RNE/CONS/8901

STATUS REPORT

OF

PRE-REVIEW MISSION

ON

THE NETHERLANDS GOVERNMENT SUPPORTED RURAL WATER SUPPLY PROJECTS

IN

KERALA STATE

AUGUST 24 — SEPTEMBER 8

1989

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C O N T E N T S

INTRODUCTION AND SUMMARY

INTRODUCTION AND SUMMARY

1 Introduction

1.1 I, the reporting consultant, Dinker B. Bhatt (hereinafter the Consultant) was assigned to execute pre-review mission of all the eight rural water supply projects supported by The Netherlands Government and furnish report. The terms of reference (TOR) was enumerated under the Royal Netherlands Embassy (RNE) letter 8291/jas/vs of August 10, 1989 signed by Mr. J.A. Speets, Water Coordinator (WACO) on behalf of the Ambassador.

1.2 According to the TOR mentioned below :

* review the progress of project implementation of the eight Netherlands supported schemes
* summarize and assess the procedures for project planning, preparation, tendering implementation on maintenance
* describe staffing of the different stages in the project
* compare the proposed coverage and the actual coverage of the scheme
* describe and review procedures for siting taps
* obtain an impression of users satisfaction
* assess maintenance cost of the schemes and describe proposed coverage scheme for these cost.

- a pre-review mission was executed to Kerala State between August 24 to September 8, 1989 by visiting Trivandrum and other places and site visits on certain random check points on all eight water supply systems. A detailed programme was drawn in consultantion with IR. H.S. Pesman c.i. the Technical Liaison Officer (TLO), Indo-Dutch Drinking Water and Sanitation Program Kerala Water Authority (KWA) and officials of KWA upon reaching Trivandrum on August 24 1989 and was issued to the concerned Superintending Engineers (SEs) on August 25 1989. In the meantime discussions at KWA and Cordinating Office Socio Economic Units (CO SEUs) Kerala was carried on August 24 - 25 1981.

1.3 The tour programme was meticulously followed. On the spot check was conducted on the seven water supply projects viz. i) Nattika-Firka, ii) Vakkom - Anjengo, iii) Mala, iv) Kundara, (all the four regional rural water supply schemes - RRWS), v) Koipuram, vi) Trikkunnapurha and vii) Cherianadu (all the three individual rural water supply schemes- IRWS). For the viii) Pavaratty RRWS the discussions were carried out in office only since the Consultant had visited the site on earlier trip to Kerala state.

1.4 Based on site visits, discussions with KWA officials at site as well as in the head office (HO) at Trivandrum all points of the TOR are described in the main report and are summarized in the underlying paragraphs.

2.0 Summary

2.1 Review of progress

Out of the eight schemes all except viii) Pavaratty RRWS are under implementation-execution. The three schemes arranged according to the original chronological order, are commissioned with partial-full water supply. They are ii) Vakkom- Anjengo RRWS (partial), iii) Mala RRWS (partial) and vi) Thrikkunapuzha IRWS (full). The other four schemes are at various stages of execution. The i) Nattikka. Firka RRWS and v) Koipura IRWS are at advance stage nearing completion and can be put into commission by 6/1990. The vii) Cherianadu IRWS involves river works construction and can be expected to be complete by end 1990. The iv) Kundara RRWS has lot many works to be completed including largescale material order and may be expected to complete by 6/1991.

The viii) Pavaratty RRWS is under investigations for source. It seems large scale hydrogeological

investigations will be necessary for underground as well as surface water sources. It is rather too early to predict the passage of the scheme.

The progress of all schemes is very much tied up with finance availability. If the funds are provided, some schemes may be completed even earlier.

The following pages give summary overview of all the eight schemes.

The general observations for all eight schemes are summarized as:

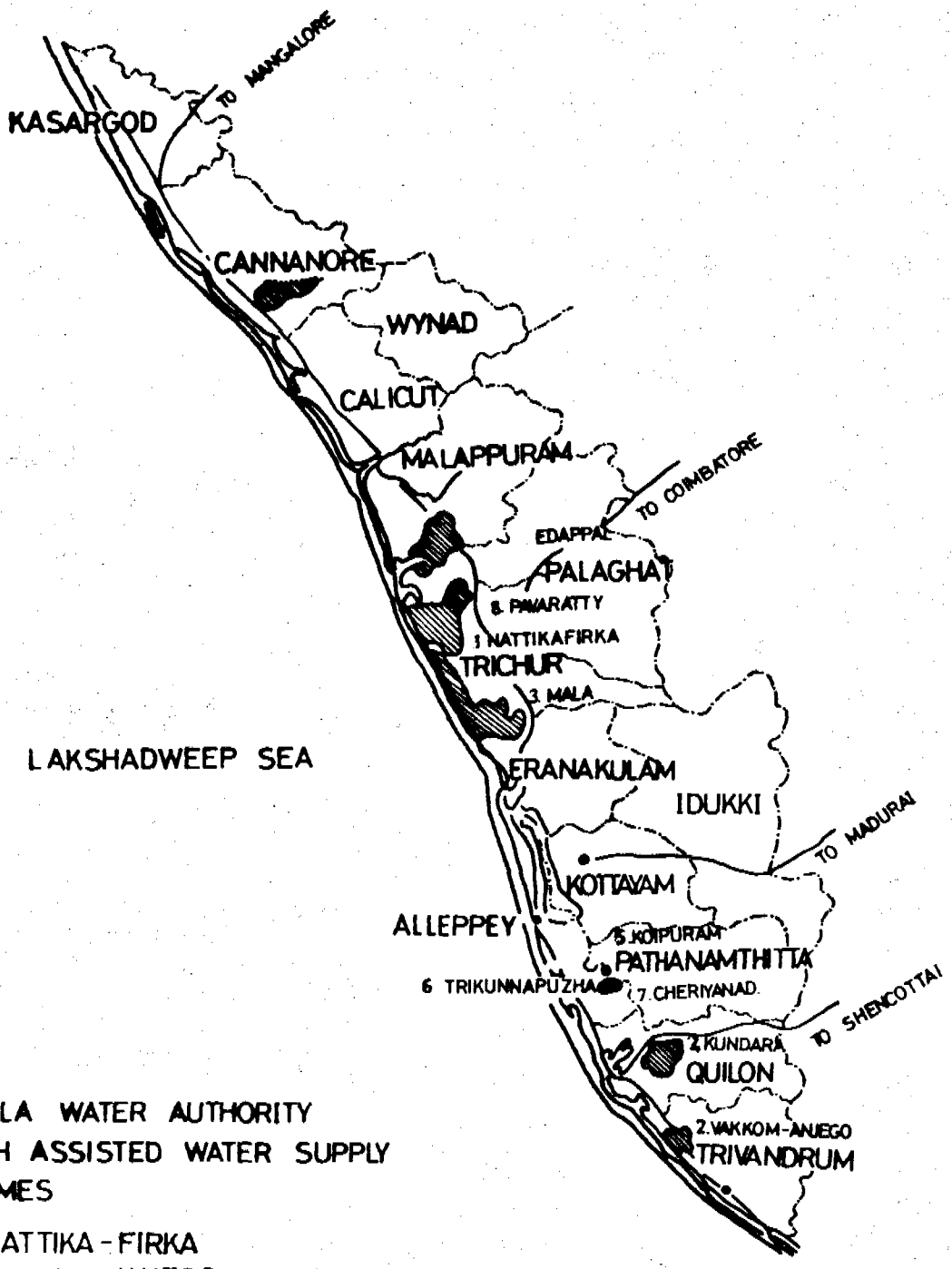
(i) diesel generating sets to be provided on key pumping stations because of erratic nature of electrical supply

(ii) water hammer control devices to be provided on critical pumping mains

(iii) chlorination by bleaching power to be added to system is not a satisfactory method. Alternatives to be considered

(iv) water supply measuring meters should be provided after master OHSRs. This will show wastage leakage also.

KERALA STATE



KERALA WATER AUTHORITY
DUTCH ASSISTED WATER SUPPLY SCHEMES

1. NATTIKA - FIRKA
2. VAKKOM - ANJEGO
3. MALA
4. KUNDARA
5. KOIPURAM
6. TRIKUNNAPUZHA
7. CHERIYANAD
8. PAVARATTY

PROJECT BENEFITTED AREA

SUMMARY OVERVIEW OF EIGHT DUTCH SUPPORTED WATER SUPPLY PROJECTS IN KERALA - AUGUST 1989

KE - I

1. Nattika Firka RRWS

(a) Target Population - 402 000 (2011) - 10 Panchayats. Rate of water supply 50 lpcd

(b) System data - River water intake well + Pump house. Complete rapid sand filtration (inlluding flocculation clarification) Chlorination

- Raw water transmission main 5.7 km 600 mm CI
- 20 Mld RSF + Pumphouse
- Clear water transmission mains 40.01 km 700 mm to 200 mm PSC, AC
- Service reservoirs 13 Nos 6705 kl

GLSR 1 at TP 800 kl

OHSR 1 at TP 850 kl

OHSR 11 for 10 panchayats 5055 kl

- Pumping stations
  1 at source intake well
  1 at TP
  2 Boosting stations may be added in distribution system in second stage

- 310 km distribution system 200 mm to 50 mm AC PVC HDPE Further 273.5 km may be added as per SEU survey

- 1333 stand posts out of which 1000 casted ready for fixing

(c) Start up - Initial start 1982. Scheme at advance stage

(d) Present status - One of the largest schemes at an advance stage except construction of TP-started 10/85 still incomplete - civil works nearly completed mechanical electrical installation in progress. Likely completion 6/1990 (critical activity). Expected completion of whole scheme 6/1990, after laying 47 km distribution system (critical activity)

(e)	Finances	-	Original scheme approved 10/1982 for Rs. 674.0 lacs. Revised scheme approved 11/ 1986 for Rs. 1175.71 lacs. Expenditure 7/1989 Rs. 1286.22 lacs (incl establishment charges). Funds now required Rs 294.0 lacs (1989 - Rs. 129 + 1990 - Rs. 165). Budget (1989) Rs. 50.81 lacs

Summary Overview of Eight Dutch Supported Water Supply Projects in Kerala - August 1989.

KE - I

2. Vakkom - Anjengo RRWS

(a) Target Population - 193 600 (2011), 6 panchayats appears already exceeded (1989)

(b) System data - River water intake well, Rapid sand filter (RSF), chlorination
- 3.4 km raw water pumping main 400 mm CI
- 13.2 km clear water transmission main 500-450-400 mm CI
- 3 service reservoirs 1 OH 2 GL total storage 4150 kl - 3350 kl + 800 kl
- 188 km distribution pipelines may be 200 km with extensions
- 1082 standposts may be 1180 numbers ultimately

(c) Start up - Initial start in 1977 for 2 panchayats. Added 4 panchayats in 1981 to form present scheme. Expected completion end 1990, if money available

(d) Present status - Most of the construction work completed except for electrical mechanical part of RSF treatment plant. Previous contractor

		has left the job and new contractor has been involved whose contract is finalised now (8/1989), (critical activity). Water is presently supplied in limited quantity with partial treatment (infiltration in intake well + chlorination). Present coverage 60% population, 2-3 Mld supply (against 9.7 Mld). Stand posts 903 fixed out of 1082, remaining numbers ready for fixing
(e)	Finances -	First estimate of 6 panchayats (present scheme) estimate Rs. 382.60 lacs (1981), revised Rs. 422.25 lacs (1985). Present expenditure (8/1989) Rs. 415.19 lacs. Requires Rs. 85.0 lacs to complete entire scheme by 9/1990 (Rs. 52.0 lacs in 1989 + Rs. 33.0 lacs in 1990). Budget provision (1989) Rs. 6.55 lacs - too inadequate
(f)	User satisfaction -	Whatever limited supply is available people accept grudgingly, awaiting eagerly full supply. Standpost positions satisfactory

Summary Overview of Eight Dutch Supported Water Supply Projects in Kerala August 1989

KE - II

3. Mala RRWS

(a) Target population - 203800 persons (2011)
(6 panchayats)
rate of water supply 50 lped

(b) System data - River water intake well + pumphouse
Rapid sand filtration Chlorination
Rural + Urban

- Raw water transmission main 40 m
CI 350 mm designed to include Rural + Urban component

- RSF 13.50 Mld present capacity
(7.25 Rural Mala + 6.25 Urban component)

- Clear water service reservoir
common Rural + Urban GLSR 300 kl.
Rural components separates from here

- Pumping main for clear water 350 mm CI 3.21 km

- Storage service reservoirs all four OHSR total 3295 kl. 1 OHSR some distance away from TP 3000 Kl (Master)
3 OHSRs in panchayats 295 kl

- Pumping stations

  1 at HW intake well

  1 at TP for Rural component

  (also 1 for Urban component)

  pumps 3 (2 working + 1 standby)- critical activity

- Clear water transmission mains

  2.97 km 350 mm AC

  9.27 km 300 mm AC

  3.31 km 250 mm AC

- Distribution system

  193 km as per project

  193 km laid 300 mm to 75 mm

  AC PVC HDPE

  Additional 73.50 km as per SEU's survey

- Stand posts 520 according to project report, 327 fixed. Additional 300 likely in SEU report.

  Existing 325 taps of 17 old schemes may have to be accomodated

  Total ultimately about 1000

(e) Start up - Initial start up 1985.

Anticipated completion end of 1989.

(d) Present status - Scheme is partially commissioned. Master OHSR will be completed shortly. At present water supplied by direct pumping of filtered + chlorinated water

All three pumpsets at TP for clear water pumping were simultaenously out of order (2nd Sept 89). These are high head pumps and requires setting right (critical activity)

(e) Finances - Original project cost Rs. 341.12 lacs (1985). Now revised (8/1989) to Rs. 814.35 lacs. Break up –

Part I Original Rs. 499.29 lacs

Part II Additional lines and taps Rs. 143.68 lacs

Part III Socio Economic Units (?) Rs. 171.38 lacs

Total Rs. 814.35 lacs

Expenditure (8/1989) Rs. 374.35 lacs

Requires Rs. 85.0 lacs (net cost) (1989 Rs. 40 lacs + 1990 Rs. 45 lacs) to complete original work

(f) User Satisfaction - People satisfied for stand post sites

Summary Overview of Eight Dutch Supported Water Supply Projects in Kerala August 1989

KE - II

4. Kundara RRWS

(a)	Target population	- 218 100 (2011) 7 panchayats + 4 panchayats and small industrial demand added later on
(b)	System data	- River water intake well, Rapid sand filter (RSF), Chlorination - 5.3 km raw water pumping main 500 mm (3300 m CI, 2000 m PSC) - 23.2 km clear water transmission mains 500 mm to 250 mm (AC, ST) - 10 service reservoirs total storage 4245 kl (3 OH-1610 kl 7 GL - - 2635 kl) - 170 km distribution pipe lines may be 215 km with extensions - 555 stand posts, ultimately 700 in numbers
(c)	Start up	- Project approved in 1985 and first work started in 1986 for distribution of Kundara Expected completion middle 1991 if finances provided, otherwise 1992-93 in normal course

(d)	Present status	-	Source nearly ready. Majority of conveyance pipes for main transmission yet to be ordered and procured (17 km out of 23.2 km) -(critical activity). Treatment plant tenders invited 1/1988 now finalised 8/1989 time limit of construction 18 months (critical activity). Out of 170 km distribution pipes 127 km ordered and received and from that 88 km laid. Service reservoirs 3 Nos to be constructed (critical activity)
(e)	Finances	-	Project approved (1985) for Rs.718.0 lacs. Revised cost Rs. 788.0 lacs including extensions, yet to be agreed to in principle. Expendit 8/1989 Rs. 313.0 lacs. Budget for 1989 Rs. 100.0 lacs

Summary Overview of Eight Dutch Supported Water Supply Projects in Kerala August 1989

KE - II

5. Koipuram IRWS

(a) Target population - 44 400 (2011)

(b) System data - Infiltration works comprising of main well, baby well, infiltration gallery 66 m length, connecting pipe pump house + chlorination.

- Pumping main 200 mm CI 4.67 km pumping machinery
- High level GLSR 150 kl storage
  Low level GLSR 550 kl storage
- Boosting for higher zone with pumping main 150 mm CI 1.5 km
- Distribution system 200 mm - 63 mm AC PVC pipes-6.48 km for higher zone 23.42 km for lower zone.
  Total 30 km
- Stand posts 50 as per project 92 additional recommended with 37.6 km addl pipe line by SEU

(c) Start up - Initial start up 12/1985
All works completed. Expected date of completion 3/1990

(d) Present status - All work completed exeept power connection (critical activity) and 3 km distribution line - procurement and laying-90 mm PVC pipes

(e) Finances - Original estimates of scheme Rs. 91.76 lacs (1985) Revised Rs. 110.0 lacs (1989) not approved yet which incorporates inclusion of an old scheme with 12 km pipe lines to be laid

Finally Rs. 25.0 extra for providing 37.6 km pipeline + 92 additional stand posts. Total cost of ultimate project Rs. 135.0 lacs

Expenditure (7/1989) Rs. 83.0 lacs

Budget provision (1989) Rs. 4.1 lacs - too inadequate

Summary Overview of Eight Dutch Supported Water Supply Projects in Kerala August 1989

KE - II

6. Thrikkunnapuzha IRWS

(a) Target population - 19700 (2011) for five words of panchayat

(b) System data - Source tube well 350 x 200 mm 209 m deep yield 150 000 lph

- Pumping main 150 mm CI 20 m
- OHSR 160 kl by the side of tube well
- Pumping station submersible pump 10 kW 50000 lph+Chlorination
- Distribution system 150 to 40 mm PVC HDPE 20.1 km about 150 canal crossings
- Stand posts 94.No house connections given against 150 demand
- Rate of water supply 50 lpcd + 10% wastage allowance

(c) Start up - Start 1985 completed 12/1988. Water supply started

(d)	Present status	-	The scheme is completed in 12/88 and water supply started. About 700 kl water being supplied to about 14000 present population - present coverage 87% Rate of WS 50 lpcd provided
(e)	Finances	-	Original estimate for three wards of panchayat was too low. Two more wards added later on. Estimated cost of five wards scheme Rs. 1 .1 lacs (1985). Now revised (1988) to Rs. 24.15 lacs. Additional Rs. 11.0 lacs required for additional 10 km extensions of pipe lines and 39 additional taps (95 % coverage)
(f)	User satis-faction	-	Very much. Will be still more upo extensions

Summary Overview of Eight Dutch Supported Water Supply Projects in Kerala August 1989

KE - II

7. Cheriyanadu IRWS

(a) Target population - 34 700 (2011)

(b) System data - Infiltration work comprising of main well, connecting baby well and 8 arms of 15 m gallery. Connecting pipe 300 mm AC 14 m. Pump house + Chlorination

- Pumping main 200 mm CI 500 m
- OHSR 460 kl
- Distribution 30.8 km
  250 mm to 90 mm AC/PVC pipes
  Additional 24.0 km required
- Stand posts 70 nos. Additional 37 suggested by SEU.
- Rate of water supply 50 lpcd

(c) Start up - Initial start up 1985. Majority works completed. Expected completion 6/1990

(d) Present status - The infiltration works construction has been dragging behind. River perennial. Well and baby well nearly completed, gallery to be laid. (critical activity). Work now to be taken up in summer 1990. Remaining all works nearly completed including 95% distribution

- SEU has suggested 24 km additional distribution lines and 37 additional stand posts for 95% coverage

(e) Finances - Project originally approved (5/1985) for Rs. 42.14 lacs revised to Rs. 86.94 lacs (1988) which is likely to reach Rs. 113.0 lacs to include extensions and additional stand posts. Expenadtiture (7/1989) Rs. 56.52 lacs. Budget this year Rs. 4.09 lacs - too inadequate

Summary Overview of Eight Dutch Supported Water Supply Projects in Kerala - August 1989.

KE - III

8. Pavaratty RRWS

(a) Target population	-	In the year 2011 (i) Within project area 657000 (ii) Outside project area 211000 Total 868000 18 panchayats within project area 3 towns and 3 panchayats outside project area
(b) Water demand	-	Ultimate demand (2011) (i) Within project area 36.1 Mld (ii) Outside project area 21.2 Mld Total say 57.5 Mld
(c) Water availability	-	4.5 Mld from existing, 53.0 Mld from other sources.
(d) System data	-	May be multiple source systems - infiltration gallery, shallow tube wells, surface water sources - investigations continue
	-	Pump houses pumping mains according to sources

- Storage, treatment according requirement
- Conveyance mains also as per sources
- Service reservoirs total 16 numbers (12 OH, 4 GL) at present. May change
- Distribution 16 zones-preliminary designs made computer design in progress

(e) Start up - Project first investigated in 1982. Still at a preliminary stage because source is not yet finalised

(f) Present status-(1) Availability of water in Bharatpuzha river under study with CWRDM - (critical activity)

(2) Trial gallery work started 83 m gallery laid at 3.5 m depth out of 250 m length

(3) Bore well work in some panchayats in progress

(4) Land acquisition of reservoir sites completed

(5) Preliminary designs of distribution system completed. Computer designs under progress

(6) Soil investigation work on foundation sites completed

(7) Shallow tubewells work held up for want of screens

(8) Design of OHSR s in progress at Engineering College Calicut

(9) First project report preparation under progress at Engineering College Trichur

(10) Purchase of pipes worth Rs. 230/- lacs made

(g) Finances - Present estimated cost Rs. 1745.6 lacs. Revision cost depends upon finalisation of source

Expenditure 7/1989 Rs. 250.42 lacs

2.2 Project Planning and Preparation

The current procedure of project planning investigations surveys designs and preparation is being carried out by a separate Investigation Planning and Design organisation situated at Cochin. The organisation headed by a Chief Engineer (CE IPD) has Superintending Engineers (SEIPD) Executive Engineers (EEIPD) and subdivisions (AEE IPD) at various places. This organisation prepares project report designs plans estimates drawings etc for all rural and urban schemes.

There is general impression that the scheme preparation has received an impetus after the organisation was created under a separate Chief Engineer (CEIPD).

2.3 Project Implementation

After obtaining sanction administrative (AA) and technical (TS) the particular project goes for implementation to the regional chief engineer in whose territorial jurisdiction the project area falls. The material planning and procurement is being carried out by Chief Engineer, Planning Services and General (CE PSG) while the works component (less materials ordered/procured) is undertaken by the respective Regional Executive Engineer/Superintending Engineer.

Tenders are floated as per financial powers delegated and works started. Any changes required in designs/

estimates as per site conditions and requirement are carried out by the organisation under regional chief engineers.

There is an observation of delays in works due to financial powers of material procurement, tenders acceptance, excess approval etc. The KWA may consider at an appropriate time to enhance existing powers (which are low compared to present day price level) and to delegate new powers to executive officers.

The existing workload seems to be unequal. Some reorganisation of circles divisions and subdivisions appears necessary with a view to have equitable distribution of works (construction + maintenance). This is especially necessary considering large number of projects (worth Rs.150 crores) likely to be posed for bilateral assistance in near future. A detailed study for work redistribution appears imminent.

2.4 Project Maintenance

The current practice of keeping construction and maintenance to gether with the same subdivision/divisions is all right in the present context. However few observations which are seemingly important may be looked into.

(i) The construction and maintenance activity may be separated at section office level

(ii) There should be more involvement of engineers/technicians from Mech/Elect disciplines to be provided on maintenance jobs

(iii) Treatment plants must have qualified chemists attached to them for routine water analysis and performance observations of TP

(iv) Maintenance gang (for distribution system especially) is not necessary on large scale but a fitter with two assistants (linemen) may be provided at subdivision in charge of considerable maintenance activity

2.5 Staffing

The staffing pattern for the implementation and maintenance of the eight Dutch assisted water supply schemes is the same as generally prevailing in the KWA. It is seen that construction maintenance is being looked after by the same units (subdivisional offices, divisional offices etc). In addition those units look after other schemes as well. In short there is no conspicuous separate organisation entirely meant for the implementation and maintenance of bilateral assisted (Dutch as well as Danida) schemes.

It will not be possible to keep the staff separate and entirely meant for the Dutch assisted schemes. However it is observed that some divisions and subdivisions are heavily loaded (other being lighter) and some redistribution of work load seems necessary.

Most of the projects are at advanced stage. It will be necessary to conduct a special study for staffing pattern of construction-maintenance in view of large number of projects in pipe line to be posed for bilateral assistance. In the meantime KWA may look into some redistribution of works amongst the divisions, subdivisions.

2.6 Coverage

The two schemes put into partial commission have about 50-60 per cent coverage (Mala and Vakkom-Anjengo). The third scheme of Thrikkunapuzha has(it is claimed) 87% coverage of present population. There is general satisfaction of water supply as well as position of taps.

To achieve 90 per cent coverage (95 per cent in two schemes) it will be necessary to provide additional pipe lines and additional taps. In all schemes these extentions are of considerable cost. The financial aspect of the provision of pipelines and taps has to be agreed to. The revision of schemes in most cases is done and for remaining can be done quickly upon finalisation of stand post sites.

2.7 Site Selection of Public Standposts

The site selection procedures for placing public stand posts have been very successfully elaborated by the

SEUs. In fact the CO SEUs has come out with a comprehensive manual (draft under approval) for site selection of stand posts.

The ward water committees (WWC) play an important role in finalisation of sites. The formation of such committees is advancing at a fast rate and in many cases has effictively come into operation. The selection of sites is completed at many places but since SEUs have come into existence for past one and a half years or so a lot still remains to be done.

The following observations are relevant here :

(i) The WWCs should have an Assistant Engineer of KWA as Ex-officio member. KWA may like to consider placing of 2-3 AEs on deputation to each of the three SEUs. At a later stage and if necessity arises one AEE may also be placed to assist CO SEUs on technical matters.

(ii) Where schemes are at advance stage of construction the stand posts are already fixed by KWA before SEUs came into existence. The SEUs require to review their positions now. As far as possible these sites may have to be accomodated as otherwise it will be difficult to remove a stand post (already fixed) later on.

(iii) Where a particular piece of land is required to be surrendered for (a) stand post site and

(b) pipeline leading to stand post, the owner of land gives undertaking of surrender on plain paper. This procedure requires to be legalised so that later on disputes may not arise.

The progress of the SEUs is given in main report.

2.8 User Satisfaction

The three schemes which are under partial/full operation has obtained a very good user satisfaction. People are satisfied with water supply and where the supply is partial (Vakkom-Anjengo) they await full supply eagerly. It is so said that there will be special celebrations in the area when Vakkom-Anjengo scheme is fully commissioned.

There is satisfaction about the sites of public stand posts. People in Mala project area who are presently getting partial water supply are very much happy for sites of public taps as it was ascertained during site visit.

2.9 Maintenance Cost

The yearly maintenance cost estimates for four schemes - two RRWS and two IRWS were obtained. The cost of water supply per kl and per person per month was worked out. The cost varies from Rs. 0.82 to Rs. 1.17 per kl and Rs. 1.24 to Rs. 1.77 per person per month. This

does not include depreciation and interest on capital. It is reasonable to adopt a flat rate of Rs. 1.00 per kl (or Rs. 9/- per family of six persons per month) as maintenance cost of water supply. The rate is worked out on 1981 population and 100% coverage and can be brought to any coverage by rule of three.

3.0 Acknowledgements

The report is the outcome of the site visits to all the project areas, meeting with panchayats people and also talking to users at water stand posts. The officials of KWA and SEUs have given extensive data, information and overall cooperation during site visits and personal interviews which is very much appreciated. In fact the visit of Consultant was at such a short notice that officials had to rush for site visits, data collection etc. All these are gratefully acknowledged.

The help and guidance provided by Ir. H.S. Pesman c.i. TLO Kerala is unforgettable. The report would not have been possible at all but for his solid cooperation during entire pre-review mission stay in Kerala.

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MAIN REPORT

1.0 The Kerala State

1.1 Kerala State extends from almost southern part of India on the west coast as a narrow strip 580 km long on the coast line and 35 km to maximum 120 km in width (average width 65 km). The eastern part of the state is hilly with central narrow plains and coastal saline tract with back waters on the western part. The annual rainfall is very high averaging 3085 mm. The topography is such that rain water drains away to sea by 41 big and small rivers and streams without much ground water recharge. The land area is 39000 km^2.

1.2 The population of the state is 25.5 million (1981) out of which 20.7 million is rural. There are 1219 villages and 50 towns out of which 3 are city corporations. The rural density is average 560 persons per km^2 and urban 2670 persons per km^2. The average population density is 660 persons per km^2. The state literacy rate is highest at 70.5 per cent.

1.3 Population increases naturally at the rate of 1.65 percent per year. The decadal population growth rate for 1971-81 was 19.25 per cent. The development of villages (and, towns) are along the road typically called the ribbon development. Hence the pipe lines and standposts also are along the road, or only at a small distance from the road.

2.0 The Kerala Water Authority

2.1 Retrospect

The public health engineering activities of the State were being attended to by the State Public Works Department prior to 1956, and since it was felt that the establishment of a separate department will be very much beneficial for carrying out these activities more effectively, a separate department known as Public Health Engineering Department (PHED) was established in 1956. The objectives of the PHED were as follows.

(1) To investigate, plan, design and implement water supply schemes and drainage schemes in the State

(2) To provide technical assistance to all departments, boards and local bodies in the State with regard to water supply and sewerage

(3) To maintain all rural and urban water supply and drainage schemes in the State

(4) To conduct research and development in the fields of Water Supply and drainage

The Government of Kerala, by an ordinance established a new Authority called Kerala Water and Waste Water Authority, by converting the eastwhile Public Health Engineering Department into an autonomous authority with effect from 1-4-1984. A bill to replace the

ordinance was passed by the Kerala State Legislature and the assent of the President of India was obtained on 4th August 1986. The name of the Authority has also undergone change and now the Authority is designated as the Kerala Water Authority.

2.2 Constitution of the Authority

The Authority shall consist of the following members, namely

(a) A Chairman appointed by the Government

(b) A Managing Director, who possesses experience in management and administration or who is a qualified Engineer not below the rank of a Chief Engineer having sufficient experience in management and administration in water supply and sewerage works appointed by the Government. Provided that no person who is more than fifty-five years of age shall be appointed as Managing Director

(c) The Secretary to Government in charge of Public Health Engineering Department, or the Kerala Water Authority, ex-officio

(d) The Finance Secretary to Government, ex-officio

(e) The Secretary to Government in charge of Local Administration Department, ex-officio

(f) The Secretary to Government in charge of Development Department, ex-officio

(g) Two members representing the local bodies in the State, appointed by the Government

Provided that if for any reason there are no elected members in office in any of the local bodies in the state, the Government may appoint a person who had been a member of any such local body

(h) A member belonging to a scheduled caste or scheduled tribe appointed by the Government

(i) A technical member, who shall be a qualified Public Health Engineer not below the rank of a Chief Engineer, appointed by the Government

2.3 Functions of the Authority

Under the provisions of the Act the Authority shall perform all or any of the following function viz,

1 Preparation, execution, promotion, operation, maintenance and financing of the schemes for the supply of water and for the disposal of waste water

2 Rendering all necessary services in regard to water supply and collection and disposal of waste water, to the Government and on request to private institutions or individuals

3 Preparation of state plans for water supply and collection and disposal of waste water on the directions of the Government

4 Fixation and revision of tariffs, taxes and charges of water supply and maintenance service in the areas covered by the water supply and waste water systems of the Authority

5 Establishment of state standards for water supply and waste water services

6 All functions, not stated herein which were being performed by the Public Health Engineering Department of the Government before the commencement of this Act

7 Assessment of the requirements for manpower and training in relation to water supply and sewerage services in the state

8 Carrying out applied research for the efficient discharge of the functions of the Authority

9 Making provision for the supply of wholesome water and efficient sewerage services to the people in the state

10 Taking such other measures as may be necessary to ensure water supply in times of emergency

11 Such other functions as may be entrusted to the Authority by the Government by notification in the Gazette

2.4 Structure of the Authority

Under the constitution of the Authority, the Managing Director is the Chief Executive and shall have the general control and direction over all the employees of the Authority. From a point of operation and maintenance of schemes, the entire state is divided into 2 regions, viz, South zone and North zone, each zone being headed by a Chief Engineer. The headquarters of the Chief Engineer South zone is Trivandrum and that of Chief Engineer North zone is Calicut. There is a third Chief Engineer, at Cochin, who is in over all control of Investigation, Planning and Design of Water Supply and Sewerage Schemes. He is also in overall charge of research, water quality monitoring etc. At the headquarters, there is a Chief Engineer (Planning Services and General) who is responsible for over all planning, technical services, materials and management services, training, administration and personnel functions etc. The Chief Engineer (Planning Services and General) will be assisted by 2 Deputy Chief Engineers and one Superintending Engineer who is in charge of the overall monitoring of schemes. Under the Superintending Engineer, there are a number of Executive Engineers, Assistant Executive Engineers, Assistant Engineers, Draftsmans and other supporting staff. The Chief Engineer (PSG) will be assisted in the administrative matters by the

Administrative Officer, Administrative Assistant, Office Superintendents, Clerks and other supporting staff.

There is a Secretary for the Authority, who is responsible for the various actities associated with the normal functioning of the Authority, including convening of meetings etc.

The regional and IPD Chief Engineers have a Deputy Chief Engineer, Executive Engineer and other supporting staff for carrying out the functions attached to the chief engineer's office.

The regional and IPD Chief Engineers have Superintending Engineers in charge of circles working under them. While the regional Superintending Engineers are in charge of constructions operation and maintenance of schemes, the IPD Superintending Engineers are in charge of investigation planning and designing of schemes.

Normally under a Superintending Engineer, there will be three or more Executive Engineers, each Executive Engineer being in charge of a Division. Typically, each division consists of sub divisions under Assistant Executive Engineers and sections under Assistant Engineers.

At present there are 31 executive divisions and 7 IPD divisions in the Authority. The total number of circles is 9. The total strength of staff in the Authority exceeds 6000.

3.0 The Rural Water Supply Programme

3.1 Government of India have reintroduced the central sector programme of Accelerated Rural Water Supply Programme during 1977-78 for accelerating the drinking water supply facilities to the identified problem villages. Problem villages were identified by the department based on the norms fixed by Government of India. The criteria for identification of problem villages are as under.

Criteria I - Those not having an assured source of drinking water within a distence of 1.6 km or within a depth of 15 meters

Criteria II - Those which suffer from excess of salinity, iron or fluorides or other toxic elements hazardous to health

Criteria III - Those where sources of water are liable to the risk of cholera or guineaworm infestation

Kerala has got 1219 rural villages as per 1981 census. Out of this 1196 villages have been identified and approved by Government of India as problem villages- 1124 villages in the 1980 survey and 72 villages in the 1985 survey. As on 31-3-1989, 7 villages have been covered in full and 1176 villages have been covered

partially with protected water supply facilities. 13 villages have not been provided with any source of dinking water as 31-3-1989.

323 rural water supply schemes benefitting about 323 problem villages are under construction as on 1-4-1989.

3.2 The rural water supply programme in Kerala state (and elsewhere also) is undertaken under several funding heads and agencies. They are :

i) The accelerated rural water supply programme(ARP)

ii) The minimum needs programme (MNP)

iii) National funding agencies like LIC HUDCO etc.

iv) Bilateral assistance from other Governments (international) e.g. the Netherlands Government, the Danish Government etc.

Regarding the international assistance at present Kerala state is being assisted by two agencies viz. the Netherlands Government (Indo-Dutch programme) and Government of Denmark (Indo-Danish programme) for several of their water supply schemes and other health sector schemes. The Netherlands Government has so far taken up under their assistance eight rural water supply schemes - five rigional or group schemes (RRWS) and three individual or single village water supply schemes (IRWS). There have been three main agreements of assistance from Netherlands Government as under.

KE I	1	Nattika-Firka RRWS
	2	Vakkom-Anjengo RRWS
KE II	3	Mala RRWS
	4	Kundara RRWS
	5	Koipuram IRWS
	6	Thrikkunapurha IRWS
	7	Cherianadu IRWS
KE III	8	Pavaratty RRWS

Each one of the rural water supply schemes is described in details in later pages.

3.3 The Technical Laision Officer Indo-Dutch Water Supply and Sanitation Programme (TLO)

This office was created under Netherlands assistance of KE General in 1984 and is at present under approval upto November 1989 and is likely to continue as large number of water supply projects (worth Rs. 152 crores at the present) are proposed by KWA under Netherlands Government assistance.

The functions of the TLO are

a. Generally to assist the KWA in the preparation and implementation of all rural dirnking water supply projects in Kerala State :

a.1 At the request of KWA to assist in solving any technical problems as might arise in the preparation of designs and tender documents, evaluation of tenders and detailed designs prepared by contractors

a.2 At the request of KWA to assist in solving the technical problems arising during the implementation of water supply projects

b. Specifically, in the case of projects financed with Dutch bilateral assistance (eight projects)

b.1 To advise KWA in preparation of tender documents, the evaluation of tenders and detailed designs prepared by contractors for all lump sum contracts and other contracts valued over Rs. 10 lacs in above projects

b.2 To be available to KWA to advise on planning and on the formulation of a programme to increase the number of house connections on the formulation of a proposal to improve water quality testing programme and on the formulation of a plan to introduce the use of aerial photography in the project preparation

b.3 To assist the KWA in the implementation of the above mentioned eight projects and to ensure that the quarterly disbursement claims submitted to the Government of Netherlands are in general agreement with the progress of the work and to recommend these claims for approval.

The present TLO is IR. H.S. Pesman c.i. is in the office since 12-1984 and is carrying out the programme in solid mutual cooperation with the KWA.

3.4 Socio-Economic Units, Kerala

Socio-Economic Units (SEUs) Kerala is a project organisation assisting the Kerala Water Authority (KWA) to attend the socio-economic aspects of water supply and sanitation. The organisation works in the fields of :

- Selection of sites for public water supply taps
- Sanitation particularly human waste disposal
- Health Education
- Monitoring and evaluation of impact of water supply
- Documentation

The organisation made a beginning by opening North Unit in Calicut in 3/87 followed by Coordinating Office in Trivandrum in 5/88. The SEU South was established at Quilon in 8/88 and SEU central at Trichur in 9/88 .

The project implementation spread over initially a three year period may cost over Rs. 140 lacs which is funded by the Governments of Netherlands and Denmark roughly on 2/3, 1/3 share basis.

Major part of SEUs' activities are field based. Besides they also organise seminars, conferences, conduct studies, publish reports and information literature on topical issues from time to time.

Annexure C is a hand out issued by Coordinating Office SEUs (COSEUs) showing outline of activities and Annexture D give details at a glance what they did in 1988.

The expenditure of CO and all three SEUs for the year 1988 is Rs. 75.5 lacs.

The current publications of the COSEUs related to water supply to Kerala state are :

1) Quarterly newsletter JALASANDESH
2) A booklet on Water in Malayalam (English version under preparation)
3) Recommendations for siting water supply standposts (draft under finalisation)

4.0 Project Implementation Review - Dutch Assisted Water Supply Schemes

As mentioned earlier eight rural water supply schemes- five regional (RRWS) and three individual (IRWS) are approved under bilateral assistance from the Netherlands Government under three main agreements. Out of eight schemes seven schemes are at various stages of implementation.

They are in short

i) Nattika - Firka RRWS under advance stage of construction expected to be completed in 9/1990

ii) Vakkom-Anjengo RRWS is nearing completion. Water is being supplied in limited quantity with partial treatment. It is expected to be completed fully in 12/1990

iii) Mala RRWS is partially commissioned. It is expected to be completed by 12/1989

iv) Kundara RRWS is roughly halfway through. It can be completed earliest by 6/1991

v) Koipuram IRWS is nearly ready. The scheme can be commissioned by 3/1990 as only power connection is to be obtained

vi) Thrikkunnapurha IRWS is commissioned in 12/1988. The present coverage is 87% with full 50 lpcd water supply

vii) Cheriyanadu IRWS is having majority works completed except river works. Earliest it can be commissioned by 6/1990

viii) Pavaratty RRWS is at a very initial stage as source is to be finalised. It is suggested to go for multiple source system viz. infiltration works + shallow tubewells in river and on bank + surface water from dam. Some pipes are purchased as advance planning

The detailed description of all the eight rural water supply schemes is given in the following pages.

1. Comprehensive Rural Water Supply Scheme to Nattika Firka (RRWS)

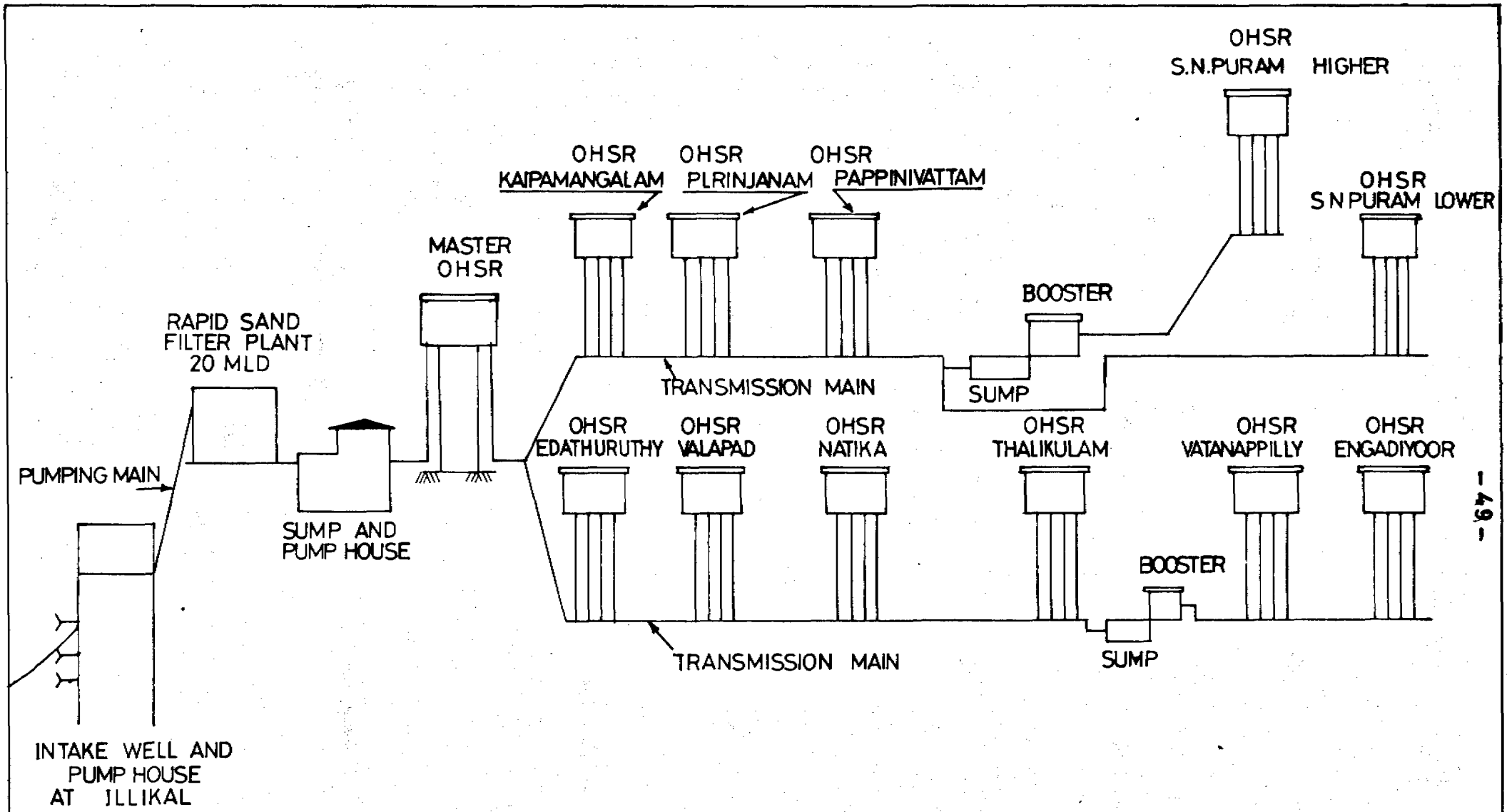
This project is financially assisted by the Royal Netherlands Govermment under INDO/DUTCH drinking water and sanitation programme.

Nattika Firka - an administrative unit is consisting of 10 panchayats along the Arabian Sea coast stretching north-south direction in Trichur District of Kerala State.

Intrusion of salainity from sea and back waters in the ground water and consequent absence of quality drinking water is the vital problem of this coastal belt. This strip of land is a major portion of an island surrounded by sea water. Nattika Firka extends about 35 km in length and having an average width of 5 km. This thickly populated region is having an average population density of 1800/- per km^2 with an area of 140.5 km^2.

Water borne diseases are very usual in this Firka. As this area is having very loose sandy soil and most of the inhabitants are dependent on shallow wells and open ponds for their water demands, epidemic diseases are very common. The inhabitants of this locality are of poor fishermen community and agriculture labourers.

Considering all these relevant facts, a perennial source is selected for this RRWS. The source is Karuvannur river, 15 km away from the Firka, and its water level



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KERALA WATER AUTHORITY

COMPREHENSIVE WATER SUPPLY SCHEME TO NATTIKKA-FIRKA

will be maintained during summer also by supplementing from Chimmney dam in the upstream of the same river.

This scheme is designed for 30 years to benefit about 4 lakhs people by the end of 2011 AD. per capita rate of supply is 50 lpd with no allowance for wastage etc.

Raw water from the upstream side of the Illickal regulator is pumped to Vellani, through 5.7 km of 600 mm CI pumping main, where water treatment plant of 20 Mld capacity is being built. The work of TP was started in 10/1985 but so far civil works are nearly completed and mechanical electrical equipment is being erected. Expected completion is 6/1990 (critical activity).

The clear water collected in the GLSR of 850 kl capacity and is pumped to an Master OHSR 800 kl capacity in the plant yard itself. The Master OHSR feeds the 11 Nos OHSR tanks in 10 panchayats of Nattika Firka by gravity. In the second stage, boosting is designed to feed 4 numbers of OHSR at the farthest ends. The gravity main pipes of 40.01 km length varies in sizes from 700 mm to 200 mm diameter are almost laid.

Distribution net works spreads all over the 10 panchayats. Each panchayat is having separate gravity distribution system with OHSR. One panchayat has two OHSRs to command its vast area. Eight OHSRs, are completed and remaining three are likely to be completed by 6/1990.

About 310 km of pipe line constitutes the entire distribution system. The sizes are ranging from 200 mm to 50 mm dia AC, PVC HDPE. Finally the treated water reaches to the pots of the most needy public through 1333 Nos of street spouts. Out of total 310 km distribution system length, pipe lines for 263 km length is laid. Remaining length of 47 km is yet to be ordered and laid (critical activity) which can also be completed by 6/1990.

This project was started in November 1982 and was proposed to complete during 1/88. Due to the following reasons the scheme could not be completed in time as programmed and it is expected to be commissioned by 6/1990.

1. Delay is land acquisition.
2. Delay in getting sanction from the National Highways authorities
3. Nonavailability of cement and steel in time
4. Delay in getting electric connection
5. Non availability of pipes and specials
6. Non availability of funds in time
7. Poor progress of treatment plant construction

The revised estimate so far approved is for Rs. 1175.71 lacs against the original estimated amount of Rs. 674.0 lacs.

Eventhough the original preposal was to cover 90% population it is not fully materialised due to the development of the area during the implementation period of the project. So based on the suggestions from the WWC provision

for extension of distribution lines are proposed in the second revised estimate. With these extensions the coverage will be more than 90% population.

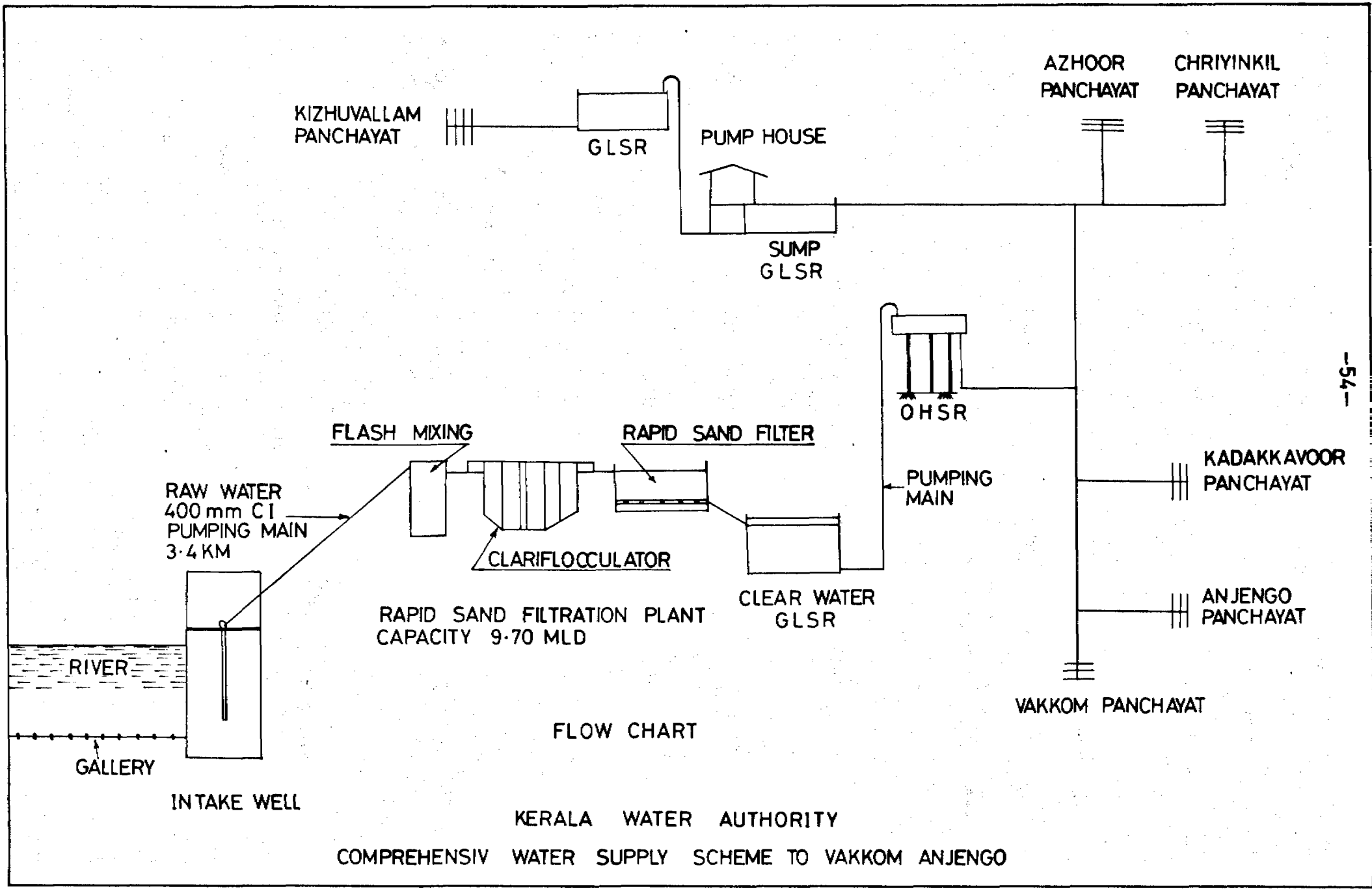
For the completion of the works an additional amount required is Rs. 294.0 lacs as shown in the table below.

		1989-90 Rs.lacs	1990-91 Rs.lacs
1.	Intake well, raw water pumping main, Raw Water pump sets etc	6.75	2.75
2.	Treatment plant, land scaping, protection works approach road, clear water sump, pump sets etc.	Treatment plant 18.50	11.40
3.	Gravity main to various panchayats (including pumping main to S.N. Puram)	2.00	43.07
4.	O.H. Tanks 11 Nos. and Motor Tank, sump, pump house and pump sets for Booster stations at Vadanappilly and Pappanivattom (Mathilakam)	33.00	50.15
5.	Distribution system including 1330 Nos. street hydrants as per project	45.30	5.13
6.	Administrative building, store, quarters etc.	0.21	2.13
	Total	105.76	114.63
7.	Establishment Charges Contingency and other miscellaneous charges	23.24	50.37
	Total Rs.	129.00	165.00 lacs

2. Comprehensive Rural Water Supply Scheme to Vakkom-Anjengo (RRWS)

Originally there existed water supply schemes for two panchayats viz Chirayineezhn and Kizhu villam. Subsequently four more panchayats were added to make a comprehensive regional water supply scheme of larger coverage.

Water supply scheme to the six Panchayats viz., Vakkom, Kadakkavoor, Anjengo, Chirayinkeezhu, Kizhuvillam and Azhoor and was posed for bilateral assistance from the Netherlands Government. It was not possible to provide independent water supply to all these Panchayats and hence a comprehensive water supply scheme to meet the requirements of the people in the project area with a dependable Vamanpuram river source was designed. The estimated population benefitted by the scheme would be 1,93,600 in 2011. The ultimate water demand at a per capita rate of supply of 50 lpcd will be 9.70 Mld. The intake works are located on the bank of the river at the location known as Paravoor-Puzhakkadavu. The intake works include construction of an intake well and jack well. The raw water pumping main is designed to carry the ultimate water demand is 400 mm CI for a length of 2700 m. The treatment plant of the rapid sand gravity type and clear water reservoir are located at Valiyakunnu. The capacity of the treatment plant is 9.70 Mld. A clear water reservoir of 800 kl capacity will be constructed. The treated water collected in the reservoir near the treatment plant



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KERALA WATER AUTHORITY

COMPREHENSIV WATER SUPPLY SCHEME TO VAKKOM ANJENGO

will be pumped into an over head service reservoir already constructed. From this water will be conveyed by gravity for a distance of about 2500 m and from where it branches into two - one branch feeds Vakkom, Kadakkavoor and Anjengo panchayats and the other branch feeds Chirayinkeezhu, Kizhuvilam and Azhoor panchayats. As the Kizhuvilam panchayat area is elevated distribution by gravity from the over head service reservoir is not possible and hence water is collected in a sump and then pumped to a ground level reservoir at an intermediate point and distributed in the panchayat area.

In the distribution system the Hydraulic calculation is based on the density of population which will be more or less correct as the population is evenly spread in the entire area. Peak factor adopted is 2. The sizes of distribution lines designed vary from 250 mm to 63 mm. The total length of the distribution system is 188 km and the number of stand posts (street taps) proposed is 1082 in number in the scheme but may be 200 km and 1180 in number respectively on SEU's recommendations.

The construction period was 4(four) years from 7/1981. The scheme was proposed to be completed by 7/1985 but has remained incomplete due to (i) delay in getting land from panchayats and (ii) delay in completing treatment plant, besides inadequate funds. By this time all the lands required are obtained from panchayats.

The contract for construction of treatment plant was originally awarded in 8/1983 but there had been controversy for price escalation as the work progressed slowly. Ultimately the contractor left in 11/1986 after nearly completing all civil works and bringing all plant and machinery on site. Subsequently a new tender was floated in January 1988 which is now accepted (8/1989). Mainly erection of mechanical electrical parts of rapid sand filter (RSF) plant and some corrective work to civil works remain and hiving fixed the agency now, it can be expected to bring the scheme into commission by 9/1990.

The revised estimate so far approved is for Rs. 422.50 lacs and expenditure to date is Rs. 415.19 lacs. It is necessary to have about Rs. 85.0 lacs to complete treatment plant and other remaining works given below. Thus the ultimate cost will be Rs. 500/- lacs.

The development in the project area is phenomenal, with increase in population. It appears necessary to provide extensions of distribution system to achieve desired 90% coverage.

The balance works to be arranged for the proper completion of the project are :

1.	Treatment Plant Site Balance work	Rs. 30.00	Lacs
2.	Pipe line interconnection, construction of Valve Champer, Introducing Air Valves etc.	6.00	"
3.	Cost of pipes and specials to be procured	9.00	"
4.	Electrical Work inside and around the plant.	2.00	"
5.	Amount to be remitted to K.S.E.Board for Power supply to various points	5.00	"
6.	Yard levelling, wash Water disposal, Internal Roads etc.	7.00	"
7.	Balance work at Ground level Tank site Keezhuvillam-Inter connection fixing Control Valves, Yard fencing etc. complete	2.00	"
8.	Providing Anchor Blocks at various Thodu crossings	2.00	"
9.	Procurement of Clear Water Pump set, supply and Erection	1.50	"
10.	Labroratory Equipments and Furniture	2.00	"
11.	Unforeseen Items	3.50	"
	Establishment ever head	15.00	"
	Total	Rs. 85.00	Lacs

With the above works completed the scheme can be fully commissioned by 9/1990.

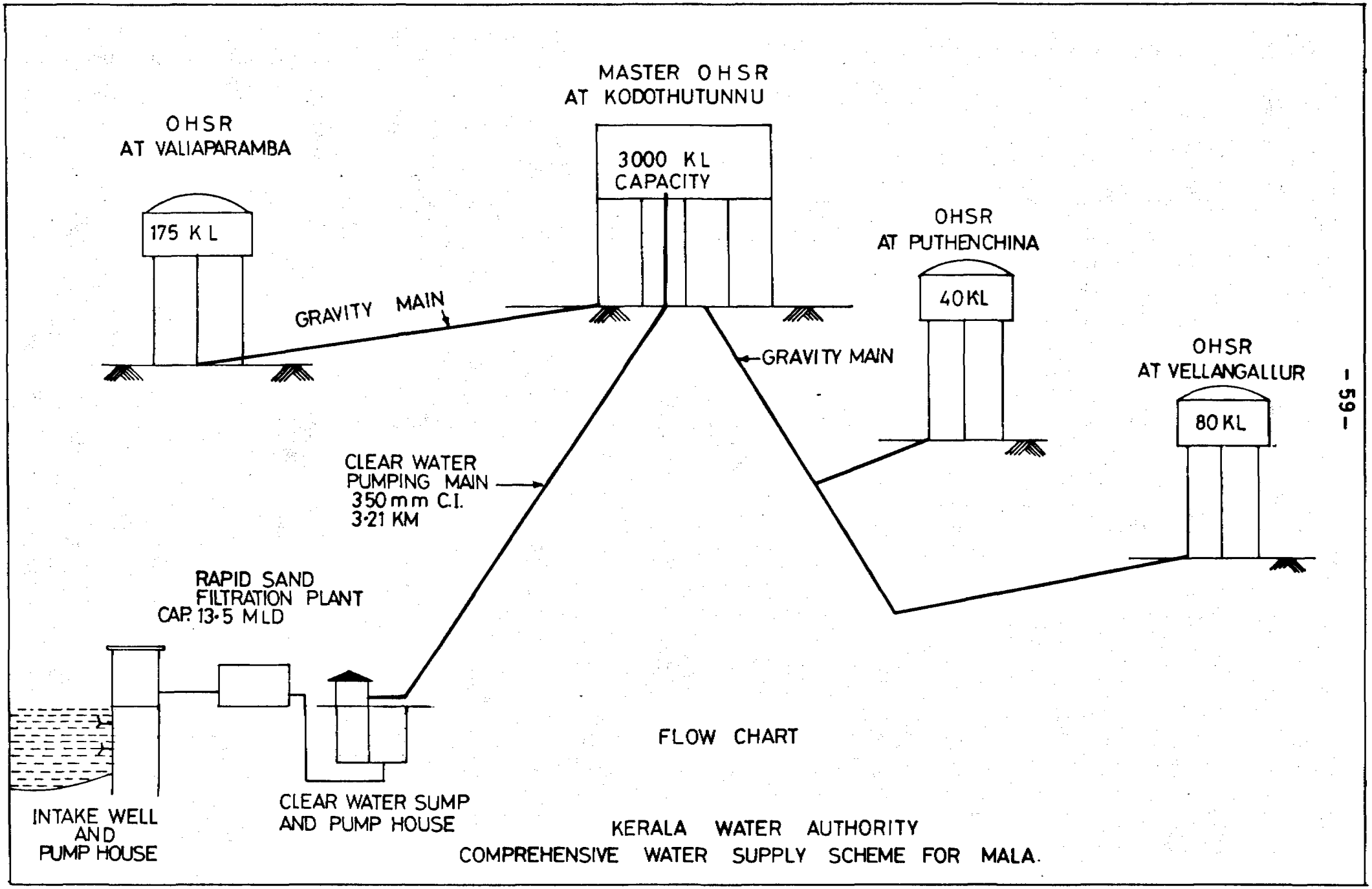
3. Comprehensive Rural Water Supply Scheme for Mala (RRWS)

Comprehensive Rural Water Supply Scheme to Mala and adjoining panchayats will provide safe potable water to six panchayats which are lying in two taluks, Mukundapuram and Kodungallur, of Trichur District. The project has been sanctioned administratively and technically in Januayy 1985. The water supply project with an estimated cost of Rs. 341.12 lakhs has been taken up for implementation during January, 1985 with bilateral assistance from the Government of Netherlands and the work was actually started on 25.5.1985.

Project Aarea :

The project covers an area of 141.22 km^2 extending over six panchayats.

		Population Actual and Anticipated			
		1971	1981	1996	2011
i)	Mala	23400			
ii)	Annamanada	19400			
iii)	Kuzhur	13900			
iv)	Poyya	15200			
v)	Puthenchira	13800			
vi)	Vellangallur	23100			
	Total	108800	129400	163500	203800


MASTER OHSR
AT KODOTHUTUNNU
3000 KL
CAPACITY
OHSR
AT VALIAPARAMBA
175 KL
GRAVITY MAIN
OHSR
AT PUTHENCHINA
40KL
GRAVITY MAIN
OHSR
AT VELLANGALLUR
80KL
CLEAR WATER
PUMPING MAIN
350mm C.I.
3·21 KM
RAPID SAND
FILTRATION PLANT
CAP. 13·5 MLD
INTAKE WELL
AND
PUMP HOUSE
CLEAR WATER SUMP
AND PUMP HOUSE
FLOW CHART
KERALA WATER AUTHORITY
COMPREHENSIVE WATER SUPPLY SCHEME FOR MALA.

Of these six panchayats five panchayats namely Mala, Annamanada, Kuzhur, Puthenchira and Vellangallur are in Mukundapuram Taluk and the remaining Poyya panchayat lies in Kodungallur Taluk.

The above six panchayats are comprised of sixteen villages. All of these villages have been identified as problem villages due to salinity as per the survey on water supply facilities in villages conducted during 1980.

Chalakudy River flows along the eastern and southern boundaries of the project area.

SCOPE :

The Water Supply Scheme will provide water to 90% population of the project area at the rate of 50 lpcd for their domestic use. The population benefitted by the project during 1981 and 2011 will be 129400 and 203800 respectively. The ultimate water demand has been estimated at 10.20 Mld in 2011.

SALIENT FEATURE :

Chalakudy River which flows along the eastern boundary of the project area is a perennial river. This river has been adopted as the source for the water supply scheme to Kodungallur and Methala urban communities and it was under execution at the time of the study for the scheme to Mala and adjoining panchayats. Adopting the source as common for both the projects, various components of head works namely intake well,

pump House, raw water main, treatment plant etc. of Kodungallur Water Supply Scheme have been designed and constructed at Vynthala to meet the total requirements of both the urban + rural projects.

As the project area spreads over six panchayats the area has been divided into four ZONES, Zones I to IV, for designing distribution net works, each zone has been provided with independent storage reservoirs. Over head service reservoir proposed for Zone I at Kodothukunnu for Mala will be having a capacity of 3000 kl and a height of 19 metres above GL. This reservoir will function as the reservoir for Zone I and also will feed water to the overhead reservoirs of the other three zones by gravity. The clear water from Vynthala treatment plant (TP) will be lifted to the main tank at Kodothukunnu using 3 Nos. 60 KW electrically driven motor pump sets through 350 mm CI pumping main of length 3415 metres.

ZONE I

Area covered	:	Mala Panchayat
Storage Reservoir	:	At Kodothukunnu 3000 kl cap acity, 19m staging
Distribution lines	:	41.50 km
Street Fountains	:	112

ZONE II

Area covered	:	Annamanada, Kuzhoor and Poyya panchayats
Storage Reservoir	:	At Valiaparambu, 175 kl capacity, 12m height
Gravity main	:	350 mm AC 3070 metres

Distribution lines	:	76.60 km
Street fountains	:	245

ZONE III

Area covered	:	Puthenchira Panchayat
Storage reservoir	:	At Puthenchira 40 kl , 12 m height
Gravity main	:	(1) 300 mm AC 9200 metres common (2) Branch 250 mm AC 36 metres
Distribution lines	:	20.98 km
Street fountains	:	53

ZONE IV

Area covered	:	Vellangallur Panchayat
Storage Reservoir	:	At Kannachankunnu 0.80 lakh litres, 12m height
Gravity main	:	Branch main 250mm AC. 3040 metres
Distribution lines	:	51.20 km.
Street fountains	:	110

PRESENT STAGE OF PROGRESS

1.	Head works	:	All works completed
2.	Clear water pump sets	:	3 Nos 60 kW installed. Trial run started on 15.12.1988. (critical activity)
3.	Clear water pumping main	:	3210 metres against 3415 metres laid and completed

4. Gravity mains

i)	350 mm AC for zone II (3070 m)	:	Completed
ii)	300 mm AC for Zone III & IV (9200 m)	:	Completed
iii)	250 mm AC for Zone III (3040 m)	:	Completed

5. Reservoirs

i)	30 lakhs litres tank at Kodothukunnu (3000 kl)	: :	Work in progress and has completed upto and including 4m of side wall and will be completed by 12/89
ii)	1.75 lakh litres at Valiaparambu (175 kl)	:	Completed
iii)	0.40 lakh litres at Puthenchira (40 kl)	:	Completed
iv)	0.80 lakh litres at Kannachankunnu (80 kl)	:	Completed

6.	Distribution system	:	195 km completed against 193 km. Only very few number of gap connection in Kuzhoor area remains and that will be completed shortly
7.	Fitting of Public stand posts	:	As against 520 Nos of public standposts proposed in the Original Project Report, the Socio Economic Unit, after field study has recommended to instal 548 Nos of public stand posts. Out of the 548 Nos of taps 327 numbers have been fitted and the balance will be completed shortly.

In order to tide over Water Supply interruptions that may occur due to cleaning of tank (which has only one chamber) bye-pass arrangements, for pumping water direct to the gravity mains or to the distribution systems have been provided. Hence the trial run could be started on 15-12-1988, even before completing the master OHSR at Kodothukunnu. As it was made possible to start trial run during December, 1988 we could be managed to supply water in three panchayats - Mala, Poyya and Puthenchira - as a drought relief measure. Because of this, the water Supply by lorry to the drought affected areas of the above three panchayats was avoided.

SOCIO ECONOMIC UNIT

The idea of socio economic study and the low cost sanitation programme has been very recently introduced into the project. The Socio Economic Unit of Trichur Centre completed their field studies to finalise the locations of public stand posts in all the six panchayats within a short span of time. Hence the fitting of public taps could be taken up during December, 1988 itself. The SEU has furnished the final list of public stand posts. The list is being reviewed in consultation with concerned panchayats and will be finalised shortly.

As per the field study conducted, the SEU has recommended to extend distribution system to the tune of 79.5 km so as to achieve 90% actual coverage.

REVISED ESTIMATE

The expenditure incurred as on 31-8-1989 for works alone is Rs. 316.095 lakhs. As per quarterly prggress reports, quarter ending March, 1989, the total expenditure incurred including establishment charges etc. is Rs. 374.349 lakhs.

A revised porject estimate has been prepared and submitted and that is under scrutiny and evaluation at the Chief Engineer's office.

The Revised Estimate consists of three parts.

Part I, II and III.

Part I - Original works

All items of work approved under the original Project Report have been included in this part. The revised cost has been worked out following the accepted norms and guide lines.

The estimate amount of this part comes to Rs. 499.20 lakhs.

Part II - Additional works

As per the original project report 90% coverage has been contemplated. In order to achieve the coverage certain items of works such as extension of distribution lines and providing taps etc. are necessary subject to the study and recommendation of the Socio Economic Unit.

The amount estimated for the additional works comes to Rs. 143.68 lacs.

Part III - SOCIO ECONOMIC UNIT

The Socio Economic Study and the low cost sanitation have only been recently introduced into the project. The amount required for various activities including low cost sanitation programme are provided in this part.

The amount has been estimated as Rs. 171.38 lacs.

The total Revised cost of works comes to Rs. 814.35 lacs. The estimate is under scrutiny in the Chief Engineer's Office.

Conclusion :

The scheme is at a very advance stage near completion. The requirement of funds to complete it according to original project proposals is Rs. 85.0 lacs excluding establishment charges is Rs. 85.0 lacs.

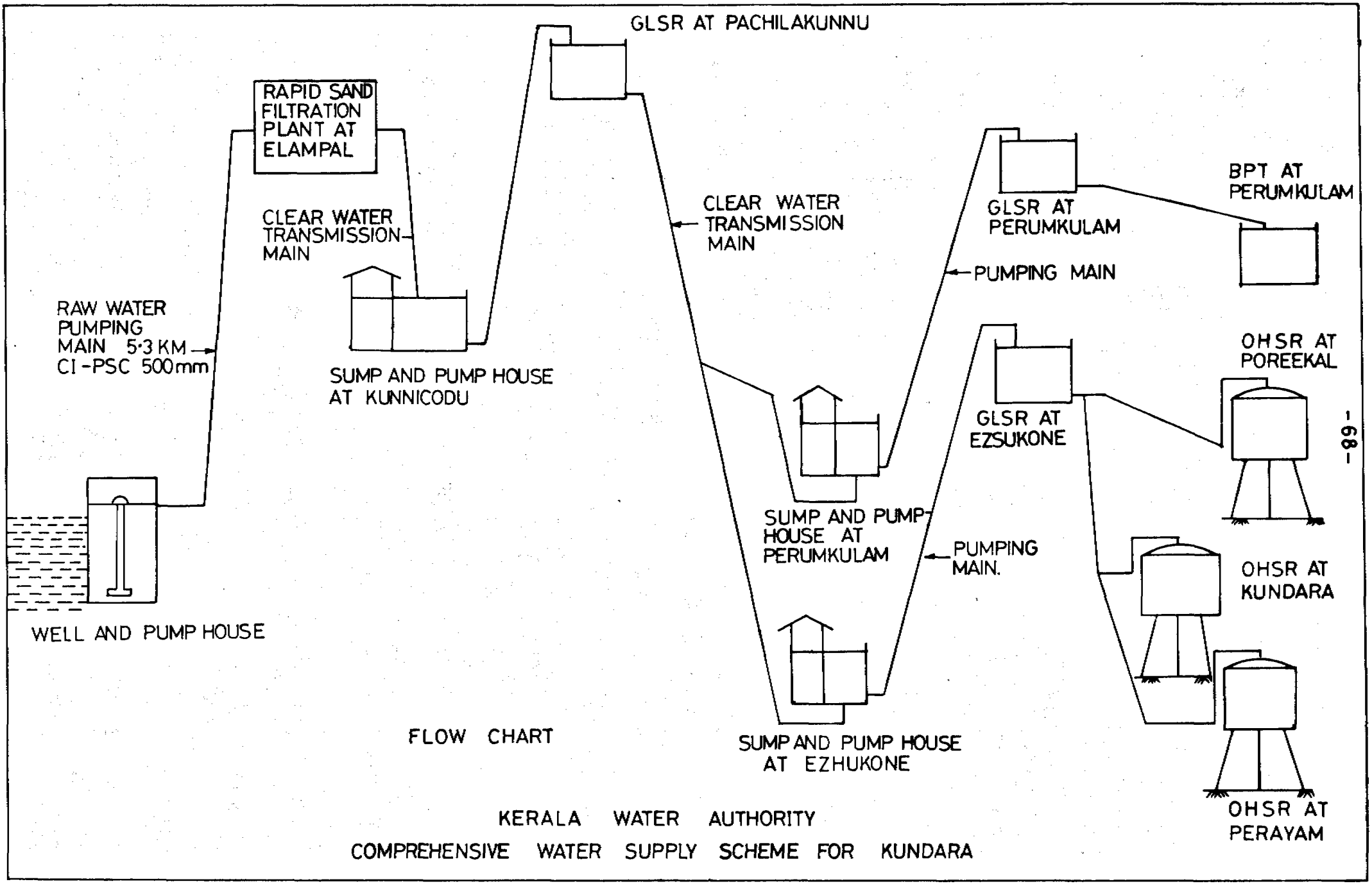
The implementation schedule which was included in the original Project Report was first revised during 1987. According to that schedule the project was programmed to be completed and commissioned during December, 1988. But due to certain unexpected problems regarding the receipt of materials mainly cement the work of the main reservoir at Kodothukunnu was effected at various stages of progress. The work as a result of the above mentioned situation is now lagging for about one year behind schedule. However as bye pass arrangements had been provided and all works except the construction of the main tank had been completed the trial run was started on 15-12-1988.

4. Comprehensive Water Supply Scheme for Kundara (RRWS)

The source of the water for this Scheme is Kallada river at Punalur. A well-cum-pump house (10 m dia and 18.5 m depth) is under construction on the river bank at 360 m upstream of Punalur junction. The total water demand in 1996 is calculated as 16 Mld (which includes 0.5 Mld industrial and 6.8 Mld for Kottarakkara and adjoining three panchayats) and the source is adequate to meet the total demand.

The water from the well will be pumped into treatment plant at Elampal about 5 km west from Punalur by using 128 KW pumpsets (2 Nos) at a time, though 500 mm CI and 500 mm premo pristressed concrete pipes. The capacity of the treatment plant is 16 Mld at first stage (1996). The ultimate capacity of the treatment plant is 20 Mld in the second stage (2011). Intake works, treatment unit and transmission units are designed to meet the ultimate demand in 2011 and to provide water for 4 more panchayats namely Kottarakkara, Vettikkavala, Malila and Vilakudy and small industrial demand for Alind.

The treated water from the treatment plant will flow by gravity to a sump at Kunnikode (670 kl capacity) 5.5 km from Elampal though 500 mm AC pipes. From the sump, water will be pumped to a GLSR at Pachilakunnu using 105 KW pumpsets (2 nos) through 500 mm steel pipes for length of 260 m. From this reservoir water will flow by



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KERALA WATER AUTHORITY

COMPREHENSIVE WATER SUPPLY SCHEME FOR KUNDARA

gravity through 500 mm AC pipes for a length of 7.2 km upto college junction which is the tapping point for Kottarakkara and 3 other panchayats and then through 400 mm AC Pipes for a length of 1.42 km upto market junction at Kottarakkara. From market junction, the transmission main bifurcates into two, one line with 250 mm AC pipes to a length of 4.4 km leads water to Perumkulam sump(120 kl capacity) by gravity. The second line leads water to Ezhukone sump (285 kl capacity) through 350 mm AC pipeline to a length of 4.4 km by gravity. From Ezhukone sump water is pumped to a GLSR at Ezhukone (385 kl capacity) through 300 mm CI pipeline to a length of 1.56 km. This GLSR tank feeds water to 3 OHSRs namely :

(1) OHSR at Poreekal having capacity 470 kl of 300 mm and 250 mm AC pipes for a length of 6.72 km,

(2) OHSR at Kundara having capacity 400 kl through 300 mm AC pipeline for a length of 5.99 km, and

(3) OHSR at Perayam having capacity 740 kl through 250 mm AC pipeline for a length of 2.89 km

Water stored at Perumkulam sump is pumped to GLSR at Perumkulam having capacity 195 kl through 200 mm CI pipe line to length of 700 m. From this sump water flows through gravity to break pressure tank at Perumkulam having capacity 650 kl through 200 mm AC pipeline to a length of 700 m.

The Project area is divided into 4 zones

Zone I - Kulakkada and Neduvathoor panchayats

Zone II - Pavithreswaram and Ezhukone panchayats

Zone III - Kundara panchayats

Zone IV - Perayam and East Kallada panchayats

Higher areas of zone I are fed from the GLSR Perumkulam and low areas from the BP tank at Perumkulam. Higher areas of zone II are fed from the GLSR Ezhukone and low areas are fed from OHSR Poreekal. Zone III is fed from the OHSR at Kundara and Zone IV is fed from the OHSR Perayam.

The total distribution system length is 170 km and may be ultimately 215 km with extensions (as suggested by SEU) using various pipes having sizes 350 mm to 75 mm. The total number of public taps proposed are 555. Provision is also made for giving house connections for 40% households. About 700 numbers of stand posts (public taps) may be required ultimately to cover extensions thereby 90% population coverage.

The special feature of the scheme is that it requires four pumping stations because of hilly terrain in addition to some pumping that may be involved at the treatment plant. They are :

i) At intake well to TP for raw water

ii) At first GLSR at Konnikodu for clear water

iii) In Zone I, and

iv) In zone II

The scheme has progressed considerably having upto date expend iture of Rs. 313.50 lacs (8/1989) against sanctioned cost of Rs. 717.55 lacs (5/1985). It seems the revised cost may go upto Rs. 788.0 lacs upon completion. (excluding establishment charges). The expected completion is 6/1991 if Rs. 475.0 lacs are available for incomplete works as shown in table below. The current year budget is Rs. 100 lacs which is already spent.

Item	Description	Amount Rs.lacs	Yearwise break up
1.	Pending Payment for pipes already revieed or ordered	45 lacs	
2.	Cost of Balance pipes and Speials including extension	148 "	1989
3.	Treatment plant	60 "	Rs. 45.0 lacs
4.	Procurement of Cement and steel (Balance Quantity)	40 "	1990
5.	Payment for contractor for the labour charges for pipe laying	40 "	Rs. 230.0 lacs
6.	For Reserviors	35 "	1991
7.	Electrical works	25 "	Rs. 200.0 lacs
8.	For pump sets	35 "	
9.	Miscellaneous	30 "	
10.	Establishment charges	17 "	
		475 lacs	

At the present level of finance availability the implementation of the scheme may extend to 1992-93 or even later.

5. Rural Water Supply Scheme for Koipuram (IRWS)

Koippuram scheme is intended to cover Koippuram Village. This village is stiuated in Thiruvalla Taluk of Pathanamthitta District. It is about 13 km east of Thiruvalla Municipal Town, extending on either side of Thiruvalla-Kozhancherry road. The terrain of the project area is rolling with hillocks and valleys. This village is having an average population density of 1124 per km^2 with an area of 22.26 km^2.

This village consists of the entire Panchayat area of Koippuram. The major portions of the Panchayat experience acute water scarcity especially during summer. The weaker sections of the society are residing at Kanjirappara Harijan Colony situated in the northern part of the Panchayat. As this area is having hard rock and gravelly soil, most of the inhabitants are depending on the springs from the rockey hills and deep open wells and ponds. (which are drying in the summer). For want of drinking water, epidemic diseases are very common. To manoeuvre the underground water resources is highly costly affair. Further the quality and quantity of under ground water are uncertain. Most of the inhabitants of this locality are agricultural labourers and agriculturists. This area is identified as a problem village as per the criteria prescribed by the Government of India. In view of

this, a small water supply scheme has been undertaken and commissioned in 1972 for covering a portion of a Panchayat ward out of the eleven wards benefitting about 4000 people making use of open dug well as source, which is also getting dried in the summer.

Considering all these relevant facts, a perennial source is selected for this scheme. The source is pumba river about 2.0 km away from Kumbanadu Junction in Thiruvalla-Kozhancherry Road. There is adequate flow in this river during summer also.

This scheme is designed to cater to the needs of drinking water for ultimate population of 44,450 in 2011 A.D. The percapita rate of supply is 50 lpcd.

An intake well of internal dia. 6 m is put up at Konnathukadavu in river Pumba. An infilteration system consisting of 3 m dia radial well with 3 Nos of radial lines each of 20 m 250 mm dia AC perforated gallery pipes is put up to collect the drinking water and convey the same through 300 mm dia. CI leading pipe of length 74 m to the intake well.

The drinking water is pumped from intake well to a GLSR of 550 kl capacity located at Purayidathukavu, 4.5 km distant from the well. For this, 200 mm CI pipes are used as pumping main. The entire distribution area is zonalised into two viz. Low level and high level zones.

The said low level reservoir feeds the entire area coming under low level zone and at the same time serves as a sump for high level zone. In second stage, from this sump, water is boosted to the high level reservoir of capacity 150 kl through 100 mm dia CI pumping main. It commands the entire high level zone. Distribution net works spreads all over the Panchayat except Ward II.

A total of 30.0 km of pipe lines constitute the entire distribution system. The sizes are ranging from 250 mm to 63 mm dia. Finally the drinking water is distributed through 115 Nos. of street spouts.

Zonal wise details are furnished below :

Sl No	Zone	Population as 1981 census	Capacity of GL Reservoir (in lacs)	Distribution Lines Km	No of street spouts
1	Low Level	22184	5.50	23.52	50
2	High Level	6050	1.50	6.48	
	Total :	28234	7.00	30.00	50

This project was started during December 1985 and was proposed to complete by 9/87. Due to the following reasons the scheme could not be completed in time as programmed and it is expected to be commissioned during 3/1990.

1. Delay in handing over the land by the Panchayat
2. Delay in getting sanction from P.W.D. for cutting open the roads for laying pipes

3. Non availability of Cement and steel in time
4. Delay in getting power connection
5. Non availability of funds in time
6. Poor progress in the construction of gallory system, the work being seasonal

Even though the original proposal was to cover 90 % of total population of the village, it would not be fully materialised due to the development of area during the implementation of the project and exclusion of distribution lines in a ward on account of the existing small water supply scheme (which has no adequate coverage as originally designed). As per the recommendations putforth by the Socio Economic Unit for an ensured 90% coverage of total population, 12 km of extensions of pipe lines are being incorporated in the detailed estimate. For the completion of these works total amount required is Rs. 110.0 lacs. The additional works proposed as per the revised estimate is for Rs. 18.24 lacs. The expenditure up to 5/89 is Rs. 82.966 lacs.

The estimate is being revised for Rs. 110.0 lacs against the original estimate amount of Rs. 91.76 lacs. Further to include 92 additional stand posts and 37.6 km of pipe lines as per SEUs' report an additional sum of Rs. 25.0 lacs will be necessary. The ultimate cost of scheme may be Rs. 135.0 lacs.

The scheme is completed in all respects as per the provisions of original estimates. Only power connection is awaited and pumps are to be installed which may be completed with 2-3 months.

Policy decision is now required (i) to include old scheme with 12 km of pipe lines and (ii) provide 37.6 km of pipe lines and 92 standports both as per SEUs' recommendation.

6. Rural Water Supply Scheme for Thrikkunnappurha (IRWS)

Thrikkunnappuzha Panchayat is situated in Karthikappally Taluk of Alleppey District. Most of the area is water logged with natural canals. The Panchayat extends over an area of 12.53 km^2 spread over 11 wards. The total population of this panchayat as per 1981 Census comes to 23111. The people are socially and economically backward. Due to proximity of sea and back waters, the surface water available in this area is always saline and not potable. The only source of drinking water in this area are a few taps from three small existing schemes two of which are very old. These schemes are grossly inadequate.

The existing water supply schemes are :

1. For Pallana - (Ward VI and VIII)
2. For Panoor - (Ward III, IV and V)
3. For Pathiyankara- (Ward I and II)

Sources of all these schemes are tube wells. Most of the area west of Thrikkunnappuzha river will be covered by the existing three schemes.

The Thrikkunapurha scheme implemented with bilateral assistance from the Royal Netherlands Government will benefit wards VIII, IX and X ie. the areas east of Thrikkunnappuzha river and also wards V and VI towards

west. There was acute scarcity of drinking water in this area. The situation has totally changed with the completion and commissioning of this scheme. Further extension of the distribution system is also necessary for the full coverage of the area.

Scheme as per the original project report has been completed partially in July 1988 and fully by December 1988.

This scheme was designed for an ultimate population of 10,839 expected in 2011 AD and the water demand at 50 lpcd is estimated to be 5,96,000 litres/day allowing 10% wastage/losses.

The OHSR is of 160 kl capacity. This will be sufficient only for the requirement upto 1996 (15 years period) and the distribution system is designed for the ultimate requirement of 2011 AD.

Source of the scheme is tube well constructed at the primary Health Centre Campus at Thrikkunnappuzha by the Central Ground Water Board. The 209 metres deep tube well of 350 x 200 mm size will yield 1,50,000 litres/hour whereas the requirement is only 25,000 litres/hour.

Pumping is done for 16 hours a day (two shifts) by means of a 10 KW Submerssible Pumpset through 100 m GI pumping main of 20 M length. Water is being stored in a RCC OHSR of 160 kl capacity and after chlorination distribution is done through 94 Nos of street fountains. Distribution net

work consists of various sizes of PVC pipes varying in size from 40 mm to 160 mm with a total length of 20070 metres.

Estimated Amount	:	Rs. 14.10 lacs
Agreement date	:	8 - 5 - 1985
Date of starting the scheme	:	6 - 12- 1985
Date of completion as per original proposal	:	31 - 12 - 1988

The scheme had to be completed over a period of 2 years.

The reasons for the delay in the completion of the scheme are :

1 Non-availability of cement and steel

2 Slackness on the part of the contractor

3 Dispute among the public in the fixation of street taps

After a study conducted by the Socio Economic Unit in the project area it is recommended that an extension of 10 km length of distribution system and 39 additional taps for 95% coverage of the panchayat. A revised estimate based on their recommendation is under preparation. The revised estimate with extension of distribution system is expected to cost Rs. 35.15 lacs. The expenditure (8/1989) is Rs. 24.15 lacs.

The scheme is completed and at present supplies 50 lpcd to about 87% of present population (ie. about 14000 people). The people are happy with water supply and position of public taps.

7. Rural Water Supply Scheme for Cheriyanadu (IRWS)

This water Supply Scheme is financially assisted by the Royal Netherlands Government.

Cheriyanadu panchayat is situated in Chengannur Taluk of Alleppey District and is about 60 km South East of Alleppey Municipal Town and is about 10 km south west of Chengannur Municipal Town. The Achankoil river flows along the South West boarder of the panchayat. The extent of the panchayat is 13.20 km^2. The population as per 1981 census is 19803.

Acute scarcity of drinking water is being experienced in the panchayat. Open wells dug deep into the hard rock are the sources of potable water and these will get dried up during summer season.

Considering the above fact, a perenial source is selected for this water supply scheme. The source is Achankoil river which is expected to meet the ultimate water demand of this land locked area, occupied mainly by people belonging to economically weaker sections and Harijans. They are mainly engaged in agriculture.

The project is designed to meet the requirements expected in the year 2011. The ultimate population to be benefitted by the scheme will be 34,748 in 2011 and the ultimate water demand works out to 1.72 Mld in 2011 AD

at a percapita supply rate of 50 lpcd. The scheme envisages provision of house service connections also.

The river is proposed to be tapped near Kollakadavu road bridge by constructing an intake well on the bank of the river and connected by infiltration gallary beneath the river bed. The infiltered water will be collected in the well. The pumphouse will be constructed directly over the well. The infiltered water collected in the well will be pumped into an OHSR of capacity of 460 kl, through 200 mm CI pipe having 500 m length, will be disinfected by chlorination and will be distributed through pipes of sizes ranging from 90 mm to 250 mm. The water will be supplied to the consumers through street taps and house service connections.

Village benefitted	:	CHERIYANAD
Projected Population in 2011 AD	:	34,748
Estimate Amount	:	Rs. 42.14 lacs
Distribution system	:	30820 m
Taps	:	70 Nos
Agreement Date	:	18-9-1985
Date of starting	:	23-12-1985
Date of completion (as per original proposal)	:	31-12-1986

Additional distribution lines for a length of 24000 metres with 37 street taps are proposed as per revised scheme to

enhance the coverage from 60% to 95% of the population, based on the recommendation of the Socio Economic Unit.

The scheme had to be completed by 31-12-86 as per original proposal. The delay is mainly due to the slackness on the part of the contractor and also delay occurred in supplying the departmental materials such as cement, steel and pipes. To some extent the weather conditions also had its contribution.

The estimate amount for the expanded scheme is Rs. 113.34 lacs. Expected date of completion for the expanded scheme is 31-12-1991. The budget provision for 1989-90 is Rs. 4.09 lacs. The expenditure for 1989-90 is 11.54 lacs.

It was planned to complete the scheme by December 1989 but the river works remained incomplete. Now the expected date of completion is June 1990.

8. Pavaratty Regional Water Supply Scheme (RRWS)

1.00 In 1982, The Public Health Engineering Department of Kerala State conducted a preliminary investigation for the Pavaratty Regional Water Supply Scheme and prepared feasibility report. The Indi-Dutch Comprehensive Appraisal Mission for Rural drinking water supply schemes in Kerala considered this project among others in November 1982 and their recommendations were incorporated in their report KE 5. The feasibility report was not fully accepted then as it was felt wanting in sufficient data on source etc. eventhough it was prepared in conformity with the suggestions contained in KE-5.

2.0 The source of the scheme proposed for the Project is the river Bharathapuzha at Varandukuttyakadavu. The Indi-Dutch Appraisal Mission recommended a scientific assessment of the availability of water at the source at Bharathapuzha and also to investigate the possibility of tapping ground water from the project area as an alternative source. Accordingly efforts were made to assess the ground water potential within the project area. The study on this was conducted by the Organisation "Action for Food Production" (AFPRO) New Delhi, during the months February to May, 1984. As a result of the study, certain high yielding zones with expected

yield of 25000 lph and above per bore well, and medium yielding zones between 10,000 lph and 25,000 lph were identified in the project area. Their recommendations are compiled in their report "Hydrological Investigation in Pavaratty-Chalissery and Adjoining Panchayats".

3.00 A study of the source Bharathapuzha was conducted by "Centre for Water Resources Development and Management" (CWRDM) Calicut, during the summer of 1986. In their final report it was concluded that it is possible to draw the required 53 Mld of water from Bharathapuzha during the normal months. But during the extreme summer from March to May, enough water cannot be expected to be available at this source. As a first approximation, it was assessed that 25 Mld of water can be safely expected from the source of Bharathapuzha. The remaining 28 Mld was suggested to be extracted from the ground water sources within the project area by means of bore/ tube wells. For a precise assessment of these two potential sources a more detailed study was necessary. Their report is documented in "Assessing the surface water at the source of C.W.S.S. to Pavaratty".

4.00 The side letter for the project was signed between the Royal Netherlands Government and the Government of India in the year 1986, with the specific understanding that the following three essential conditions will be fulfilled in addition to others.

1. A detailed survey/study at the intake site at Bharathapuzha river has to be conducted to establish the adequacy of source

2. The possibility of using high yield bore wells in the project area as source for water supply shall be explored

3. A more detailed Project Document of international standard is under preparation with Government Engineering College Trichur

4.1 In order to carry on the study on the potential of the source a substantial work involving financial commitment had to be taken up. The signing of side letter on this project has greately helped these studies by assuring the necessary financial support. Mainly because of this help, the work on these studies could be carried on further.

5.0 As a follow up action on the assessment of source, it was decided to construct one infiltration gallery capable of yielding 5 Mld of water as recommended by CWRDM. In the river bed of Bharathapuzha during the year 1988 and to test pump that system. It was planned that the actual number of galleries required for extracting the expected total yield of 25 Mld could be determined based on the test results. Preparations were made for this and tenders were invited, but due to incidence

of early rains in the summer of 1988, the river bed of Bharathapuzha was flooded earlier. The gallery work can be done only in a favourable situation when the river bed is almost dry. The trial gallery work was started during the dry season of 1989 but only a portion of it was completed due to problems developed during execution. So the trial pumping of the gallery has to wait till January-May 1990.

6.0 When the estimate for trial gallery was prepared, it was felt that the cost of the gallery as an extracting system from river bed is very high. So a search was begun for alternative methods. The alternatives of radial wells, open shallow wells and shallow tube wells were studied. It was found that the shallow tube wells are suitable for the soil conditions in Bharathapuzha. 3 nos of shallow tube wells (each to yield upto 1 Mld of water) are also proposed to be established and trial pumped during the ensuing summer. After trial pumping, the shallow tube wells and the trial gallery and studying their performance as well as cost factors, a decision has to be taken on the number of units on each category to be established for extracting water from the river bed of Bharathapuzha.

7.0 On the subject of ground water extraction from the project area, an assignment was given for locating the sites for potential bore/tube wells in 4 nos of Panchayats in the project area to CWRDM, Calicut as a follow up of the studies carried out by the AFPRO earlier. The assignment was completed by CWRDM in the year 1987. Out of the 4 Panchayats, 3 were in aluvial tracts and no potential sites could be located there. In the fourth one 9 nos of sites were identificed. Trial bore wells are constructed at these sites during the dry season of January - May, 1989. The results are not yet fully analysed, but the indications are not quite positive.

7.1 Out of 14 nos. of remaining Panchayats in the Project area, 4 nos. are in the aluvial tract where no bore wells are expected to be feasible. For the 6 nos Panchayats of high land area, a second assignment was given to CWRDM, Calicut for establishing potential sites. The field work on it has been completed and the final reports are awaited.

7.2 The exploration work for potential bore well sites in the remaining 4 nos of Panchayats is entrusted with the P.H. Mechanical Division of Kerala Water Authority with its Headquarters at Cochin. They have completed the investigation in all panchayats, and the report on 3 nos are received. The fourth report is awaited.

8.0 A substnatial pre-financement was received for the project in the beginning of the financial year 1988-89. In order to utilise this prefinancement it became necessary to make certain adaptations in the priorities of the project. During the months of May - June 1988 a decision was taken to prepare the design of the distribution system on a priority basis and to procure and lay the pipes and also to construct the service reservoirs. Accordingly, the design of distribution system was completed, tenders for supply of pipes were called for and preparations are being made for laying of the pipes when received. Supply orders have been issued and the pipes are being received.

8.1 For designing the service reservoirs,the general data was collected and the structural design work entrusted to the REC, Calicut. For determining the requirement for foundations of the tanks, soil exploration work has been carried out by two reputed firms in Madras. They completed the work in all sites and their report were submitted to the REC, Calicut for designing the foundations of tanks.

9.0 For construction of the service reservoirs (16 nos) land has to be acquired in different locations. The sites were finalised, technically approved and proposals for land acquisition has been forwarded to District Collector, Trichur and Palghat. Land Acquistion Proceedings are in progress.

10.0 The preparation of First Project Document was proposed to be completed by the end of December, 1988. Preparations on this work has progressed to a great extent. But because of the additional burden of work incidential to the change in priorities as mentioned in Para 8.0 above and due to lack of staff in the organisation, this work was entrusted to the Engineering College, Trichur as a consultancy assignment. The preparation of the First Project Report is in progress.

11.0 As the investigations for reliable source(s) continue, it will be worthwhile to look into (i) obtaining surface water from any of the irrigation dams as may be feasible and (ii) carry out geohydrological investigations for shallow tubewells on bank of Bharatpurha river. It appears multiple ground water and surface water sources may have to be adopted for this scheme.

12.0 As an advance planning pipes worth Rs. 230.0 lacs have been purchased for the distribution system. Total expenditure on the scheme till to date (7/1989) is Rs. 250.42 Lacs.

4.1 Common Observations

The common observations on all the eight regional as well as individual water supply schemes are mentioned hereunder. They should be considered and actions taken wherever applicable

(i) Some of the water supply schemes especially RRWS have multiple pumping points. There is initial pumping at the source itself. Thereafter pumping is involved at treatment plants, clear water pumping, zonal pumping etc. The eastern regional schemes (Kundara for example) are in hilly region and involve multiple pumping. The electrical supply being erratic it would be desirable and recommended to include diesel generating sets at important spots (source, treatment plants etc). KWA may want to consider this issue in consultantion with the Dutch mission.

(ii) On long pumping main (especially of brittle materials like CI PSC) there will be problems of water hammer. Water hammer arresting devices should be considered to be included on critical pumping mains.

(iii) The treatment plants should have qualified chemists to handle laboratories and engineers-technicians of Mech/Elect disciplines for manning pumping stations. KWA may consider to recruit such people

(iv) All the schemes will have to be necessary the extensions of pipe lines and additional stand posts to achieve 90 per cent coverage Attention of KWA and the Dutch mission is invited for policy decision in this regar

(v) Chlorination by bleaching power to be added to system is not a satisfactory method. Alternatives to be considered

(vi) Water supply measuring meters should be provided after master OHSRs. This will show wastage leakage also.

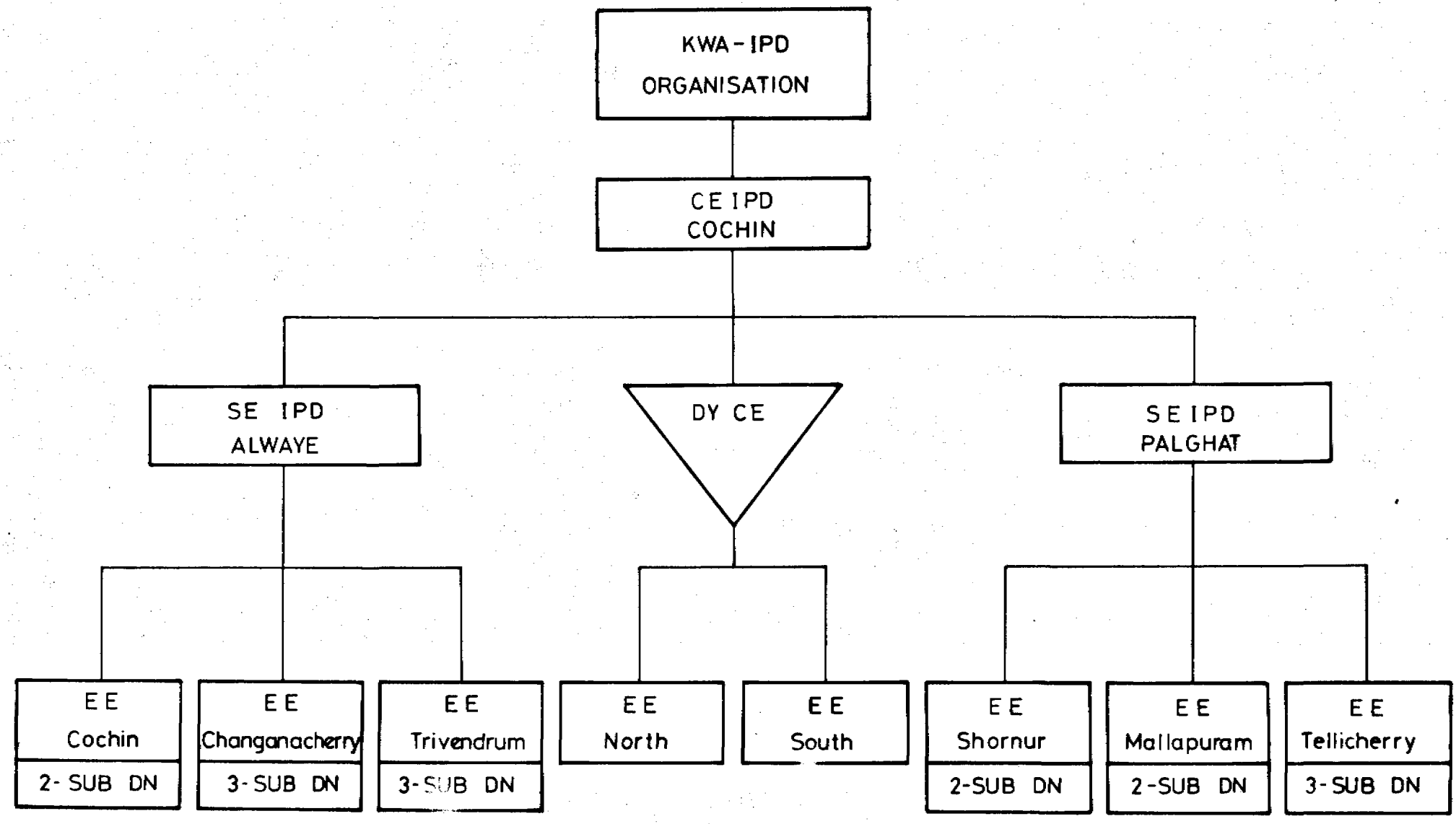
5.0 Investigation Planning and Design

5.1 The current investigation planning and design activity for rural water supply schemes is carried out by the Investigation Planning and Design (IPD) organisation headed by a Chief Engineer with head quarter (HQ) at Cochin. The organisation has one Dy CE with two EEs to assist him at HQ and two SEs stationed at Always and Palghat. Each IPD SE has three EEs stationed at different district places. In addition the IPD organisation has at Alwaye one R & D cell which undertakes quality monitoring and one central laboratory with two more laboratories in Trivandrum and Calicut .

The IPD organisation investigates and carries out surveys for water supply schemes. It prepares complete project report, designs plans and estimates and furnishes the same to CE IPD. The project is sanctioned at appropriate level by the concenred CE (of construction-maintenance) and then it goes for implementation after obtaining funds from KWA HQ.

Generally the provision of budget is made as per priority of the scheme. The funds come through Government from variety of sources including bilateral assistance.

5.2 The projects prepared by IPD organisation contain designs which are general in nature (type designs).



INVESTIGATON PLANNING AND DESIGN ORGANISATION AT A GLANCE

The revisions necessary if any due to site conditions etc are being carried out by the organisations under respective Chief Engineers of construction maintenance and got approved by them.

5.3 Project Implementation.

Once the scheme is administratively approved (means approval to the financial arrangements) and technically sanctioned (thereby approving technical/engineering provisions), the scheme is ready for implementation. The materials component, which is the usual major part of any water supply scheme, is separated out and tenders floated for materials procurement. In KWA there is centralized purchase system wherein the Chief Engineer Planning Services and General (PSG) arranges for ordering procurement and placement of all materials. The remaining part of the scheme is the works (civil, mechanical, electrical) portion where the EE for the concerned scheme invite tenders for construction work, installation of pumping plant and machinery etc after combining the part estimates into workable groups. Normally headworks i.e. source structures and pump houses are put into one group, transmission and distribution mains into another group GLSR and OHSR into third group etc. The tenders are invited and accepted as per powers of various officials provided they are within certain limits of

excess cost. Since the materials component is separately arranged, usually the labour component is incorporated in tenders.

5.4 The financial powers of various officials of KWA are shown in Annexure with regard to sanctions, contracts, excesses, purchases etc. Since the value of materials and labour are increasing at a phenomenal rate, KWA may want to consider, at an appropriate time, to upgrade the existing powers of EE and AEE especially and give additional ones where not existing for i) purchase of materials, ii) Waiving tenders, iii) excess approval above estimates, iv) tender invitation limits and v) purchase of petty items. This will reduce the references that may be inevitable to higher authorities for important items of construction and maintenance by local officers directly in charge of such works and thus aim at decentralization of procedures to some extent.

5.5 The level of expenditure of construction and maintenance as well as that for establishment is seen in the following table. It will be seen that the expenditure ratio of maintenance to construction for the entire KWA activities (mainly water supply for rural + urban and urban sewerage) has been 1:2.33 and 1 : 4.22 for actuals in years 1986-87 and 1987-88.

LEVEL OF EXPENDITURE AGAINST BUDGET PROVISION
OF KERALA WATER AUTHORITY FOR THE YEAR MENTIONED

Item of Expenditure	1986 - 87 Actuals Rs. lacs		1987 - 88 Actuals Rs. lacs		1988 - 89 Anticipated Rs. lacs	
	Budget	Expenditure	Budget	Expenditure	Budget	Expenditure
Capital Works (C)	4352.95	2633.65	4159.00	5716.30	5430.00	4137.00
Maintenance Works (M)	820.50	1129.38	930.11	1355.87	1320.56	1524.34
Establishment (E)	694.76	1042.63	1543.65	1530.48	1737.91	2180.00
Total	5868.21	4805.66	6632.76	8602.65	8488.47	7841.34

Whereas the same is 1 : 2.71 for anticipated expenditure for current year (1988-89 since finals are not yet ready). The average ratio works out to 1 : 3.09 which appears reasonable. However as more and more schemes will be taken up this ratio may change as many more schemes will go under maintenance. The other factors are price rise for wages and materials. In any case it is reasonable to accept the ratio 1:3 as level of expenditure ratio on maintenance : construction for time being to start with.

5.6 Again the construction work load and maintenance workload have different character in working. As such a unit having maintenance work only is doing several times the work compared to that of a unit having construction work only of equal value. The equivalence of the workload has to be evolved. It seems the ratio of three (3) is also applicable here. Hence a unit having maintenance work load of Rs. 50 lacs is equivalent to the construction workload of Rs. 150 lacs.

5.7 Now coming to the data given of expenditure figures in the table it is seen that total expenditure on works (construction + maintenance) is Rs. 3763 lacs Rs. 7072 lacs and Rs. 5661 lacs (anticipated) for three years 1986 to 1989. There are 31 works and

stores divisions and average expenditure per division (in charge of EE) comes to Rs. 121.4 lacs Rs. 228.1 lacs and Rs. 182.6 lacs respectively. The average expenditure is Rs. 177.4 lacs per division per year. Taking a range of Rs. 150.0 lacs to Rs. 210.0 lacs per year as total work load per division and equivalence ratio of maintenance : construction to be 1 : 3 the following criteria of work load evolve (shown in table next page).

It would be reasonable to adopt the above criteria for (i) creation of an executive division according to work load and (ii) redistribution of workload amongst various divisions.

During the pre-review mission an impression was developed that some executive divisions are loaded heavily with maintenance and construction works compared to other lighter divisions. This is of course a subject of a separate study with a view to evolving pattern of executive establishment especially divisions and subdivisions according to (i) workload (ii) territorial position.

Item	Level of Expenditure per year per Division Rs. lacs					
Construction work load C	175.0	150.0	125.0	100.0	75.0	60.0
Maintenance work-load M	35.0	50.0	65.0	75.0	85.0	90.0
Total actual C + M	210.0	200.0	190.0	175.0	160.0	150.0
Total Virtual C + 3M	280.0	300.0	320.0	325.0	330.0	330.0

6.0 Project Maintenance

6.1 The maintenance of all water supply (and sewerage) schemes is being carried out by the same teritorial organisation in charge of construction. This is an ideal system in the present context and should continue as such. Out of the eight Dutch assisted schemes only one individual Thrikkunapurha rural water supply scheme (IRWS) is fully commissioned. The other two Vakkom-Anjengo and Mala both RRWS are partially commissioned. All the three above fully/ partially commissioned schemeswill require extensions of pipe lines and additional taps for the desired 90% coverage.

6.2 The remaining four out of five schemes are at various stages of construction and will take one to three years for commissioning and maintenance. Detailed study will have to be undertaken for the maintenance organisation for the schemes.

7.0 Maintenance of Treatment plants and Distribution systems

7.1 The maintenance of treatment plants not only involves dealing with filters but also quality control of water. Personnel of Mech/Elect engineering disciplines are ideally suited for this job. As there is large scale pumping plant attached to the filteration units the mechanical or electrical engineer is more ideally suited to be in overall running of a plant. He may be assisted by filter operators and other low level

(now underlined, see JMR. p.22)

staff. Likewise for water quality control a laboratory is normally attached to the filtration plant. Routine chemical and bacteriological tests are must and as such qualified chemists may be placed at the filteration plants.

7.2 The maintenance of distribution is a routine job. The persons employed should make a routine run on the distribution system. Keeping in mind the Kerala situation a large scale maintenance units need not be employed. However a fitter with two linemen may be attached to a subdivision having large scale maintenance who may be of handy assistance to the section office (in charge of maintenance) for large scale breakdowns of pipe lines.

8.0 Establishment for Construction and Maintenance

8.1 The KWA is constructing as well as maintaining all water supply (and also sewerage) schemes. A point at issue may arise whether construction and maintenance activities be separated keeping them respectively under construction division and maintenance division only. This will not be practicable as it will result in (i) duplication of establishment and (ii) higher overheads. An argument sometimes heard is that keeping construction and maintenance activities together there is possibility of the maintenance

work being overlooked. Water supply (also sewerage) being essential services this argument will not hold good. Besides Kerala state is highly sensitive to such issues. Hence the present practice of keeping construction and maintenance together ie. under charge of the same establishment unit should continue. At lower level of Assistant Engineer (in charge of a section office) the maintenance and construction works may be separated. There are large number of schemes under maintenance as well. Hence a separate study regarding (i) work distribution and (ii) staffing pattern seems necessary.

Chr: joint staffing upto SA, but what against 'computing actual time spent on maint. vs. construction?

8.2 The establishment expenditure of the past three years is 27.71 percent (1986-87), 21.64 per cent (1987-88) and 38.51 per cent (1988-89 anticipated) of the expenditure on construction and maintenance. KWA is debiting establishment charge at flat rate of 22 per cent. It may consider to put enhanced establishment charges say at 33 per cent on maintenance works.

Weak assuming that 1/3 of time spent on maintenance?

9.0 Staffing pattern

9.1 The staffing pattern of the executive and implementing organisation which is very similar to (or part and parcel of) the general staffing pattern of KWA is as under :

Starting from lowest field level

- there is Section Officer (SO) or Assistant Engineer (AE) in charge of the Section Office.
- there is Sub Divisional officer (SDO) or Assistant Executive Engineer (AEE) in charge of a Sub Division. There are 2-3 Section Offices under one SDO.
- there is Divisional Officer or Executive Engineer in charge of a Division. There are normally 3-4 sub division under one EE
- there is circle officer or Superintending Engineer (SE) in charge of a circle. There are normally 3-4 divisions under one SE.
- then the Chief Engineer of the region (CE) who has 2-3 circles under him.

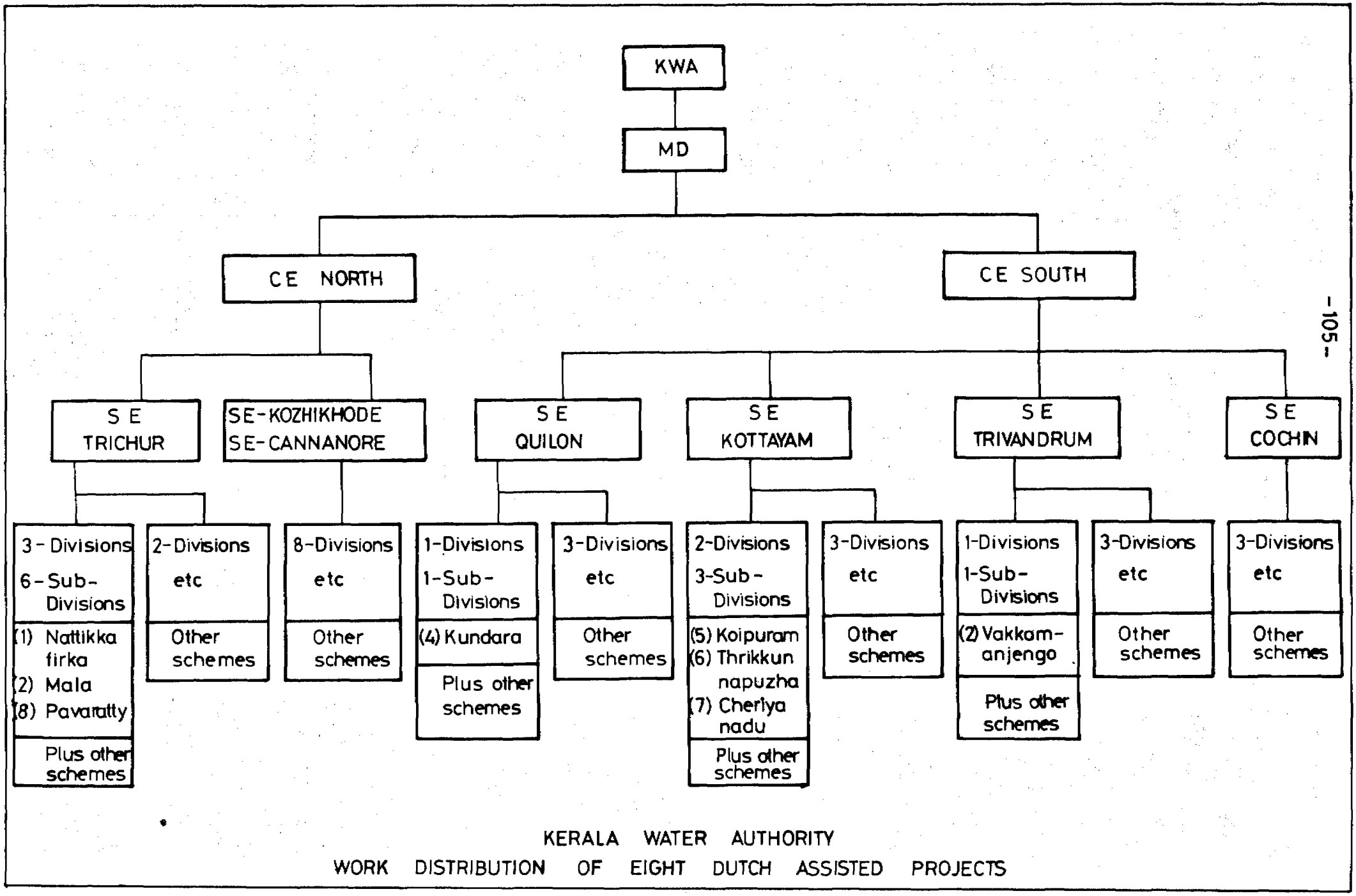
The KWA has two CEs (North/South) in charge of implementation and a CE (PSG) for material procurement. There are seven SEs attached to the two CES and thirty EEs working under them respectively. One material procurement and stores EE is directly working under CE (PSG).

9.2 The eight Dutch assisted projects fall within the jurisdiction of both CES. CE (North) has one SE (Trichur) with three executive divisions (EE) and

six Sub Divisions (AEE) to look after three major RRWS Viz (i) Nattikka-Firka (3) Mala and (8) Pavaratty. The CE (South) has remaining five schemes, SE (Quilon) with one division (EE) and one sub division (AEE) looking after (4) Kundara RRWS, other SE (Kottayam) looking after three IRWS namely (5) Koipuram (6) Thrikkumapurha and (7) Cherianadu and SE (Trivandrum) looking after (2) Vakkom Anjengo RRWS. The chart following herewith shows the distribution at a glance.

As the above SEs and EEs are loaded with construction and maintenance of other schemes it seems some of them are heavily loaded. Redistribution of workload and internal transfer of some subdivisions amongst divisions seems imminent. As an example the EE at Irinjalakuda in charge of Mala scheme is heavily loaded with work load of Rs. 560 lacs. Whereas EE at Quilon in charge of Kundara, though having many works under him, has only one sub division looking after the Kundara scheme.

9.3 Conducting a detailed study of staff pattern for construction-maintenance indicating redistribution of workload may be considered and at an early date. KWA may like to initiate action on it since large number of Dutch assisted projects may be in pipeline.



KERALA WATER AUTHORITY

WORK DISTRIBUTION OF EIGHT DUTCH ASSISTED PROJECTS

In conclusion at this point of time the following observations may be looked into,

(i) Maintenance of schemes should be separated from construction activity at the section officer level. The AEEs for construction and maintenance should be separate. Mopeds should be provided to AEs for inspection.

(ii) There should be more input of Mechanical/ Electrical engineers and technicians for maintenance of pumping plants and treatment plants. It seems there are very few people from Mech/ Elect discipline.

(iii) There should be working laboratories to conduct routine water tests and qualified chemists should be attached to treatment plants.

(iv) Maintenance gang for distribution system on a large scale is ruled out . However it may be considered to provide one fitter with two assistants attached to the sub division office for overall maintenance.

10.0 Procedures for Siting Taps

10.1 The development of Kerala villages have been phenomenally along the roads typically called the ribbon development. The pipelines naturally used to be along the road and also the taps. (or perhaps few metres off the road). This has not been the entirely

satisfactory system but was followed under the prevailing circumstances. The coverage was used to be around 50 - 70 per cent.

10.2 The criteria for siting the taps were evolved such that there should be one public tap within a radius of 250 m for 90 percent people of the weaker section of society. Also one tap to serve 20 - 25 households i.e. 100-150 people of which maximum to be needy households.

10.3 The fixing of public taps based on the above evolved criteria is being carried out by the SEUs. To assist the concerned SEU of the area ward water committees are formed for each ward of the respective panchayat. The membership of WWC has been :

- 1 elected panchayat member of the ward
- 2 female members of Social Samaj Working units
- 1 social worker of repute or local teacher
- 2 representatives of youth wing
- 1 ICD Supervisor or Public Health Nurse of that area

7

Plus 1 Ex-Officio SEUs staff

Majority of WWC members are women. Below the concerned WWC a stand post committee is formed which is from amongst the people around area. This committee looks after cleanliness of stand posts, avoiding misuse of water and fault repair, leakage etc.

10.4 It would add to the efficiency of the WWCs to include one Assistant Engineer of the KWA as member Ex-Officio who would look after the technicalities of stand post siting. KWA may want to consider the deputation of 2-3 AEs to each of the SEUs.

10.5 The following criteria for stand post siting are observed

1) - Choose only areas and households that cannot afford private connections

2) - Try and locate one stand post to serve at least 20 households but not less than 15 households in any case within 250 m radius (people served 100-150)

3) - Choose a point facilitating maximum number of needy households

4) - Choose an area with possibilities to undertake activities like washing etc. nearby

5) - Ensure good drainage

6) - Avoid possibilities of water logging on platform and surroundings

7) - Avoid areas too close to roads and pathways that will be obstructive to traffic

8) - Avoid wherever possible private locations and areas susceptible to misutilization

9) - Encourage private and community connections werever possible

10)- Avoid undesirable interferences and considerations

10.6 The progress of formation of WWCs their functioning and site selection activities are given (August 1989) in the following table (next page).

10.7 Two more observations are relevant here. The stand posts already fixed by KWA before the SEUs came into operation are required to be reviewed by the SEUs. It may so happen that the existing sites may have to be abandoned and new sites selected. In view of public objection to the standposts removal already in operation this will result in duplication of stand post number. Utmost case may be exercised in this regard.

Where the land is required to be relinquished, the procedure will have to be legalised so that later on disputes may not arise on the ownership of land for standposts and pipe lines.

REVIEW OF PROGRESS OF SITE SELECTION OF PUBLIC STANDPOSTS

(AUGUST 1989)

Item	Name of scheme	Panchayat	Wards	WW Committees Formed	WW Committees Functioning	Stand On Line	Posts Extn	Sites Total	Length of Extn Km	Notes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Nattika-Firka	Engandiyor	10	10	10	18	79	97		The study is just completed
		Vadanappally	10	10	10	56	103	159		
		Thalikulan	10	10	10	22	63	85		
		Nattikka	9	9	9	6	27	33		
		Valapad	12	12	12	18	58	76		
		Edathuruthy	11	11	11	31	82	113		
		Kaipamangalam	11	11	11	45	100	145		
								708	174	
2	Vakkom-Anjengo	Anjengo	9	9			72(50)	122		Standposts were fixed before SEUs. Coverage study continues. All WWCs will be formed by 9/1990
		Arhoor	10	1			22(72)	94	About	
		Cheriyinkil	12	12			176	176	12	
		Kadakkavoor	11	11			244(12)	256		
		Kizvallam	11	11			253	253	Total about 200	
		Vakkom	9	9			164	164		
								1065		

.....Contd.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3	Mala	Mala	12	12	12	56	-	56		Stand posts sites on extn study yet to start. Total SPS may be 1000 including 300 of existing 17 schemes to be accomodated
		Annamanads	11	11	11	24	-	24	79.50	
		Kurur	9	9	9	19	-	19		
		Poyya	9	9	9	61	-	61	Total about 267	
		Puthenchira	9	9	9	78	-	78		
		Vellangallore	12	12	12	126	-	126		
								364		
4	Kundara	Kundara	9	9	9				Ultimate 215 km against 170 km ultimate SPS 700 against 555	Formation of WWC complete. Function will start upon schemes nearing completion (1991)
		Kullakada	11	11	-					
		E. Kallada	10	10	-					
		Pavithreswaram	11	11	-					
		Perayam	9	9	-					
		Ezukon	10	10	-					
		Neduvathoor	10	10	-					

...Contd..

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
5	Koipuram	Koipuram	11	11	11	50	92	142	37.6	WWC has actively carried out work
6	Thrikka-nnapuzha	Thrikkamapurha	10	10	10	94	29	123	10.0	WWC has actively carriedout work
7	Cheriya-nadu	Cheriyanadu	10	10	-	70	37	107	24.0	WWCs are under reorganisation
8	Pavarratty	-	-	-	-	-	-	-	-	Scheme at a preliminary stage of investigations

11.0 Maintenance costs

11.1 The maintenance cost differs from project to project and is different in each case due to (i) population size covered (ii) type of scheme whether RRWS or IRWS (iii) type of source whether ground, river or reservoir (iv) level of treatment and host of other factors.

11.2 For the maintenance of a particular scheme as soon as the scheme goes to operational stage, a maintenance estimate is required to be prepared and got approved by the Chief Engineer. (The first estimate is required to be approved by CE). Then the water supply is switched on. The maintenance estimate prepared by KWA officials include (i) establishment (ii) chemicals (iii) oil fuel and energy (iv) maintenance and repair to plant machinery and structures. Regular annual maintenance estimates for 1988-89 for the following schemes are obtained from the concerned EEs.

(1)	Nattikka - Firka RRWS	Rs	4466000/-
(3)	Mala RRWS	Rs	1930000/-
(5)	Koipuram IRWS	Rs	600000/-
(7)	Cheriyanadu IRWS	Rs	384300/-

Details of maintenance cost for each of the above schemes is worked out as under :

(1) Nattikka - Firka RRWS

Population (1981) 2,30,000

Rate of water supply 50 lpcd

Annual maintenance cost Rs 4466000/-

Per year water supply in kl

$$\frac{2\ 30\ 000 \times 50 \times 365}{1000} = 4197500 \text{ kl}$$

$$\text{Cost per kl} = \frac{44\ 66000}{41\ 97500} = \text{Rs. } 1.06$$

Cost per person per month

$$= \frac{44\ 66000}{2\ 30000 \times 12} = \text{Rs } 1.62$$

(3) Mala RRWS

Population (1981) 1 29 400

Rate of water supply 50 lpcd

Annual maintenance cost Rs 19 30 000/-

Per year water supply in kl

$$\frac{129\ 400 \times 50 \times 365}{1000} = 2361550 \text{ kl}$$

$$\text{Cost per kl} = \frac{19\ 30\ 000}{23\ 61\ 550} = \text{Rs } 0.82$$

Cost per person per month

$$= \frac{19\ 30\ 000}{129400 \times 12} = \text{Rs } 1.24$$

(5) Koipuram IRWS

Population (1981) 28200

Rate of water supply 50 lpcd

Annual maintenance cost Rs 600 000/-

Per year water supply in Kl

$$= \frac{28200 \times 50 \times 365}{1000} = 514650 \text{ kl}$$

$$\text{Cost per kl} = \frac{600\,000}{514\,650} = \text{Rs } 1.17$$

Cost per person per month =

$$= \frac{600\,000}{28200 \times 12} = \text{Rs } 1.77$$

(7) Cherianadu IRWS

Pppulation (1981) = 22 300

Rate of water supply = 50 lped

Annual maintenance cost Rs. 3 84 300/-

Per year supply of water in kl

$$= \frac{22300 \times 50 \times 365}{1000} = 406980 \text{ kl}$$

$$\text{Cost per kl} = \frac{384\,000}{406980} = \text{Rs } 0.94$$

Cost per person per month

$$= \frac{384\,300}{22300 \times 12} = \text{Rs } 1.44$$

11.4 It is seen that for two RRWS the cost per kl is Rs 1.06 and Rs 0.82 and cost per person per month is Rs 1.62 and Rs 1.24 for the two schemes. Against this the respective figures for two IRWS are Rs 1.17 and 0.94 per kl and Rs 1.77 and Rs 1.44 per person per month respectively. The rates are based on estimates.

11.5 Elsewhere in a study got conducted by DANIDA in 7/1988 the maintenance cost figures reported by the consulting engineers are as follows :

Schemes having daily supply in litres	Range of cost and average cost Rs. per kl
100 000 to 2000 000	0.28 to 3.67 average 0.84
50 000 to 100 000	0.47 to 4.86 average 1.72
Below 50 000	0.82 to 5.93 average 2.72

As can be seen the maintenance cost (exclusive of depreciation and interest on capital) varies considerably and no uniform pattern can be evolved. However with a reasonable assumption the maintenance cost may be taken as Rs 1.00 per kl and Rs 1.50 per person per month. Hence a family of six (Kerala is having a little higher family size) will spend Rs 9/- per month or Rs 108/- per year. This sounds fairly reasonable.

A detailed study may be carried out with a view to going into the depth of maintenance charges.

12.0 Conclusion

The visit by Consultant to Kerala state for pre-review mission was at a short notice. Previously it was understood that the review mission would begin in month of October 1989. However despite short time interval, the programme was arranged perfectly well thro' the efforts of Ir. H.S.Pesman TLO Kerala and MD KWA and other KWA officials at HQ. The site visits were arranged and followed carefully as planned.

The Consultant has worked under overall guidance of TLO Kerala. The main points of summary overview of progress ware finalised at Trivandrum and were discussed with Mr. K. Padmanabhan Nair MDKWA. Broad policy issues were also discussed. There was general consensus on the discussion points all of which are included in the report.

It is hoped that the pre-review mission report will be received well by the Dutch review mission and the Royal Netherlands Embassy.

* * *

ANNEXURES

ANNEXURE - A

Abbreviations Used

AA	Administrative approval
AC	Asbestos cement
AE	Assistant Engineer
AEE	Assistant Executive Engineer
BPT	Break pressure tank
CE	Chief Engineer
CHM	Chairman
CI	Cast iron
CO	Coordinating office
CWRDM	Centre for Water Resources Development and Management
EE	Executive Engineer
GL	Ground level
HDPE	High density polyethelene
HQ	Headquarter
HW	Head works - water collection works at source
IRWS	Individual rural watersupply scheme
KWA	Kerala Water Authority
kl	Kilo litres
km	Kilometre
l	Litres
lped	litres per capita per day
m	Metre
MD	Managing Director

Mld	Million (Mega) litres per day
OH	Overhead
PHED	Public Health Engineering Department
PHEL	Public Health Engineering Laboratory
PSC	Prestressed concrete
PVC	Polyvenyl chloride
RRWS	Regional rural water supply scheme
RSF	Rapid sand filter
SE	Superintending Engineer
SEUs	Socio Economic Units
SR	Service reservoir
ST	Steel
TP	Treatment plant
TS	Technical sanction
WL	Water level
WWC	Ward water committee

ANNEXURE - B

Officials Contacted :

Indo-Dutch Rural Water Supply & Sanitation Program

IR. H.S. Pesman c.i. Technical Liaison Officer

ER. Manoj Sankar Asst. TLO

Kerala Water Authority

Er. K. Padmanabhan Nair	Managing Director
Er. V.S. Sadanandan	Dy Chief Engineer PMU
Er. K. Sudha Devi	Executive Engineer PMU
Er. A. Jaju Jacobs	AEE PMU
Er. R. Unnikrishnan Nair	Chief Engineer (South)
Er. K.G. Ravi	Executive Engineer WBDN Trivandrum
Er. N.P. Andrews	Executive Engineer WBDN Adoor
Er. Yamuna Bai	AEE Kundara
Er. M.P. Mohan	Chief Engineer (North)
Er. N.S. Ranjanan	Superintending Engineer Trichur
Er. R.V.A.Thampuran	Superintending Engineer IPD
Er. Indira Ramachandran	Executive Engineer
Er. T.C. Vergese	Executive Engineer Nattika
Er. Francis Trachil	AEE Mattika
Er. P.T. Mohan	AEE Nattika
Er. K.K. Mathew	Executive Engineer Mala
Er. E.N. Shivam	AEE Mala
Er. K.K. Diwakaran	Executive Engineer Pavaratty
Er. M. Aravindakshan	AEE Pavaratty
Er. Joseph Thomas	Executive Engineer Karingada

Er. R. Sukumaran	AEE Thrikkunapurha
Er. V.S. Abraham	AEE Koipuram
Er. Mohan Lal	AEE Cherianadu
Er. T.V. Jacob	Chief Engineer IPD

Socio Economic Units (Kerala)

Mr. Martin De Graaf	Senior Advisor
Mr. K. Balachandra Kurup	Executive Coordinator
Mr. C.O. Kurion	Programme officer Quilon
Mrs. Kochurani Mathew	Programme officer Quilon
Mr. K.A. Abdulla	Programme Manager Trichur
Mr. R. Suresh	Programme officer Trivandrum
Mr. Isac John	Programme Officer Calicut

Coverage of the Project

The Rural water supply schemes serves over 2 million people in 73 Panchayats (see map).

These schemes are being constructed over a 6 year period, costing over Rs. 80 crores, and are financed by the Governments of Netherlands and Denmark.

The implementor is the Kerala Water Authority (KWA), the organisation responsible for the construction, operation and maintenance of the rural water supply systems in the state.

Socio-economic aspects of water supply and usage

Safe water is only a potential benefit and it will improve people's health only if the socio-economic aspects are paid due attention.

In this context, the following goals are important:

- involvement of people in designing and planning water supply schemes;
- developing and using a system of site selection that ensures access to safe water, especially for the weaker sections;
- promotion of health education leading to community action for proper storage and use of water, and better health and hygiene practices;
- provision of sanitation facilities and improved practices;
- establishing effective systems for sustained operation and maintenance, as well as for recovering operation costs to the extent possible.

The Socio-economic Units (SEUs)

To assist the KWA in the work towards these goals, 3 SEUs are established in Quilon, Trichur and Calicut respectively. These units have a Social Scientist, a Community Organiser, a Health Educator, and various field and supportive staff.

The Co-ordinating office in Trivandrum comprises of an Executive co-ordinator, a Dutch Senior Adviser, an Information Manager, support staff and resource people as and when required.

The SEUs and the Co-ordinating office work in close collaboration with the KWA and assist in the following tasks:

- selection of sites for public taps;
- formation of ward committees, which are seen as vehicles for community involvement;
- improvement and expansion of health education activities, through campaigns, education materials, etc.;
- construction of latrines in selected panchayats;
- improvement of public awareness in regard to value and costs of water;
- strengthening of KWA's ability to monitor and evaluate the healthy impact of rural water supply schemes.
- investigate and document the various aspects of water sanitation and participation in Kerala.

A major part of these activities are field based. Organising seminars, conferences, studies; and publishing newsletters and topical reports are also viewed as important activities.

Collaboration and Coordination

The KWA and the SEUs work in close collaboration with all relevant departments and voluntary agencies in the field. One of the major goals of this programme is to strengthen collaboration, coordination and exchange between all partners involved with water supply, sanitation, health and people's participation. The purpose is to learn, share and benefit from the experience of others and to complement all that is being done in the above areas.

All interested agencies and individuals are invited to discuss and explore possibilities of working together for better health through safe water, and sanitation with people's participation.

Newsletter

JALA SANDESH is the bilingual bi-monthly newsletter of the SEUs. Contributions as articles, drawings and suggestions are most welcome.

Co-ordinating Office:

Post Bag 6519,
Vikas Bhavan, P.O. Trivandrum 695 033.
Phone: 68907, 69543

SEU-Calicut: KWA, West Hill, Calicut 673 005.
Phone: 65410

SEU-Trichur: KWA, Public Health Circle, Trichur.
Phone: 24961
SEU-Quilon: KWA, Inspection Bunglow
Phone 78391

ANNEXURE-C

ANNEXURE - D

SEU-KERALA 1988 IN A GLANCE

For those who are interested in what we did during 1988 we present a summary of our activities and accomplishments. This, of course, only reflects those aspects of our work which can easily be quantifiied...

I. INPUTS

WHEN ESTABLISHED?	Unit-North:	1/3/87
	Coordinating Office:	1/5/88
	Unit-South:	29/8/88
	Unit-Central	8/9/88

HOW MANY PER 31/12?	CO	South	Central	North
staff in office:	7	9	7	7
staff in field:	None	3	4	7

AT WHAT COSTS?	CO	South	Central	North
total spent in 1988:	16,5 lakh	21,5 lakh	15,5 lakh	22 lakh

HOW MANY KMS?	CO	South	Central	North
nr.kms by project car(s)	28000	11000	15000	51000

WHAT ABOUT THE KWA?	CO	South	Central	North
Official meetings w.KWA:	35?	8	6	11

WHAT ABOUT DELHI?
number of visits by Delhi-based colleagues (Danida and RNE): 5
number of visits to Delhi: 3

WHAT ABOUT HEADOFFICES?
number of visits by head-office colleagues (Danida or DGIS): 1
number of official missions from Europe: 0

II. OUTPUTS

A. SITE SELECTION FOR PUBLIC TAPS

ORIGINAL SITE SELECTION COMPLETED	South	Central	North
in how many panchayats, by 31/12/88?	1	6	4
ORIGINAL SITE-SELECTION GOING ON in how many panchayats, at 31/12/88	-	-	1
REVIEW AND RESELECTION OF SITES IN how many panchayats in 1988?	1	6	na
TOTAL OF SITES (RE-)SELECTED IN 88?	72	336	669

B. HEALTH EDUCATION

HEALTH EDUCATION IN HOW MANY panchayats in 1988?	9	5	7
NUMBER OF WORKSHOPS OR CONFERENCES	2	2	5
With such agencies like:	students	district level staff, Health Dep. Staff,	district level staff, Field level staff

COLLABORATION IN THE FIELD OF HEALTH EDUCTAION WITH WHOM?
a)Unit South: Health Srvices, Social Welfare Dep.,CDFO, QSS, Nehru Yuvak Kendra, KSSP, NSS
b)Unit Central: AIR, DIO, Dep.of Public Health, Med.College, PHCs, Churches,Social Service Societies,Schhols,Anganwadies,NSS.
c)Unit North: Health trainees, Voluntary agencies, Health dep.

WHAT KIND OFTHE MATERIAL PRODUCED?
a)Unit South: Leaflets of Diarrhoea and chlorination
b)Unit Central: Talking points on water and sanitation for PH staff and NSS volunteers; information notices for beneficiaries.
c.Unit North: pamphlets on diarrhoea management, precautions to be taken during monsoon, prevention of gastro-enteritis, time-table card with health messages; health education booklets on water use, storage and handling and on sanitation.

TO HOW MANY H.E.MATERIALS	South	Central	North
distributed in 1988?	2800	10,000	100,000
HOW MANY HEALTH EDUCATION CLASSES given during 1988?	211	91	145
HOW MANY BENEFICIARIES REACHED by some form of health education?	7,020	14,000	70,000

C.Sanitation

IN HOW MANY PANCHAYATS	South	Central	North
sanitation activities in 88?	3	2	1
HOW MANY LATRINES COMPLETED IN 88?	700	150	680
HOW MANY UNDER CONSTRUCTION per 31 december 1988?	183	390	190
HOW MANY SANITATION IMPLEMENTATION committees functioning?	2	2	-
HOW MANY BENEFICIARIES PAID THEIR share in 1988 for latrines?	875	620	870

D..Community Participation

HOW MANY WARD WATER COMMITTEES established during 1988?	16	85	46
HOW MANY WARD WATER COMMITTEES functioning per 31/12/88?	3	85	-
HOW MANY PANCHAYAT WATER COMMITTEES established in 1988?	-	-	6
HOW MANY BENEFICIARIES CONRIBUTED 25% for their latrines in 88?	875	620	870
HOW MANY OFFICIAL MEETINGS WITH PANCHAYATS were held by the Unit in 1988?	40	18	39

E.Monitoring and evaluation

BASE-LINE DATA COLLECTED FROM HOW MANY panchayats?	3	6	5
HEALTH DATA COLLECTED FROM HOW MANY health institutions?	116		
HOUSEHOLD LEVEL DATA COLLECTED FROM how many households?	135	2000	17,295
MAPS PREPARED FOR HOW MANY PANCHAYATS?	1	2	7

F.Miscellaneous

HOW MANY PROJECT NEWSLETTERS PUBLISHED BY C.O.: 2 x 1500

STUDIES COMPLETED AS PER 31/12/88:

1.Knowledge, Attitudes and practice of Health Related Activities
2.Problems and prospects of involving a voluntary agency in the pilot sanitation project.
3.Utilisation and appeciation of drinking water in different localities in Kerala (3 studies)
4.How people perceive Community Participation.

STUDIES ONGOING PER 31/12/88:

1.Experiences in community participation in regard to drinking water and sanitation, elsewhere in India.
2.Operation and Maintenance of Rural Water Supply schemes in Kerala
3.The possibilities of using health data for monitoring and evaluation of the impact of rural water supply schemes in Kerala.
4.Process evaluation of the Pilot Sanitation Programme
5.Evaluation of the use of weekly radio broadcasts related to drinking water

OTHER PROJECT RESULTS:

1.Design and production of 12 x 10.000 Posters (health education), and 5000 calenders.
2.Design and initial production (1550 units) of ceramic pan and trap, suitable for Kerala sanitation.
3.Membership of State Sanitation Cell
4.Draft manuals for site selection and sanitation

We thank all who supported us in 1988 and we appreciate all who stimulated us to new approaches by not supporting us.

martin de graaf
senior adviser, 24/1/89

ANNEXURE - E

SOCIO ECONOMIC UNITS KERALA

KERALA WATER AUTHORITY

RECOMMENDED

MANUAL FOR SITE SELECTION OF PUBLIC WATER POINTS

BY

S. E. US

(DRAFT)

AUGUST 1989

CONTENTS

PURPOSE OF THIS MANUAL

The Manual is intended for all those interested and involved in undertaking drinking water supply schemes. The steps outlined here are aimed at achieving the involvement of the community, to incorporate their needs, so as to obtain an optimal use and function of the scheme. These steps are based on the experiences gained by the Socio-Economic Units of the Kerala Water Authority, in the Rural Water Supply schemes assisted by the Dutch-Danish Governments. These procedures are not claimed to be final or the only ones; it may be necessary to change or adapt some of them according to the area and requirements of the schemes intended. The salient feature of the activities of this Water Supply Scheme, is that of the strong involvement of beneficiaries, especially women.

The involvement of people in the scheme, promotion of better use of water, of health education and establishment of an effective system for continued operation and maintenance (including cost recovery) of the schemes are perceived as basic requirements for the sustenance and envisaged benefits expected of this project, to serve the users optimally. Therefore the community's involvement in the selection of sites for public taps is of considerable importance. It is only through such involvement a sense of "belonging" can be created and misutilization, underutilization and neglect of assets can be avoided.

Involving a community is a time consuming process, but although time consuming, this time spent is well-spent, especially in the long run and as learnt from our experiences. We wish to share this with you and hope that this Manual will contribute to convince implementators of such development programmes about the advantages of community participation, and prove to be useful in people's projects.

Socio-Economic Units, Kerala
Kerala Water Authority

SITE SELECTION PROCEDURES BEING FOLLOWED BY THE SEU

Procedures	Personnel	Time Approximately required	Resources
*I. Preparation of Ward Maps			
a. Levels and compass surveying of Project area indicating settlements, households, boundaries, landmarks, major roads, footpaths, institutions etc.	3 Surveyors	1-11/2 month for each panchayat	Survey Instruments & Pentograph
b. Drawing and copying of maps	2 Draftsmen	Two weeks for each Panchayat	Pentograph Ammonia Printing Machine.
II. Designing Stage	SEU Staff & Ward Water Committee	6-9 months.	
III. -Introduction of schemes to Government & Non-Govt. Offices in Panchayat.	SEU staff	Two days.	
-Collection of information and available data of population, distribution, water supply facilities.			
-Institutions, colonies, existing Organizations, Mahila Mandals, Youth Clubs etc.			
IV. Preliminary Site Selection.			
a. Inform dates of activities in different wards to Panchayat; Village, Health, Block Development Offices and ICDS and get lists of backward and needy areas from various field level personnel.	Site Selection Team (S.S.T)	One day	
b. Introduce project and site selection purposes to local people; identification of possible persons to form Ward Committees (W.C) (See page 8).	Field Level personnel of Health ICDS, Panchayat Village, Block Development Offices, Social Workers, Club Members, and S.S.T.	Two wards per day.	

	c. Ward Water Committee (WWC) formation, explain taks to them and fix dates for meetings.	Field Assistants of S.S.T	Per Ward
	d. Field survey to confirm landmarks and boundaries indicated on maps received	Technical staff of Site Selection Team Bill Collectors/and Village men (Panchayat and Village Office).	
	e. Training of Ward Water Committee Members	SEU/KWA	2 days (1+2)
	* This stage is undertaken by the KWA and the maps are provided to the SEU by the KWA.		
	f. Solicit opinions of householders of the areas, especially women and decide on the specific location for a standpost.	W.C, S.S.T and Local people	1-2 days per Ward.
	g. Collect demographic and socio-economic data of households here and other general information.	Field Assistants of S.S.T	2-3 days per Ward.
	h. Complete details required in the standpost Site Selection Form and Land Surrender Forms.	S.S.T	1 day per Ward.
	i. Action on Land Surrender Forms	Panchayat & Village Offices	
	j. Correction and finalization of Maps	2 Draftsmen	10 days per Panchayat
IV.	Finalization of Standpost sites selected	Community Organiser (SEU) and Asst.Engineer (KWA).	Half month per Panchayat.

Step III takes between 1-11/2 months per Panchayat if proper maps, vehicle and required staff are available. A 4-wheel-drive jeep is most ideally suited in the type of terrain usual here.

Step III (f) - (i) take place simultaneously.

The time requirement here is subject to variation according to the terrians and area of Wards/Panchayats concerned. The density of population is another factor affecting this, as also the availability of vehicle.

The time stipulated above is for a Panchayat Ward without much hilly areas, with an area of about 1 sq.km and an average of 300 households per Ward.

SECTION ONE

Points to be considered during Site Selection for Standposts

1) -Choose only areas and households that cannot afford private connections.
2) -Try and locate one standpost to serve at least 20 households (about 200 people) and not less than 15 households in any case, within a 250 m radius.
3) -Choose a point facilitating maximum needy households.
4) -Choose an area with possibilities to undertake activities like washing etc. nearby.
5) -Ensure good drainage facilities.
6) -Avoid possibilities of water logging on platform and surroundings.
7) -Avoid areas too close to roads and pathways that will be obstructive to traffic.
8) -Avoid wherever possible private locations and areas susceptible to misutilization.
9) -Encourage private and 'Community' connections (a group of householders taking a connection) wherever possible.
10) -Avoid political interferences and considerations.

Points to be noted in Field Activity

Introduce project to Panchayat, Health, ICDS, Village and Block Development Office Officials and local residents.

Contact local Youth Clubs, Mahila Samajams and other such agencies.

Conduct survey with as much general participation as possible and with field level personnel (official and non-official) whenever and wherever possible.

Hold general discussions especially, with women users, invite general and local opinions, crosscheck information.

Locate places or households for holding meetings and informal classes.

General Features to be observed and information to be obtained

An idea of the area, especially about colonies, institutions, health centres, possible rehabilation areas, new roads, relocation of existing colonies etc.

-Present source of water, especially drinking water, during dry and wet seasons, their quality, quantity, distance, location and surroundings.

-Number of households depending on these sources.

-Socio-Economic situations of these households.

-Occurrences of water and faecal borne diseases and health situations generally.

SECTION TWO

Explanation of Site Selection Procedure

Objectives of Site Selection

The Dutch and Danish supported project envisages safe and reliable drinking water supplies to 90% of the population of the project areas, all year round, within reasonable distances from housing Units (approximately people around 200-250 meters around). It aims especially to cover that part of the population that cannot affort private connections and those located in remote and far flung areas. The overall objective expected to be achieved is to improve the quality of people's lives. The implementation of the schemes and their sustenance is viewed to be undertaken with community participation. This aspect is very important, keeping in mind that, unless the community feels itself responsible for the condition and functioning of the schemes, the schemes cannot be expected to be viable to the desired degree. It is to achieve this that, this procedure for site selection of public standposts has been outlined.

The major steps that have been considered for site selection are:

I. Preparation of maps
   - Surveying of project area
   - Map drawing

II. Data collection and information of project activities

III. Preliminary site selection activities
   - Obtain list of needy & backward areas from all possible sources
   - checking of boundaries & landmarks with personnel of concerned departments
   - informing local people about purpose of activity
   - formation of Ward Committees
   - visiting proposed areas and selecting sites
   - completing forms for standpost site selection
   - surrender of land, where involved
   - correction and finalization of maps

IV. Finalization of Site Selection

I. PREPARATION OF MAPS

Maps of Panchayats indicating topographical features, ward boundaries, institutional and settlement distribution patterns, existing water sources, roads, footpaths etc. are prepared. The Surveyors who does field survey for this work have to be specially instructed about the requirement in the preparation of these maps, as, the existing procedure is only to survey main roads, adjacent buildings and mark levels. Aerial maps, if available, are useful to indicate natural features; for Kerala the vegetational canopy may camouflage most habitation areas. Present experiences indicate that existing maps available in various offices are outdated (atleast 15 years old) or unreliable (not to scale) or not meeting the above requirements. Separate Ward Maps of the Panchayats to a scale of 1:4000 are drawn, and being used by the Site Selection Team.

II. DATA COLLECTION AND INFORMATION OF PROJECT

A survey of existing data, available from various sources like Panchayat, Village, Block Development Offices, ICDS and Health Departments, about the areas in general, details about backward colonies, villages, proposed new colonies, relocation of habitations etc. and information about water and health situations, is conducted. Particulars of the Project purposes are informed at these offices as also the expectations of their co-operation and help needed. Having an idea about the situation of existing water schemes, water utilisation, people's opinion and idea of an ideal water supply scheme etc. is useful. A Utilization Study of existing Water Supply schemes is very helpful for this and should be undertaken if possible. Meetings at the District and Panchayat levels with personnel of different agencies are very effective and helpful.

III. PRELIMINARY SITE SELECTION

a. The Panchayat, Village and Block Development Offices are informed by the Site Selection Team (S.S.T) about the date when work in a Panchayat is to start. A List of backward and needy areas there is obtained from these offices.

b. These Departments' Officials being locally known themselves could introduce the team to the local population and identify possible persons in each Ward for the Ward Committees (W.C). See page/0.

c. The Field Assistants of the S.S.T are responsible for the formation of this Committee, and together with the local people select 5 men and at least 2 woman who are knowledgeable about the area and needs. They are requested to make a list of water needy areas of the Ward. A date is fixed with them to visit all such areas of the Ward.

d. The boundaries and landmarks on the maps provided are confirmed, if possible with the Government personnel especially Bill Collectors, by the Technical Staff of the S.S.T. The Technical Staff during the surveys, also prepare a list of needy areas.

e. Training of Ward Water Committee Members

Ward Water Committee members will be given on orientation training for 2 days on various aspects of the Water Supply and Sanitation Programmes.

f. At the next meeting with the W.C an inventory of potential areas in a Ward drawn from the suggestions and lists from various sources is prepared and each of them visited. Specific problems of each area are discussed and checks made to ensure that the norms prescribed for selection of a site are followed (see page 5).

g. The local women especially, are encouraged to voice their opinions and state their requirements. The needs and problems of the area are discussed, e.g. water logging, privacy, accessibility, obstruction to public wayfare, elevation of the area, distances etc. All these are considered within the technical and financial constraints before site selection is made.

Some details about the households around here, their socio-economic conditions, general features and characteristics of the settlement are collected.

h. When a consensus for a site has been made, it is marked with a numbered peg, and details of this and the area are collected and filled in the Site Selection form (Annexure II). A sketch of the area around here, as far as possible to scale, marking the numbered peg is made on the Site Selection form.

i. If private land is involved, land surrender forms (Annexure III) are filled up by the owners. These forms are handed over to the Panchayat Office for necessary action from the Village Office concerned.

IV. FINAL SELECTION

After a Panchayat is completed, the Community Organizer, SEU and Assistant Executive Engineer, (or Assistant Engineer) KWA jointly inspect each site for its technical, financial and socio-economic suitability. The locations of the sites on the Ward Maps and the sketch of the area around the site selected are checked. If the site is unsuitable then an alternate one is considered. If selection is good, then the site is jointly approved.

Copies of maps of the Panchayat and Wards (Annexure IV and V) Site Selection Forms and, Land Surrender Forms where present, are then handed to the implementing authorities for necessary action.

The Ward Water Committee constitutes seven members who are well-known and acceptable to the local people and officials. They may be social workers, religious leaders, teachers or any other active persons. They should be suggested by local officials and people themselves. The elected Panchayat Ward Member is a member of this committee as also a woman member. This committee is set up envisaging a number of activities. Initially, they suggest areas that could be considered for site selection and identify specific water related problems of the area. It is hoped that once the scheme is commissioned, this Committee will serve as a forum for the public to voice their grievances, needs, problems with regard to water and sanitation at the Ward and Panchayat level. The SEU Sanitation and Health Education programmes have also the close involvement of the Ward Committee and it has representation at the Panchayat level interdepartmental/Agency Committee, through the Ward members and elected Ward Water Committee members.

SITE SELECTION TEAM

a. Technical	Asst. Engineer/Draftsmen	1
	Surveyors (KWA).	2
b. Socio-Economic	Field Assistants	3

Government Department Field Staff Mainly Contacted

Panchayat Office	Bill Collectors
	Overseers
Block Development Office	Village Extension Officers
	Block Extension Officer
Village Office	Villagemen
Health Department	Junior Public Health Nurses
	Junior health Inspectors
Integrated Child Development Scheme (ICDS)	Anganwadi Workers

ANNEXURE I

LAND RELINQUISHMENT

Form No. A. Rule-3

1 Date of Application :

2 Name and Address of the Applicant

3 Details of the Relinquished land:

a) Village

b) Survey Number and sub-Division no.

c) Total Area

d) Relinquished area

4 Reason for relinquishing the land

5 If the land is aquired from the govt:

Year Month Date

6 Signature of the applicant :

Statement/Declaration

Form B Rule : 7

Taluk Village

Residence Son/Daughter

I hereby relinquish all my rights over the above property and hand it over to the government.

Place

Date Signature

Party signed in our presence

Witness 1)

2)

Village Officer

Annexure II

SITE SELECTION OF STANDPOSTS

Project | Pag No
Panchayat | Ward
Village | Nonrest township
Habitation | Population

Total number of households :
Number of S.C. Households
Present source of water Dry season : Wet season

Number of potential benefiary households

Number of potential S.C. beneficiary households

Nearest beneficiary household : House Number : Distance:

Furthest beneficiary household: House Number : Distance:

Location for standpost

P1

P2

P3

P4

Ward Committee Members

1)
2)
3)
4)

Po al bene.. laries consulted locally

1)
2)
3)
4)

Skilled Persons
Plumbers
Blacksmiths

ANNEXURE - F

DELEGATION OF POWERS TO THE ENGINEERS OF KERALA WATER AUTHORITY

Sl. No.	Nature of Power	Extend of Powers delegated to					Remarks
		Managing Director	Chief Engineer	Superinten-ding Engineer	Executive Engineer	Asst.Exe. Engineer	
1	2	3	4	5	6	7	8
1.	Original Works						
	Administrative Sanction	15 lakhs	10 lakhs	4 lakhs	2 lakhs	20,000	
2.	Original Works						
	Technical Sanction	Unlimited	Unlimied	20 lakhs	5 lakhs	50,000	

1	2	3	4	5	6	7	8
3.	Maintenance Works						
	Estimate Sanction	Unlimited					Initial sanction will be issued by the Chief Engineer in all cases and Subsequent sanction will be accorded by the Division Officer according to rules.
4.	Contribution Works		2 lakhs	50,000	25,000		
5.	Municipal Works		Unlimited	10 lakhs	2 lakhs	25,000	Technical Sanction as per delegation will be issued subject to the limits prescribed in the Kerala Municipalities rules

1	2	3	4	5	6	7	8
6.	Investigation of Schemes						
	Administrative Sanction	2 lakhs	1 lakh	20,000	10,000		The cost should not exceed 1% of the rough cost of the work or project.
7.	Excess over Estimates Sanction for revised estimates	50%	35%	25%	10%	5%	The power of passing excess applies to both excess over administrative sanction and technical sanction subject to overall, sanctioning power.
8.	Tender Acceptance Monetary Limit		Unlimited	Unlimited	5 lakhs	50,000	

1	2	3	4	5	6	7	8
9.	Tender Acceptance Percentage Excess		35% over estimate rate less cost of depart--mental materials	25% over estimate rate less cost of depart--mental materials	15% over estimate rate less cost of depart--mental materials	10% over estimate rate less cost of depart--mental materials	
10.	Waiving of Tender		25,000	20,000	5,000	1,000	
11.	Payment of Bills	Unlimited	Unlimited	Unlimited	Unlimited	First & Final bills upto 20,000 and intermediate bills 40,000	
12.	Lease of usufructs and Lands		Unlimited	Unlimited	10,000 (at a time)	1,000 (at a time)	
13.	Auction for conduct of ferries, canteens, etc, including confirmation.		Unlimited	Unlimited	5,000	1,000	

1	2	3	4	5	6	7	8
14.	Approval of Survey Reports of unserviceable articles including tools and plants and improvements in acquired land and trees. (both living and dead)	(A committee consisting of three officers will consider & recommend and decision will be taken after examining the report of the committee) 3 lakhs	2 lakhs	1 lakh	25,000	5,000	Based on book value or value of land acquisition wherever available and if not value assessed by the Exe. Engineer concerned.
15.	Survey report of buildings for disposal	3 lakhs	2 lakhs	1 lakh	25,000	5,000	Based on value of land acquisition award and if not available on value assessed by the Exe. Engineer, concerned.
16.	Survey report confirmation of auction sale.	(The officer who conducts the auction on sanctioned Survey reports will be competent to confirm the auction on the spot, if the bid amount is not less the 75% of the assessed value of totals of the survey reports. If the bid amount is less the 75% of the assessed value the next higher authority will confirm the sale which need not be the authority sanctioning the survey report).					

1	2	3	4	5	6	7	8
17.	Purchase of tools and plants charged to works.	Unlimited	5 lakhs	2 lakhs	1 lakh		This power will be exercised subject to store rules and subject to budget provision.
18.	Purchase of tools and plants other than those charged to works.		Unlimited (except for vehicles)	1 lakh	25,000	250	"
19.	Puchase of materials other than tools and plants	Unlimited	5 lakhs	1 lakh	25,000		"
20.	Tools and Plants Estimate repairs and carriage		Unlimited	1 lakh	50,000	2,500	"

1	2	3	4	5	6	7	8
21.	Repairs to Motor Vehicles						
	a. Vans, Cars and Jeeps		10,000 (at a time)	5,000 (at a time)	3,000 (at a time)	3,000 (at a time)	This limit is including cost of spare parts and will be subjected to the condition that the repairs should be done in a departmental or approved workshop.
	b. Other Vechicles		20,000 (at a time)	10,000 (at a time)	5,000 (at a time)	5,000 (at a time)	
22.	Valuation of Buildings		Unlimited	10 lakhs	2 lakhs	20,000	
23.	Rent Certificate		Unlimited	Unlimited	500	100	
24.	Write off stores		2,000 (at a time)	1,000 (at a time)			
25.	Write off of irrecoverable amount		2,000 (at a time)	1,000 (at a time)			