvananthapuram dist. For Rs 136.40 crores and Augmentation of WSS to Kumarakam, Thiruvarpu panchayaths in Kottayam district for Rs 24.05 crores has been sanctioned by Government of Kerala under New capital scheme or SAARK (Special Assistance against Recessions in Kerala). Works are in progress.

State Plan Schemes

34. Thereare11 ongoing schemes and other works such as replacement of pipes, pumps, rehabilitation, renovation works sanctioned under state plan. The above works are in various stages of implementation.

Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT)

35. Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) was launched for improvement in urban infrastructure including water supply in towns and cities in a planned manner.

36. The implementation of the scheme is done by the respective Urban Local Bodies (ULB)–Municipalities for which the funds will be released to Urban Local bodies according to requirement. In order to execute the projects smoothly a Tri-partite agreement is signed between the respective Municipality, Kerala Water Authority, and Department of LSGD. As per this MoU a city level Technical Advisory Group is formed for respective Municipalities Funding pattern: Central: 80%; State: 10%; ULB: 10% The main schemes executed under this head are listed below.

Table 6

Sl. No.	Name of Schemes	Municipality	As amount in lakhs
	Schemes sanctioned during 2007		
1	Wss to Alappuzha & adj. Panchayaths	Alappuzha	19351
2	WSS to Payyannur	Payyannur	4019
	Schemes sanctioned during 2009		
1	WSS to Guruvayoor	Guruvayoor	3144.33
2	WSS to Chavakkad	Chavakkad	1900.67
3	WSS to Thalasseri	Thalasseri	4120
4	WSS to Vadakara	Vadakara	2091.75
5	WSS to Kalpetta	Kalpetta	3217
6	WSS to Perinthalmanna	Perinthalmanna	811
7	WSS to Chittur – Thathamangalam	Chittur- Thathamangalam	650
8	WSS to Changanassery	Changanassery	391.9
9	WSS to Thiruvalla	Thiruvalla	627.9
10	WSS to Ottappalam	Ottappalam	3000
11	WSS to Malappuram	Malappuram	1976

37. Of these 6 schemes namely, WSS to Perinthalmanna, WSS to Chittur-Thathamangalam, WSS to Changanassery, WSS to Thiruvalla, WSS to Ottappalam and WSS to Malappuram have already been commissioned. The other schemes are in various stages of implementation.

Jawaharlal Nehru national Urban Renewal Mission (JNNURM) Projects

38. Government had accorded Administrative Sanction for four projects for Rs699.70crores, one each in water supply and sewerage sector for Thiruvananthapuram and Kochi Corporations of Kerala under JNNURM. In order to execute the projects a Tri- partite agreement between the respective Corporation, Kerala Water Authority (KWA), Department of LSGD was signed on01/11/07.The implementation of the scheme is done by KWA on behalf of the respective Urban Local Bodies (ULB), for which the funds will be released to ULBs according to requirement. A city level Technical Advisory Group was formed for both Corporations.

Table 7

Sl. No.	Name of City and Scheme	As in Crores of Rupees	Project Components
	Thiruvananthapuram (Capital City) Funding: Central: 80%; State: 10%; ULB: 10%		
1	JNNURM-Water supply scheme to Trivandrum	87.16	Distribution Lines, Rehabilitation of distribution system
2	JNNURM-Sewerage scheme to Trivandrum	215.41	Sewerage treatment plant, pump house and sewer mains
3	Rehabilitation of Sewerage systemPhaseII	121.15	Rehabilitation of main pumping stations, extension of pumping main, replacement of pumpset, providing 4 mld STP at Govt. Medical College
	Kochi (City with One million plus population) Funding: Central: 50%; State: 30%; ULB: 20%		
1	JNNURM-Water Supply Scheme to Kochi (Part-I) to Kochi (Part-I)	201.17	Intake well, WTP, Sump, Tank, Transmission mains
2	JNNURM –Sewerage-Scheme to Kochi city – Central Zone (Part-I)	74.81	Sewage Treatment Plant, Pump house and sewer mains

39. The various packages of the above works are in progress.

Guruvayur Sewerage Scheme

40. The project is to provide an effective drainage system for the full coverage of the thick in habitant areas under Guruvayur Municipality. The main objective of the project is to improve the environmental conditions now prevailing in the area. The general hygiene in the area would keep up improving health hazards. Implementation of the project will promote the sanitary and health statuses of the inhabitants in the project are as preventing incidences for water born diseases.

41. Dry and wet contaminants including sewage from hotels, houses and commercial complex's at Guruvayur are collected and conveying through various size of PVC sewer lines to sewage treatment plant at Chakkumkandam and sewage treated as manure. This scheme includes the following components.
    1. 3MLDSewageTreatmentPlant.
    2. Laying of PVC Sewer Lines and Manholes.
    3. Repairs and maintenance of collection well.
    4. Supply, erection and commissioning of pump sets.
    5. Power line extensions to pumping stations.
    6. Supply and installation of Diesel Generator.
    7. Procurement of various types of Sewer Clearing Equipment.
    8. Inter connection of pumping station, pumping main and sewer lines.
    9. Computerised monitoring of sewer network

42. The work is in progress and about 85% of the work has been completed.

Trivandrum Sewerage Scheme

43. The Thiruvananthapuram sewerage was commissioned in the year1945.The scheme area is divided into seven blocks viz A, B, C, D, E, F and G, for the convenience of execution of Sewerage system.

44. As part of the scheme, the first block A was commissioned in the year 1945, block B was commissioned in the year 1965 and C block in the year 1970. Block D and E were partially commissioned in the year 1994 and 1990 respectively.

Rehabilitation of TSS A, B& C Blocks

45. The design period of TSS is already over as the A, B, C blocks were completed long back. Rehabilitation of existing sewer lines and brick manholes are inevitable in A, B, C Blocks of Trivandrum sewerage scheme due to increase in population and also mostofthesewerlinesareundersized.Butproperrehabilitationofthisschemewas not done after the commissioning of these blocks. In order to meet the requirement of rapid growing population in the city, existing undersized sewer lines need to be replaced. Also the dilapidated man holes constructed in brick has to be re-constructedwithRCCinaccordancewiththeIndianstandardspecification.

46. During 2015-16, Administrative sanction has been accorded for 25 nos of works amounting to Rs9.00crores. Works are in progress.

Deposit Works

47. Under decentralized planning Kerala Water Authority undertakes deposit works from local bodies and other departments. Most of these works are line extension proposals and mini schemes. As on 30.9.2016, there are 1142 ongoing deposit works are under implementation.

48. KWA also execute works based on the funds received from Kerala State Coastal Area Development Corporation, Minority Department, SC/ST departments, MLA- ADS fund, MP fund and other agencies for supplying water to more areas and benefitting more population.

Computerisation and IT-Initiatives

49. During2015–2016KeralaWaterAuthorityintended to achieve its Mission- Vision bybringing more transparency in the services and making more customer friendly environment. For accomplishing its Mission, KWA worked in tandem with Kerala State IT Mission leveraging the Infrastructure and resources intended for Digital India Movement so as to be more Consumer Oriented.

50. The in-house developed Abacus suite the Enterprise Work Flow based Billing and Accounting and Collection Utility System for KWA. The same was modified to a state of the art level to handle full lifecycle of Consumer Management Billing Management, Collection Management, Meter Management and Service Management.2,00,000 more connections were brought to Centralized Spot Billing System– e-Abacus. ByMarch2016, 80%ofWaterConnectionswerebroughtunder Centralized Billing System by implementing in 24 Divisions, 40 subdivisions and 60 sections.

51. Initiatives like Regional Electronic Clearance System (RECS) through Reserve Bank of India which facilitates the consumer the debit option of their Bank Account for the payment to KWA bills was implemented. Also Electronic Spot Billing was introduced in Thiruvananthapuram Division. BPL Consumer Billing Module was deployedforimplementingStatePolicytosubsidizewaterchargeofBPLConsumeRs

52. KWA received the following Awards during 2015-16 for the achievements in the sector.
    1. CSI Nihilant National Level Award for e–Governance for e-Abacus Project For Citizen Service Delivery Through Electronic Means,
    2. SKOCH Order Of Merit National Award for e-Governance For Excellence In e-citizen Service Delivery
    3. CSI–Valient State Award for e-Governance under the Category Citizen Service Delivery.

53. KWA has taken steps to implement Enterprise Resource Planning (ERP) by which it is planned to envisage Full Cycle Resource package for Finance, HR, GIS based asset, procurement, O & M management, etc.

CHAPTER 2
KERALA RURAL WATER SUPPLY AND SANITATION AGENCY (KRWSA)

54. KRWSA, Registered under Travancore literacy scientific & charitable societies Act 1955, is a special purpose vehicle under the Water Resources Dept. KRWSA had successfully implemented JALANIDHI Phase1 Project covering 112 Gramma Panchayaths in the state demonstrating the project philosophy of:
    1. Demand Responsive Approach
    2. Cost sharing principles
    3. Community Based O&M Management.

55. The above guiding principles in the project design had been successfully demonstrated during implementation and in the O&M period. The project was implemented with the participation of GPs/BGs and with the technical assistance support from NGOs [SOs] where the role of KRWSA was to facilitate the above stake holders in project implementation by providing project management & technical supervision support. The community Groups [BGs] are also registered under the Travancore literacy scientific & charitable societies Act 1955 to reckon these informal groups as legal entities. The project planning & implementation had been through Community Driven Development focusing attention on improved service delivery to the community with the final outcome of sustainability of investments. The assets created in the project were transferred to the full ownership of the community and the responsibility of Ownership had been drilled in to the community. The Major achievements of the project are:
    1. ThePHASE1 JALANIDHI project have provided HH water service to 188115 HHs in 112 GPs by implementing 3710 schemes.\
    2. The project also provided better sanitation facility nearly 1,00,000 HHs of the rural public in 112 project implemented GPs
    3. JALANIDHI Phase 1 Project penetrated through the rural community in providing HH level services to all the beneficiary HHs covered, even in most geographically difficult terrains & tribal hamlets.
    4. The project had developed bottom up approach in planning, implementation & O& M of the schemes which helped in developing committed community leaders to continue with the successful sustainable operation of the schemes.
    5. Even the tribal, who hitherto have only received free service, have accepted the change and contributed Rs 83.6 lakhs in cash and labour to the capital cost contribution.
    6. The BGs operate the majority of schemes satisfactorily without any financial support from the GOK, saving a substantial amount to the state exchequer towards maintenance expenses.
    7. The project have provided increased access to drinking water &better sanitation facilities to the poor groups of the community in these rural area by mobilizing the share of the capital cost through labour participation of such beneficiary groups .
    8. . There is also a separate Tribal Sub-Project, a special component for the tribal HHs covered in the project.

9. The capital cost sharing for the deprived & vulnerable groups was reduced to 50% that of the general category with provision for mobilizing major portion of it through labour contribution.
10. The projecthad empowered the community in decision making process by enhancing their capacity through community trainings
11. The implementation of the schemes had been done through community contracting resulting in savings in the committed cost of implementation.
12. The project have strengthened the capacity of the GPs by creating infrastructure & IT facilities for better service to its rural population.
13. In every project GP exclusive capacity building programmes conducted for women for income generation & other initiatives. It was made mandatory that in all BGs 1/3 of the office bearers had to be women. Many of the schemes even now are operated by women beneficiaries.
14. The project could develop an informal resource pool capacitated for community mobilization, technical support, dispute resolution on social issues & capable of carrying out basic project management activities.
15. The project could develop computerized project monitoring technique by capturing project related information that helped in decision making at all levels to speed up project implementation.
16. These achievements helped the project in motivating the community by providing improved facilities to their basic needs. Even after nearly a decade from the end date of the project more than 60% of the schemes function satisfactorily meeting full O&M charges through community based Management.
17. The fact that nearly 40% of the assets created are not serving the community satisfactorily to the desired service level opens up the shortfalls of these schemes in the O&M period.
18. Providing Drinking water to the rural population is the responsibility of the LSG of the GP. JALANIDHI Phase1 project was not successful in establishing this. The successful BGs that satisfactorily operate even as on date function as standalone establishments in the GP limiting service to its beneficiary HHs.
19. The success of operation of the many schemes entirely depends upon the leadership of the community groups. In other words the leadership capability decides the successful operational life of the scheme. This clearly reveals the absence of a successful operating system.
20. Many of the small schemes implemented in JALANIDHI Phase1 Project gradually suffered
21. Source sustainability issues.
22. Water quality issues.

56. There are cases that the adequate source provided turned out to be in adequate for various reasons including excessive pumping, absence of effective GWR measures, Change in the climatic conditions& associated short fall in rain fall, absence of WM in small WSS. Likewise the quality issues also cropped up during the O&M period by abandoning desired level of periodical chlorination, absence of effective source protection & upcoming sanitation challenges in the rural area. The issue of source in adequacy & depleting trend in water

quality calls for an alternate model in rehabilitation of these schemes to ensure sustainability of operation.

1. There are schemes that turned out to be either partially or fully defunct by major capital maintenance /replacement requirements. The community Groups who viably operated the scheme in normal O & M scenario fail to bear this magnitude of capital expenditure and the schemes remain defunct. The BGs are to be made aware the necessity in differential tariffing & installation of WM in all schemes. It demands for an institutional mechanism to provide an one time technical & financial support to put these schemes in service.

2. The project had been implemented in any GP to address the water quality & scarcity issues prevailed there and ideally the GP & BGs were to carry forward the capacity built at the GP & BGs level in further widening the scope of the improved service delivery to more HHs ,but at least should have prevented slip back in coverage. The Apex body of community groups [BGF] had been formed in all these GPs but only in handful GPs these apex bodies are functioning & coordinating with the individual BGs. In many of the cases neither the GP nor the BGs recognize the apex body as a legal entity and BGs act as a standalone schemes with no social commitment to either the non beneficiary HHs or the GPs. The GPs are not taking any initiative to support & monitor the BGs. This has gradually deprived of the desired project outcome as the time passes by, the enthusiasm in community driven development embedded in the project.

3. The methodology of community driven development in project implementation was well demonstrated in JALANIDHI PHASE1 project but the cohesion within the community groups varied from excellent to nearly satisfactory level with the increased nos. of beneficiary HHs in the community groups. This behaviour is more visible in the O&M period and this has overburdened SLC/BG committees in shouldering the full responsibility of owner ship by themselves.

57. The JALANIDHI PHASE2 project has started the implementation activities with the effective starting date as 1.1.2012 spanning over 51/2 years with the project closing date as 30.06.2017. The project is planned to implement in 200 GPs with the development objective of improved access to rural community for DW & SANITATION facilities. The project is still under implementation stage with 3 Batches of GPs selected for implementation in a phased manner. In addition to the three Batches 3 Multi GP schemes are also taken & progressing well in the implementation stage. The key achievements

58. The key differences between Phase1 & Phase2 projects are
    1. The capital cost sharing of beneficiaries have been reduced to 10% from 15% shared in Phase1 Project & correspondingly the capital cost sharing of the GPs have been increased to 15% from 10% shared in the Phase1 project.
    2. The assets created in the Phase2 Project are made under the joint owner ship of BGs & GPs.

3. More no. of schemes are implemented in synergy with KWA by providing improved service delivery to the community through BWSS & Multi GP schemes.
4. The GPs have been empowered (1) To hire the services of the SOs for technical services to implement the project (2) To enter into agreement with BGs for implementation of the schemes
5. The Phase 2 project is restructured in June 2016 to utilize the additional rupee equivalent of loan component in $ by way of devaluation of Rs against $ with the project closing date as 31.12.2018. In the restructured scenario the project is taking up implementation of 2 more Multi GPs to provide better service delivery to 11 more GPs. Added to this the project is revisiting 2 LWSS implemented in JALANIDHI PHASE 1 project for improving the service delivery to 24*7.
6. In addition to the issues surfaced in the PHASE1 JALANIDHI project, in PHASE 2 PROJECT implementation witnessed additional issues like
7. The changed community behaviour from active participation in implementation & O&M phases to that of consumers who are willing to pay for a better service.
8. Though GPs are taking satisfactory level of participation in the implementation of the project the lead role envisaged& owning up the project by the GP is not yet successfully demonstrated.
9. In phase2 Jalanidhi project 29 GPs are implementing either BWSS or Multi GP schemes out of the115 GPs so far taken up for project implementation as a viable solution to the WQ & Source sustainability issues that can arise during the O&M period. There are issues of lack of concerted efforts from both KWA & KRWSA in speeding up implementation of this alternate model.
10. The issues highlighted in the O&M period of both Phase 1 & 2 projects are to be resolved for maintaining the designed service delivery to the covered beneficiaries. [Both the projects are designed to provide a service delivery @ 70 lpcd per capita].

59. The Government is planning to provide piped water supply to all HHs in the state in a phased manner depending on the availability of resources and there need to be a priority in providing piped WS coverage to rural HHs either with respect to WQ or Water scarcity issues.

60. The GP selection criteria adopted now in implementation of JALANIDHI project can be changed according to the basis of priority fixed by the Government. The GPs have to assess the issues related to WQ & Water scarcity either by themselves or through technical support of the sector institutions or by engaging other technical consultants. The technical consultant hired has to assess the need of the GP based on detailed water security plan. The need assessment has to be on the basis of 100%safe water supply coverage in the GP, utilizing the existing HH wells / common sources and not to be limited to piped water alone. The conjunctive water use pattern of the rural community has to be considered and this has to continue wherever possible till the time the Govt. would be possible to mobilize resources to provide HH piped water supply to all HHs in that GP. This is essential since the water consumption pattern of both urban & rural people in the state is much higher than the average consumption pattern at the national level.

61. The state is having higher no. of HH wells than at the national scenario but there is comparatively higher rate of bacteriological contamination in these HH wells. The GP should take steps to mitigate the WQ issues in the individual / community water sources in the GPs considering the behaviour, especially of the rural public, to utilize only the well water for drinking & cooking purposes and also to ensure no slip back in the current water supply coverage of the GPs. A committee chaired by the Health &Education standing committee as chairperson with CDS of Kudumbhasree, Junior PH Nurse, Health inspector as members can support the rural community in ensuring the individual/common sources in the GP free from contamination. The Kudumbhasree& Asha workers will be able to take forward this as a campaign programme in the GP periodically & get the DW tested in recognised water quality testing labs. CCDU will be able to support this campaign programmes.

62. In the case of GPs already implemented the project the BGs /BGF/ GPs have to carry forward the capacity building gained in project planning , implementation & O&M to increase the coverage in the GP by adding up either new schemes or rehabilitating the already implemented schemes in the same institutional model adopted for implementing the JALANIDHI schemes where the operating agency wherever engaged or any other technical consultant hired by the GP& post implementation support mechanism to be in place will take the roles of SO & KRWSA in the institutional model.

63. There is absence of a uniform pattern among the BGs in a GP in fixing O&M tariff and capital cost share demanded from HHs for new connections within the command area of the scheme. In fact the BGs within a GP should adopt to a common policy in giving new

connections to HHs within the command area without any discrimination in the class of membership in the community groups. The only criteria in allowing a new connection should be the technical feasibility in including additional HHs without any adverse impact to the existing service delivery. The GP should exercise the responsibility and authority of the joint ownership in a judicious manner in monitoring the modus operandi in providing new connections to HHs within the command area.

64. The LSGD has to direct the LSGs at the project GPs to monitor the operational issues of the schemes and to furnish the details captured to the WRD on a monthly basis after commissioning & exit of the schemes in the project GPs. Even the three tier LSGs can be made responsible in monitoring the operational results of the GPs in their jurisdiction. Once GP made responsible in furnishing monthly operational details of all schemes the full or partially defunct schemes can be brought into full operational level by adopting the steps below.
    1. The issues in the defunct / partially functioning schemes implemented in JALANIDHI Projects are to be diagnosed with the interactive meeting with BGs/BGF & GP board and its concerned officials.
    2. Depending on whether technical/quality/institutional weakness that led to full or partially defunct state prevailing now, an one time support will have to be provided. The BGs that need an one time support for making the schemes operational have to agree for installation of WM in all the beneficiary HHs & to agree for differential tariffing. They should also agree to adopt the amended BG byelaw to ensure joint ownership of the scheme by BG & GP. The respective BGs & GPs have to mandatorily share a portion of the cost required for rehabilitation.
    3. The institutional mechanism that is going to be established for post exit support will provide the requisite support to the BGs & GPs in resolving the above issues.

65. The depletion of sources & water quality issues that crop up during O&M period can be resolved by switching over to BW model wherever possible by rehabilitating the water distribution network in to a robust system. The option to convert the small schemes in operation in to BWSS is to be explored to avoid source sustainability& WQ issues, wherever KWA has established capacity to provide BW.

66. In the context of the changed community behaviour there need to be an alternate model for an effective O&M at least in the case of LWSS/BWSS/Multi GP schemes with higher no. of beneficiary HHs covered, rather than the BGs themselves taking care the maintenance. This model will enable to impart a professional approach in the community based management. There need to be a continued support required from GP in selection & contract management of the operating agencies by the SLCs. A committee constituting representatives from GPs[GP president & Health & Education standing committee chair person]/ BGs/SLCs/BGF has to monitor the O&M activities of the operating agency hired for service. Invariably the GP secretary will be the convenor & the health inspector of the GP will be a member of this monitoring committee. The personnel hired as operating agencies are to be given refresher trainings for skill updates. The institutional mechanism for

post exit support can impart refresher trainings through accredited technical institutions nearby.

67. The water charges levied by the community managed schemes are higher than that levied by the major service provider in the sector. In addition to this Government approves concessional tariff to poor & vulnerable people covered by the major service provider. This is hindering higher inclusion of community in JALANIDHI schemes and also the community tends to default remittance of user charges. This is all the more critical in the case of BW model where the water tariff levied from the beneficiary HHs is much higher than the water tariff collected from the consumers provided with service delivery direct from KWA . There need to be a uniform tariff policy at least in the case of alternate model of BWSS.

68. The idea of KRWSA to move forward in the 13th five year plan period with added level of synergy with LSGD & LSGs in improving the service delivery of the rural public by empowering LSGs & BGs(beneficiary Groups) with Technical, Institutional & Managerial support through the state level grievance cell being set up by the GOK can be promoted .

69. Initial interactions with LSGD has been initiated to converge grants allotted by 14th finance commission & Non Road & General purpose Maintenance Grant from annual plan fund to LSGs towards mobilizing GP share & like wise to converge MNREGA fund for mobilizing BG share for the capital maintenance expenditure required to restore the slipped back coverage in the either partially or fully defunct schemes implemented in the phase 1 Jalanidhi project. There is also provision for utilizing grant form 14th finance commission to enhance capacity building programs of GP level institutions in the sector. In the state context it will enable the GP level institutions to monitor the WQ issues, developing resource pool requirement for more systematic & effective operations leading to an improved service delivery of the schemes managed by the community. In nut shell the improved synergy of activities between LSG & KRWSA will resolve the operational issues of the community base managed schemes. The detailed action plan for the financial year 2017 --18 will be jointly worked out with LSGs

CHAPTER 4

PRESENT SCENARIO OF DRINKING WATER SECTOR IN KERALA – ISSUES AND SUGGESTIONS

70. Under the Indian Constitution drinking water comes within the domain of the State Governments. The 73rd Constitutional Amendment mandates the responsibility for drinking water and sanitation services to Local Governments. Till this empowerment of local self-governments, Kerala Water Authority was the only agency to supply drinking water and according to KWA, 48 % of the total population has been covered under various drinking water supply programmes. As per the census 2011, approximately 65 % of the households depend on wells for drinking water. Though Kerala receives an annual average rainfall of more than 3000 mm, the typical physiography and geological conditions do not ensure safe drinking water in many places throughout the year. Physiographically, Kerala can be divided into three regions and the High land region which covers 48 % of the total area is of 1860 sq.kms. It has higher slopes than the other two divisions and supply of water through major water supply schemes are comparatively difficult. The Midland region covering an area of 16200 km2ie, about 40 % of the total land area also has undulating terrain. The Coastal region with high population density covers an area of about 4000 km2. Such a typical physiography demands for implementation of small drinking water schemes. Hydrological Data (2012)of Central Water Commission for the last ten years show that the base flows of rivers has decreased drastically and this may be partly due to decrease in groundwater storage and partly due to decrease in the storage capacity of catchments. Large scale reclamation of paddy fields and low lands along with uncontrolled and unscientific removal of laterites have added to this. Rapid urbanization and infrastructure development without caring for rainwater recharge to subsurface also made matters worse.

71. The water policy of the State of Kerala, approved in 2008 conceives the necessity of conservation, development and management of water resources based on the concept of watershed and it gives first priority for domestic consume Rs Therefore an integrated system of wells and ponds and piped water will be more suitable and sustainable for Kerala, considering the physiographical, economical and sociological aspects. It is a known fact that the rural community is more inclined to use the well water than piped water and this aspect should be taken in to consideration

Table 8 *Annual rainfall at select stations in Kerala over past century*

Station Name	1901-1950	1951-2000	Difference
Thiruvananthapuram	1812.1	1792.0	-20.1
Kollam	2398.1	2357.8	-40.3
Alappuzha	3274.8	3006.1	-268.7
Kozhikode	3178.1	3175.8	-2.3
Kannur	3274.4	3256.2	-18.2
Palakkad	2019.4	1999.1	-20.3
Munnar	3815.9	3744.3	-71.6
Peerumade	5164.8	4427.7	-737.1
Punalur	3159.4	2760.6	-398.8
Thrissur	3096.4	3082.3	-14.1
Kottayam	3261.5	2858.0	-403.5
Thiruvalla	3093.0	2732.2	-360.8
Neyyattinkara	1653.9	1622.6	-31.3

Source Central Water Commission Report (2012)

72. Investments in water infrastructure and institutions are crucial for economic development. There is a strong relationship between water management and the economy, and investments in good water management can be considered as longer-term payback for increased economic growth and poverty reduction. During the 13th plan period, Kerala is giving substantial importance for the activity of providing safe drinking water availability in developmental planning. Since the 13th plan would be a plan of growth, the idea of economic, income and production growth are non – negotiable. The growth is always accompanied by investment in the people and their growth is accompanied by infrastructural development.

Table 9*Flow in Kerala Rivers*

Sn	Site name	River	Season	1998 -99	1999 -00	2000 -01	2001 -02	2002 -03	2003 -04	2004 -05	2005 -06	2006 -07	2007-08	2008 -09
				(Flow in Million cubic meters)										
1	AmbaramPalayam	Aliyar	Monsoon	115	181	115	131	105	81	151	150	99	194	123
			Non-Monsoon	384	182	182	155	159	121	228	247	197	217	142
			Annual	499	363	297	286	264	202	379	397	296	411	265
2	Arangaly	Chalakudy	Monsoon	2245	1762	1088	1185	1162	1022	1456	1870	1443	3038	1108
			Non-Monsoon	418	189	27	221	495	401	226	230	225	139	246
			Annual	2663	1951	1115	1406	1657	1423	1682	2100	1668	3177	1354
3	Ayilam	Vamanapuram	Monsoon	616	522	368	405	261	241	563	508	638	699	396
			Annual	920	740	536	535	431	418	792	809	855	850	522
4	Erinjipuzha	Payaswani	Monsoon	2214	2111	1708	1974	1239	1754	1740	2079	2135	2806	1665
			Non-Monsoon	267	160	109	159	131	127	100	226	212	224	102
			Annual	248	2271	1817	2133	1370	1881	1840	2305	2347	3030	1767
5	Kalampur	Kaliyar	Monsoon	1325	1138	910	113	734	806	891	1309	1118	1337	764
			Non-Monsoon	252	100	35	138	106	71	40	187	160	82	31
			Annual	1577	1238	945	1251	840	877	931	1496	1278	1419	795
6	Kallooppara	Manimala	Monsoon	1751	1352	1186	1528	930	1189	1064	1595	1394	1823	1172
			Non-Monsoon	445	122	130	406	231	360	184	465	386	190	60
			Annual	2196	1474	1316	1934	1161	1549	1248	2060	1780	2013	1232
7	Karathou	Kadalundi	Monsoon	1099	930	740	870	748	536	919	1152	1808	2461	818
			Non-Monsoon	96	589	66	131	110	36	44	252	188	177	75
			Annual	1195	1519	806	1001	858	572	963	1404	1996	2638	893
8	Kidangur	Meenachil	Monsoon	1846	1634	1212	1311	963	1095	1015	1691	1364	1893	1383
			Non-Monsoon	465	118	122	370	243	342	145	462	306	281	119
			Annual	2311	1752	1334	1681	1206	1437	1160	2153	1670	2174	1502
9	Kumbidi	Bharathapuzha	Monsoon	4361	3310	2309	3386	2435	1766	3592	4808	5343	7551	2537
			Non-Monsoon	1088	304	336	840	329	378	309	767	738	853	297
			Annual	5449	3614	2645	4226	2764	2144	3901	5575	6081	8404	2834
10	Kuniyil	Chaliyar	Monsoon	4832	4332	2971	2917	1941	1719	3594	5011	4709	6735	3078
			Non-Monsoon	943	531	435	711	163	408	224	1150	402	260	112
			Annual	5775	4863	3406	3628	2104	2127	3818	6161	5111	6995	3190
11	Kuttyadi	Kuttyadi	Monsoon	0	0	810	800	714	645	896	1086	1150	1516	956
			Non-Monsoon	0	5	62	89	72	94	114	228	232	171	124
			Annual	0	5	872	933	786	739	1010	134	1382	1687	1080
12	Malakkara	Pamba	Monsoon	3916	3245	2862	2893	1678	1927	2510	3615	3248	3741	2036
			Non-Monsoon	1379	484	596	703	291	514	920	1489	1004	794	199
			Annual	5295	3729	3458	3595	1969	2441	3430	5104	4252	4535	2235
13	Mankara	Bharathapuzha	Monsoon	1163	947	382	245	237	147	349	636	647	1451	381
			Non-Monsoon	495	98	54	81	53	31	58	226	161	200	57
			Annual	1658	1045	436	326	290	178	407	862	808	1651	438
14	Neeleeswaram	Periyar	Monsoon	6839	4778	4124	5212	4158	3517	5307	6816	4783	7702	4193
			Non-Monsoon	1923	999	1129	1680	1161	1161	1319	2505	2240	2365	1409
			Annual	8762	5777	6253	6892	5319	4678	6626	9321	7023	10067	5602
15	Pattazhi	Kallada	Monsoon	1312	1196	947	810	483	344	593	618	554	689	311
			Non-Monsoon	742	515	427	494	505	424	384	521	383	306	232
			Annual	2054	1711	1371	1304	988	768	977	1139	937	995	543
16	Perumunnu	Valapattana	Monsoon	3986	300	2711	2858	2828	2396	3528	4389	4477	5373	2954
			Non-Monsoon	324	176	195	170	145	212	129	461	266	166	140
			Annual	4310	3976	2906	3028	2977	2608	3657	4850	4743	5539	3794
17	Pudur	Kannadipuzha	Monsoon	189	180	99	117	90	71	144	236	203	484	144
			Non-Monsoon	238	34	41	37	27	17	57	139	72	116	25
			Annual	427	214	140	154	117	88	201	375	275	600	169
18	Pulamanthole	Thootha	Monsoon	1876	1730	1155	1281	871	603	1297	1757	1887	2587	1146
			Non-Monsoon	321	161	156	342	171	175	148	369	289	207	106
			Annual	2197	1891	1311	1623	1042	778	1445	2126	2176	2794	1252
19	Ramaman-galam	Muvattupuzha	Monsoon	4404	3722	2494	3447	2632	2639	2965	4091	3256	4278	2644
			Non-Monsoon	2300	1492	1301	1973	942	1218	1372	2028	1668	1934	947
			Annual	6704	5214	3895	5420	3574	3857	4339	6119	4924	6212	3591
20	Thumpamon	Achankoil	Monsoon	1201	1047	920	929	441	519	814	899	1026	1076	651
			Non-Monsoon	412	148	171	330	197	291	104	347	302	201	69
			Annual	1613	1195	1091	1259	638	810	918	1246	1328	1277	720
21	Vandiperiyar	Periyar	Monsoon			175	139	84	95	167	297	161	218	98
			Non-Monsoon			5	18	16	27	18	38	108	47	9
			Annual			180	157	100	122	185	335	269	265	107

73. Kerala is one of the vulnerable States in India in terms of per capita utilization, availability and quality of drinking water and management. At present, out of 941 grama panchayats, almost 700 panchayats have treated water supply and except for 7 municipalities, all urban areas are also supplied with treated water. . Alternate schemes may be planned for the non

covered area and the deficit in the per capita utilization may also be met through alternate schemes.

74. Kerala Water Authority is the major provider of drinking water in the state of Kerala and the common problems faced by large scale suppliers of water are the following.
    1. Inadequate supervision and monitoring
    2. Lack of skilled/trained operating staff
    3. Schemes not operating in their full efficiency
    4. Huge difference in the quantity produced and distributed
    5. Visible leaks remain unattended for long
    6. Standby units in pumping plants, chlorinating units and other equipment remain under repair for long
    7. Many components of treatment plants not functioning for years
    8. Water meters not functioning right from inception
    9. Air valves and valve glands dripping and valve pits susceptible to flooding and pollution
    10. No single individual having comprehensive information about the quantity of production, beneficiaries, reasons for non-supply, rate of flow, water level in tanks etc.
    11. Public tampering with water installations due to scarcity
    12. Officials not interested in placement of maintenance jobs
    13. Chlorination techniques are not properly supervised so that residual chlorine presence is more than the water quality standards.
    14. Non-payment of water charges by local bodies.
    15. Lack of proper documentation about technical aspects
    16. Lack of data in GIS platform

75. A proper evaluation of the above mentioned aspects may be done by the top officials of Kerala Water Authority so as to remain as a service oriented organization.

76. While planning for development of the drinking water sector in a state like Kerala, the major issues that need to be looked in to are
    1. While installed capacity is huge, its distribution is skewed and hence there is a need to address the issues of where future capacity needs to be developed if equitable and sustainable development is to be a reality
    2. The need to explore the best institutional mechanism to ensure water to all and universal piped water supply becomes a reality given that KWA is highly asset creation rather than service oriented while small demand driven and community led projects, while being responsive, accountable and service oriented, have challenges related to sustainability of source, ensuring quality of water and long term managerial viability in the absence of institutional support
    3. The need to ensure local bodies play a key role in water and sanitation services as they have been statutorily mandated to do
    4. The need to institutionalise participatory service provision and operations and management to usher in transparency, accountability and responsiveness

5. The need for institutionalizing a mechanism for monitoring water quality, which is a major worry for Kerala, at much more regular intervals and across a wider and broader spectrum than is being currently adopted
6. Looking at cost effective solutions moving away from conventional ones in difficult terrains and remote locations where the cost of providing conventional solutions can be prohibitively expensive and cannot be justified
7. The need for an investment framework that defines order of priority of investments from the limited resources to ensure achieving objectives and end goals
8. Looking at revamping KWA through the lens of transforming it into a service provider and making it structurally more accountable and the incremental steps needed to address this change
9. Ensuring source sustainability in terms of quality of water (including prevention of salt water intrusion into our sources) is critical.

77. Planning in the water sector requires a clear cut idea about what has been done and what is to be done. In Kerala, there are several agencies in the water sector directly contributing to the development of the sector and this includes the major player Kerala Water Authority and other agencies like Jalanidhi , Groundwater Department, Rural Development Department, Central Groundwater Board, and the indirectly contributing agencies like Irrigation department, Soil conservation department, Agriculture department, Forest Department and several non-governmental organizations in the sector of rain water recharging and harvesting. Lack of data sharing and lack of quality data are the major hindrances to assess the work done in the field of drinking water sector.

78. Knowledge of water resources can be easily obtained across regions by using technologies like remote sensing and geographical information system. This opens a new doorway to what can be achieved once we have more knowledge. This is the backbone for effective solutions and advancing water governance. It is a basic requirement to understand who is using how much water. This information provides an input to an enabling policy environment in which we can set targets for more productive resource utilization.

79. Implementation of small demand driven community led projects is the way out to provide drinking water where major schemes are not viable and ensuring sustainability of source is the major hurdle. Identification of the source scientifically and ensuring water availability through pumping test and identification of substitute source, artificial recharge, rainwater harvesting and recharge etc are needed. In order to bring long term managerial viability, the beneficiaries of the scheme of a particular place may form a society which is to be registered under the charitable societies act (like in Jalanidhi schemes) and the ward member of that area should invariably be nominated to the elected administrative body. The society should run the project, collect fee and maintain accounts as per the societies act and if necessary the local self government may provide a nominal amount to support it. An apex body of such societies may be set up at the District level and State level and meetings may be conducted for sharing of experiences and for effective interactions in the presence of MLAs, Local self govt bodies and concerned departments. Awards should be given to the best performing societies.

80. In order to create awareness about water quality and possible in expensive water treatment methods, laboratories in the selected schools should be strengthened and necessary training to teachers and students should be imparted. Necessary funding for this project can be made from the anticipated Hydrology Project III.

CHAPTER 5
RECOMMENDATIONS

1. First organized water supply scheme was the water supply scheme to Thiruvananthapuram, the capital of the erstwhile kingdom of Travancore. The scheme was planned in the earlier part of the 20" century and a report of the scheme was prepared in 1921. Construction of the project started in 1931 and Lord Wellington, then Viceroy and Governor General of India inaugurated the scheme on 11-12-1933. Much progress has been achieved in the drinking water sector through the different schemes implemented up to the 12 th plan. Even after the empowerment of local self governments through panchayati raj bill, no visible changes were introduced in the drinking water sector. But during the plan implementation period of 11thand12thplan, slowly and steadily, a participatory approach was introduced in this sector and the local self-governments and Jalanidhi implemented a number of schemes in the rural sector. During the 13th plan, small demand driven and community led projects, which are responsive, accountable and service oriented, should be given preference in rural areas. The focus should be on moving incrementally towards that model after incorporating the lessons learned (ensuring source sustainability, ensuring water quality and ensuring a robust institutional mechanism which while being community managed is supported by the Grama Panchayat. Initially, such schemes should be provided technical backstopping support from a technically competent agency like KWA till a competent task force is formed in the Grama panchayat for providing technical support.

2. An analysis of the schemes implemented show an increased rural–urban gap in piped water supply. This suggests a government priority on urban areas over rural areas. There is a need for a more equal and inclusive policy objective without which the Sustainable Development Goal for universal access to drinking water cannot be achieved.

3. In the water supply sector, governance shall mean efficiency and equity in distribution; delivery process transparent, accountable, participatory and responsive; empowerment of citizens and delegation of powers to enhance their welfare. There is an increasing awareness of the need to strengthen technical and managerial capacity of different tiers of local governments and the communities for implementing different and diverse models of service delivery. Government should make appropriate action to achieve such a plan.

4. Kerala Water Authority is the premier organization in the drinking water sector of Kerala and have a well established net work for the distribution of drinking water. The revised Kerala budget for 2016-17 states that KWA will be converted to a profit making organization without increasing the water charges, by writing off an amount of Rs1004 crores. It will continue as the premier organization and should be transformed as a well managed, service oriented organization. Proper documentation, collection and compilation of data and analysis, technical and technological up gradation to

identify and prevention of leakages, time bound execution of projects, service oriented approach with local self governments are the sectors where changes are needed.

5. During the 11th and 12th plan period, a huge number of small drinking water schemes were implemented by grama panchayats, block panchayats and District panchayats but these schemes were not taken in to account due to lack of proper documentation and reporting to the concerned authorities. The investment made by the local self government in the drinking water sector may be obtained and the present position of such schemes should be reviewed and rejuvenated. The work done by KWA, Jalanidhi, Local self Governments, other Govt. Departments, non-governmental organizations etc in the drinking water sector may be brought in a GIS platform so as to evaluate the work done and to find the water gaps and to plan for the future. Statistics like total area covered, sources, implementing and operating agencies etc. are yet to be collected and compiled panchayat wise.

6. As far as the State of Kerala is concerned, number of stake holders in water sector is more and there is a lack of coordination between the agencies. There is reluctance on the part of these agencies in sharing the data and hence evolution of a comprehensive data base is a herculean task. Validation of data is not done properly and data gaps and erratic data have deteriorated the quality of data maintained by different agencies. Many a time there is lack of scientific analysis before implementing schemes by these agencies and moreover there are duplications in the works. Hence a comprehensive data base has to be evolved along with interagency validations and the work done in the water sector has to be reviewed periodically. For this a cell has to be formulated with Water resources Secretary as Chairman and top officials from KWA, Irrigation, Land Use Board,, CGWB, Soil conservation, Groundwater, Planning, LSGD, Jalanidhi, Central Water Commission, Coimbatore, Agriculture Department.

7. For sustainability of drinking water sources, construction of many artificial recharge structures is undertaken by various government agencies and non-governmental organizations. This leads to unscientific constructions and hence the purpose is not served always. The funds allotted to each such Department/agencies should be monitored and sanction for further schemes/structures should be accorded by the technical body nominated by the cell after considering the existing schemes and post implementation scenario. This in turn will regulate the cost along with confirmation of quality. Presently no Post facto evaluation studies are done after construction of recharge structures. Doing so will enable evolving of designs (wherever possible) suitable for particular locations. As there are several agencies, it is better to get the structure plotted in a GIS frame work, before sanctioning it, so as to ensure the relevance and viability of the structure.

8. The 13thplan should focus on small, demand driven and community led projects, and redefines the role of local bodies, making them capable of maintaining the sustainability of such schemes. People who are accessible to drinking water in their own premises and who are reluctant to use piped water should not be forced to use

piped water. All necessary guidance to maintain the quality of water of their source should be given. Though the traditional users of well water are aware about quality maintenance, whenever a problem arises, the local self-government with the help from competent government agencies should provide necessary guidance in the matter. Also, the local self-government can hold awareness camps and provide leaflets on water quality and necessary materials to maintain quality of water through support from govt. agencies.

9. In order to enlighten the people about the water quality of the area, water quality labs can be set up in each block, by strengthening the already existing plus two schools labs and training should be given to estimate the water quality parameter Rs There is duplication of work in the water quality sector by various govt. departments and agencies and this should be curtailed. Kerala water authority has district labs and sub labs, Health department operate Public health laboratories, Groundwater department has yet another three regional analytical labs and irrigation dept has also chemical labs. In addition, pollution control board, Agricultural universities, CWRDM, CGWB and CSIR have labs. At least the labs under Government sector may be merged with KWA so that duplication of work can be avoided and can go for certification of drinking water sources like piped water, well water, hand pumped water etc to get recognition from GOI.

10. Pollution of water resources should be dealt strictly with the existing laws and awareness creation among the public is needed to keep the environment clean. Houses made in plots with more than 4 cents of land to have mandatory rain water recharging structures and the existing rule may be amended to give the option of either rainwater harvesting in tank form or open well recharging through roof rainwater harvesting or rainwater percolation pits .

11. Incentivising the panchayats who are willing to take the distribution of water and taking care of well (source) is very much needed. Significant part of the fund should be earmarked for this sector.

12. The role of local self-governments in drinking water sector may be enhanced through the bulk supply model wherein KWA provides bulk treated water to the Grama Panchayat which then ensures intra-Grama Panchayat distribution through a community managed model with necessary support from the Grama Panchayat and a technical backstopping agency to take care of major contingencies/break downs. While implementing such schemes, the lessons learnt from the bulk water supply implemented in Kollam district during 2008 (Chavara – Panmana Tsunami Rehabilitation Project) may be used to rectify the problems in such models.

13. Local self-governments are setting apart a portion of plan funds for projects on drinking water. .A lot of community managed water supply schemes commissioned and now defunct can be renovated and repaired using the funds of LSGD.

14. In order to protect the sustainability of groundwater sources (wells, tube wells and bore wells) the existing rule in the groundwater (control & regulation) act should be suitably amended. Considering the increasing resistance against the construction of new bore wells, and to avoid interference of wells, data on the existing borewells in Kerala is essential. The role of groundwater department may be redefined from development of groundwater to management of groundwater. Groundwater Department should act as the nodal agency for providing the technical expertise for suggesting site specific recharge structures and also lead in the monitoring and evaluation of the implemented structures. Groundwater department should provide the training and capacity building to the local people for the data collection and finally the department should provide the lead role in preparing the impact assessment report of the implemented structures. The implementation of the proposed structures can be done by the local bodies, line departments and also by engaging MGNREGS activity.

15. Water resource of the State should have to be computed accurately with watershed the fundamental unit. Currently data dispersed in different departments should be collected, collated and validated by an apex body and the same may be utilized for the development of an interactive water resource information system.

16. There is a widespread propaganda that quality of water in Kerala is poor, the main reason being attributed to the presence of fecal and coliform bacteria. Some of the recommendations of the National workshop on the issues and challenges of drinking water management in Kerala organized by State Planning Board during January 2016 were to use nano method to remove fluoride and use of miox pen for water quality monitoring and disinfection.(page 2 of the report) The chemical contaminants through the presence of minerals in water are iron (many parts of the State) and fluoride (in pockets in Alappuzha and Palakkad districts) Terafil filters invented by National Institute for Interdisciplinary Science and Technology (NIIST) (former CSIR) can be manufactured using Kudumbasree (an agency like IRTC, Palakkad can train the Kudumbasree)and each filter unit with an approximate cost of Rs1000/- can be used without any recurring cost for a period up to 5 years, capable of removing bacteria and iron with 98.6% purity of water. Use of such filters ensures immunity from water related diseases.

17. There are many abandoned quarry pits in Kerala that can be effectively used as storage tanks. Identification of leakage in the quarry pit through fractures is the first step and these fractures are to be plugged. Cleaning of the pit, protecting it with side walls are the next steps. Depending on the elevation find out the possible ways of water harvesting/ water entry in the monsoon season. Quantify the water, test the water quality periodically and if needed treatment plants can be set up in potential sites and these can act as potential sources. The department of Mining and Geology and Local Self Governments can make a list of abandoned quarries, their extension and approximate depth. It can contribute a lot for solving the water scarcity especially in higher elevation places

18. Special package for Kuttanad through water harvesting in abandoned padasekarams/large ponds. Such schemes are suitable for Kuttanad and the techniques are already known. In order to solve the water scarcity problem in Kuttanad area, such structures should be constructed so as to solve the problem.

19. Water management in Attapady area has to be considered as a special case for which the following recommendations are made.
    1. Energisation of yielding bore wells which have not yet been energized so far or which are currently under-utilized.
    2. Site investigation and micro water supply scheme implementation in acute water shortage areas.
    3. Developing and ensuring the sustainability of the existing natural springs in the area.
    4. Maintenance and ensuring sustainability of the water harvesting schemes/structures implemented through AHADS (Attappadi Hill Area Development Society). The scope of Haritha Keralam Scheme can be extended in this line and the activity of MGNREGS can be utilized to the level possible in this case.
    5. Implementation of long pending Attappadi Valley Irrigation Project (AVIP), will enhance the water availability in the area.

20. Every year during March to May, the people's representatives and political parties demand for supply of water through tanker Lorries and give list of places to District Collectors and the revenue authorities in turn arrange supply of water. A perusal of the list of places in various districts shows that for the last ten or 15 years the list has been almost the same. During the 13 th plan period, one of the first priority should be given to solve the drinking water problem of such areas by suitably planning supply of drinking water.

21. Well Recharging from Roof Rainwater Harvesting is an artificial ground water recharging method suggested by Central Ground Water Board of India. This has been successfully piloted in many part of Kerala particularly by Thrissur District Administration popularly known as "Mazhapolima". The benefit of this technique is ensuring sufficient water levels including in summer while it improves the water quality of dug wells particularly in the saline ingress coastal wells. The central government schemes like MGNREGP, IWMP, Western Ghats schemes, schemes of Soil and Water Conservation Department, Jalanidhietc have successfully employed this technique at varied levels across Kerala. However, adequate knowledge about this technique is not given to Panchayati Raj institutions and public at large. This gives a vacuum to be filled up by awareness programme on Well Recharging by the State Government. Public Relations Department has to focus upon this subject as an immediate requirement for the state in popularizing the subject under climate contexts.

81. The state government also has pushed the subject in the Haritha Kerala Programme however limited to workers of MGNREGP in a programme called "Jalasubhiksha". The need of the hour is to popularize the subject so as to enable the Kerala households to employ this technique by their costs. This will ensure the sustainability part of the well recharging technique. Financial support for educational institutions may be given to adopt this technique which will make multiplier effects of demonstration models of schools particularly.

ANNEXURE 1

PROCEEDINGS OF THE MEMBER SECRETARY STATE PLANNING BOARD

(Present: Sri. V.S. SenthilIAS)

Sub: Formulation of Thirteenth Five Year Plan (2017-22) – Constitution of Working Groups on **Drinking Water and Sewerage**-Orders issued.

Ref: - Note No: 260/2016/PCD/SPB Dtd: 6/09/2016 of the Chief, Plan Co-ordination Division, State Planning Board

No.298/2016/SS (W7)/SPBDated: 19/09/2016

As part of the formulation of Thirteenth Five Year Plan it is decided to constitute **14** Working Groups under Social Services Division. Accordingly Working Group on **Drinking water and Sewerage** is hereby constituted with the following Co- chairpersons and members

Co- Chairpersons

1. Sri.V.J. Kurian IAS,Addl. Chief Secretary, Department of Water resources, Government Secretariat, Thiruvananthapuram
2. Dr. Vijayakumar. K,RetiredProf. & HOD,Community Medicine, Medical College, Thiruvananthapuram, Mob.9447563000

Members

1. Smt.TinkuBiswal IAS,Secretary toGovernment,Department ofWater resources, Government Secretariat, Thiruvananthapuram
2. Sri. V.K. Baby IAS, Secretary (LSGD), Government Secretariat,Thiruvananthapuram
3. Sri. AjitPatilIAS, Managing Director, Kerala WaterAuthority, Jalabhavan,Vellayambalam, Thiruvananthapuram
4. Dr.K.Vasuki, Director, Suchitwa Mission,Swaraj Bhavan Base Floor-1,Nanthancode,Kowdiyar P.O,Thiruvananthapuram-6. 95003, Phone:04712317730,2319831 - Suchitwamission@gmail.com
5. Sri. Nizamudeen A., The Land use Commissioner, Kerala State Land Use Board, VikasBhavan ,Thiruvananthapuram,Pin.695033
6. Sri. V.Kunhambu, The Regional Director, Ground Water Board,Kerala Region, Kesavadasapuram, Thiruvananthapuram- Pin.695004
7. Dr. Rajesh.K,Associate Fellow & HOD,Social Sciences Department, IRTC (Integrated Rural Technology Centre), Palakkad, Mobile:-9497065402, Post4rajesh@gmail.com
8. Dr.T.N.Prakash, The Director,National Centre for Earth Science Studies, Post Box No.7250, Akkulam,Thiruvananthapuram – 695 011, Phone : +91-471-2511501-Email director@ncess.gov.in
9. Sri.K.S. Madhu, The Director, Groundwater Department,JalavijnanaBhavan, Ambalamukku, Kowdiar, P.O.,Thiruvananthapuram - Phone No. 0471-2434098 (O) 0474-2712634 (R) - e-mail: gwdkerala@ gmail.com

10. Sri.V.K.Mahanudevan, Chief Engineer, Irrigation & Administration,Public Office Building, Museum P O,Thiruvananthapuram-695033 -Office Ph- 0471 2322927Mobile : 9447780159 -Email: cea.irrgn@kerala.gov.in
11. Dr. Jose C.Raphael, Director, Mazhapolima, District Collectorate, Ayyanthole, Trissur 680003, Email:josraphael@hotmail.com
12. Sri.K.Chandrashekaran Nair, Secretary, District Panchayat, Thiruvananthapuram 6950045 -Phone:-04712550750
13. Adv. ParaniyamDevakumar, Federation ofResidents , Associations Thiruvananthapuram, Vazhuthacaud , Thiruvananthapuram - 695 014 - Tel : 0471 2476440, 9446508446 -Email : paraniyamdev@gmail.com
14. Dr.Ajith Kumar P.N.,AjithBhavan, Kaithavana,Alappuzha 688003 - Mob: 9447104033 - Email:pnajith13@gmail.com

Convener

Smt. ShilaUnnithan, Chief, Social Services Division, State Planning Board, Thiruvananthapuram

Co-convener

Smt.Shakeela T. A.,Research Officer,Social Services Division,State Planning Board

Terms of Reference

1. To review the development of the sector with emphasis on progress, achievements,present status and problems during the 11th and 12th Five Year Plan periods.
2. To evaluate achievements with regard to the plan projects launched in the sector, both by the State Governments and by the Central Government in the State during these plan periods.
3. To list the different sources of data in the 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 sector and base the analysis of the previous plan on these indicatoRs
5. To outline special problems pertaining to the sector Drinking Water and Sewerage.
6. To focus on integrated Water Resources Conservation and Management and River Rejuvenation.
7. Recommendation on location specific approach for water security and management.
8. To provide option for social audit of all the schemes
9. To suggest effective method for non-revenue water management system.
10. To formulate suitable mechanism for certification of drinking water sources like piped water, well water, hand pumped ground water etc. to get recognition from Government of India.
11. Extension of sewage work.
12. To promote rain water harvesting for ground water recharging and conservation with the support of LSGIs
13. To prepare scientifically verified database to make it accessible and every person.
14. Reorganising Kerala Water Authority and revaluating Jalanidhi project execution and management.

15. To suggest, a set of projects in general and region specific viable projects which can be undertaken during the 13th plan period.
16. Suggest effective interventions required to address the alarming rate of water pollution.
17. The Co-Chairpersons are authorised to co-opt additional members in the working group, if necessary..
18. The Working Group will submit its report to the State Planning Board by 1st December 2016.

The non-official members of the Working Group will be entitled to Travelling Allowances and Daily Allowances as applicable to Class I Officers of the Government of Kerala.The Class I Officers of Government of India will be entitled to travelling allowances and Daily Allowances as per rules if reimbursement is not allowed from departments.

Sd/-
V.S. Senthil IAS
Member Secretary

To

The person concerned
The Sub Treasury Officer, Vellayambalam

Copy to:

The Accountant General, Kerala (A&E) with C/L
All Divisions, State Planning Board
P.S. to Vice Chairman, State Planning Board
C.A. to Members, P.A. to Member Secretary
C.A. to Sr. Administrative Officer
Finance Officer,P.P.O, Publication Officer,
Computer Section, Accounts Sections
Stock File

Forwarded/By Order
Sd/-
Chief, Social Services Division
State Planning Board

ANNEXURE 2

A decision for nominating **three official representatives for drafting the report By Heads of the Departments** had taken in the meeting and as such 3 officials were nominated. Nominees were

1. Sri Haris
   Deputy Chief Engineer (operations)
   Kerala Water Authority

2. Sri LP Chither
   Director (Drinking Water)
   Suchitwa Mission.

3. Sri VL Mohan Kumar,
   Director(Operations)
   Jalanidhi

Dr. Ajith Kumar, Superintending Hydro Geologist (Rtd.), Directorate of Ground Water Department, Thiruvananthapuram (member of the Working Group) has taken effort to frame the final Working Group report.