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PROPOSED
RWS & SANITATION PROGRAMME KERALA

PROGRAMME IMPLEMENTATION DOCUMENT

for

GOVERNMENT OF KERALA

submited to

ROYAL NETHERLANDS EMBASSY

GOVERNMENT OF NETHERLANDS

DECEMBER 2002

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Rural Water Supply and Sanitation Expert

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List of Abbreviations

ADS	:	Area Development Society
BP	:	Block Panchayat
BPL	:	Below Poverty Line
CBO	:	Community Based Organisation
CDS	:	Community Development Society
CMU	:	Co-ordinating and Monitoring Unit
CWRDM	:	Centre for Water Resources Development and Management
DLTC	:	District Level Technical Committee
DP	:	District Panchayat
DPC	:	District Planning Committee
DSR	:	Detailed Scheme Report
GoI	:	Government of India
GoK	:	Government of Kerala
GoN	:	Government of Netherlands
GP	:	Grama Panchayat
GPWAP	:	Grama Panchayat level WATSAN Action Plan
GWD	:	Ground Water Department
HH	:	Household
IMG	:	Institute of Management in Government
KRWSA	:	Kerala Rural Water Supply and Sanitation Agency
KRWSSP	:	Kerala Rural Water Supply and Environmental Sanitation Project
KWA	:	Kerala Water Authority
MIS	:	Management Information System
MoA	:	Memorandum of Agreement
MoU	:	Memorandum of Understanding
MTA	:	Mid Term Assessment
NGO	:	Non Government Organisation
NHG	:	Neighborhood Group
PAR	:	Participatory Action Research
PE	:	Panchayat Engineer
PID	:	Programme Implementation Document

PMC	:	Programme Management Cell
PMU	:	Programme Management Unit
PRA	:	Participatory Rural Appraisal
PRI	:	Panchayati Raj Institutions
Programme	:	Proposed RWS&S Programme, Kerala
PSCG	:	Policy Support Core Group
RGNDWM	:	Rajiv Gandhi National Drinking Water Mission
RWS&S	:	Rural Water Supply and Sanitation
SAC	:	Social Audit Committee
SCR	:	Scheme Completion Report
SHG	:	Self Help Group
TA	:	Technical Assistance
TAC	:	Technical Advisory Committee
UC	:	User Committee
UG	:	User Group
VRC	:	Village Resource Cadre
WAP	:	WATSAN Action Plan
WQS	:	Water Quality Surveillance

Programme Summary

Country : Government of India

User State : State of Kerala

Programme Goal

To meet the unmet demands of water supply and sanitation services and systems to the residents of selected Grama Panchayats in the Programme districts in an integrated and holistic manner. Integrated in the sense that water supply service delivery will be integrated with water resources conservation and sanitation and hygiene practices. It is holistic in the sense that water resources management and whole of the community is the focus of attention of the Programme. More than engineering, the water supply and sanitation service delivery to the target population will have balanced focus on the human side, institutional aspects, social aspects and environmental conservation.

The ultimate goal for the Programme will be institutionalising and empowering perpetually performing User Groups, which are totally internally driven and self reliant with least dependence on external support systems including GOs and NGOs. The Programme will restore decision-making responsibility to the User Groups and ensure access to resources and information.

The User Groups will be organically linked with the Panchayati Raj Institutions and streamlined with the decentralised planning process, based on principles of subsidiarity, inclusion, equity and transparency. Special attention will be paid to include the women, BPL families and other marginalised sections in the Programme activities. The Programme will implement a special Tribal Development Plan to cover the tribal habitations.

Programme Scope Coverage and Duration

As revealed by the stakeholder consultations done at the district level and in selected Grama Panchayat level, the proposed Programme intends to cover **20 Grama Panchayats** out of the 51 Grama Panchayats in Idukki District and **25 Grama Panchayats** out of the 71 in Alappuzha District with water supply and sanitation schemes. The GPs will be selected based on normative parameters including poverty levels. The Programme will be implemented in an initial batch of 4 Grama Panchayats in each district to further learn from the field realities while implementing and perfect the design before scaling up.

The Programme will cover **1.03 lakh** households in Idukki district and **1.12 lakh** households in Alappuzha district with community based as well as individual household schemes.

A whole range of feasible and appropriate technology options suiting the various geographic and hydrologic regions of both the Districts including spring water protection, protection of traditional water sources, roof water harvesting, gravity water supply schemes, pumping water supply schemes etc. are proposed. A Participatory Action Research to bridge the current gaps in the availability of appropriate solutions to tackle specialised problems in water resources management like micro watershed management and recharge measures, improving drainage especially in the waterlogged areas, protection of backwater canals, protection and development of traditional water sources etc. will be attempted through a participatory testing and adapting process.

The Programme propose to implement a socio-technical process which will reckon all local needs, priorities and peculiarities following an "optimal pace" of implementation. The Programme is proposed to be implemented in 8 years with an initial Inception Phase of 9 months and a development cycle duration in a Grama Panchayat of 36 months.

Programme Activities

The activities which will be undertaken as part of the Programme have been grouped under the following component headings:

A. Mobilising and Empowering User Groups
B. Institutional Support to Programme Facilitating Institutions

- B1: Panchayati Raj Institutions Strengthening
- B2: Co-ordinating and Monitoring Programme Implementation
- B3: Sector Policy Development
- B4: Technical Assistance

C. Building up Water Supply and Sanitation Systems and Services

- C1: Building Water Supply Services
- C2: Sanitation and Hygiene Promotion
- C3: Setting up a Self-regulatory Community Monitoring System for WATSAN Systems and Services

D. Participatory Action Research and Studies
E. Capacity Building Support

Programme Institutional Arrangement

The Programme propose to work with the existing institutions at the state level and the Panchayati Raj Institutions. The most important institutional entity in the organisational arrangement is a socially committed and continuously improving learning organisation called the User Groups. User Groups, which are associations of all user households are sponsored and promoted under the Grama Sabha and recognised by the Grama Panchayat as the local working group for water supply and sanitation. The funds under the Programme are devolved to the User Groups through the Grama Panchayat. The cost-sharing pattern for water supply will be 15:10:75 to be shared among the users, Grama Panchayat and the Programme respectively. An NGO will be contracted by the Grama Panchayat to provide handholding and social mobilisation support to the User Groups. In addition to identifying and developing local leaders as User Committee members, the Programme will identify potential local resource persons who will be trained and developed as a Village Resource Cadre. The Village Resource Cadres developed like barefoot local experts can be contracted by the User Groups to avail social and technical services.

The User Groups are federated within a Grama Panchayat and recognised as the sub group responsible for planning all the water supply and sanitation related programmes of the Grama Panchayat under the decentralised arrangement. At the block level a sub committee will be constituted to assist the Technical Advisory Committee in vetting the WATSAN Action Plans prepared by the Grama Panchayat. The WATSAN Action Plans are the aggregation of the WAPs prepared by the User Groups and approved by the Grama Sabha. A special technical committee will be constituted to assist the DLTC in according the technical sanction to the WATSAN Action Plans.

The Programme Management and Co-ordination will be undertaken by a restructured and repositioned Kerala Rural Water Supply and Sanitation Agency through a dedicated State level Programme Management Cell (PMC) and a field level co-ordinating and Monitoring Unit (CMU). The KRWSA General Body and Governing Council will be expanded to include the representatives of Local Self Government, Rural Development, Planning and Economic Affairs, Health Services, Tribal Development etc. to bring about meaningful convergence and Programme support.

The Programme will support Government of Kerala in facilitating the development of a broad based sector policy evolving towards Integrated Water Resources Management. GoK will set up and facilitate the performance of a State level Policy Support Core Group. The high power group of Policy Support Core Group is likely to consist of secretaries to Government of Water Resources, Planning and Economic Affairs, Local Self Government, Rural Development, Tribal Development, Health Services Departments etc.

The Programme will be supported and guided by national and international expertise through Technical Assistance.

Programme Cost and Financing

The total cost of the Programme is estimated at Rs. 222.19 crores to be funded by Government of Kerala Rs. 5.82 crores, PRIs Rs. 19.73 crores, User Groups through capital contribution Rs. 26.36 crores and through donor grants Rs. 170.28 crores. The GoK share will be to meet the operational expenses in an increasing proportion through the Programme years. In addition to the above cost GoN will fund the Technical Assistance Programme, which is separately budgeted at Dfl 6.16 Million.

Chapter 1

Introduction

The state of Kerala is a narrow stretch of land having a geographic area of 38,863 Sq.Km. located on the southwestern side of Peninsular India. It is bordered by the Lakshadweep Sea in the west and Tamil Nadu and Karnataka states to the east and extends across 8°18' and 12° 48' North latitudes and between 74°52' and 77°22' East Longitudes. It has a long coastal line stretching across 590 Km. The state has an average width of 70 Km. with a maximum of 125 Km.

According to 2001 census, the total population of the State is 31.84 million, of which roughly 73.6% (1991 data-2001 figures are not yet available) is rural. Kerala is one of the most densely populated States in India with 819 persons per Sq.Km. The sex ratio is also high with 1058 females per 1000 males. However, the female literacy is lower at 87.86% compared to 94.20% of males. The decennial growth rate of population during 1991-2001 was 9.42%.

The state is administratively organised into 14 Revenue Districts, 152 Community Development Blocks and 991 Grama Panchayats. There are 5 Municipal Corporations and 53 Municipalities.

1.1 State's Physiography

The physiography of the state is characterised by 3 natural regions. About 10% of the geographic area is lowland, lying below 6 meters above the Mean Sea Level (MSL). The midland region lying between 6 meters to 80 meters above MSL constitutes 42% of the area. Nearly 48% is highland, lying above 80 meters of Mean Sea Level. The two plateau regions are in the eastern hill regions- the Wyanad plateau, which is over 750 m above sea level and the Munnar plateau in Idukki District, which is about 1,000 M above sea level.

In the hills and uplands, soil is deep, moderately well drained and clayey with high gravel content. Hard laterites with rock outcrops are present. About 64% of the soil is very deep, deeper than 150 cm and about 25% are deep to about 100-150 cm. About 4% of soils are less than 100 cm deep. About 6% is covered with rock and laterite outcrops.

1.2 Socio Economic and Demographic Characteristics

Kerala is a densely populated State having 819 persons per sq. km. having a total population of 31.84 million (2001). The sex ratio is favourable towards women having 1058 females per 1000 males. Kerala is the most literate State in the country having 90.92% of its population above 6 years literate. The female literacy rate is 87.86%.

The birth rate per 1000 population is 18.2 (1998) and 26.4 (1998) is the death rate for 1000 population. The infant mortality rate per 1000 is 15.6 while maternal mortality rate per 1000 is 1.4. The life expectancy at birth in Kerala is 71.67 for males and 75 for females.

There is a well-developed health care infrastructure providing 357 beds per 100000 populations. In 1998, under family welfare activities, the couple protection rate in Kerala was 64.32. There is greater access to education in Kerala having 94.39% of the rural population served by a

primary school within a distance of 1 km. and 97.96% within a distance of 2 kms. The gross enrollment ratio using the projected school going age group population stood at 102% for lower primary age group, 109.41% for the UP age group and 94.51% for the high school age group. The percentage enrollment of girl students in the lower primary, upper primary and high school levels during 2000 stood at 49.07, 48.15, and 50.19 respectively.

1.3 Water Resources in Kerala

The average rainfall of the state is estimated at 3000 Mm. About 60% of the annual rainfall in the state is received during the South-West monsoon (June to August), 25% during North-East monsoon (September to November) and remaining during the summer months. Like the temperal distribution, there is also spatial difference in rainfall availability. There are rainshadow areas where the rainfall is substantially lower.

There are 44 rivers in the state which are all monsoon fed and are fast flowing, 41 rivers are west flowing quickly draining into the Arabian Sea. According to National Norm for classification of rivers, there are no large rivers but the state has only 4 medium rivers. The remaining rivers are only minor ones with smaller catchment area. The total discharge of the rivers in Kerala is estimated at 77,900 Mm^3. There is no recent estimates on the utilisable portion of the surface water. An early 1974 estimate puts it at 60% of the average yield.

The total availability of ground water is estimated at 454Mm^3 out of which 150Mm^3 is utilised.

1.4 Community Initiatives in Water Supply and Sanitation

There have been several disjoint initiatives in different parts of Kerala, by communities to organise themselves and solve their water supply and sanitation problems. These community initiatives proved themselves to be successful in meeting the demands and aspirations of local communities.

a. Olavanna Grama Panchayat

The Olavanna Grama Panchayat situated in Kozhikode district is a small Grama Panchayat with around 10,000 households have been witnessing community movement in setting up water supply facilities since 1985. The first community initiated water supply project was commissioned in 1987. Since then about 26 schemes have been completed by community initiatives alone covering about 1250 households. Not only that the capital cost have been fully met by the communities, the entire operation and maintenance is in the hands of the community and the costs are shared by the users. In addition, there are 34 schemes initiated by the communities with assistance from the Grama Panchayat under the decentralised planning. In these schemes the community's contribution range from 25% to 50%. All the schemes are managed and operated by the communities.

There were no external support by way of NGOs or funding. Olavanna was a classic example where decision-making, implementation, mobilisation and spending of financial resources have been fully in the hands of the communities. The entire initiative was totally driven with local resources. All elements of participatory, demand-responsive approach and treating water as an economic good is clearly visible in Olavanna experience. In terms of community empowerment, it may be very hard to find an alternate example in the country matching Olavanna.

b. Cheekode Grama Panchayat

The Cheekode Grama Panchayat in Malappuram district has put forth a successful community model involving Grama Panchayats and Socio Economic Unit Foundation (SEUF). This is the first donor assisted community based model in Kerala, funded by Government of Netherlands. During the period 1998 to 2002 about 25 schemes consisting of pumping, gravity based and rainwater-based technologies have been implemented. The initial cost-sharing pattern was, community 30 to 40%, Grama Panchayat 20% to 30% and balance contributed by RNE through SEUF. SEUF has been providing technical support and social mobilisation activities. During the later stages, User share was limited to 20%, Grama Panchayat taking 40% and RNE contributing 40%.

Cheekode demonstrated the integrated delivery of water supply with sanitation. Yet another not worthy feature of Cheekode model is implementation of non-conventional technologies like rainwater harvesting, development of springs, introduction of Ferro cement technology, rejuvenating traditional defunct, wells etc. Cheekode has a rare distinction of a Panchayati Raj Institution and an NGO, working in partnership to strengthen the decentralisation process..

1.5 GoK Request Support to Scale up Community Initiatives

In February 2001, Government of Kerala submitted a Project Concept Document on a Rural Water Supply and Sanitation Programme for two districts in the state to Royal Netherlands Embassy, New Delhi. In June-July 2001, the first Appraisal-cum-Reformulation Mission was fielded by Government of Netherlands. This Mission was of the opinion that the Project Concept Document did not reflect the functional linkage of the approach with ongoing Decentralisation process in Kerala and did not fully capture the experience and learning of the sector in the past. Hence the Mission could not reformulate the implementation document. However, the Mission based on their field visits and discussions advised to select Idukki and Alappuzha as the Programme Districts.

The secretary to Government, Irrigation, Government of Kerala stated the commitment of GoK in implementing the reform policies of GoI in the Water Supply and Sanitation Sector during the NGO consultation workshop organised by Royal Netherlands Embassy, New Delhi, in November, 2001. It was also stated that most of the suggestions put forth by the first RNE Mission are in line with this policy of GoK.

In November 2001, RNE fielded the second Reformulation Mission. This Mission held a series of stakeholder consultations and meetings with Shri. K. Jayakumar, Secretary to Government, Irrigation and Water Supply Department, Shri. S. M. Vijayanand, Secretary to Government, Planning and Economic Affairs Department, and Dr. K. M. Abraham, Secretary to Government, Finance (Resources) Department. In addition, the Mission met the Hon. Minister, Irrigation and Water Supply and other senior officials of the state. The important output of the Mission was a framework for a Programme Implementation Document.

In March 2002, at the requrest of Government of Kerala, a three-member Formulation Mission to draft the final Programme Implementation Document was fielded by RNE. A State Level Core Stakeholder Meeting was held to finalise the ToR for the Mission. As part of Terms of Reference, rapid primary data collection based on sample and representative Grama Panchayats from the Programme Districts using participatory methodology on socio-economic and technical aspects were instituted. It was also agreed to collect information on hydrogeologic scenario of the

Programme District. The PID Formulation followed a participatory process involving stakeholders at the State level, District level and Grama Panchayat level.

1.6 Participatory PID Formulation

Consultations with core State level stakeholders were held three times. Two District level Workshops were held in each of the Programme Districts. The first Workshop discussed and approved the methodology for primary data collection including identification of Grama Panchayats for the study. The second Workshop validated the findings of the study and discussed the project design including Grama Panchayat level and District level institutional arrangement.

The socio-economic and technical data collection followed participatory methodologies at the GP level.

The draft PID will be discussed at a state level core stakeholder meeting and later in a state level Workshop involving a cross seciton of all the stakeholders. The chronology of consultations undertaken by the Mission is summarised in **Attachment 1.1.**

Chapter 2

Kerala's RWS&S Sector Overview and Analysis

2.1 GoI Policies

The two path breaking events influencing Rural Water Supply and Sanitation Policy of GoI are:

- The 73rd Constitution Amendment and emergence of rural local self government institutions – the Panchayati Raj Institutions
- The national wide launching of Sector Reforms (RWS&S) Pilot Project in 58 districts all over the country to translate the reform policy in water supply and sanitation sector into a reality

Rajiv Gandhi National Drinking Water Mission, while setting apart 20% of resources under Accelerated Rural Water Supply Project (ARWSP) to implement the reform policies in the pilot districts as summarised below:

- Adoption of a demand-driven approach based on empowerment of villagers to ensure their full participation in the project through a decision making role in the choice of scheme design and management arrangement (informed decision making);
- Focus on village level capacity building (Village Water and Sanitation Committees);
- Ensuring an integrated service delivery mechanism by streamlining the functions of the agencies involved in project implementation and;
- 10% (at least) capital cost sharing and 100% sharing of O&M cost by users. The proportion of capital cost shared should increase proportionally with increasing service demand. This contribution can be in the form of cash or kind (labour, land or material)
- Taking up of conservation measures for sustained supply of water through rainwater harvesting and ground water recharge structures.

a. Swajaldhara

In November 2002 GoI decided to open up the reform initiatives in the rural drinking water sector through out the country by launching Swajaldhara Project with the following key elements:

- Demand driven and community participation approach
- Panchayats/communities to plan, implement, operate, maintain and manage all drinking water schemes
- Partial capital cost sharing by the communities upfront in cash
- Full ownership of drinking water assets with Grama Panchayats
- Full Operation and Maintenance (O&M) by the users/Panchayats

The other highlights of the policy are:

- Recognising Panchayati Raj Institutions (Grama Panchayat and Block Panchayats) roles in implementing rural water supply and sanitation schemes throughout the country
- A lesser capital contribution of 5% for Scheduled Caste and Scheduled Tribe

- Uniformly recognising the roles and responsibilities of Beneficiary Groups and Village Water Sanitation Committee (VWSC)
- Provision of one time operation and maintenance grand aimed at maintaining an O&M revolving fund

2.2 GoN Policies

The new Dutch policy for development co-operation that was initiated after a period of reflection on the effectiveness of ongoing programs has the following guiding principles. All assistance should be based on ownership of the recipient country/state. Coherence is sought with the government's own policies and poverty reduction strategies, as well as thorough consultation with relevant stakeholders in civil society. With structural poverty reduction as their overarching goal, aid activities are preferably initiated at the macro or sectoral level, so as to maximise their effect and sustainability as well as their integration in the national budget provisions. However, for the sake of analysis and pilot testing of new approaches, lower level activities can form an integral part of Dutch-assisted programmes. The international development targets relating to poverty reduction, gender, environmental sustainability, through improved governance and institutional development are considered issues requiring priority attention. In order to avoid overlapping and maximise the synergy of aid, GoN strongly advocates close co-ordination and harmonisation of aid instruments and procedures with other donors, under the guidance of the recipient country/ state government.

2.3 Decentralisation in Kerala

In line with the 73rd Constitutional Amendment, GoK enacted the Kerala Panchayati Raj Act. The Kerala Act made far reaching institutional and legal reforms to implement the full spirit of the Constitutional Amendment to create autonomous institutions of local self-government. During the Ninth Five Year Plan period about 30.5% of the Plan Resources were devolved to the local governments almost untied to allow local decision-making based on priorities set by the people. The campaign mode of planning in the form of People's Planning Campaign was a great success in participating the grass root communities in the planning process.

In the case of water supply and sanitation the Kerala Panchayati Raj Act have given powers to Panchayati Raj Institutions to plan and implement facilities. The Kerala Water Authority Act was also amended to restore these powers to the Panchayati Raj Institutions.

The guidelines for the preparation of the Tenth Five Year Plan provide special priority for water supply and sanitation activities. The sectoral ceiling for funds devolved to the Panchayati Raj Institutions can be amended to meet the resources for implementing water supply and sanitation activities. The Panchayati Raj Institutions can meet the additional funds required by taking equal amounts from the three sectors.

2.4 Kerala Water Authority Experience

Kerala Water Authority has been the dominant player in the rural drinking water production and delivery from 1984 onwards. The KWA came into being in 1984 and was created to provide functional and financial autonomy to bring in efficiency in the sector based on the broad principles of the Water Decade (1980-1990).

The KWA has been following a supply driven mode mainly focusing on building and maintaining comprehensive schemes. The KWA has no control over its personal policy and Water Supply Tariff Decisions. Due to various reasons, the financial position of KWA eroded drastically.

During the Ninth Plan period, KWA started taking up deposit works to design and implement water supply schemes for the Panchayati Raj Institutions. The GoK also decided to handover 1050 single panchayat water supply schemes of the KWA to the Panchayati Raj Institutions. The progress of transferring these schemes has not been encouraging.

The conventional practice of assessing coverage based on habitations as per national norms is highly misleading in Kerala context. The habitations in Kerala are continuous. The reach and coverage of rural areas of Kerala by KWA schemes cannot be reliably estimated.

Of late KWA is implementing an innovative project for rainwater harvesting named as "VARSHA" which is being implemented in a participatory manner on a pilot basis.

2.5 Kerala Rural Water Supply and Sanitation Project - Jalanidhi

Kerala Rural Water Supply and Sanitation Agency has been created by Government of Kerala as an autonomous body with the mandate to implement Kerala Rural Water Supply and Sanitation Project, a demand driven participatory water supply project funded by World Bank. The Programme is named as Jalanidhi. The project is being implemented in Palakkad, Kozhikode, Malappuram and Thrissur districts since 1999. The important features of the project are:

- It envisages an integrated approach encompassing water supply and sanitation, watershed management, capacity building, micro-credit for the poor
- The capital cost-sharing is in the ratio of 75:15:10 (World Bank:BG:GP)
- The O&M cost are to be fully borne by the community
- There is a "soft- package" for tribes and other marginalised sections and empowerment of women

After an intensive pilot phase of implementing the project in 5 Grama Panchayats, the project is in a rapid expansion phase. While it is too early to draw lessons on the sustainability of the Beneficiary Groups initiated under the project, the following key observations are available on the project performance:

- The project could not so far demonstrably address the issue of Integrated Water Resources Management. This is evident from the failure of the newly developed sources in some of the schemes
- The project is not integrating with the Panchayati Raj Institutions fully recognising the constitutional status of Panchayati Raj Institutions. The project implementation is not streamlined with the decentralised planning process of the Panchayati Raj Institutions
- The project mode of greater focus on achieving predefined outputs has raised concerns on how far the project could achieve the real empowerment of the Beneficiary Groups

2.6 Sanitation Policy

The traditional approach in Kerala has been to see water, watershed management, sanitation and health programmes in isolation and in a fragmented manner. A significant contribution of the donor-funded projects has been the integrated perception in linking rural drinking water with

sanitation and bringing to bear such an approach in the policy towards improving the quality of life of the people.

A National Sample Survey study (1991) has shown that the sanitation coverage of Kerala was around 52%. The household coverage in rural areas was still lower at 44% and much below that for BPL families. In all probability this situation may have improved since, especially because the drive towards safe latrines for households and environment sanitation under many programmes including the People's Plan Campaign, had made considerable progress. Even so, one can firmly maintain that there is a yawning gap in rural sanitation in Kerala. Open-air defecation continues to be a major threat to the pollution of surface and ground water in addition to soil contamination. Coastal areas characterised by high population density and high water tables are dangerously prone to pollution. Panchayats like Kainakari in the Alappuzha District are hapless victims of the crying evil of contaminated water and health hazards of the coastal belt. There is need for an innovative intervention and policy initiative.

It seems that traditional approach still continues in practice. Several agencies like the Rural Development Department, Fisheries Department, SEUF, SC/ST Development Corporation, the RWSS etc., are involved in sanitation. The GoK has a Total Sanitation and Health Mission (TSHM) established in 1999.

The sanitation activities in the state are totally separated from drinking water supply activities. There are neither policies nor guidelines on converging the sanitation activities with drinking water supply.

a. Kerala Total Sanitation and Health Mission

Kerala Total Sanitation and Health Mission was established in 1999 as a bold initiative with the long-term objective of improving the living standards of the people of Kerala by inculcating in them a new sense and culture on health and environmental sanitation, through programmes managed and replicated by local initiatives. The KTSHM is supposed to have a technical support group having the responsibility of action planning, working out operational details of technical packages, action research, budgeting, financing, software development, organising training programmes etc. The current state of affairs in TSHM is in divergence to its multi-functional Mission status. All the specialists like community medicine and health, community development, training, community water supply etc. have left the organisation.

The Mission could not succeed in dove tailing sanitation programmes with the drinking water supply.

b. NIRMAL 2000

Nirmal 2000 is a project, which successfully met the fundamental necessity of the society to keep its environment clean and of the people to remain hygienic. Initiated in 1996, Nirmal 2000 demonstrated a successful partnership involving GoI, GoK, Royal Netherlands Embassy, UNICEF and Panchayati Raj Institutions. The project implemented total sanitation in Kottayam district of Kerala by implementing personal sanitation, household sanitation, institutional sanitation and environmental sanitation. It harnessed community participation by mobilising neighbourhood groups. It used various tools for its IEC activities like lighting lamps, kalajadhas (rallies displaying traditional and folk art forms), training programmes, seminars, workshops, exhibitions, health clubs etc. It also built two-pit latrines as part of the programme. School sanitation, hospital sanitation, sanitation in slotted houses etc. were also implemented. The strength of the Programme lies in the

perpetual harmony concept and solidarity contribution to bring about improvements in the microenvironment of the neighbourhood by involving the poor as well as the rich.

2.7 Tribal Development Policy

In Kerala, the Scheduled Tribe population was 3.20 lakhs (1991) constituting 1.10% of the total population of the State. Wyanad District accounts for 36% of the tribal population and Idukki District 15.6%. The tribal communities with pre-agricultural stage of development and very low rate of literacy rate recognised as primitive tribal groups, are present in Kerala constituting nearly 4.8% of the total ST population in the State. These primitive tribes are Cholanaikans, Kattunaikans, Kurumbas, Kadars and Koragas. According to a survey conducted by Forest Department in 1992, 17,156 Scheduled Tribe families are living in interior forests in 671 settlements, majority of them engaged in the collection of minor forest produce and forest protection work.

The Scheduled Tribes have a relatively backward economic status with 55.47% engaged as agricultural labourers. The employment among Scheduled Tribe people in the organised sector is relatively low.

Special programmes are being formulated under tribal subplan with the main objective of promoting the socio-economic conditions of the Scheduled Tribe in the State and free them from exploitation. As part of the tribal subplan strategy, 5 integrated tribal development projects were started in the State between 1975 and 1980. In 1989, the number of these projects was raised from 5-7 to bring 75% of the tribal population within these project areas. District level decentralisaion of tribal subplan was introduced from 1983-'84 onwards. About 65-70% of the tribal subplan funds have been devolved to the Local Self Governments from 1997-'98 onwards. Instead of Grama Sabhas, "Oorukoottams" (the general body of a tribal habitation) are convened in tribal settlements for identificaiton of project under tribal subplan, slection of beneficiaries etc. Social activists from Scheduled Tribes are selected and deployed in tribal settlements for co-ordinating activities under tribalsubplan. In 2000-2001, Rs.43 crores have been earmarked as plan grant to Local Self Governments under tribal subplan.

2.8 Role of NGOs

There are large numbers of NGOs working in watershed and water supply related activities in Kerala. KRWSA affirmed the role of NGOs in Water Supply and Sanitation Sector with the start of Kerala Rural Water Supply and Sanitation Project. They provide the social mobilisation and technical assistance support to the Beneficiary Groups under the project.

The opinion is clearly divided about the roles of NGOs in community development. Some of the Grama Panchayat members who have been spearheading the decentralised planning, by mobilising local volunteers have been critical about NGO role. The total sanitation campaign programmes, the local resource mapping programmes, watershed development programmes etc. have all proved the constructive role NGOs can play.

There have been various initiatives including those supported by Inter cooperation (SDC) to build the capacity of NGOs in Kerala.

2.9 GoK Sector Policy

GoK is yet to evolve its policy for Rural Water Supply and Sanitation Sector. The following gaps exist:

- Lack of integration of water supply and sanitation
- Lack of integrating rural water supply activities with Panchayati Raj Institutions, especially under ARWSP
- Even though the Tenth Plan Guideline provides for mobilising resources by the Panchayati Raj Institutions for implementing water supply, in the sector reforms pilot districts there is no Grama Panchayat contribution
- There is no state level nodal agency for rural water supply
- There is no integrated vision to manage the water resources
- Absence of a state level arrangement for capacity building and knowledge bank for the sector.

Chapter 3

The Programme Outline and Scope

The proposed RWS&S Programme is designed as a process aimed at empowering user communities to creatively and perpetually solve their water and sanitation related problems in partnership with the Panchayati Raj Institutions, NGOs and existing community based organisations. Major output of the Programme is conceived as self-organised, self regulating and internally driven user organisations fully empowered to implement solutions to the general developmental issues as well as specific water supply and sanitation related problems. The Programme will also evolve the ground for an enabling and supporting policy environment. In achieving the above, the Programme will offer maximum flexibility at the user level so as to create enough space for them to get organised and perform efficiently. Hence the Programme design set only broader contours in its design, which is summarised in this chapter as Programme Outline.

3.1 Programme Goal

- To ensure adequate quantity of safe drinking water and sanitation facilities to the rural communities in the Districts of Alappuzha and Idukki, by institutionalising a sustainable, effective and replicable community based rural water supply and sanitation service delivery through the mobilisation and empowerment of User Groups in an integrated and holistic manner
- To further decentralisation by strengthening Panchayati Raj Institutions to perform its facilitating roles to support the communities
- To stimulate and develop an enabling and guiding policy environment conducive for the User Groups, Panchayati Raj Institutions, existing community based organisations and NGOs to perform in a coordinated and integrated manner to manage water supply and sanitation sector in particular and conserve water resources in general

3.2 Programme Objectives

The Programme has the following specific objectives:

- To mobilise and empower User Groups to undertake planning, implementing, operating and maintaining rural water supply and sanitation infrastructure through a transparent and sustainable participatory process and by establishing appropriate linkages with Panchayati Raj Institutions, existing community based organisations and NGOs
- To ensure that women, below poverty line families and other vulnerable sections of the society are included in Programme activities in an equitable manner
- To provide institutional support aimed at building the capacities of Panchayati Raj Institutions and state level organisations to take up responsibility of facilitating community based rural water supply and sanitation Programme
- To plan, design and pilot, action research programmes and studies to test and learn social, institutional, technical, environmental and economic implications of innovative concepts and interventions especially targeted to solving existing problems related to water resources, water supply and sanitation for which proven solutions are not available

- To build the human resource capacity of User Groups, Panchayati Raj Institutions, state level institutions, NGOs and local resource persons to carry out their new roles and responsibilities in a participatory, partnership and process based mode
- To set up and strengthen an integrated structure and knowledge support system to synthesise holistic policies and development strategies for the water resource, water supply and sanitation sector of the state

3.3 Programme Component Activities

In order to attain the Programme goal and specific objectives as above, the Programme will implement a series of activities, which are distinctively grouped and identified as components of the Programme. Even though such a classification is arbitrary, the grouping aid communication of the Programme to all the stakeholders, working out the implementation arrangement in a clear and logic manner and also help monitoring the success of the Programme. However, care will be taken during implementation to protect from the risk of a divergent and compartmentalised component wise implementation. The Programme Components are:

A: Mobilising and Empowering User Groups
B: Institutional Support to Programme Facilitating Institutions

- B1: Panchayati Raj Institutions Strengthening
- B2: Co-ordinating and Monitoring Programme Implementation
- B3: Sector Policy Development
- B4: Technical Assistance

C: Building up Water Supply and Sanitation Systems and Services

- C1: Building Water Supply Services
- C2: Sanitation and Hygiene Promotion
- C3: Setting up a Self-regulatory Community Monitoring System for WATSAN Systems and Services

D: Participatory Action Research and Studies
E: Capacity Building Support

The detailed description of these components including the various activities, which will be undertaken, and elaboration of component implementation arrangements are discussed in the following chapters.

3.4 Programme Design Summary

The Programme following a flexible process approach to provide for the needs, priorities and demands of local communities, seek community empowerment as its major outcome. The Programme design is a route map to achieve this vision. However, empowerment is a very qualitative attribute, which manifest itself in the different behavioural traits of the community. Acknowledgement and willingness to shoulder responsibilities by communities is one of the several forms of its manifestation. Hence it is very difficult to capture all the ingredients required for a successful process Programme aimed at building community capacities, in a straight jacketed "input –output" framework. The entire dynamics and complexity cannot be fully reflected in such a

framework. Moreover, in many situations the "impact" of the Programme activities is more pronounced and meaningful to the communities than mechanical outputs.

However, considering the effectiveness as a communication tool, the overall Programme outline is summarised in Table 3.1.

Table 3.1: The Programme Design Summary

Narrative Summary	Output/Objectively Verifiable Indicators	Means of Verification	Risk/Assumptions
Programme Goal			
• To ensure adequate quantity of safe drinking water and sanitation facilities to the rural communities in the Districts of Alappuzha and Idukki, by institutionalising a sustainable, effective and replicable community based rural water supply and sanitation service delivery through the mobilisation and empowerment of User Groups in an integrated and holistic manner • To further decentralisation by strengthening Panchayati Raj Institutions to perform its facilitating roles to support the communities • To stimulate and develop an enabling and guiding policy environment	Number of rural water supply and sanitation schemes successfully functioning without external support Reduction in incidence of water related diseases and person-days lost Reduction in PRI budget allocation for O & M expenses in water supply The spread of the Programme in non-Programme GPs by people's own initiatives State level sector policy conducive for User Groups, Panchayati Raj Institutions and NGOs to perform in a coordinated manner	Programme Process Report Economic Review Annual Reports PRI Newspaper Reports, Economic Review Policy statements, GoK budgets, plan guidelines, government orders	GoK remain committed to the reform principles in the sector No natural calamities PRI representatives committed to demand-responsive approach Programme success convincingly publicized The ministry and council of ministers remain convinced about community based holistic and integrated approaches
Programme Activities and Objectives ***A. Mobilising and empowering User Groups*** To mobilise UGs by including women and other vulnerable groups; sufficiently empowered to plan, implement, operate and manage water supply and sanitation facilities; sharing benefits in an equitable manner, organically linked to PRIs sub Grama Sabha entities and working in partnership with NGOs and local resource persons	Number of UGs registered Number of UGs functioning effectively based on parameters of inclusion, equity and transparency Number of plans prepared Number of schemes implemented Amount of capital contribution mobilised Number of women members and vulnerable sections included as members, selected as office bearers, participating in activities	Programme Process Reports Programme Review Reports	Social mobilisation process effectively done UG members provided with effective technical support Affordable solutions are selected Willingness to participate Effectiveness of community capacity building

Narrative Summary	Output/Objectively Verifiable Indicators	Means of Verification	Risk/Assumptions
B. Institutional support to Programme facilitating institutions			
B1: PRI Strengthening To enhance the institutional, financial and human resource capacity of the PRI at GP, BP and DP level to enable them change from the current direct service delivery approach to facilitating empowerment of Grama Sabha and UGs and also to develop a vision and strategy for Integrated Water Resource Management	Amount of funds set apart by PRIs under RWS&S as their share in capital investment Number of GPs bringing in effective convergence of line staff Number of GP level, UG federations constituted Number of VRCs functioning effectively Number of PRI representatives sensitised on Reform Principles	PRI annual plans Annual Report of GPs Programme Process Reports	Timely release of financial resources to the PRIs, PRIs' efficiency in raising resources Willingness of staff PRI representative's willingness Selection of VRCs on merit Effectiveness of the capacity building Programme
B2: Coordinating and monitoring Programme implementation To reposition KRWSA as the responsible agency for managing rural water supply and sanitation activities of the state, strengthen the Agency to manage and co-ordinate Programme implementation	KRWSA Memorandum and Articles of Association amended State level PMU and field level CMU set up	Government Order Progress Reports	KRWSA imbibing a facilitating and guiding style of functioning Timely recruitment of staff with professional competencies and concern for the community
B3: Sector Policy Development To provide knowledge support systems to GoK in developing, enabling policy guidelines aimed at empowering User Groups, strengthening PRIs, bringing about convergence and coordinated activities of line departments and NGOs and evolving into a holistic water resources management policy for the state	GoK vision and strategy for the sector Number of co-ordination meetings of PSCG Efficient and judicious management of water resources sector Integrated basin development plans	Government Orders Progress Reports, meeting background notes and minutes Annual budgets, economic review, pilot project proposals	GoK's commitment to develop water resources sector in an integrated and holistic manner Line ministry's willingness to collaborate and coordinate activities Competing uses and stakeholders' willing to collaborate and reduce externalities
B4: Technical Assistance To provide review support, advisory, monitoring, policy support and other specialised support for Programme implementation and sector policy development	Number and type of experts Professional competencies of experts Relevance and efficacy of assistance	ToRs Mission Reports RSM and Midterm Review Reports	Support to synchronise with implementation Contextual relevance of expertise

Narrative Summary	Output/Objectively Verifiable Indicators	Means of Verification	Risk/Assumptions
C: Building up water supply and sanitation systems and services			
C1: Building Water Supply Services			
To build sustainable new water supply facilities planned, owned and managed by User Groups aimed at providing safe drinking water to non-served and under-served households in selected GPs in the Programme Districts To identify and rehabilitate single Panchayat Water Supply Schemes implemented by KWA and PRI institutions through community participation and operate and maintain the same by User Groups	Number of problem locations identified Number of adequate and sustainable water sources identified and developed Number of traditional water sources protected and put to use Number of plans prepared through community participation Quality of designs/plans Amount of capital contribution mobilised by communities Number of Water Supply Schemes constructed Quality of construction Number of households provided with safe drinking water Number of vulnerable households covered Quality, quantity and reliability of Water Supply Schemes Number of KWA/GP schemes identified Quality of designs/plans for rehabilitation Number of Rehabilitation plans approved by the community Quality of rehabilitation Number of KWA/GP schemes rehabilitated and functioning	Progress Reports Review Mission/impact studies Programme Progress Report Review Mission	Effectiveness of technical assistance Availability of hydro geologic skills Capacity of User Committee Effectiveness of technical assistance Participatory skills of VRC Technical Advisory committees functioning efficiently Effectiveness of technical assistance Procurement and supervising skills of User Groups Fund availability of GPs Affordability of the households Institutional capacity of the User Group GoK/KWA commitment to policy GPs' willingness Effectiveness of technical assistance Number of schemes worthy of rehabilitation Ability of the existing assets to perform

Narrative Summary	Output/Objectively Verifiable Indicators	Means of Verification	Risk/Assumptions
C2. Sanitation and Hygiene Promotion			
To bring about total sanitation by integrating personal hygiene, household sanitation and environmental sanitation improvement	Community awareness on personal hygiene practices	Progress Report	Content delivery and targeting of the messages
	Effectiveness of solid waste management at household level	Mission Report	Environmental pollution guidelines
	Number of latrines constructed	Impact Report	Follow up education acuvities
			Appropriateness of latrine technology
	Quality of facilities created		Effectiveness of technical assistance
	Reduction in incidents of water borne and water related disease especially in women, children and working population		
	Effectiveness of solid waste management facilities set up		Effectiveness of technical assistance
C3: Setting up a self regulatory Community Monitoring System for WATSAN Systems and Services			
To establish a simple and self regulatory support and monitoring system to resolve problems and ensure sustainability of community institutions, water source and other systems	Number and regularity of meetings	Minutes of the meetings	Effective inter group interaction
	Number of issues resolved	Case Record	The GP leadership having good facilitation skills
	Number of water samples collected and tested	Progress Report	
	Number of community based systems instituted	Progress Report	
	Improved calamity forecasting		Reliability and promptness of testing
D. Participatory Action research and studies			
To identify technological, institutional and process gaps in water resources management, water supply and sanitation sector and develop solutions through action research, pilot testing and studies and evaluation and application of IWRM concepts	Number of gaps identified and proposals developed	Progress Report	Uncertainty of results
	Number of off stream activities carried out effectively and conclusively		Efficiency, commitment and co-ordination of agencies entrusted with
	Replicable models/learning produced	End of activity reports	

3.5 Approaches and Guiding Principles

The extensive stakeholder consultations at various levels conducted for the preparation of the Programme design, especially those with the communities came up with suggestions on the salient principles to be followed by the Programme. These principles are also consistent with Government of India Policy Guidelines for Rural Water Supply and Sanitation Sector and GoK's commitment to reform Rural Water Supply and Sanitation Sector as well as decentralisation.

These are the most important ingredients in the Programme recipe, the flavour of which can be sensed in all aspects of the Programme, in its objectives, in its components, in its activities and in the processes followed.

3.5.1 Community Empowerment

Lack of user involvement and absence of community participation have been identified as the root cause of poor sustainability and failure of most of the rural water supply as well as sanitation schemes implemented in the past. The PRA exercises conducted at the community level confirmed this as the root cause for the current water supply and sanitation related problems faced by them. The counter arguments coming up in the higher level workshops have been the questions of community capacity to plan, implement and manage water supply and sanitation services. However, communities have expressed their total willingness to take on the responsibilities themselves. The Programme recognises this willingness of the communities and also flag the need to build their capacities.

The current situation of the community in distress at the receiving end of a top-down supply driven public utility will be reversed with the community taking a lead role in planning, implementing and managing water supply and sanitation services. The Programme provides for mobilising and empowering user communities to seek, plan, implement and manage efficient and cost-effective solutions to their water supply and sanitation related problems. The User Groups will be institutionalised as learning and continuously improving civil society organisation with enhanced access to information, technology and financial resources. The most important role in the development process - the power to take decisions - will be irreversibly restored to the User Groups. The Programme ultimately aims at empowering the User Groups by demystifying financial, information and technology related knowledge domains and building their competencies. The most important impact and significant outcome of the Programme will be the emergence of User Groups as vibrant, responsive, cost-efficient and socially committed community-based institutions enshrined in the philosophy of *Grama Swaraj*.

3.5.2 Greater Roles for Women and Marginalised

The Programme has been designed recognising the fact that women and children are the worst affected lot with problems arising out of scarcity of drinking water and poor sanitation situations. The Programme also recognises that, sustainable solutions to water supply and sanitation problems will remain as an unattainable myth, if it fails to give prominent role to women not only in decision-making, but also in the continued management. There are large numbers of community-based organisations mainly organising women and BPL families in most of the Grama Panchayats in two of the Programme districts. The Grama Panchayats have taken an initiative to recognise them under the "Kudumbasree" Programme. The Programme social mobilisation activities to mobilise User Groups will work with the existing neighbourhood groups of women so that the User Groups include substantial representation of women especially, those from the BPL families. Wherever strong, three tier-federated arrangement exist under "Kudumbasree", appropriate linkages with the

functioning of User Groups will be established. Apart from the Kudumbasree groups, all other performing self-help groups and other community based organisations will also be involved in Programme activities.

In addition, the following two stipulations are made to ensure that women are involved in the community activities as well as take lead and active roles in managing the affairs of the User Groups:

- Whatever be the Quorum the User Groups adopt in their bylaws for various meetings, it will be stipulated that a minimum of 50% of those present in any meeting shall be women and then only the required Quorum for the meeting is satisfied and the decisions have validity
- 50% of the User Committee members shall be from among the women members of the User Groups

The Programme has also been designed to include the hitherto marginalised sections of the society like the poor, the Scheduled Castes, the Scheduled Tribes etc. It is always the poor and the marginalised that are severely hit and seriously hurt under situations of water scarcity and poor sanitation. Linkages with existing Neighbourhood Groups, is expected to ensure the participation of poor families in the User Groups. 20% of User Committee members shall be from Scheduled Caste and Scheduled Tribe families.

3.5.3 Furthering Decentralisation Process

Consistent with 73rd Constitutional Amendment and Kerala Panchayati Raj Act, the three tiers of Panchayati Raj Institutions have a key-facilitating role in implementing the Programme. The User Groups are sub Grama Sabha groups recognised by the Grama Panchayats. The organic linkage of the User Group with Grama Sabha and Grama Panchayats enables Programme funds being channeled to the User Groups through the Grama Panchayats. The Grama Panchayats also co-ordinate the Programme implementation through a federated arrangement of User Groups. The Grama Panchayats contribute 10% of the capital cost of the schemes.

The District Panchayats will set up Technical Advisory Committees to vet and accord technical clearance for the schemes submitted by User Groups and sanctioned administratively by the Grama Panchayats. In line with Government of Kerala policy on decentralisation as pronounced in the Guidelines for the implementation of the Tenth Plan, a special working group for water supply and sanitation will be set up by the District Panchayat with the President, District Panchayat as the Chairperson. This Working Committee with external Resource Persons will prepare water supply and sanitation plans for the Districts integrating resources available from Government of India, Government of Kerala, Local Governments and other donor agencies for implementing water supply and sanitation activities. Government of Kerala will issue necessary guidelines that these district level plans will integrate all the activities under water supply and sanitation in the district following the philosophies; principles and implementation modalities prescribed for the two district Water Supply and Sanitation Programme. The field level Co-ordinating and Monitoring Unit will function as the Secretariat of the Committee.

This approach is expected to have the following benefits:

- Greater inter-layer co-ordination among Panchayati Raj Institutions
- Strengthening the functioning of Grama Sabha
- Norm based allocation of resources reflecting need and demand
- Reversal of roles from controlling and interfering to that of a facilitating and enabling

- Endorsing and restoring decision-making powers to the communities

3.5.4 Holistic Water Resources Management

The Programme is not trying to solve the water scarcity problems of target communities through building conventional piped water supply. Instead, it is attempting to empower the communities with knowledge and skills for managing water resources in a sustainable manner. It provides for preserving and developing traditional water sources and indigenous knowledge. The Programme is implementing complimentary and supplementary activities to protect and conserve water resources like environmental sanitation, water recharge and micro watershed activities, improvement of drainage etc.

The implementation of the Programme aims at developing regional plans of actions having broader perspective than implementation at the micro-level. There will be strong interface for linking the implementation at micro level with meso and macro levels.

As elaborated in *section 5.2*, the Programme offers a range of options to the community to solve their water scarcity problems and also to manage the water resources considering the unitary principles. Community capacities will be built to empower User Groups to decide on appropriate technologies evaluating for themselves, the hydro geologic and environmental peculiarities as well as the sociological and financial aspects. The support systems both at the social and technological aspects have been designed to provide sufficient information to the User Communities to enable them take informed choice of technology.

The Programme places lot of importance in restoring and protecting traditional water sources, utilising the existing traditional wisdom and knowledge base etc. to solve water supply and sanitation problems on a sustainable basis.

3.5.5 Sustainability

The Programme aims at creating water supply and sanitation facilities and services, which will continue to deliver satisfactory and affordable services to the User Community. The Programme is envisaged to take up conscious steps to ensure the sustainability of the facilities created and the institutions involved. Some of these steps are:

a. In order to ensure Source Sustainability

- Establishing the adequacy and sustainability of the water sources through minimum scientific tests and plan withdrawal only after leaving enough for future (e.g. 50%) as a non-negotiable precondition for approval of the plans
- Implementing watershed activities for recharging sources
- Introducing strict source monitoring systems by the communities

b. In order to ensure System Sustainability

- Selection of most appropriate technology and design considering hydro geological, environmental, sociological, financial and economic peculiarities of the local areas and communities
- Complying with quality standards and assuring quality specifications in implementing schemes

- Selection of simple technology and appropriate training on O&M so that communities themselves can manage the schemes without external dependence

c. *In order to ensure Institutional Sustainability*

- Communities share a portion of capital costs as well as full operation and maintenance costs. This will ensure selection and implementation of affordable schemes, which are cost effective. There is least dependence for financial resources from outside sources and will promote self-reliance of User Groups
- Selection of small systems reduces the multiplicity of stakeholders and hence the User Groups level conflicts are resolved easily
- Federation of User Groups and regional O&M Support Systems ensures inter User Groups linkages and networking resulting in experience sharing and joint action for system sustainability

3.5.6 Optimal Pace of Implementation

Since the focus of the Programme is to build community capacities, through learning by planning and implementing solutions to their water supply and sanitation problems, themselves. Capacity Building is a slow process. Sufficient time will be provided to the communities to acquire the required capacities. The Programme will not insist on the capacity to spent money, create physical progress and quick solutions as parameters of success.

In addition to capacity considerations the seasonal variations, economic and social activities in the village etc. are all considered in deciding the speed with which schemes are planned and implemented. The Programme will follow an "Optimal Pace of Implementation" considering all the above and also avoiding undue delays, which may dampen community enthusiasm and interest.

3.6 Programme Scope

GoK has decided to implement the Rural Water Supply and Sanitation Programme in the two Districts of Alappuzha and Idukki.

3.6.1 Selection of Districts

The RNE appraisal team undertaking the problem analysis of the Water Supply and Sanitation Sector of Kerala in accordance with the ToR approved by GoK pointed out that the problem analysis of the RNE Appraisal Team proved that the water and sanitation problems are more in the coastal and hilly districts. Accordingly, GoK ranked separately the coastal and hilly districts based on scarcity for water (number of households without a water source within 250 m from the house), lack of sanitation coverage (measured by the percentage of households without latrines), poverty (measured by the percentage of people who belong to the BPL category). Idukki District topped the list of hilly districts. Among the coastal districts, Alappuzha topped the list. The Map of Kerala showing the Programme districts, detailed road map of the districts, maps showing boundaries of Grama Panchayat in the district are given **Attachment 3.1.**

3.6.2 Selection of Grama Panchayats

The Programme is designed to implement rural water supply and sanitation schemes through creation of new facilities and rehabilitation of existing ones. It is not proposed to cover the entire district at least during this phase of the Programme.

During the District Level Workshops, the stakeholders were requested to suggest criteria for selecting the Grama Panchayats for implementation. They were also presented based on existing coverage, the likely coverage of Grama Panchayats under this Programme. It was decided in Idukki District Workshop that 20 Grama Panchayats out of the 51 Grama Panchayats will be covered. In Alappuzha, the coverage under the Programme will be 25 Grama Panchayats out of 71. The Grama Panchayat will be covered in four batches as detailed in *section 10.3.2.*

The Grama Panchayats in the Programme districts need to be prioritised for Programme intervention. The criteria to be used to select the most needy Grama Panchayats were discussed at the Stakeholder Consultation Workshops at State level, District level and Grama Panchayat level. The criteria will be used to prioritise the Grama Panchayats is summarised in **Table 3.2.**

Table 3.2 Criteria to prioritise Grama Panchayats

Sl. No	Criteria	Indicator	Weightage
1	Incidence of poverty	Number of Below Poverty Line households as per published BPL survey of Government of Kerala	15
2	Lack of drinking water supply	Number of BPL families having no drinking water source within 200 meters as per published BPL survey of Government of Kerala	35
3	Lack of latrine facilities	Number of BPL families having no toilets as per published BPL survey of Government of Kerala	20
4	Scheduled Caste and Scheduled Tribe population of the GP	Number of Scheduled Caste and Scheduled Tribe as per Census data	10
5	Implementation efficiency of GP	The real plan expenditure excluding notional items like deposits during the last 3 years as published in the Annual Plans	10
6	Ability of the GP to raise own resources	Rate of increase in the demand to collection of own taxes in the last three years	10

The criteria listed above as serial numbers 1 to 3 are clear indications of the need for the Programme. By selecting the indicator as BPL families, the poverty focus of the Programme will be maintained. Moreover, the indicators can be drawn from the BPL survey conducted by Government of Kerala, one standard and reliable database uniformly across two Districts, which has been compiled through a standardised procedure and anomalies rectified after publishing and calling for grievances. The data for criteria 4 will be taken from the National Census data. The criteria 5 and 6 can be reckoned as proxy indicators for demand for developmental interventions. Thus, a balanced combination of need and demand-based criteria will be used for ranking and prioritising the Grama Panchayats. The indicators based on BPL survey for all the Grama Panchayats in both the Programme Districts are given in **Attachment 3.5.**

The source for data on items 5 and 6 will be the directorate of Panchayats and District Planning Office.

The detailed Hydrogeologic setting of the Programme districts is given in **Attachment 3.2**. The summary of findings from the PRA exercise done in the two districts as part of Programme preparation is given in **Attachment 3.3**.

3.6.3 Selection of Area for User Group

Within selected Grama Panchayats, those User groups will be selected which are most in need of RWSS, and who are most prepared to organise themselves. The decision will be left to the Grama Sabha in consultation with existing community-based organisations.

- Demonstrable scarcity of drinking water and sanitation as reported and as illustrated in the Ward Water Resource Map prepared through a participatory process
- Backwardness of the area with lack of road accessibility, lack of electricity etc.
- Incidence of water borne disease
- Areas having failed Water Supply Schemes especially, KWA schemes
- Areas having specialised problems of water logging, lack of drainage and other environmental issues
- Existing co-operation and participation of women groups
- Incidence of poverty indicated by BPL house density, location of settlement colonies etc.
- Willingness to contribute (in cash or kind) to the construction and O&M cost
- Willingness to form User Groups and User Committees
- Potential areas having community based Integrated Water Resources Management needs

Gramasabhas
Selecting User Groups-
Sustainability of
User Groups

The panchayaths are likely to
decide User groups. Nomination
Selection Criteria required

Chapter 4

Mobilising and Empowering User Groups

Participation of the target population of most development programmes often referred to as "beneficiaries", take on various forms. It includes any or combination of activities like gathering information from them, consultations, free labour and donation of materials, mobilising capital contributions and sharing of O&M costs. Such efforts range from a purely top-down to strictly bottom-up approaches and quite often are admixtures of varying degrees of both.

At the core of the RWS&S Programme for the two districts are activities to mobilise the primary stakeholders – the users of water supply and sanitation systems and services - and empower them to assume the most important responsibility of decision-making and management of the facilities. The Programme considers participation as the highest level of user involvement to collectively identify, analyse and prioritise problems, search and evaluate options of solutions, plan for long lasting solutions to the existing problems, implement through social action the plans and look after the long term operation and maintenance of water supply and sanitation solutions implemented by them. Clearly departing from creating a "virtual sense of ownership" in the minds of the users, the Programme activities restore the "real ownership" with the users not only of the assets created but also of the decisions, resources, implementation processes and continued management of the assets and resources. The activities of this component are based on the recommendations from the PRA exercise done at selected Grama Panchayats in both the districts at the community level. Lessons are also drawn from the community-based water supply and sanitation experience at Cheekode Grama Panchayat in Malappuram District and Olavanna Grama Panchayat in Kozhikode District.

4.1 Objectives of the Component

- To mobilise and institutionalise User Groups as sub Grama Sabha bodies fully empowered to plan for, implement, manage, maintain and operate water supply and sanitation systems and services in their respective geographic areas
- To internalise institutional, resource based and knowledge based capacities within the User Groups to perform roles entrusted with them maintaining highest standards of efficiency, efficacy and transparency
- To ensure that women and other vulnerable sections of the community are fully mainstreamed in to the activities of the User Groups and the benefits of the Programme are equitably received by one and all in the User Groups

4.2 Activities under the Component

This component is the most fundamental activity of the Programme targeted towards a very crucial output - a well performing and fully competent community organisation. The hitherto unorganised rural community organise themselves into an institutional entity and perform together as a cohesive group. Not only they must perform in a self-regulating manner, but also have to resolve conflicts internally to manage development processes sustainably. In fact all the other component activities of the Programme are converging to this component. The activities, which will be undertaken to implement the component mainly include:

- Planning and implementing Grama Panchayat level sensitisation and awareness campaign
- Developing and implementing appropriate social mobilisation and socio-technical process to organise the community including women and other marginalised sections of the community to form and register User Groups through a socio-technical process
- Identifying and developing community leaders as User Committee members to execute User Group decisions
- Linking the User Groups with Grama Sabha, existing community based organisations and Grama Panchayats
- Preparing Grama Panchayat level status and resource report on existing water supply and sanitation situation using participatory methodologies
- Providing handholding support to the communities for social mobilisation and social action through an NGO
- Supporting User Groups with necessary technical assistance to decide upon technology options, preparation of plans and estimates, procurement of goods, works and services, operate and maintain the facilities by identifying and developing local resource persons called Village Resource Cadre
- Developing manuals and guidelines for the User Groups to guide them in their activities
- Conducting training programmes, cross visits etc. to impart necessary knowledge, skills and attitudes in User Group and User Committee members
- Developing and implementing a participatory monitoring mechanism for the communities to learn and develop from the implementation of the facilities

4.3 Stages of Implementation

The Programme proposes to manage this basic component in stages allowing sufficient time to the communities to imbibe core competencies to perform a demanding role in the development agenda of their respective villages. The implementation of the component will not be rushed through or pushed from outside to attain targets or to show short lived physical achievements. The services of an experienced NGO will be utilised to provide handholding support to the community and to facilitate various activities.

The various phases for implementation are:

- Sensitisation and Awareness Building Phase
- RWS&S Situation Analysis and Conscientiousness Building Phase
- Institutionalisation Phase
- Community Planning Phase
- Community Implementation Phase
- Operation and Maintenance Phase

During the first three phases, the communities will be given handholding and assistance predominantly with social, human resource and community development inputs. The later three phases require more support and assistance in engineering and technological aspects, which will be provided to the communities.

The handholding NGO while facilitating the above phases of activities will identify local resource persons who will be trained as Village Resource Cadre to support the community to manage the activities from the Community Planning Phase onwards. Until then they will work in the community along with the NGO as trainees learning all the aspects of the processes on the job. Once

the User Groups are registered after the Institutionalisation Phase, the NGO will phase out its activity. The User Groups can contract the trained Village Resource Cadres to avail technical support services to manage the activities further.

The handholding and technical assistance inputs are expected to substantially improve the community capacity to self-manage their affairs themselves than developing dependencies with GOs or NGOs.

4.3.1 Sensitisation and Awareness Building Phase

This is the phase when Programme concepts and principles are first disseminated across everyone in the Grama Panchayat. The main messages to be spread are the need for as well as the potential of community organising themselves to solve existing problems, salient features of the Programme, importance of conserving and managing water resources sustainably etc. This phase is expected to arouse enough interest and consensus in the minds of the residents of the Grama Panchayat on the Programme as well as on the principles behind it.

Grama Sabhas, public places like schools, anganvadies, primary health centers, existing community based organisations etc. will serve as the platform for carrying out the awareness building activities. All tools of rural communication and concept communication will be utilised to generate package and disseminate messages like mass media, street plays, traditional arts and folk forms, posters, leaf lets, notices etc.

4.3.2 RWS&S Situation Analysis and Conscientiousness Building Phase

The awareness building Programme gradually intensifies into closer interaction with the community members. Interested and willing community members come forward to further explore and analyse the water supply and sanitation situation in their neighbourhoods. This phase will use appropriate participatory tools to probe and record the water supply and sanitation situation as well as existing resources mapping.

These activities will establish the need for collective action by the communities themselves with facilitating support from the Panchayati Raj Institutions. The members of the existing CBOs and local resource persons spearhead this stage. The exact sequencing of events as well as its time duration will vary in different communities. However, in a Grama Panchayat this phase could be completed in three months time. The critical activities to be carried during this stage are:

- Identifying willing and socially committed local resource persons from different areas of the Grama Panchayat and enlisting their participation for the situation analysis
- Developing the local resources persons into potential leaders and Village Resource Cadre trainees
- Residents of various wards come together informally to take part in the participatory situation analysis and resource mapping at the Grama Panchayat level
- A Grama Panchayat level development report containing the water supply and sanitation situation as well as resource maps including traditional water sources is prepared
- Identifying and delineating problem clusters of households in the Grama Panchayat facing water supply and sanitation related issued and ranking them according to severity and need for intervention
- Participatory collection, compilation, analysis and documentation of local resources and water supply and sanitation situation. The local water supply and sanitation situation report will have two parts as follows:

a. GP Resource Maps

Resource Maps will be prepared for the Grama Panchayat geographic area, using the revenue cadastral maps as base maps. Following information will be mapped:

- Survey boundaries, roads & footpaths.
- All houses (with House Nos.), shops, temples, mosques, schools, etc.
- Water supply status of each house (severity of problem).
- Water sources (wells with status, tanks/ponds, springs, streams, other traditional sources, piped water supply schemes, bore wells etc.).

The GP Resource Maps will also be used to identify the cluster of houses facing the most acute water problems (both quality and quantity).

b. Bench Mark Survey

This database would be required to assist in planning as well as comparing the impact of the schemes. The database would generate through a simple household level questionnaire. The household survey will cover the following information:

- Population details (adults, children, cattle)
- Present water availability (quantity, quality, and duration)
- Present water use (seasonal, for various purposes)
- Sanitation, health status

The data collection will be done by the community spearheaded by local leaders, local resource persons and Village Resource Cadre trainees.

- A Grama Panchayat level workshop will discuss the situation analysis report and prioritise problem locations for focusing further activities. The criteria for selecting an area within the Grama Panchayat for implementing the Programme is given in *section 3.6.3.*
- The resource map showing the problem clusters identified will be prominently displayed at the Grama Panchayat office and other public places. The residents of the Grama Panchayat, other local resource persons are invited to point out discrepancies or gaps in the resource map. A minimum of 15 days will be allowed to invite suggestions from those who could not attend the workshops or other activities during the period
- The Grama Panchayat council finalise and adopt the development report and resource map on water supply and sanitation as the vision, strategy and priority, after discussing and incorporating valid suggestions received from the residents

4.3.3 Institutionalisation Phase

The activities under *sections 4.3.1* and *4.3.2* are happening in an informal manner using Grama Sabha and existing CBOs as platforms. During the Institutionalisation Phase, the informal coming together of residents in the problem locations identified during the earlier steps will be formalised. The situation analysis is expected to give sufficient awareness levels to the residents especially in pockets, where water supply and sanitation situations are worse and pronounced problems exist. The residents might have initiated discussion among themselves and met two three times to discuss the issues. This initiative needs to be recognised and formalised now to carry forward the Programme activities to further stages. Just like the situation analysis stage, this phase also will take a course consistent with social, political and environmental factors of the community. During this phase the focus of attention is narrowed down to problem clusters within the Grama Panchayat. It is

important that the residents in the problem clusters learn about their situation slightly deeper and start exploring the range of solutions before registering into a User Group. The social process will now become a socio-technical process, which will result in a cohesive User Group with members fully understanding their situation and with a strong sense of purpose before them.

- Once the community fully understands the existing local situation, they start searching for alternative solutions to solve their problems. It is a search by the community and its leaders and not prescriptions from outsiders. The outsiders can provide the community with information, help them learn and understand pros and cons of the alternatives and at the best guide them take informed decisions in selecting the best, cost-effective as well as sustainable solution. The probable sequencing of activities is as follows:

  - Socio-technical feasibility study for rehabilitation of existing Water Supply Schemes
  - Semi detailed technical studies for new schemes
  - Development of a Technology Selection Matrix for the problem cluster
  - Community consensus on possible solutions and
  - Formation of User Groups

  The detailed description of the above activities is given in *section 6.1.4*, dealing with the socio-technical processes in building Water Supply and Sanitation Systems and Services. The socio-technical processes will narrow down the various options to solve the problem and the community will be able to take an informed decision on the most probable as well as feasible solution before committing themselves into formation and registration of the User Groups. The community now proceeds with group formation and registration activities.

- The leaders identified by the Grama Sabha further work in the community and organise a formal general body, enlisting representation from all the households likely to be benefited from the potential solution. This general body must have attendance representing not less than 75% of the residents of the area, with at least 50% of those present are women and the entire BPL families as well as Scheduled Caste and Scheduled Tribe families are represented. This general body will resolve to form the User Groups, adopt a bylaw and decide the nature of registration. The first office bearers of the User Groups, which constitute the User Committee will also be selected
- Membership campaign to enroll members from the User Groups. All BPL families in the area as well as Scheduled Caste and Scheduled Tribe have to be enrolled as members
- The User Committee members present themselves in the Grama Sabha and narrate the purposes for which and steps through which the User Group was formed and registered. It is mandatory that the representation of women, all BPL families and Scheduled Caste and Scheduled Tribe families in the User Group as well as in the User Committee is complied with. Then the Grama Sabha recommend to the Grama Panchayat to recognise the User Committee as the local working group on water supply and sanitation with the ward member as the patron of the committee. The President, Secretary and other members of the committee will be elected by the User Groups. In all subsequent Grama Sabha the User Committee will present the report of its activities and will seek its approval as per the Tenth Plan Guidelines of GoK
- The User Groups will set up a notice board prominently displaying all its activities, transactions, decisions etc.
- The Grama Panchayat recognise the User Groups and form a federation of the User Groups in a Grama Panchayat with the President, Grama Panchayat as its Chairperson. All the Presidents of the User Groups are members in the federation. Grama Panchayat level resource persons in water supply and sanitation sector are invited as associate members in the federation. Wherever the CDS is active, two representatives from the CDS are also made members. The Grama

Panchayat resolves to recognise the User Group federation as the Grama Panchayat level working group on water supply and sanitation sector as per the Tenth Plan Guidelines of GoK

4.3.4 Community Planning Phase

From this stage onwards there is a formal institutional form for the community called the User Group. The User Group will select/elect a set of office bearers who will constitute the User Committee. The User Committee will be the executive arm of the User Group to implement all its decisions. The community leaders, who have been spearheading the situation analysis and socio-technical process, will normally be selected by the User Group as the User Committee. The User Committee members are trained to undertake participatory planning activities in their respective areas/wards for solving the existing water supply and sanitation related problems. The User Group can now contract the Village Resource Cadre who has been fully trained to provide the required social and technical support to the User Committee. The planning phase activities are expected to provide the following:

- The User Group members and User Committee members are given opportunity to learn and internalise the sociological, the economic, health related, hydro geological and engineering aspects of the water supply and sanitation related issues in the area
- The newly created institution of the User Groups attain critical skills in problem solving and planning for the development of the area
- To provide opportunity to all the members of the User Groups to take part in a decision-making process, the responsibility of which has been restored to the community. Nobody else other than the User Groups have the powers to take decision on behalf of the community. Even the office bearers and User Committee members have to get approval from the User Groups before any decision is implemented
- The technology, service levels, quality of service etc. are decided by the User Groups through informed decision-making by evaluating technical, sociological, economic and environmental considerations of sustainability and affordability
- All decisions strike an impedance matching with the local situations and needs and take into consideration the traditional practices and local wisdom
- The decision choices are also based on cost-efficiency and manageability by the communities

The User Groups now undertake detailed planning of the water supply as well as sanitation systems and services required to solve their problems. The following are the critical steps in this direction:

- **Preparing Detailed Scheme Report (DSR):** The User Groups then prepares through detailed technical survey the Detailed Scheme Report for their water supply scheme. Depending upon whether the User Group has decided to set up a new scheme or rehabilitate an existing one the detailed cost estimates, engineering drawing etc. are prepared with the assistance from the Village Resource Cadre. The detailed description of the step is given in *section 6.1.5*. Even though the User Committee will spearheading the process, all the critical decisions are taken in consultation with the User Group. In addition to the engineering details the Detailed Scheme Report will also contain details of O&M arrangement, capital cost sharing aspects, documentation of the community consultation process with which the report has been prepared, probable coverage of BPL and other marginalised families with the scheme etc.

- **Working out Sanitation and Hygiene Promotion Plan:** The User Group then prepares a sanitation and hygiene plan for the community as per the details given in *section 6.2*.

- **Preparing WATSAN Action Plan (WAP)**: The User Committee then prepares a local WATSAN Action Plan integrating the plans for water supply and sanitation. The WATSAN Action Plan format will be developed during the inception phase of the Programme. However, the WAP shall essentially contain the following:

  - The coverage of households, including coverage of BPL and other marginalised households
  - The process of preparation of the plan including the minutes of various User Groups meetings approving each decisions of the User Committee and showing details of participation by women and other marginalised members of the group
  - The detailed engineering report
  - The sources of funds with which the plan will be executed including community contribution for capital as well as operation maintenance
  - Arrangements for implementing the plan
  - Arrangement for operation and maintenance of the facilities
  - Arrangements for maintaining the sustainability of the source
  - Arrangements for community monitoring of source sustainability, water quality, progress of implementation, operation and maintenance etc.

The detailed methodology for studying the feasibility of options, selection of scheme design criteria etc. are discussed in *chapter 6*, Building up Water Supply and Sanitation Systems and Services.

- **Grama Sabha Approval**: The WAP is approved by the User Groups in a general body meeting with 2/3rd of the members present, a minimum of half of those present being women and majority of the BPL and other marginalised sections represented. The WAP approved by the User Groups is presented to the Grama Sabha for approval. The Grama Sabha recommend to the Grama Panchayat the WAP to be included in its annual plan.

- **The Grama Panchayat level WATSAN Action Plan (GPWAP)**: All the local WAPs are consolidated into a Grama Panchayat level action plan by the Grama Panchayat level sub group for water supply and sanitation, which is the federated arrangement of the User Groups.

- **The Technical Vetting and Technical Sanction**: The District Planning Committee will set up a sub group of the Technical Advisory Committee on water supply and sanitation at the block level, who will vet the Grama Panchayat level WATSAN Action Plan submitted by the Grama Panchayats. The District Planning Committee will also set up a district level sub group of the DLTC, which will accord technical sanction to the Grama Panchayat level WATSAN Action Plan. The composition of Technical Advisory Committee as well as DLTC sub groups and sanction procedures are discussed in *chapter 5, section 5.1.* Panchayati Raj Institutions Strengthening.

- **Community Contribution Mobilisation**: The Programme envisages community contribution as a means for promoting self-reliance among User Groups and maximum utilisation of local resources and expertise. The community contributes a portion of the capital costs as well as share among its users 100% of the O&M expenses. The community is also expected to build a corpus fund to meet future requirements of extension, augmentation or ultimate replacement of parts of the infrastructure.

  The share of community in capital costs has been arrived at based on the PRA exercise done at the community level as part of Programme preparation. During these interaction sections with the community, they have expressed willingness to share up to 20% to 40% of the capital costs. The Programme proposes a minimum of 15% capital contribution by communities, half of

which will be paid in cash and half of which can be contributed through own labour. Even though an overall minimum is prescribed the User Groups are free to decide the level of capital contribution from its members based on a combination of parameters like service level opted, economic conditions, social situations etc. However the principle will be to equate support from the Programme resources across all the users irrespective of economic or social discrimination.

Similarly the operation and maintenance costs will be worked out by the community and appropriate arrangements for sharing the same from among the user households will be instituted by them.

4.3.5 Community Implementation Phase

Active involvement of the User Group through the different phases of mobilising and empowerment will result in an irreversible graduation level of competence. Having involvement within the User Groups will be in a charged level of confidence to take on the implementation of the schemes. The implementation phase like the earlier phases will also emerge through certain critical steps. However local adaptations to suit local situations is an option fully reserved for the User Groups. The following are the critical steps in implementation a detailed account of which is also given in *section 6.1.6* and *section 6.2*:

- **Community Procurement**: Like all other decisions the procurement decisions are also exclusively reserved for the User Groups. The User Committees are entrusted with the responsibility of procuring goods, works and services for implementing the schemes. All transactions are done in a transparent manner and all records can be verified by any member of the User Group. The details of procurement including source, quantities and prices will be displayed prominently to be seen by all the User Group members. Quality standards will not be compromised and price negotiations will be scrupulously done. If the User Groups in a Grama Panchayat decide to bundle procurement for price advantages, the federation of the User Groups can undertake the procurement.

  During the Inception Phase detailed guidelines for community procurement will be developed. These guidelines will elaborate the following:

  - Guidelines for procuring materials and spares
  - Guidelines for procuring works
  - Guidelines for procuring services like plumbing, electrical etc.
  - Quality monitoring
  - Price negotiations
  - Precautions during procurement

- **Community Implementation**: Implementation of the WAP is the direct responsibility of the User Committee, in consultation with the User Groups. The User Committee will ensure that the plans are implemented as per schedule. They will also ensure that the execution of the plan adheres to the design, quality standards and within the estimated and approved budget. It is important that the progress of implementation is made known to the User Groups members periodically.

- **Social Audit**: Social audit is an important tool for the User Group to independently monitor all activities of the scheme implementation. Social Audit aims at ensuring that in all the activities of the community, the basic principles of the Programme like inclusion, equity, transparency etc. are not violated. Every member of the User Group and Grama Sabha get to know that how the principles of participation equity and inclusion are protected during implementation. Social

Audit will be done by a Social Audit Committee (SAC) consisting of senior, experienced and knowledgeable members of the community known for their integrity and commitment. The members of Social Audit Committee are independent and are not connected with planning or implementation activities. Social Audit Committees are appointed by the Grama Sabha based on the recommendations of the User Groups. The Social Audit Committee report their findings directly the User Groups and then to the Grama Sabha.

- **Community Record Maintenance**: The community maintains records on all activities of scheme implementation. These records are public documents, which can be verified by any member of the User Group. It is the responsibility of the User Committee to maintain the records. They will be provided with necessary training to do so. The following minimum records are to be maintained by the User Committee.

  - Daybook for receipt of funds from Grama Panchayat and user contribution and payments made by Grama Panchayat
  - Store ledger for construction material
  - Member-Register for ascertaining demands and collections of share of Capital cost from user
  - Member-Register for ascertaining demands and actual labour contributed towards their share of voluntary labour for Capital cost from user
  - Member-Register for ascertaining demands and collections from user, the O&M cost
  - Daybook for receipt and payments towards O&M
  - Bank Passbook of O&M
  - Receipt-book for cash receipts
  - Minutes book for recording resolutions passed by User Committees

- **Preparing and publishing WAP Completion Reports**: The User Committee will prepare a WAP Completion Report and will present it to the User Group for approval. The Completion Report will essentially contain the following:

  - Description of all the activities carried out during implementation
  - As laid out/as completed maps of the schemes
  - Details of procurement
  - Receipt and Expenditure Statements
  - Savings and cost effectiveness of implementation
  - Major deviations from the approved plan with justification for deviation

- **Recognising the services of the User Committee**: The Grama Sabha will publicly honour the User Committee members for their commitment and dedication.

4.3.6 Operation and Maintenance Phase

As has already been stated several times, the ultimate aim of this component of the Programme is to spin off self-propelling and sustainable User Groups sufficiently empowered to manage the water supply and sanitation service delivery systems in a perpetual manner. In doing so they must be least dependent on external support systems like NGOs or GOs. The real test for sustainability as well as success of the Programme is in the continued service delivery and hence in operating and maintaining the water supply and sanitation services. The critical steps in Operation and Maintenance phase are:

- **Commissioning the facilities**: The User Groups commission the facilities they have planned and implemented with joy and festivity. This is an important event to reinforce their confidence

and recognising their capacities. The User Groups leaders are honoured during commissioning. The important statistics like time taken to complete, expenses incurred, sources of funds, names of User Committee members who toiled to complete the schemes etc. are prominently displayed on the assets. However, sufficient care will be taken not to generate unwanted publicity and other hypes for the Programme.

- **Fixing and collecting O&M charges:** It is important that the User Group realistically work out the cause for operating as well as maintaining the systems. The User Committee calculates these details and presents it to the User Groups for approval. Since the services will be used by different households at different levels, the users will be charged with the cost of O&M according to usage. The decision on how exactly this will be implemented is that of the User Group. They will also decide on how O&M charges will be collected from the members. It is advisable to collect an upfront contribution equivalent to six months O&M charges from all the users before commissioning which will provide a cushion to absorb initial problems. The details of working out the O&M costs are discussed in *chapter 6*.

- **O&M arrangement:** The User Committee will continue after the commissioning with the major responsibility of Operation and Maintenance. The arrangement for the daily operation of the scheme, preventive maintenance as well as fault repairs will also be decided. The Programme during its inception phase will develop a detailed O&M manual for the communities.

- **Conflict resolution:** Water being a basic necessity for human existence combined with its limited availability, become a very sensitive subject to which quite often users respond emotionally. In order to ensure sustainability of the systems as well as institutions it is important that the User Committee and User Groups are able to amicably resolve differences and clash of interest, which can crop up from time to time. Effective conflict resolution and continued efficient performance of the User Groups is the real litmus test for community empowerment.

4.4 User Groups – the Institutional Arrangement

The most important institutional entity in the organisational arrangement for the Programme is a socially committed and continuously improving learning organisation called the User Group. The Programme targets much of its resources to these institutions, which will emerge as the fulcrum not only for water supply and sanitation activities at the grassroots, but also the pivot for all the community development and community infrastructure activities. Ultimately, the Programme aims to empower User Groups demanding cost-effective and efficient services from many of the state level institutions on a fee-based arrangement. They will also set benchmarks of quality standards, fees and prices based on value, performance standards for all community-based services. The responsibility of planning, implementing, operating and maintaining water supply and sanitation related activities will be the responsibility of the User Groups, which are associations of all users of the facilities created under the Programme.

4.4.1 Constitution

The User Group will be an association of all the households directly benefited by a water supply scheme and registered under Charitable Societies Act. Every household will be represented in the User Group by two adult representatives, of whom one shall be a woman, if there is an adult woman in that household. The User Group has the following constitution:

a. General Body called the User Group; and
b. User Committee who is the executive arm of the User Group

The Government of Kerala has issued a Government Order clarifying the roles of User Committees in implementing decentralised water supply schemes in Panchayats and Municipalities vide GO (Rt) No. 2141/2000/LSGRD dated 31.05.2000 of Local Self Government (DP) Department.

4.4.2 Roles and Responsibilities

The main implementation responsibility of the Programme is vested with the User Groups. All other institutions will have only supporting and facilitating roles to perform.

a. Functions of the User Groups

- Decide on technology, service level and operating and managing arrangements for the facility.
- Ensuring that mechanisms are found and applied to enable all marginalised households to participate on a sustainable basis, in consultation and cooperation with NHGs, Grama Sabha and Grama Panchayat
- Implementation of water supply and sanitation facilities
- Contribute partially the capital costs and fully the O&M expenses
- Fixing user charges
- Conducting social audit

b. Powers of the User Groups

In order to carry out the above functions the User Groups have the following powers:

- To select the User Committee and its removal
- To approve the action plans for implementing the WS facilities
- To adopt regulations regarding considerations and usage of drinking water resources and environmental sanitation guidelines in the area of operation and monitor its implementation
- To approve the budget and audited accounts
- To adopt and amend by-laws
- To admit and remove members
- To address the grievance of its members
- To fix user charges

c. Functions of User Committee

The User Committee has the following functions:

- Act as the implementing agency on behalf of the User Groups
- Execute the decisions of the User Groups
- To function as local resource group for any WS&S related activity

d. Responsibilities of the User Committee

They carry out these functions User Committee has the following powers/responsibilities:

- To incur expenses towards procurement of goods, services and works for implementing, operating and maintaining the facility.
- To ensure proper O&M of the WS facilities
- To procure goods, works and services
- To ensure the quality and timeliness of drinking water supply and implement a system for quality monitoring
- To exercise truthfulness, transparency and prudence in management in all aspects of the scheme implementation
- To regulate or ration water supply in order to ensure equity in distribution
- To enter into agreements for executing decisions of the User Groups
- To collect user charges as fixed by the User Groups
- To maintain documents and books of account relating to all activities of the scheme implementation

4.4.3 Linkage with Grama Panchayat

The User Groups are sub Grama Sabha structures having organic linkage with it. The Grama Sabha is the platform within which the User Group is initiated and registered. The User Groups are recognised by the Grama Panchayat and the User Committee is the local working group for water supply and sanitation activities. The Grama Panchayat will organise a federated arrangement for all the User Groups within the Panchayat with the Grama Panchayat President as its Chairperson. As elaborated in *section 4.3.3*, Institutionalisation phase, this federation of User Groups will be recognised as the Grama Panchayat level working group on water supply and sanitation.

The functioning of the User Groups will also be integrated at the planning level by consolidating the local WATSAN Action Plans, at the Grama Panchayat level by the federation of User Groups.

The Grama Panchayat will channellise funds available with various other programmes for implementing water supply and sanitation activities while finalising the Grama Panchayat level WATSAN Action Plan. Integrating such available funds will be the responsibility of the Grama Panchayat.

Memorandum of Understanding

The Grama Panchayat will sign with the User Committee, a simple of Memorandum of Understanding to channellise Programme funds, funds available with other programmes as well as Grama Panchayat share to the User Groups. This simple MoU, which will be developed during the inception phase, will cover the following aspects:

- Roles and responsibilities of the User Groups and User Committee
- Stages of release of funds
- Milestones of physical achievements linked to each stage of release of funds
- Non-negotiable principles of inclusion, transparency, quality of implementation etc.

4.5 Arrangement for Capacity Support

User Groups are newly organised community based organisations, which cannot originate de novo and acquire capacity to perform the roles and responsibilities by itself. The Programme will provide for, under this component capacity support to the User Groups. The capacity support will be provided through the following means:

- Handholding for social mobilisation and social action by engaging an NGO
- Technical support through identifying and developing a Village Resource Cadre (VRC)
- A range of other knowledge support activities like training programmes, workshops, cross visits etc.

The handholding social mobilisation and social action is the major mode during Programme initiation. The intensity of handholding will be slowly tapered as the User Groups are formed and User Committee members start assuming and performing their roles and responsibilities. Simultaneously a cadre of local resource persons will also be identified and developed to provide technical support to the User Committee and User Groups. The later two are in fact, the deliverable outputs by the handholding NGO. The focus is developing and internalizing capacities at the User Groups and User Committee level. The other two modes are only vehicles to achieve this.

4.5.1 Handholding for Social Mobilisation and Social Action

NGOs experienced in participatory methodologies will be contracted to initiate Programme activities at the Grama Panchayat level. The exact selection process of the NGOs and their Terms of Reference will be developed during the inception phase.

a. Tasks to be performed by NGO

The NGOs are expected to perform the following tasks:

- Develop and run the sensitisation and awareness building activities
- Facilitate the situation analysis and conscientiousness building activities
- Help community identify and develop local resource persons as Village Resource Cadre
- Facilitate meetings, workshops and participatory events up to the planning phase of activities
- Facilitate the mobilisation of the User Groups, User Committee selection and training them
- Facilitate enrolment of members, mobilise community contribution etc.
- Help Grama Panchayats and Grama Sabha to initiate Programme implementation, set up federation of User Groups etc.
- Help communities plan for water supply and sanitation services and systems

b. Skills and competencies of the NGO

The NGO must field a team leader and two mobilisers to perform the task. The team leader must have not less than ten years experience in facilitation skills and field level application of participatory tools. The two mobilisers must also have similar competencies and experience of at least five years. The tasks to be performed are important but more important will be how the same will be performed. The NGO is the catalyst and the change agent and not implementer or a contractor.

c. *Expected outputs and output quality*

The following are the expected outputs from the NGO:

- The general residents in the Grama Panchayat are aware of the Programme principles
- A Grama Panchayat level development report and resource map prepared in a participatory manner dealing with the water supply and sanitation situation
- A User Group with adequate representation and involvement of women, BPL and other marginalised sections in the community and empowered User Committee
- Local resource maps and bench mark survey reports using participatory methodologies
- Local WATSAN Action Plan
- The Village Resource Cadre identified and trained
- Emergence of a successful partnership and meaningful linkage among User Groups, Grama Sabha, Grama Panchayat, existing CBOs and Village Resource Cadre
- A fairly elaborated and well documented report on the social processes and other activities carried out in the Grama Panchayat

d. *Selection of NGOs*

The selection of NGOs will purely follow a market-based selection considering general standing and experience along with the competencies of the personnel being fielded to carry out activities of the Programme. The Programme will generate a database of the NGOs in the sector and shortlist them for different service requirements. The database and short listing will be updated every year capturing the changes.

Whenever a service is to be contracted, the short listed NGOs will be asked to submit detailed technical proposals. While inviting the proposal, a detailed description of service along with the available budget will be communicated to the NGOs. The Technical Proposal will be evaluated by giving scores to institutional competencies judged on past successful performance, the suitability and effectiveness of the methodologies proposed as judged from efficiency of carrying out the service and competencies of the personnel exclusively earmarked for carrying out the service.

e. *Other services from the NGO*

In addition to the handholding and social mobilisation, services of the NGO will also be utilised in impact evaluations, specialised capacity building support, specialised monitoring, specialised backstopping support for Programme implementation.

4.5.2 Technical Support through Developing Village Resource Cadre

Village Resource Cadre identification and development is an important component of the Programme to build local capacities in social as well as engineering aspects of community based development. In addition to the User Community, the Programme envisages development of a team of local professionals. These Village Resource Cadre are expected to successfully bridge the capacity gaps of the User Groups in performing their roles and responsibilities. Considering the history of Kerala with demonstrated volunteerism by resourceful persons in the community during successful literacy programmes and decentralisation programmes in the past, coupled with wider acceptance for civil society organisation, the Programme will develop a Village Resource Cadre.

The Village Resource Cadre members shall be invariably from within the geographic boundaries of the Grama Panchayat. While identifying them, the chances of the continued presence of these team members beyond the Programme period to be available to the community need to be stressed upon. The Programme will be investing to build the capacities of the Village Resource Cadre, which shall be tapped by the community even on later dates. The following advantages exist under this arrangement in contrast to NGO service providers:

- Internalisation of capacities within the Grama Panchayats, which can be accessed even after Programme period
- Opportunity to tap and nurture locally available human resource potential
- Programme implementation becomes an internally driven process
- Promote voluntarism
- Cost-effective solution as there are no organisational overheads

a. Composition of the VRC

The Village Resource Cadre is a gender-balanced (50% women) cadre of field workers trained and accredited by the Programme having the following skill-mix for each Grama Panchayat:

- Social mobilisation/ community Organisation 5 nos.
- Community engineering, surveying/ technical data collection 5 nos.

The following competencies will be developed in them by the Programme:

Social and Management Skills

The following soft skills will be imparted: - Participatory methodologies, participatory village resource assessment, communication and campaigning skills, methodologies for social action, conducting baseline surveys, mobilising community contribution, rural institutional building and organisation development, facilitating skills and training skills, community conflict resolution, building successful partnership etc.

Engineering and Technical Support Skills

The Village Resource Cadres will get hands on training to perform tasks like conducting engineering surveys, identifying and testing water sources, evaluating feasibility of technical options, designing and estimating schemes, quality assurance of procurement, work supervision, work measurement and quality certification, working out operation and maintenance plans etc.

b. Selection and Development of VRC

The Grama Panchayat with the help of the NGO will identify during the awareness building and situation analysis phase, not less than 10 persons based on the following eligibility criteria.

- Persons having proven past association with voluntary work in literacy campaigns, decentralised planning
- Willing to work with the communities and have qualities like good communication, team work, rapport building etc.
- Having undergone earlier professional training gets preference but degrees are not a must
- Willing to work full time during the period of training and certification with a subsistence level stipend

- Willing to work full time with the community after certification in a manner required for the Programme and at costs affordable to the User Groups
- Office bearers of the political parties and those not acceptable to the general community as a whole are to be avoided

The selected Village Resource Cadres not less than 10 in numbers will be associated with the Programme during the campaigning and Grama Panchayat level development report preparation. The NGO will impart necessary training to them on the job. Any of the selected persons who are not able to imbibe the Programme philosophies and are not comfortable in working for the community will be encouraged to leave. They will also be concurrently given training on the engineering and technical aspects of the Programme. During the training period, they will be provided with free transportation, lodging and food depending up on the actual requirements. An honorarium to cover the subsistence will also be provided. The exact amount will be worked out during the Inception Phase.

After successful completion of the training, these persons will be accredited to provide the required support services to the User Groups. A rostrum containing the names of such accredited persons will be maintained by the respective Grama Panchayat. They will be completing the training by the end of the institutionalisation phase.

c. *Engagement for Service and Payments to VRC*

The User Groups from the community planning phase onwards are free to select at least two Village Resource Cadre persons to assist them. One person will be a social mobiliser and the second one a community engineer. The User Group, if they so desire, can engage more than one community engineer also. The services of the Village Resource Cadre shall be engaged by the User Groups only based on actual requirements and the payments to them will be effected by the Grama Panchayat based on actual work undertaken by the Village Resource Cadre as certifed by the User Groups against deliverable outputs. The User Groups can engage only persons from among the Village Resource Cadre. If they are not satisfied by a person, they can be replaced by another member of the Village Resource Cadre. A model contract format will be developed during the inception phase to engage the Village Resource Cadre by User Groups.

The total payment to the Village Resource Cadres by the Grama Panchayats as per the above arrangement will be met from, the Programme funds subject to a maximum of 3% of the estiamted cost of hardware to be built by the Beneficary Groups in a Grama Panchayat. The payment to all Village Resource Cadre members engaged by a User Groups will not exceed 2% of the toal estimated harware cost for the User Groups. The Village Resource Cadres shall not be eligible for any salary, transportation, incentives, accomodation etc. under the Programme. The exact amount of payments and details of contracting of Village Resource Cadre will be developed during the Inception Phase.

After completion of the Programme in one Grama Panchayat, these Village Resource Cadre can enroll their names at the Block Level, where their services can be hired by any developmental programmes under regular Block/Grama Panchayat programmes where community engineering and community mobilisation inputs are required in the same manner as under the Programme.

Chapter 5

Institutional Support to Programme Facilitating Institutions

One argument quite often raised against community empowerment and decentralisation to devolve powers of decision-making and responsibilities of implementation to Grama Sabha and User Communities, is that such activities are efforts to reduce the importance of the Governments. Yet another criticism at least from some quarters is that Government is shirking from its responsibilities thrusting the entire burden on the people. The Programme has its second most important component taking care of both these criticisms. This component of the Programme will implement activities to equip the Governments at all levels right up to the Grama Panchayat to perform an active facilitation and monitoring role. It also aims to efficiently channellise through the User Groups, the scarce financial resources in an effective manner, ensuring that every Rupee spend brings in value and satisfaction to the users.

The grass root user organisations cannot be initiated, nurtured and equipped to perform perpetually in isolation and in a vacuum. The Programme define User Groups as grass root community organisations, which will work in a space clearly demarcated and exclusively reserved for them, and with well-defined organic linkage and functional relationship with Panchayati Raj Institutions and state level institutions. The User Groups are registered as societies, which will not give them the kind of permanence and operational leverage available to the constitutional bodies, unless they are organically linked with the constitutional bodies.

With the User Groups empowered to perform, the traditional roles of the governments at all levels will undergo a transformation to bring in quick decision-making, ensuring that the decisions are locally relevant and enhancing the efficiency and efficacy of public spending. The government will no more be a direct provider of services through inefficient public utilities. Instead, the Programme will strengthen the state level and local level governments to assume a new creative and optimal role as a facilitator and monitor to devolve planning, implementation and management responsibilities to User Groups in line with the principles of subsidiarity. The Programme will implement activities to strengthen the Panchayati Raj Institutions and state level institutions to imbibe the change and perform the new roles efficiently.

Realising the need for support at all levels of the government to transform and provide support to the User Groups, this component will implement four sub components of activities:

- B1: Panchayati Raj Institutions Strengthening
- B2: Co-ordinating and Monitoring Programme Implementation
- B3: Sector Policy Development
- B4: Technical Assistance

5.1 Panchayati Raj Institutions Strengthening

The Programme realises that the process of reform has already set in, in the functioning of Panchayati Raj Institutions at the three levels on account of the following important events:

- 73rd Constitutional Amendment
- Kerala Panchayati Raj Act, 1994 and Kerala Panchayati Raj (Amendment) Act, 1999

- Guidelines for the formulation of Tenth Plan by National Development Council
- Guidelines for the preparation of Tenth Five Year Plan by local governments issued by Planning and Economic Affairs Department, GoK

5.1.1 Objectives of the Sub Component

- To support and accelerate the reform process in changing the role of Panchayati Raj Institutions from that of direct implementer to a more effective role of enabler, facilitator and monitor for the developmental activities in water supply and sanitation sector and bring about coordination among the three tiers of Panchayati Raj Institutions
- To integrate fully the functioning of User Groups and the planning process for water supply and sanitation services and systems, with the decentralisation process
- To support Panchayati Raj Institutions in developing a vision and strategy for developing the water supply and sanitation sector by addressing the holistic issue of water resources management through integration of intra-sectoral and cross-sectoral issues, programmes and schemes and coordinating the activities of various line departments like water supply, sanitation, health and poverty alleviation

5.1.2 Activities under the Sub Component

- Strengthening Grama Sabha as a platform for planning developmental activities in water supply and sanitation, developing and consolidating User Groups and its activities, and also in linking up User Groups institutionally with the Grama Panchayat
- Empowering Panchayati Raj Institutions' elected representatives and officers through orientation training programmes and workshops on the reform principles and decentralisation, so as to enable them devolve implementation and financial responsibilities to User Groups
- Constituting, orienting and empowering working groups, sub committees and Technical Advisory Committee in water supply and sanitation sector at the three levels of Panchayati Raj Institutions and smoothen planning and technical sanction activities in water supply and sanitation sector
- Empowering district Panchayats in performing a co-ordinating and lead role to achieve intra-district, inter-block and inter-Grama Panchayat co-ordinated action in water supply and sanitation sector
- Streamlining the planning process in water supply and sanitation sector entrusting the primary planning responsibility with User Groups and involving all stakeholders, in accordance with the guidelines for the preparation of the Tenth Five Year Plan by local governments issued by GoK

5.1.3 Integrating WATSAN Action Plans with Decentralised Planning in the State

The methodologies for preparing local WATSAN Action Plan and Grama Panchayat level WATSAN Action Plan have been described in *sections 4.3.1* to *4.3.4*. The following aspects of the Programme planning methodology dovetail it with the decentralised planning process:

- Preparing local WATSAN Action Plan and integrating it at the Grama Panchayat level, taking care of resources allocation based on local priorities and local needs as expressed by the users themselves
- The User Committee is recognised as local working group for planning water supply and sanitation plans and the Grama Panchayat level working group is the federation of User Groups

- The Programme's planning process precedes a participatory situation analysis at the Grama Panchayat level as well as at the local level, updating the development reports and wider consultations with all the stakeholders and is exactly in line with the decentralised planning
- The implementation of the WATSAN Action Plan will be the responsibility of the User Groups. They themselves will procure materials, works and other services required to implement the plans

5.1.4 Pronounced Purpose and Role for Grama Sabha

The User Groups originate from Grama Sabha and function in close linkage with it. The Grama Sabha will form the first consultation platform for all the local stakeholders to discuss issues like prioritising problems, allocating resources, sustainability of natural resources etc. It will serve as a dynamic assembly to ensure transparency, equity and sustainability of all the activities of the User Group. The Grama Sabha recommends to Grama Panchayat, the recognition of the User Groups as well as approval of local WATSAN Action Plan. This will substantially increase the importance of the Grama Sabha and its meetings will become critical to attract larger participation by members. In addition to the regular Grama Sabhas special sessions of the Sabha will also be held to discuss WATSAN Action Plan. Grama Sabha will also ensure that women are included in all the activities and take a lead role in the functioning of User Groups. Similarly, inclusion of other vulnerable sections of the community, like the BPL families and Scheduled Caste and Scheduled Tribe families.

5.1.5 Vetting and Technical Sanction of WATSAN Action Plan

The Programme will follow the institutional arrangement prescribed by the guidelines for the preparation of the Tenth Five Year Plan by local governments for vetting as well as according technical sanction to the WATSAN Action Plans prepared by the User Groups. This will be done in two stages as follows:

a. Constituting sectoral sub committee for water supply and sanitation to the Block level Technical Advisory Committee (TAC)

The Technical Advisory Committee at the Block level will vet the WATSAN Action Plan submitted by the Grama Panchayats. The sectoral sub committee will be constituted for water supply and sanitation to help the Technical Advisory Committee. The District Planning Committee (DPC) will appoint the sectoral sub committee, which will have the following functions:

- Ensuring that the WATSAN Action Plan are in accordance with mandatory guidelines
- Ensuring that the WATSAN Action Plan are prepared in accordance with the technical guidelines for the Programme
- Verifying whether the costing is in accordance with the market rates published by the Programme from time to time

The Technical Advisory Committee cannot change the priorities and action plans prepared by the User Groups and submitted by the Grama Panchayat. In case of dispute the matter will be immediately referred to the District level Technical Advisory Committee. The Technical Advisory Committee shall not take more than ten days for clearing the WATSAN Action Plan.

The Block level Technical Advisory Committee will forward the plans to the District Level Technical Committee for technical sanction.

b. *Constituting technical committee for water supply and sanitation to the District Level Technical Committee (DLTC)*

All the public works included in the WATSAN Action Plan will be given technical approval by the DLTC. The District Collector who is the Chairman of the DLTC in consultation with the District Planning Committee Chairperson – the District Panchayat President will appoint a technical committee for water supply and sanitation to the DLTC. Incase of any clarification required the DLTC will directly discuss with the Grama Panchayat level federation or the User Groups themselves and clear the plans. A time limit of ten days is stipulated to provide technical sanction to the WATSAN Action Plan by DLTC/DPC.

Both the above committees will have adequate representations from User Groups office bearers, NGOs supporting the community, Village Resource Cadres etc. The exact composition of the committees will be worked out during the inception phase and a separate Government Order will be issued to operationalise the committees.

5.1.6 Optimal Resource Utilisation

The Programme by following the existing arrangements for technical vetting and sanction at the Block level and District level will integrate all financial resources available under various state as well as central programmes with the WATSAN Action Plan as and when available. The WATSAN Action Plan will not fund for salaries to be paid either at the User Groups level or at the Grama Panchayat level. Instead it can include consultancy charges for any technical assistance, that too not on a permanent basis. The payments to NGOs for social mobilisation support and Village Resource Cadres for technical support will be in line with this.

The WATSAN Action Plan will provide for a minimum of 15% capital contribution from the users and will ensure that Programme resources are equitably distributed over the User Communities. The per capita and per household Programme resources will be made uniform across the User Community.

The WATSAN Action Plan will not seek resource support for operating and maintaining the WATSAN facilities. The O&M expenses will be borne by the users and the action plan will clearly lays out the arrangements for collecting the same.

5.1.7 Greater Co-ordination among District Panchayat, Block Panchayat and Grama Panchayat

The Programme will be implemented with the District Panchayat taking a lead role in co-ordinating the lower two tiers. The co-ordination and convergence of WATSAN Programmes in the district will be achieved by committing the entire resources available in the sector for local WATSAN Action Plans prepared by the User Groups. The water supply and sanitation action plan will be aggregated at the Grama Panchayat level. The natural resource management action plan for integrated water resources management and watershed management activities will be integrated at the Block level. A District level water policy and action plan in line with integrated water resource management will also be prepared. All the three tiers of Panchayati Raj Institutions will earmark funds for implementing WATSAN Action Plan and Watershed Management Plans. In the Programme districts, the three tiers of Panchayati Raj Institutions will not plan separate schemes in the sector but will follow the action plans of the User Groups integrated at the appropriate level. For achieving synchronous performance the following roles have been earmarked for the three tiers:

a. Roles and Responsibilities of the Grama Panchayat

The Grama Panchayat is the most important facilitating institution of the Programme. The Grama Panchayat has the following roles to perform:

- To facilitate and co-ordinate Programme implementation
- To monitor the implementation of the Programme at Grama Panchayat level
- To provide all necessary support services to the User Groups
- To implement Grama Panchayat level programmes through Grama Panchayat level federation of User Groups
- To mobilise effective people's participation by involving women and other marginalised groups
- To recognise User Groups and User Committee as the Programme implementing and operating institutions that shall own WS facilities as realised under the Programme
- To prepare a Grama Panchayat plan for water supply and sanitation integrating the plans prepared by User Groups and a priority ranking for implementation based upon criteria as agreed upon under the Programme
- To contribute the Grama Panchayat share of investment cost
- To channel Programme funds to the User Committee in time
- To provide necessary support and monitor the activities of the User Groups, User Committee and Village Resource Cadres and to ensure that all principles, procedures and guidelines are followed.
- To take over single Panchayat KWA schemes situated within its geographical boundaries and facilitate rehabilitation before handing over the assets to the User Groups provided these User Groups agree to take over.
- To organise a federated arrangement for all the User Groups within the Grama Panchayat for conflict resolution, Village Resource Cadre evaluation, Grama Panchayat level activities, etc.
- To set up an information system on Programme implementation by involving all the User Groups
- To stimulate convergence of decentralisation activities, poverty programmes, sanitation programmes, health awareness programmes etc. with Programme activities

b. Roles and Responsibilities of the Block Panchayat

The Block Panchayat will have the following responsibilities in Programme implementation:

- Constitute the sub committee on water supply and sanitation to vet WATSAN Action Plan submitted by the Grama Panchayats
- Integrate the Watershed Management Plan for the Grama Panchayats implementing WATSAN Action Plan under the Programme
- Integrate total sanitation campaign activities with the Programme activities
- Contribute resources available at the Block Panchayat level to implement components of the WATSAN Action Plan by releasing it to the User Groups through the Grama Panchayat
- Participate in the co-ordination meetings and other activities convened by the District Panchayat for smoothening Programme implementation

c. *Roles and Responsibilities of District Panchayat*

The roles and responsibilities of the District Panchayat for implementing the Programme are:

- To help constitute the technical committee for water supply and sanitation sector to the DLTC and ensure smooth technical sanction to the Grama Panchayat and User Groups for the WATSAN Action Plan
- To prepare a vision and strategy for the water supply and sanitation sector development activity of the District fully integrating all the programmes of Government of India, Government of Kerala and other agencies in water supply and sanitation sector
- To integrate water supply and sanitation plans with the district plan and clearance by District Planning Committee
- To converge activities of District level institutions in ensuring smooth Programme implementation by Grama Panchayats and User Groups
- To select Grama Panchayats for Programme implementation using normative criteria and providing a co-ordinating role for the Grama Panchayats
- To evolve a policy framework to implement integrated water resources management in the district by involving all stakeholders

5.1.8 Synergy with Tenth Plan Guidelines for LSGs

The Programme will reckon the guidelines issued by GoK under the Tenth Plan for preparing plans under the decentralisation process by the LSG institutions. The Programme will help streamlining the functioning of the various committees like the Grama Panchayat level working groups, Block level Technical Advisory Committee, District level DLTC etc. The Programme will support building the capacity of the members of these committees. However, the operational costs of these committees will not be met from the project funds.

5.2 Co-ordinating and Monitoring Programme Implementation

The two district Rural Water Supply and Sanitation Programme will be coordinated and monitored by GoK through Kerala Rural Water Supply and Sanitation Agency. KRWSA is an autonomous society formed by GoK to implement World Bank funded Kerala Rural Water Supply and Sanitation Project in four districts of Kerala. KRWSA can be modified and repositioned to look after the Rural Water Supply and Sanitation Sector of the entire state. The repositioning of KRWSA will be carefully done to provide enough space for the User Groups and Panchayati Raj Institutions to function smoothly and the monitoring and co-ordination function entrusted with the KRWSA shall not result in centralised control of implementing the Programme.

5.2.1 Objectives of the Sub Component

- To reposition KRWSA to perform an enhanced role as the agency responsible for the Rural Water Supply and Sanitation Sector development in the state
- To strengthen KRWSA so that it is able to perform the important Programme management functions of co-ordination and monitoring of the two district Programme activities and provide important linkage at the state level
- To converge specialised expertise and inputs from various state level organisations working in the sector and channellise the same for the benefit of Programme implementation

5.2.2 *Activities under the Sub Component*

- Enabling GoK to suitably amend the Memorandum and Articles of Association of KRWSA so as to equip it to perform its enhanced facilitating role in the Rural Water Supply and Sanitation Sector Development
- Setting up a Programme co-ordinating and monitoring unit at the field level to cover both the Programme districts
- Establishing a lean Programme Management Cell (PMC) within the organisational umbrella of KRWSA exclusively dedicated to facilitate the implementation of the two district RWS&S Programme by providing important linkage with GoK
- Establishing a forum for networking the state level organisations working in the sector to tap the existing knowledge resources and specialised expertise for Programme implementation as and when necessary in the areas of human resource development, water resources management, decentralisation, remote sensing and resource mapping etc.

5.2.3 *Repositioned KRWSA*

The State Level Programme Management will be the responsibility of Kerala Rural Water Supply and Sanitation Agency (KRWSA), a society registered under Travancore Cochin Literary, Scientific and Charitable Societies Act, 1955 (*Act XII of 1955*). KRWSA has been originally registered by Government of Kerala as an independent autonomous body to manage the implementation of the World Bank funded Kerala Rural Water Supply and Environmental Sanitation Project (KRWSSP). Government of Kerala has expressed its desire to develop KRWSA into the state level umbrella organisation managing the rural water supply and sanitation sector. Accordingly, the state level management responsibility of the Programme will be vested with KRWSA.

a. Differences in the Programme's Approach

The two district RWS&S Programme differs in its approach from the World Bank assisted project in many respects.

- There is more focus and integration with the three tier Panchayati Raj Institutions in coordinating and monitoring Programme implementation
- The User Groups are sub Grama Sabha structures having clear organic and functional linkage with Grama Panchayat
- The grass root implementation processes of the Programme closely follow the GoK guidelines on decentralisation and planning methodologies of local self government
- The socio-economic, technical and environmental vetting of the WATSAN Action Plans prepared under the Programme and technical sanction are in accordance with the GoK guidelines on decentralisation
- Support and guidance to the User Groups are largely provided by a team of local resource persons who have been specially identified and trained for the purpose called Village Resource Cadre, mostly available to the Programme as bare foot volunteers
- There is more intensive role for the NGOs in the early phases of awareness building, initiating and building up User Groups by providing social and participatory skills
- The Programme follows a more flexible process approach aimed at providing a learning opportunity for the User Groups and to empower them with capacities to actively perform the roles and responsibilities exclusively reserved for them than producing outputs of physical schemes using a project mode

- The Programme designs and guidelines will be suitably adapted based on mid term and periodic assessments and reflecting implementation needs as well as performance

At the community level both KRWSSP and the two districts RWS&S Programme have community-based approaches. The repositioned KRWSA will establish structures and systems within it to maintain the innovative and unique design of the Programme. Later when the Programme implementation advances the learning from KRWSSP and the two district Programme as well as other programmes in the state could be synthesised into KRWSA's functioning. Integration of a uniform approach within KRWSA could be taken at such a later stage of state level synthesis of learning from all the experiences.

b. Changes in the Memorandum and Articles of Association and Rules and Regulations of the KRWSA

In order to provide the required institutional capacity in facilitating a process Programme with the twin agenda of empowering User Groups and furthering decentralisation in the state, the KRWSA Memorandum and Articles of Association will be amended as follows:

- The scope of activities of KRWSA will be extended to the entire rural water supply and sanitation sector of the state, not restricting to the World Bank Project alone
- The activities of KRWSA not to be restricted within the World Bank Project Districts alone, but to include Alappuzha and Idukki districts
- While defining the objectives of KRWSA, principles of strengthening Panchayati Raj Institutions, promoting facilitating roles for governments at all levels, adopting a process philosophy aimed at empowering user communities and local institutions etc. will be included and shall be in accordance with the National Water Sector Reform Guidelines
- The membership in the General Body of KRWSA will be widened to include all state level institutions connected with Water Resources Management, Water Supply, Sanitation, Public Health, Panchayati Raj Institutions, State Planning Board, Women Empowerment, Rural Development, District Panchayats, Decentralisation etc. One representative each from among the Presidents of Grama Panchayats in Idukki and Alappuzha where the two district Programme is being implemented, representatives of the User Groups, NGOs etc will also be included
- The Governing Council will be broadened to include the Programme Manager (the two district RWS&S Programme), Secretary to Government – Planning and Economic Affairs, Secretary to Government – Local Self Government (Rural) Department, Secretary to Government – Rural Development Department, Secretary to Government – Health Department, Secretary to Government – Scheduled Caste and Scheduled Tribe Development Department etc.
- Defining appointment, powers and duties of the Programme Manager (the two district RWS&S Programme)
- Formulating separate staff rules and financial management rules by appropriately adapting the existing ones to suit the Programme's requirements

c. Structural Adaptation of KRWSA

The Executive Director of the repositioned KRWSA will have the management responsibility for the World Bank funded KRWSSP as well as the two district RWS&S Programme. The Governing Council of the repositioned KRWSA will govern the Programme. Eventually the GoK may entrust the entire responsibility of managing all RWS&S programmes in the state with KRWSA, including those funded by Rajiv Gandhi National Drinking Water Mission.

To preserve the distinctive features of the two district RWS&S Programme implementation, a state level Programme Management Cell headed by a Programme Manager, who is supported by other professional staff and a field level Co-ordinating and Monitoring Unit (CMU) will be set up within KRWSA.

The financial and other resources of the Programme are to be separately managed without mixing up with funds provided by other sources. Separate books of accounts and financial statements will be prepared for the Programme.

5.2.4 Programme Management Cell (two district RWS&S Programme)

The current Programme Management Unit of KRWSA will be exclusively managing the World Bank funded Kerala Rural Water Supply and Sanitation Project. To manage the two district RWS&S Programme, a functionally independent Programme Management Cell headed by a Programme Manager will be set up within KRWSA. This Programme Management Cell will be dedicated to manage the two district RWS&S Programme at the state level. Since the Co-ordinating and Monitoring Unit set up at the field level will take care of most of the operational aspects, the Programme Management Cell will have a lean structure mainly providing policy guidance, liaison and financial management support for Programme implementation and specialised services like technical assistance.

The standardised financial management procedures and manuals of KRWSA will be adapted for the Programme implementation also.

a. Roles and Responsibilities of PMC

The Programme Management Cell will have the following functions:

- Liaise with Government of India, Government of Kerala and other agencies involved
- Prepare the agenda notes and background materials for the items to be placed in the Governing Council meetings for its deliberation and approval relating to the Programme
- Issue policy guidelines for Programme implementation
- Co-ordination of the line departments and ensuring convergence at the state level for smooth Programme implementation
- State level monitoring of the Programme and compilation and publishing reports on implementation
- Ensure smooth flow of financial resources to the implementing units
- Arrange for audit of Programme accounts and publishing reports
- Supporting the Co-ordinating and Monitoring Unit in procurement of personnel, services etc.
- Conducing performance audits at all levels of the Programme and help implementing corrective actions

b. Composition of the PMC

The Programme Management Cell will have the following positions:

- Programme Manager 1 no.
- Additional Programme Manager (Operations) 1 no.

- Additional Programme Manager (Finance & MIS) 1 no.
- Office Assistants 2 nos.
- Driver cum Peons 2 nos.

c. *Programme Manager*

The Programme Manager is appointed by the Government of Kerala. He/she will be a senior level officer having a good reputation and standing in successfully heading community development programmes involving User Communities and Panchayati Raj Institutions. A reasonable tenure of 3 years will be given to a person once posted as Programme Manager.

The responsibilities of the Programme Manager include:

- Be in charge of the administration of the two district RWS&S Programme at the state level under the overall guidance of KRWSA
- Develop policy guidelines for Programme implementation with the approval of Governing Council
- Perform the liaison work for Programme implementation with GoI, GoK and other agencies involved in the Programme
- Prepare annual action plans for the Programme and get it approved
- Publish all progress reports
- Monitor and communicate Programme progress to GoK and other agencies involved

d. *Additional Programme Manager (Operations)*

The person must have minimum 10 years' experience in managing the operations of community based donor assisted programmes, preferably in association with Panchayati Raj Institutions. He/she must have social and engineering experiences and proficient in planning, implementing and monitoring community based water supply and sanitation programmes.

The responsibilities include:

- Guiding Programme implementation, covering both engineering and social aspects at all levels of Programme implementation
- Ensuring performance by all actors of Programme implementation in accordance with the non-negotiable principles of the Programme
- Managing the communication link between field implementation and state level activities
- Managing all knowledge support and capacity building activities
- Managing all procurement and contracting functions at the state level
- Document the Programme processes and Programme learning

e. *Additional Programme Manager (Finance & MIS)*

The person shall have a minimum of 10 years' experience in managing financial and accounting function in a project situation with donor assistance. He/she shall be proficient in commercial and accounting as well as government financial procedures. The services of the Additional Programme Manager (Finance & MIS), even though identified within the Programme Management Cell will be distributed between the Programme Management Cell and Co-ordinating and Monitoring Unit. The incumbent will spend 75% of his time at the Co-ordinating and Monitoring Unit.

The responsibilities include:

- Designing and setting up financial accounting system for the Programme
- Ensure that the Programme fund flows are adequately maintained
- Publish all financial progress reports and financial statements
- Ensure audit of the Programme accounts
- Ensuring financial accountability at all levels of Programme implementation
- Support the Programme in all the information requirements for monitoring as well as other management functions

5.2.5 Co-ordinating and Monitoring Unit

The field level extension of the Programme Management Cell is a Co-ordinating and Monitoring Unit to be set up at Kottayam equi distanant from both the Programme districts. They will have sufficient delegated authority to facilitate all field level operational activities of Programme implementation. Their role is clearly facilitation of User Groups activities working hand in hand with the three tier Panchayati Raj Institutions system. The Co-ordinating and Monitoring Unit will provide the crucial co-ordination role to bring about a true partnership among User Groups, Panchayati Raj Institutions and NGOs. The role of Co-ordinating and Monitoring Unit is not controlling and pushing achievements of physical targets and financial disbursements.

a. Roles and Responsibilities of CMU

The roles and responsibilities of the Co-ordinating and Monitoring Unit are as follows:

- To co-ordinate the activities of User Groups, Village Resource Cadre, Grama Panchayats, Block Panchayats, District Panchayats and NGOs so as to ensure smooth Programme implementation
- To extend all necessary support by way of communicating various procedural guidelines, resolving bottlenecks, arranging knowledge-support activities etc.
- Monitor Programme implementation through physical and financial progress and ensuring that Programme processes are implemented without violating Programme principles
- Support the Grama Panchayat in monitoring the performance of NGOs and Village Resource Cadres
- Arrange for special support services requested by implementing institutions including arrangement of training programmes and other capacity building needs
- Arrange implementation of studies and action research activities of the Programme and provide for learning and scaling up
- Develop Operational Manuals for Programme staff, Village Resource Cadres, User Groups, Panchayati Raj Institutions
- Document the Programme processes and key learning and feed the same for policy development and scaling up

b. Composition of Co-ordinating and Monitoring Unit

The Co-ordinating and Monitoring Unit will be headed by a Programme Co-ordinator and will have the following positions:

- Programme Co-ordinator 1 no.

- District Co-ordinator (Technical) 1 no.
- District Co-ordinator (Community Development, Capacity Building, Panchayati Raj Institutions and Monitoring) 1 no.

The management team will be supported by the following assistants and supporting staff:

- Assistant Co-ordinator (Capacity Building) 2 nos. (1 for social aspect and 1 for technical aspects)
- Programme Support Staff 2 nos.
- Driver cum Peon 3 nos.

c. Programme Co-ordinator

The Programme Co-ordinator will be at the level of Additional Programme Manager in Programme Management Cell. A person having demonstrated Programme management abilities having successfully managed community-based programmes preferably in the water supply and sanitation sector. He/she must be a thorough professional having a good track record of leading a multi-functional team, managing human resource, financial resource, communication skills – both verbal and written, on the job monitoring experience etc. A minimum of 10 years' professional working experience of which, at least 5 will be as a Team Leader.

The responsibilities include:

- Be in charge of and accountable to Programme co-ordination in both the Programme Districts
- Management of all Programme activities at the Co-ordinating and Monitoring Unit level
- Co-ordinate all institutions and individuals partnering with Programme implementation
- Preparation of annual action programmes
- Ensure smooth fund flow for Programme implementation
- Preparation of Programme progress reports
- Undertake performance evaluation and monitoring functions
- Function as the convener to the Technical Committee for water supply and sanitation to the district level Technical committee

d. District Co-ordinator (Technical)

The position requires a person having a minimum of 10 years' experience in sanitary and public health engineering in a community-based implementation environment.

The responsibilities include:

- Advise Programme implementation on all engineering aspects of water supply and sanitation
- Provide training and other capacity support on engineering aspects, especially to the Village Resource Cadres and User Committee members
- Guide preparation of designs, plans and estimates of water supply and sanitation hardware
- Prepare guidelines, design criteria, schedule of rates, quality control, work measurement etc. for Programme implementation
- Support appraisal of engineering plans and estimates submitted by the User Groups/ Grama Panchayats

- Work as the convener of the sectoral sub committee for water supply and sanitation at the block level Technical Advisory Committee
- Co-ordinate the activities of Village Resource Cadres
- Monitor all construction activities, procurements of materials and engineering contracts/service arrangements by User Groups/ Grama Panchayats and ensure that all the purchases are cost effective and conforming to prescribed quality standards

e. District Co-ordinator (Community Development)

Persons having expertise in development project work involving community mobilisation, social action and gender mainstreaming. He/she must be proficient in on the field application of participatory techniques and tools. He/she must have clear understanding of Kerala's socio-cultural dynamics. Professional experience of minimum of 10 years.

The responsibilities include:

- Co-ordination and monitoring of all the community development activities of the Programme at the District level, Grama Panchayat level and User Groups level
- Monitor the activities of the NGOs
- Co-ordinate the social and community development activities of Village Resource Cadres
- Co-ordinate the social mobilisation process by ensuring participation of women and marginalised groups
- Ensure that the sanitation and hygiene promotion activities are implemented in integration with water supply
- Ensure that the non-negotiable principles of the Programme are not violated in the Programme activities at all levels
- Document Programme processes and Programme learning

f. District Co-ordinator (Capacity Building)

The person shall have a minimum of 10 years' experience in human resource management involving capacity building of community development programmes. He/she must have good communication skills and proven track record of a successful trainer.

The responsibilities include:

- Co-ordinating and monitoring capacity building Programmes
- Develop the capacities of Village Resource Cadre and monitor their performance to stop gap capacity support to them
- Provide guidance and support to the capacity building service provider
- Evaluate the various knowledge-support activities undertaken for the Programme for its effectiveness
- Manage community awareness programmes and all other Programme mass communication
- Develop communication materials

g. District Co-ordinator (Financial)

The person must have a minimum of 10 years' experience in managing the financial management portfolio of organisations engaged in community development activities. He/she must

be proficient both in commercial accounting as well as government accounting especially at the Panchayati Raj Institutions level.

The responsibilities include:

- Developing and setting up Programme financial and accounting system at the Grama Panchayat and User Groups level
- Ensure that a proper and timely fund flow system is maintained within the Programme so as to meet the fund requirement so of Grama Panchayat and User Groups
- Ensure that all the financial and accounting principles are followed by everyone concerned
- Ensure that proper books of accounts and other records are maintained by Grama Panchayats and User Groups
- Prepare and publish Programme financial reports

b. District Co-ordinator MIS

The person must be proficient in monitoring and evaluation of community development programmes preferably using participatory techniques with a minimum of 10 years' professional experience.

The responsibilities include:

- Setting up of the Programme MIS in co-ordination with MIS consultants
- Manage and administer computer system software and Programme
- Develop and implement participatory monitoring and evaluation systems by involving communities
- Design and carry out impact evaluation and special studies

5.2.6 Programme Personnel

The Programme will support recruitment, development and maintenance of the Programme personnel at the Programme Management Cell and the Co-ordinating and Monitoring Unit. The following overall guidelines will be followed in the matter:

- The Programme Manager will be appointed directly by GoK
- All other positions will be selected and contracted by KRWSA following a professional human resource approach with no external interference
- The personnel will be either taken on deputation from Government Departments and Public Sector Undertakings or through open selection. All deputation candidates must go through the normal selection process and merit will be the sole criteria for selection
- The salary and normal allowances of all persons on deputation from the government will be supported from the Programme funds in a tapering manner of 80% in the first year, 60% in the second year, 40% in the third year and 20% in the fourth year. Thereafter GoK will provide 100% of such expenses
- The salaries and allowances of staff recruited through open selection and contracted by the Programme will be supported by the Programme funds fully till the end of the Programme. GoK will make appropriate provision for a possible continuation and sustaining the Programme activities in a manner as it evolve

- In order to attract and retain best talents and to support intensive and committed performance by the personnel, a suitable incentive structure consisting of attractive compensation packages and Programme allowances to cover expenses will be offered
- Scientific performance appraisal and feedback systems will be instituted and compensation packages will be linked to performance. Appropriate systems for this will be developed through Technical Assistance
- Continuous capacity improvement programmes will be arranged for the Programme Personnel to perform the roles and responsibilities entrusted with them in a manner suitable with the Programme principles

5.2.7 Equipment and Infrastructure Support

The Programme will support purchase and maintenance of all the necessary office equipments required, both at the Programme Management Cell and Co-ordinating and Monitoring Unit including computers and communication equipments. In line with the government policies only minimum number of vehicles will be purchased, one vehicle at Programme Management Cell and one at Co-ordinating and Monitoring Unit. For meeting all other travel requirements vehicles will be hired.

The Programme will also support the operational expenses for the smooth functioning of the Programme Management Cell and the Co-ordinating and Monitoring Unit.

5.2.8 Linkages for Institutional Performance

One important feature of the Programme is that no new institutions are being created for Programme implementation except the User Groups. Independently performing an autonomous three tier Panchayati Raj Institutions, KRWSA, are collaboratively working out a new partnership which is expected to substantially reform the way these organisations have been managing developmental activities in the water supply and sanitation sector. Since different institutional entities are collaborating in the Programme implementation, the relationship and linkage between them need to be legally established and with clearly laid out roles and responsibilities to achieve synchronous performance. The following arrangements will ensure this:

a. Grama Panchayat Resolution

As soon as the District Panchayat select a Grama Panchayat for implementing the Programme, the Council of the Grama Panchayat will pass an important resolution covering all the roles and responsibilities the Grama Panchayat has to fulfill for Programme implementation including the following points:

- To scrupulously follow the Programme philosophy and other guidelines in implementing the Programme
- To assume a facilitator's role than a direct provider of service
- To adopt norm-based approaches in selecting scheme locations following the Programme processes
- Recognising the legal status and powers of User Groups
- To earmark the services of one or two existing line department staff to function as Grama Panchayat level co-coordinators for the Programme
- To earmark resources for the Programme on a priority basis and for timely release of funds
- To take over existing water supply and sanitation schemes and to facilitate rehabilitation
- To converge all the water supply and sanitation related schemes in line with the Programme

- Not to intervene in the activities and decisions of the User Groups and Programme processes unless in the event of an irresolvable conflict or major malpractices

Recognising the constitutional position of the Grama Panchayats, the Programme will not sign any contracts or agreements with the Grama Panchayat for Programme implementation. The resolution will be the legal document.

b. Resolution by District Panchayats and Block Panchayats

Similar resolutions as taken by Grama Panchayat will also be taken by the District Panchayat and Block Panchayat.

c. MoA between UG and GP

Before release of Programme funds to the User Groups, the Grama Panchayats will enter into a Memorandum of Agreement with the User Groups detailing out the roles and responsibilities of the User Groups. The roles and powers of Grama Sabha and Grama Panchayat will be clearly stated in the MoA. The process qualities, procurement and construction qualities etc. will be included. This MoA will also spell out details of fund flow and conditions of release of each installment. The capital and O&M contribution by members of the User Groups will also be included. The *section 4.4.3,* Linkage with Grama Panchayat, contains more details.

d. Contracts with NGOs

The Grama Panchayat will enter into contract with NGOs to provide handholding services for social mobilisation and social action. The tasks to be performed by the NGO, expected output and output qualities will be specified in the contract along with stages of payments and milestones for release of payments, as detailed in *section 4.5.1.* 360º feedbacks will be collected from User Groups in assessing the effectiveness of the services provided by NGO.

e. VRC Contracts

The contract with Village Resource Cadre will be entered into between the Village Resource Cadre and User Committee. The contract period will be the entire implementation and commissioning phase. However, it will be the responsibility of the Village Resource Cadre to support the User Groups for six months of operations as part of the contract. The system of performance appraisal and quality monitoring will be specified in the contract along with stages and milestones of payment.

f. Staff Contracts

All personnel of the Programme will be on contract for one year renewable for the Programme period purely based on performance assessment. A simple contract specifying the terms of reference, service conditions and payment modes will be used.

5.2.9 Specialised Support Services

The Programme may require various specialised support services like water scooping hydrological evaluation, remote sensing, specialised studies, research activities etc. As and when the demand arises the Programme Management Cell will search for the service and make available to the

Programme such services. The state level institutions in the sector like CWRDM, Kerala Mahila Samakhya, Kerala Institute of Local Administration, Kerala Total Sanitation and Health Mission etc. are some of the state level institutions, which will be networked to draw such specialised expertise. There will not be permanent commitment of costs from the Programme funds to these institutions. However, for each line of activity demanded from them separate costing will be done and MoA entered into with them specifying payment and other terms and conditions.

5.2.10 Linkage with GoK

The Water Resources Department, Government of Kerala will be the nodal department responsible for monitoring and guiding the Project. However, there will be strong linkages with Local Self Government (Rural) Department, Rural Development Department, Department of Planning and Economic Affairs and Department of Scheduled Castes and Scheduled Tribes Welfare. There will be active co-ordination among these departments in all matters connected with Programme implementation. The Governing Council of KRWSA will expanded by including the representatives of these ministries to ensure better co-ordination.

5.3 Sector Policy Development

The Programme will support GoK in shaping up an appropriate policy reform in the WATSAN sector of Kerala having the following highlights:

- Empowering User Groups by restoring planning and implementation responsibilities and financial powers with them
- Strengthening Panchayati Raj Institutions' role in facilitating WATSAN Systems and Services
- Managing water supply and sanitation development activities in an integrated manner with decentralisation
- Supporting the state government in providing an enabling environment for the User Groups, Panchayati Raj Institutions, state level institutions in the sector to co-ordinate and collaboratively participate in the activities of the sector
- Evolving an Integrated Water Resources Management Policy for Kerala by involving all stakeholders

The change process has already set in and the Programme is expected to further consolidate the reform process. The Programme has an important sub component to address to the need for consolidating a sector policy.

5.3.1 Objectives of the Sub Component

- To assist GoK in acquiring appropriate knowledge support systems which will help in developing, enabling policy guidelines aimed at empowering User Groups, strengthening Panchayati Raj Institutions, bringing about convergence and co-ordinated activities of line departments and NGOs for improving the efficiency and long term sustainability of water supply and sanitation systems and services
- To facilitate a participatory process involving all the relevant stakeholders so as to assist GoK in evolving an integrated water resources management policy for the state

5.3.2 Activities under the Sub Component

- Supporting documentation of the Programme processes and learning and facilitating meaningful interactions on the same with all the important stakeholders in the sector to synthesise the sector policy for the state
- Assisting GoK in setting up a policy support core group to emerge as the nucleus for synthesizing the sector policy, its wider consultation and evolution of a holistic and integrated water resources management policy for the state

5.3.3 Policy Support Core Group (PSCG)

The GoK may set up an empowered Policy Support Core Group (PSCG) with the following suggested constitutions. The Policy Support Core Group may consist of Secretaries to Government of the Water Resource Department, Planning and Economic Affairs Department, Local Self Government (Rural), Rural Development Department, Public Health Department, Finance Department, Scheduled Caste and Scheduled Tribe Development Department and Education Department under the chairmanship of Secretary to Government, Water Resources Department, will be set up. A small secretariat will be set up within KRWSA to assist the core group with a sector policy advisor and international advisors. The secretariat will not be a full time one but will be based on the needs and events and funded under TA component.

Roles and Responsibilities of PSCG

- Assist Government of Kerala in formulating a vision for the long time management of water resources
- Assist Government of Kerala in shaping up sector policies and action strategies in the water supply and sanitation sector
- Assist the Government of Kerala in collecting, collating and disseminating best practices, good governance models and lessons learned mainly from state context and also from national and international experience through Workshops, discussions and other interactive modes
- Assist Government of Kerala with sector studies and institutional studies aimed at enhancing effectiveness and efficiency of the sector
- Assist Government of Kerala in setting up appropriate arrangements for effectively sharing sector experiences and policies among multilateral/bilateral funding agencies and promote a partnership relationship
- Assist Government of Kerala in developing proposals to tap financial resources for the implementation of the sector policies
- Assist the Government of Kerala in framing up a holistic and integrated water resources management policy

5.4 Technical Assistance

GoN will support Programme implementation by providing necessary technical assistance under its Review Support Advisory and Monitoring Missions by making available the services of national and international experts.

a. Policy and Advocacy Support to GoK

Services of a national advisor and short-term services of international advisors will be provided to assist the Policy Support Core Group (PSCG). This support will be for three times a year for the first three years of the Programme. The tasks to be performed by these Missions are:

- Review of the performance of existing institutions in rural water supply to identify issues requiring policy support
- Review of existing policy guidelines with a view to delineate areas of policy development
- Develop a vision and strategy for the sector
- Advise PSCG in translating policy perspectives into institutional and operating strategies
- Facilitate a consultative process involving all stakeholders and an enabling environment for policy development

The Team

One National Expert and one International Expert having considerable experience in institutional reforms, sectoral studies and reforms at the state and national levels. Previous experience in advising governments on sectoral policies a must.

b. Organisation Development Support to PMC, KRWSA

Missions consisting of national and international experts to develop institutional systems and procedures for efficient Programme functioning. These Missions will support the Programme Management Unit staff as discussed in *Section 6.4*. In addition to various organisation development issues, these Missions will address specific needs as emerging during Programme implementation. During the first year of Programme, two organisation development missions and one Mission each thereafter will be fielded. The tasks expected to be performed by the Organisation Development Mission are:

- Management review
- Review of organisational performance with a view to develop systems and procedures
- Develop and operationalise computerised Management Information System
- Develop and institute a performance appraisal system
- Undertake organisational study to re-engineer organisational processes to improve efficiency

c. Field Based Implementation Support

The Co-ordination and Monitoring Unit will be advised and supported by an expatriate Advisor who will be present on a continuous basis. He/she will be assisted by a team of three national experts. The technical assistance team will not be working independent of the Co-ordinating and Monitoring Unit but will be providing support to them.

The field-based implementation technical assistance team shall consist of the following expertise:

Senior Advisor	Programme Management expert
National experts	i. Community Engineering Expert
	ii. Decentralisation and good governance
	iii.Financial Management

The tasks to be performed by this team are:

- To set up the overall Programme monitoring systems
- To support the Co-ordinating and Monitoring Unit in developing and instituting guidelines for Programme implementation
- To help Co-ordinating and Monitoring Unit to set up Programme Management Information System
- To support Co-ordinating and Monitoring Unit in developing implementation guidelines for off stream activities

In addition, Performance Evaluation and Advisory Missions consisting of international and national experts in the areas of technical, community development, gender, decentralisation and financial management will review and support Programme implementation.

d. Performance, Impact, M&E and Review Missions by RNE

RNE will field Missions to review social, technical, institutional and financial objectives issue of Programme implementation every nine months. These Missions will also review the institutional strengths and policy development issues. In addition, Mid Term Assessment (MTA) for performance and institutional reviews for midcourse corrections of the Programme will also be instituted.

e. Budget

The budget for technical assistance will be administered directly by Royal Netherlands Embassy, New Delhi. The budget for technical assistance is given in **Table 5.1.**

Table 5.1: Detailed Costs (Dfl '000) - Technical Assistance

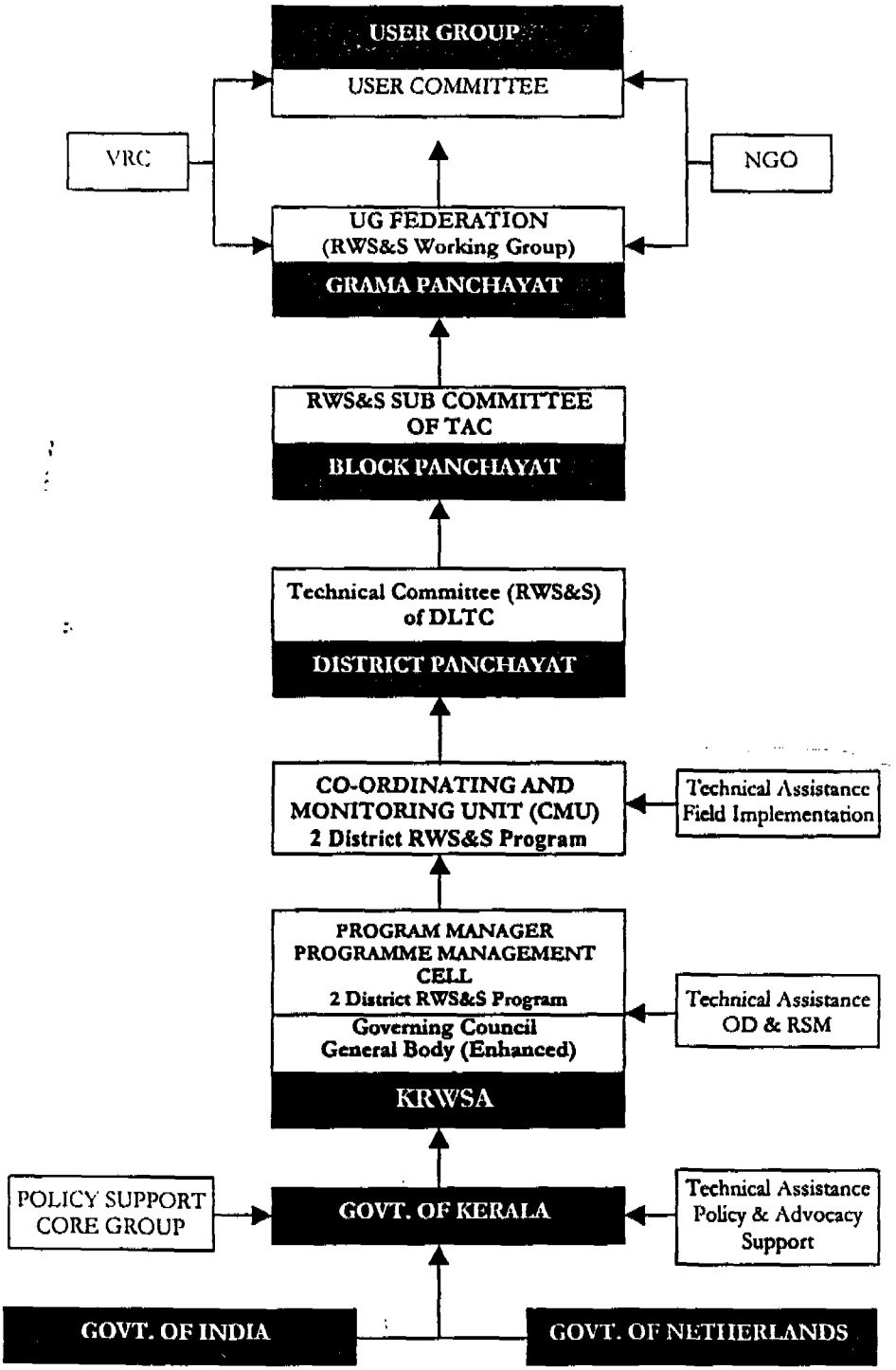
Category	Unit Cost Per Month	Person Months	Total TA
Policy and Advocacy Support			
Expatriate short term	40	12	480.00
National short term	12	36	432.00
Subtotal			**912.00**
OD Support to PMU			
Expatriate short term - Management	40	12	480.00
Expatriate short term – OD	40	12	480.00
National short term – MIS	10	24	240.00
National short term - HRD	8	24	192.00
Subtotal			**1392.00**
Field-Based Implementation Support			
Expatriate Advisor	25	60	1500.00
National Expert – Community Engineering	12	60	720.00
National Expert – Decentralisation	8	60	480.00
National Expert - Financial Management	8	60	480.00
Subtotal			**3180.00**
Support and Review Mission			
Expatriate short term	40	12	480.00
National short term	8	24	192.00
Subtotal			**672.00**
TOTAL			**6156.00**

5.5 Overall Programme Institutional Arrangement

The Programme is not contemplating the creation of any new institutions at the state level, district level or Grama Panchayat level. Instead the existing institutions are strengthened and stream lined to provide supporting and facilitating services to the User Groups in a co-ordinated manner. The Programme also is not adding on to what these institutions are currently delivering. Instead, it is focusing on changing how the services are delivered from the current physical and financial target modes to an efficient and effective process approach.

The institutional arrangement, the inter linkages etc. for the Programme facilitation, support, implementation and monitoring are summarised in the **Figure 5.1.**

Figure 5.1 Overall Programme Institutional Arrangement



Chapter 6

Building up Water Supply and Sanitation Systems and Services

The Programme proposes to empower User Groups so that they are able to intelligently plan, meticulously implement and sustainably manage Water Supply and Sanitation Systems and Services. In doing so the Programme will provide opportunities to the User Groups to adopt from a range of time tested and empirically evolved technologies and systems emanating from real experiences in the context of Kerala. This important component of the Programme thus deals with the socio-technical activities for building up WATSAN Systems and Services mainly from providing the much-needed technical support and technical capacity building of the User Groups. The implementation of the Programme will take care of appropriately blending and converging the social, technical, economic as well as environmental aspects of Water Supply and Sanitation Systems and Services rather than disaggregating and compartmentalising the hardware and software aspects.

The formation of User Groups from the initial problem clusters is closely linked with the type and availability of water source, types of technical options available etc. The geographic distribution of families as well as number of families coming together to form one User Group will thus influenced by not only technological factors but also by environmental and economic factors. Similarly, the empowerment of the communities is not only through social mobilisation, institutionalisation, training etc. but also through the experiential learning they get through surveying, designing, estimating, implementing and operating the physical facilities, which could be normally grouped as technical skills.

Fully recognising the above aspects, the description of the technical aspects under this component is purely for the sake of structuring this document. Such a division is arbitrary and the Programme implementation will follow the cascade of evolving activities of the logical community empowerment process as explained in *section 4.3*. To guide a clear understanding it may be assumed that during the social mobilisation process initiated by the NGO the following levels of development has already taken place.

- Sufficient information has been generated, analysed and documented by the community on the water supply and sanitation situation, which will aid the User Groups in further planning the solutions as facilitated by the NGO
- The Village Resource Cadres have been identified and they are being trained on the job and are working full time as trainees along with the NGO
- Sufficient discussion and awareness building on the general WATSAN situation of the Grama Panchayat has taken place and a generally agreed identification of problem clusters have been completed

This chapter is synthesised from the data generated and feedback collected from selected Grama Panchayats in the proposed districts through a detailed technical data collection and PRA exercises. The inputs have also been drawn from the hydrologic data collection exercise for the two districts.

The activities are grouped under the following sub components:

- C1: Building Water Supply Services
- C2: Sanitation and Hygiene Promotion
- C3: Setting up a self regulatory Community Monitoring Systems for WATSAN Systems and Services

6.1 Building up Water Supply Services

There is a general perception among the public, local planners and elected members in the Panchayati Raj Institutions that in order to solve the existing water supply problems new piped water supply schemes are the only panacea. The Programme will aim to demystify such monopolistic engineering solutions to the water supply problems of the community. The Programme will help communities solve their water supply problems through any one or a combination of the following approaches:

- Rejuvenating and developing traditional sources and methodologies
- Rehabilitating and restoring the existing investments in water supply
- Planning and developing new water supply services

6.1.1 Objectives of the Sub Component

- To facilitate grouping and mobilisation of User Groups in the identified problem clusters based on social, technical and environmental parameters
- To enhance the User Groups' capacity to plan for solving the existing water supply problems through informed decision-making
- To facilitate collective action by the User Groups to successfully execute their WATSAN Action Plan and management of the facilities

6.1.2 Activities under the Sub Component

- In order to help the community take informed choices on the types and range of possible solution for their existing water supply problems, the following studies will be undertaken:
    - Collecting detailed information on the primary feasibility of rejuvenating traditional water sources as well as new Water Supply Schemes
    - Study of the socio-technical feasibility of rehabilitation of existing Water Supply Schemes as identified in the Grama Panchayat Level Development Report
- Developing a feasible technology selection matrix with adequate information to help communities select solution to their water supply problems
- Formation and registration of User Groups involving families who are likely to be benefited from the proposed solution
- Developing WATSAN Action Plan by elaborating the Detailed Scheme Report (DSR)
- Facilitate social action in implementing the plans through community procurement of materials and works, community monitoring and supervising implementation etc.
- Setting up of an O&M support system

6.1.3 *Implementation Stages*

The Programme considers all the activities under the sub component as an opportunity for experiential learning to the User Groups to empower themselves in sustainably managing solutions to their water supply problems. In *section 4.3*, the overall stages of implementation of the User Groups' Empowerment Programme has been laid out. The Sensitisation and Awareness Building Phase and RWS&S Situation Analysis have produced a major output - the Development Report detailing the water supply and sanitation situation in the Grama Panchayat demarcating the problem clusters. Problem clusters are groups of households suffering severe water scarcity and sanitation related problems. During the Institutionalisation Phase, the focus of activity is shifted to the problem clusters from the whole Grama Panchayat level. The Institutionalisation Phase will have activities resulting in emergence of User Groups centered on two or three alternate options for a possible water supply facility.

As already mentioned an NGO is facilitating the activities. By now a team of volunteers have already emerged from the community working closely with the NGO, who are being groomed to develop into Village Resource Cadre. In addition to the Village Resource Cadre Team, community leaders might have also emerged and working with the NGO. The community leaders normally confine their activities at the problem cluster level whereas the Village Resource Cadre will be involved in the activities of all the problem clusters in one Grama Panchayat. By the time the Institutionalisation Phase starts Village Resource Cadre will gain sufficient hands-on-training on social mobilisation, PRA techniques, community institutions management etc. During the Institutional Phase, they will be given more focused training on water resources identification, technology choices, feasibility analysis etc. Institutionalisation Phase will witness more intensive roles for the Village Resource Cadres even though they are still being trained. This will be a transition phase where NGOs entrust more responsibilities to the Village Resource Cadres who will emerge as local experts. At the end of the Institutionalisation Phase they are available to the User Groups for contracting to avail their services.

Here the technical aspects of various activities, which will be undertaken as per the overall stages of implementation discussed in *section 4.3*, are further elaborated. The major activities with technical focus are grouped as under:

- Socio-technical activities to form User Groups
- Preparation of Detailed Scheme Report for Water Supply Schemes – for rehabilitation as well as new schemes
- Community implementation of Water Supply Schemes
- Setting up O&M support system for Water Supply Schemes

6.1.4 *Socio-technical Formation of User Groups*

There will be a normal tendency to immediately form and register the User Group once the problem clusters are identified. Departing from this the Programme will implement a socio-technical process by providing sufficient opportunities for all the households in the problem clusters to understand in-depth the problem as well as the intricacies in arriving at a feasible and sustainable solution. Such an elaborated process will trigger greater understanding about the purposes for which User Groups are formed.

Problem clusters have been identified based on existing water supply problems and the solutions to the problem need not necessarily allow aggregation of all the households in one problem cluster into one User Group. Availability of water being a natural phenomenon can lead to a situation where the households in the problem clusters could be aggregated around more than one scheme

resulting in more than one User Group within a single problem cluster. Natural terrain may again intervene and there are situations of isolated households who cannot be feasibly linked to a User Group and individual household solution need to be thought of. There will also be cases of extreme non-availability of any feasible solution within one cluster, wherein the User Groups can be formed only by coalescing more than one problem cluster. The Programme will be implemented by looking into all such possibilities and User Groups are formed only around feasible and potential solutions. Such a careful approach is expected to provide more cohesiveness of the Group and will enhance sustainability of the solutions.

The main activities proposed to be undertaken are:

- Socio-technical feasibility study for rehabilitation of existing Water Supply Schemes
- Semi detailed technical studies for new schemes
- Development of a Technology Selection Matrix for the problem cluster
- Community consensus on possible solutions and formation of User Groups

a. Socio-technical feasibility study for rehabilitation of existing Water Supply Schemes

Government of Kerala has issued Government Orders GO (MS) No. 125/98/Ird, dated 23.11.1998, deciding to transfer 1,050 small schemes within the boundaries of one Grama Panchayat to be transferred to local bodies and GO (MS) No. 44/2000/Ird, dated 12.06.2000, detailing the modalities which need to be adhered while transferring and rehabilitating single Panchayat KWA schemes to local bodies in the districts of Thrissur, Palakkad, Malappuram and Kozhikode districts. The response to these initiatives by GoK is not encouraging except in Grama Panchayats where Kerala Rural Water Supply and Sanitation Project is implemented. There are several reasons for the poor response.

The Programme proposes to rehabilitate all recoverable and feasible assets relating to the investments already made to create water supply infrastructure by KWA, Panchayati Raj Institutions and other private initiatives in Idukki district by tea planters and cardamom growers. These schemes will be made functional with appropriate rehabilitation measures like augmenting, supplementing and protecting the source, repairs and replacement of existing infrastructure like overhead tanks, pumping equipment, pipelines etc. In addition to rehabilitating and making these infrastructures functional, side-by-side the social mobilisation and social action processes will also be initiated so that the rehabilitation work and the rehabilitated infrastructure is managed by the User Groups in line with the overall philosophy of the Programme.

Before taking up a decision on rehabilitation of schemes by the communities, they will be provided with all the necessary details of the existing scheme so as to guide the community in arriving at consensus to accept the same as a feasible solution to their problem. For this a detailed survey will be undertaken to identify existing sick/poorly functioning Water Supply Schemes within the proximity of the identified problem clusters worth to be rehabilitated in a cost-effective manner. The study will also look into the feasibility of transforming these facilities into a community-managed one.

The study will cover the following:

- Preliminary assessment of the physical, technical and operational status of the scheme including source sustainability, adequacy, water quality. Mostly secondary data will be collected
- Socio-technical feasibility of rehabilitating the scheme including possible bifurcation consolidation, additional coverage etc.

- Proposed alternatives for rehabilitation with identified advantages and disadvantages along with rough cost estimate for rehabilitation
- Rough O&M cost after rehabilitation
- Action Plan for rehabilitation including technical activities, legal and institutional activities, User Groups formation etc.

The Grama Panchayat will undertake the study by engaging a consultant. The Village Resource Cadre trainees and the NGO will collaborate with the study. The local officials of KWA, technical staff from Panchayati Raj Institutions etc. will also be involved in the study. Wherever possible the consultant will use participatory methodologies to collect community perspectives on rehabilitation. The output of the study will be in a form to be directly used by the community during the participatory technology selection process to be undertaken in the problem clusters. The Report shall be in a ready-to-use format containing all the necessary information so as to enable the community to assess the various implications, feasibility and acceptance of taking over, carrying out rehabilitation and continued management of the rehabilitated schemes. Based on the above lines, a ToR for the study will be developed during the Inception Phase.

b. Semi detailed technical studies for new schemes

In those clusters where there is a feasible solution by way of rehabilitating an existing scheme, the community will discuss its acceptability considering all the aspects as provided by the consultant's study report. If such an option is not accepted by the community and the community has decided to search for alternative solution, then the Village Resource Cadre trainees and the NGO with the active involvement of the community in the problem clusters will collect basic technical data required to help the community to decide on the broad technology options available for the problem cluster to solve their existing water supply issues. Specifically the data will cover the following:

- Location, quantity and quality of various existing and potential water sources
- Approximate number of households which can be catered to by the sources
- Vertical and horizontal distances to the possible households to be serviced from the potential source
- Broad investment cost as well as O&M cost and its sensitivity to the level of coverage of households

The details collected will be incorporated in a local resource map as explained in *section 4.3*. The Village Resource Cadre trainees will be thoroughly oriented to conduct the technical studies using participatory tools.

Establishing Sustainability & Adequacy of Water Sources

The Village Resource Cadre and the community leaders will be trained in simple techniques of "water scooping" and yield testing. The actual yield testing of all water sources would be done by measuring the yield and quality of the source water during the peak summer. While it is relatively easy to study the yield and quality of existing sources for the new wells, the community has to actually locate the potential site, dig a trial well at the most feasible location and measure the yield and quality during the peak summer. While the trained VRC can locate open well and filter point sites, the community might need to seek the help of a hydro geologist for locating a bore/tube well site.

Technical Survey

Village Resource Cadre and the community leaders will be provided on-the-job training to carry out this survey using simple techniques like carpenters' transparent water tube and measure the distance. Wherever necessary, specialised services will be hired.

Since this process of data collection involves establishing the sustainability, and adequacy of both quantity and quality of the water sources, this will be done during the peak summer and the entire data collection process is expected take about two to three months for each cluster, depending up on the size, need to create test wells and complexity of clusters.

Rough Cost Calculations

Using type estimates prepared during the Inception Phase, and simple formula based on the variables such as horizontal and vertical distances, safe yield of the source, per capita supply rate, number of families etc., a rough estimate of the chosen system is prepared. Village Resource Cadre and the community leaders will be given on-the-job training for computing this.

c. *Development of a Technology Selection Matrix for the problem cluster*

In order to guide the community in taking informed choice of technology, they need a logical tool that considers as many possible parameters as possible and relevant to the situation. Based on the data generated from the technical studies, a Technology Selection Matrix, cross-tabulating technology options as rows and their attributes as columns.

The first step is to list all possible technological options for each cluster. During the technical study carried out during the Reformulation Mission, a tentative format for developing. A list of technical option available for a typical problem cluster in Alappuzha and Idukki is given in **Table 6.1.**

Table 6.1 Possible Technical Options for a Typical Problem Cluster in the Programme District

Sl. No	Alappuzha	Idukki
1	Rehabilitation and taking over of feasible Water Supply Schemes by the User Groups	Rehabilitation and taking over of feasible Water Supply Schemes by the User Groups
2	Household Water Purification Systems	Spring Protection Chamber (Manual)
3	Development of traditional sources	Gravity Water Supply Schemes
4	Well improvement with manual draw	Household Water Purification Systems
5	Hand Pumps (Filter Points)	Hand Pumps
6	Pumping water supply schemes	Well improvement with manual draw
7	Roof water harvesting systems	Pumping water supply schemes
8	New open Wells	Development of traditional sources
9	--	Roof water harvesting systems

Then a Matrix will be prepared with the technical options as rows and its attributes such as per capita capital cost, difficulties in implementation, type of service, sustainability of source, per capita supply rate, O&M cost, easiness/difficulty in O&M, social aspects (need for clusters to come together, scope of clusters splitting into smaller groups), management aspects etc. of each technical options as columns. The cells in the Matrix will be completed with quantitative and/or qualitative values based on the data generated earlier. Technology Selection Matrix for typical problem clusters in Idukki and Alappuzha was prepared, which is given in **Attachment 6.1.**

The preparation of the Technical Selection Matrix will be done in a cluster level workshop attended by local residents in the problem cluster having sufficient local knowledge, local resource persons, Panchayati Raj Institutions representatives, etc. The workshop will be facilitated by the NGO and the detailed technical inputs provided by the Village Resource Cadre trainees.

d. Community consensus on possible solutions and User Group formation

The Village Resource Cadre trainees then assist the community in organising series of informal discussions within Problem Clusters and explain the TSM developed for each cluster. During these discussions, the values/weightages attributed to different options may change. E.g. Although Rehabilitation of certain schemes might look to be economical, this night get very low preference by the community keeping in view the long delays in finalizing the plans, formal taking over, and the institutional complexities of managing a bigger scheme. These discussions are also extended to bigger groups consisting of few clusters that might want to come together in order to take up slightly bigger schemes (Rehabilitation/new multi-cluster piped water supply schemes etc.). Sub groups within a Problem Cluster who might want to take up very small/individual schemes (Rain Water Harvesting, Hand Pumps) are also consulted.

As a result of these consultations, the most appropriate and acceptable technology options are chosen, through an informed decision-making process by evaluating technical, sociological, economic and environmental considerations of sustainability and affordability. As far as possible time tested, empirically evolved practices of the area will be preferred and new solutions will be considered only if the traditional practices are no more feasible.

The NGO will also be involved in these consultations and will ensure that the BPL families and other marginalised sections of the community are involved in the consultations and their interests and view points are adequately discussed and included in the decisions. The cost considerations of the various options are discussed in detail so that the various sections of the community will be able to participate in the Programme considering the affordability of both capital cost as well as O&M costs.

By now a clear picture will emerge as to the type of proposed scheme as well as its proposed coverage of the households. The Village Resource Cadre trainees and the NGO along with the community leaders who spear headed the socio-technical process will visit all the households, which are proposed to be covered by a scheme and explain the proposal. A general body meeting with a representation from at least 2/3rd of the households and a minimum 50% of those present being women, is convened to approve the choice of technology and scheme. The general body will give its consent to share costs and take care of the operation and maintenance. The general body can resolve to form and register the User Group. The first office bearers will also be selected during the general body. The office bearers will seek the approval of the Grama Sabha to proceed further.

The above suggested methodology outlines only the critical steps in the process. Considering local needs and situation, suitable adaptations and sequencing will be adopted.

6.1.5 Preparation of Detailed Scheme Report

The User Groups are formed now and the selection of User Committee and their training programmes are over. In order to aid the community in preparing the WATSAN Action Plan, Detailed Scheme Reports are to be prepared by the User Groups with technical assistance from the contracted Village Resource Cadre. The Detailed Scheme Report will include all detailed designs, estimates and number and type of households covered by a proposed Water Supply Scheme as decided by the User Groups and approved by the Grama Sabha. By this stage the Village Resource

Cadres are certified by the Programme and are available to be contracted by the User Groups. The role of the NGO has substantially been tapered. They will completely exit at the end of WATSAN Action Plan preparation and approval.

Depending upon whether the User Group has decided rehabilitating an existing scheme to solve their water supply problems or setting up a new scheme, the User Groups will prepare either a Detailed Rehabilitation Report or a Detailed Scheme Report for the new scheme.

a. Detailed Technical Surveys

The Village Resource Cadres will support the User Committee in carrying out Detailed Technical and Topographic Survey for the new scheme or rehabilitated scheme. The User Group can engage a service provider for conducting the Detailed Technical Survey.

The Technical Survey for the rehabilitation will be done by involving additionally the Grama Panchayat representative and KWA representative. A separate Rehabilitation Committee consisting of User Committee members, Village Resource Cadres, Grama Panchayat representative and KWA representative will be constituted to do the survey as well as preparation of Rehabilitation Report.

b. Detailed Scheme/Rehabilitation Report

Preparation of the Detailed Scheme Report is primarily the responsibility of the User Committee, who will do it in constant consultation with the User Group members. The Village Resource Cadre will give all technical guidance and support in the preparation of the Detailed Scheme Report. The consultant engaged for the rehabilitation study will give necessary inputs and guidance for preparing the Detailed Scheme Report. It is important that the User Committee members are imparted the necessary skills and knowledge for the preparation of Detailed Scheme Report. The User Group members are fully aware of the important aspects of the Detailed Scheme Report.

The important contents of the Detailed Scheme Report are:

- Detailed Scheme Map containing the components of the proposed scheme (new/rehabilitated) including source, distribution lines, storage, service points, location of households to be covered, roads, buildings, natural features like streams and rivers etc. In Rehabilitation Schemes the existing as well as new features will be separately shown
- Demographic data of the potential user households
- Source Assessment Report including sustainable/safe yield, water quality, measures tc enhance sustainability etc.
- Detailed inventory of all the existing components of schemes to be rehabilitated along with physical and operational status (only for rehabilitation)
- Existing liability and other details of schemes to be rehabilitated (only for rehabilitation)
- Technical designs, engineering drawings and detailed estimates
- Arrangement for procuring materials, works and other services
- Arrangement for supervising the work and quality certification
- Arrangement for conducting social audit
- Arrangement for mobilising capital cost contribution
- Operation and maintenance arrangement
- Arrangement for monitoring source sustainability, water quality etc.

- Summary of all the activities carried out in the preparation of the Detailed Scheme Report including consultation meetings, number of people attended, women and other marginalised group participation etc.

A format for preparing the Detailed Scheme/Rehabilitation Report will be developed during the Inception Phase covering the above details.

Simple spreadsheet based computer programmes will be developed to aid preparation of detailed design and cost estimation using all the information collected during the technical studies. It will take care of the service levels and design norms selected by the community, approved schedule of rates and outturn of labour. The Village Resource Cadres will be trained to use this simple tool, which can very well be explained to the User Committee and User Groups.

c. *Design Criteria*

The Programme will focus in arriving at optimum designs, which are cost-effective as well as environment-friendly. Even though this may be a highly technical aspect, User Committee members will be thoroughly trained so as to equip them know the intricacies and explain the same to the User Groups.

For the piped water supply schemes, the per capita supply would be decided by the community based on the availability and sustainability of source, demand, service levels and ability to pay. For example, in Coastal and Kuttanad region of Alappuzha, there are plenty of water sources to meet the non-drinking/cooking requirements. Hence the system needs to be designed only for such supply that requires high quality water. In Idukki, the requirement is only for three to five months and the community may decide to have combination of rainwater harvesting and piped water.

Yet another consideration is the type of conveyance and supply. While the gravity supply can work on a 24-hour supply basis, the pumping schemes can pump/supply water for four to six hours a day due to frequent power breakdown/poor voltage and the part time nature of the pump operator. While providing water meters may theoretically ensure restricted use, its high capital cost and difficulty in accurate calibrating after each breakdown, easy to tamper with etc. are negative factors.

All the piped water supply schemes are designed as intermittent supply and it is assumed that the system can be tuned so as to ensure equitable supply. While house connections will be tuned to supply constant uniform discharge of "q", which is equivalent to safe yield of the source (litres/day) divided by the total number of user families. The Public Stand Post will be tuned to supply a discharge equivalent to number of families using the Stand Post multiplied by "q". However, in case of few families using very little water (non-resident, low population) and few families occasionally requiring excess water, User Committee will decide on the concession or surcharge respectively to be levied from time to time.

By tuning the system, the maximum rate at which water can be drawn from any point is restricted. However, there is a tendency to increase the pumping capacity and/or increase the daily pumping hours to increase the total volume of water pumped daily in order to meet the increasing per capita demand and/or expansion of the scheme. This will lead to depletion of the source and failure of the entire scheme. Hence the User Groups should put an upper limit on total daily pumping from the source. This shall be 50 to 60% of the Safe Yield of the well as determined during years of source monitoring after commissioning. However, the User Groups is free to expand the scheme by reducing the per capita supply rate.

d. Capital Cost Sharing Aspects

The Programme will fund the investment requirement for water supply facilities to the tune of 75% of the estimated costs. The User Group will contribute 15% and the Grama Panchayat will share 10% of the costs. In order to ensure that the Programme funds are uniformly spread across all the participating households, higher capital contribution requirements will be there for families demanding higher service levels. During the Inception Phase, data on detailed cost estimates will be collected to work out per-family support from the Programme. This will be fine tuned at the end of the Planning Phase in Batch-I Grama Panchayats.

Up to 50% of capital contribution by the User Groups can be by way of labour contribution. The actual payout by a benefiting household is a major factor in inclusion of BPL families in the Programme. The User Group will have the freedom to decide cross subsidising the community capital contribution depending upon income levels and opted service level.

e. Operation and Maintenance Cost

Quite often during the planning and scheme report preparation phase O&M costs are either ignored or not properly worked out. The operation costs shall be realistically estimated to cover operators' charges, energy costs, cost of chemicals for water purification etc. The operation costs shall be worked out for Kilo Litre of water produced and distributed. The Detailed Scheme Report shall clearly state the mechanisms for regulating supply to different users and calculating the user charges.

The preventive as well as repair maintenance required periodically for upkeep of the systems will also be projected. The need for replacement or repairs to different components of the system like the distribution, pumping, storage as well as the source must also be worked out and the user charges are appropriately loaded with such costs. Even if the communities are not able to realise the entire cost of replacement after a normal economic life of the assets, it shall have a corpus generated out of the periodic collections from the users to meet emergency breakdown requirements as well as a reasonable user contribution to avail finance from other sources.

f. Schedule of Rates

As per the statutory requirement, all the public works including the works undertaken by the PR need to be estimated using the PWD Schedule of Rates. PWD rates are developed on the basis of average work out turn and average labour and material costs and more often than not outdated by the time they are published. Hence seldom does a situation exist where these PWD rates are realistic and comes near to local current market rates. It becomes very difficult then for an honest convener (whom the community entrusts works under Panchayati Raj Institutions System) to complete the work within the estimated cost.

With a view to understand the prevailing field data on actual out turn of skilled and unskilled labourers and their wage rates, rates of materials and data collected from contractors who execute construction works at different locations in Alappuzha and Idukki revealed that the PWD rates are very low for many of the items. For certain items, the rates in the PWD schedules are high as well. There exist, even within the districts, wide variations of local rates of many items. It is concluded that adopting a standard rate, even for a district, is unrealistic. The local rates collected for Alappuzha and Idukki districts are given in **Attachment 6.2.**

The Programme during the Inception Phase will collect realistic market rates of materials, out turn of work of various skilled and unskilled persons, wage rates etc. required for implementation of the Programme in a scientific manner by appropriate stratification of the district and sampling.

The data on schedule of market rates collected will be submitted to the sub committee for water supply and sanitation of the Block Level Technical Advisory Committee, who in turn will recommend the same to the District Level Technical committee. The DLTC will approve the schedule of rates to be followed by the User Groups. This will be an annual exercise to update the rates every year.

Along with the schedule of rates for labour, the outturn of work also needs to be estimated. The Programme will publish the outturn of labour for different works during the Inception Phase.

g. Community Approval

The Detailed Scheme Report will be presented and explained to the User Group general body attended by not less than 2/3rd of its members and with a minimum of 50% of women participation. The Detailed Scheme Report as approved by the User Groups will be presented to the Grama Sabha for its approval.

h. Technical Approval

The Programme will follow the process of Technical Approval as followed by the Panchayati Raj Institutions under the Tenth Plan Guidelines and the institutional arrangement is explained in *section 5.1.5*. This will happen in two stages for the Programme.

The Grama Panchayats based on the recommendations of the Grama Sabha, will accord administrative sanction to the Detailed Scheme Report as included in the WATSAN Action Plan. The Detailed Scheme Reports will be technically vetted by the sub committee for water supply and sanitation of the Block Level Technical Advisory Committee. The block level members of the Technical Advisory Committee will be thoroughly oriented on the Programme principles and methodology for preparing the Detailed Scheme Report. They will vet the WATSAN Action Plans and recommend to the DLTC.

The DLTC has a separate technical committee for water supply and sanitation who will recommend the technical sanction. The District Planning Committee chaired by the President, District Panchayat will issue technical sanction subject to the following conditions:

- The Grama Sabha has recommended the plan to the Grama Panchayat who in turn has accorded administrative sanction
- The plan is already included in the Grama Panchayat annual plan for which plan funds are allocated
- The plan has been prepared following the socio-technical processes of the Programme
- The General Body of the User Group (with a minimum attendance of 2/3rd of its members and a minimum attendance by women of 50% of those present) approved the plan with its commitment to share capital and O&M costs
- The estimates are prepared based on realistic market rates as published under the Programme
- The Grama Sabha has recommended the plan to the Grama Panchayat who in turn has accorded administrative sanction

Since the DLTC members and technical committee members are thoroughly oriented on the norms for planning, Technical Approval might not face any problem.

6.1.6 Implementation of Water Supply Schemes by User Groups

The implementation of the Water Supply Schemes will follow activities already explained in *section 4.3.5*, Community Implementation Phase. The more technical aspects are elaborated below:

a. Taking over KRWSA Schemes by Rehabilitation Committee

The Grama Panchayat will approach Kerala Water Authority/Government of Kerala for necessary orders to transfer the assets of schemes decided for rehabilitation to the GP. All existing assets, net of liabilities and operating staff alone will be taken over by the Rehabilitation Committee. All functional schemes will be continued to run by the KWA staff, till the schemes are rehabilitated. The KWA will train volunteers of the Rehabilitation Committee on the job of running the scheme. The training costs will be borne by the Programme. Once trained, but not later than one year, the Rehabilitation Committee will fully take over the operation of the scheme and KWA will withdraw its staff.

b. Procurement of Materials

The procurement of goods, services and works for implementing the schemes is the responsibility of the User Groups in the case of community schemes and User themselves in the case of individual schemes. The suggested procurement methods are summarised in **Table 6.2:**

Table 6.2 Suggested Procurement Methods

Items to be Procured	Procurement Method
A. Materials	
Pipes and fittings	Inviting quotations from manufacturers or authorised dealers
Cement	Inviting quotations from manufacturers or authorised dealers
Steel	Inviting quotations from manufacturers or authorised dealers
Local materials, sand, stone, wood etc.	Local inquiry and purchase
B. Works	
Construction of open well/ponds, filter wells	Bidding by local contractors
Construction of overhead tanks	Bidding by local contractors
Boring tube wells, bore wells	Bidding by local contractors
Supply an installation of pump-sets, including electrical works	Quotation from manufacturers or authorised dealers
C. Services	
Electrical installation	Bidding by local contractors
Plumping works	Bidding by local contractors
Labour contract	Bidding by local contractors

The User Committees have to make thorough enquiries before procuring any items. The Village Resource Cadre will ensure that User Groups are properly guided during procurement. It will be encouraged that the User Groups in a Grama Panchayat under its federated arrangement will be able to negotiate with major manufacturers a good rate for supply of items like pipe, pump sets etc. The orders will be placed by individual User Groups and payments also will be effected by them

directly. Such a coordinated effort is expected to save transportation costs as well as get quality materials from reputed manufacturers.

While procuring goods and materials, quality standards need to be scrupulously followed. While selecting a supplier, either the manufacturer or an authorised dealer alone will be selected. Reputation of the supplier, quality of the product, price competitiveness, after-sale service, warranties and guarantees etc. will be considered.

The stores management responsibility will also be that of the User Committee. All valuable and perishable items procured will be properly stored and used. The User Committees will maintain proper records like quotations, bills, stock register, stock issue register etc. All matters relating to procurement will be informed to the User Group and all records connected with are public records, which can be verified by any User Group member on request. The User Committee will maintain a village notice board to display the details of procurement and stores. During the Inception Phase a Community Procurement Manual will be developed.

c. Construction Works

Building schemes is an important and intensive phase for the User Committees to carry out supervision on a day-to-day basis. All water supply and sanitation schemes are implemented either directly by the User Committees or directly under its supervision. Every member of the User Group will be kept informed about the progress of implementation, maintenance of quality standards and conformity with design stipulations as included in the approved plans. The community will also discuss the Scheme Completion Reports.

The following salient aspects will be taken care of:

- Progress of work as per schedule
- Monitoring usage of material and quality maintenance
- Deviations from the approved designs
- The progress of implementation as well as details of transactions are prominently displayed
- The User Groups is constantly consulted on implementation

The Village Resource Cadre will support the User Committees for successful completion of the schemes.

The Programme will engage the services of an independent agency to conduct construction quality monitoring and check measurement on a sample basis. The usual certification procedure for works normally followed under the Panchayati Raj Institutions will be followed for the Programme as well.

d. Scheme Completion Report

Before commissioning and putting the Scheme to full use the source yield will be tested during peak summer. The scheme will be on trial run for at least a week and water quality and scheme performance need to be monitored carefully.

Using the Detailed Scheme Report as a basis, a Scheme Completion Report (SCR) will be prepared. The exact format for the SCR will be developed during the Inception Phase and will essentially consist of the following:

- Details of all facts and figures given in the Detailed Scheme Report and as achieved by the scheme
- As-laid-maps
- Operation and Maintenance instructions

6.1.7 Setting up Operation and Maintenance Support System for Water Supply Systems

The piped water supply schemes, both new and rehabilitated, are operated and maintained by the User Groups themselves. The expenses relating to operation and maintenance will be divided among the benefiting households and collected. The User Committee will change its major responsibility into operation and maintenance. The User Group can decide to fix tariff rates, consumption slabs, penalties for excess consumption, rationing supply etc. If the User Groups so decides, the house connections can be fitted with water meters.

The following activities will be implemented:

a. O&M Training (Daily Operation & Preventive Maintenance)

Series of training will be given in daily operation and preventive maintenance of the system. These training programmes will all be practical/on-the-job types and at different levels as follows:

- *Training the designated functionaries of the User Committee in managing O&M*
  This training will be given particularly to the conveners/secretaries of the UG in mattress pertaining to the scheme management. The topics covered will be tariff-fixing, billing, collection and accounting, maintenance of records, managing/awarding repair maintenance contract etc.

- *Training the Operators in O&M routine*
  Knowledge/Skills and performance of Pump/Valve operators are very critical in sustainability and economic performance of the system. Hence they will be given rigorous practical training in daily operation & preventive maintenance of the scheme. The topics covered shall be understanding various components of the electrical, pumping & conveyance systems, tuning of the systems (ensuring prescribed discharge at all supply points) daily operation schedule, daily, monthly, and annual preventive maintenance schedule, fault reporting methods etc.

- *User Training*
  Users will be given training in hygienic use and conservation of water, preventive/hygienic maintenance of the taps, platforms and drainage etc.

f. Setting up a Repair maintenance Support System

Even though the User Committees can manage operation and routine maintenance of the systems, there may arise repair maintenance, which needs expert support. The following options will be encouraged by the Programme:

- Local plumbers and electricians will be specially trained in repair of pipelines, electrical and pumping equipments that will undertake the work for a service fee. The UG federation can support them by stocking necessary spares, service pumps, tools and equipment. The service can be contracted on call basis or blanket maintenance coverage like annual maintenance contract.

- The User Groups can enter into annual maintenance contract with the suppliers of pump set and electrical installation.

The Programme will develop a detailed Operation and Maintenance Manual covering water supply schemes with all technology options.

6.2 Sanitation and Hygiene Promotion

The urban-rural divide is less pronounced in Kerala and most of the Grama Panchayats also belong to the urban continuum in terms of a consumer society. The presence of small towns, undulating topography, humid climatic factors and high density of population pose environmental sanitation problems in many Grama Panchayats in the District.

Household sanitation and hygiene behaviour of people in the rural areas of the District, as revealed from the PRA study, indicates a dismal picture. In Idukki district, because of the hilly terrain, poor household sanitation facilities and inadequate latrine facilities in habitations located at the hilltops and slopes raises dangerous environmental sanitation problems to habitations located in the foothills. It is also revealed that in Idukki, poor households constitute majority of those settlements on hilltops and slopes. This condition pollutes water sources at the foothills.

In Alappuzha District, there is a concentration of the poor households in remote waterlogged areas. Inadequate household latrine facilities are the main source of contamination of the water bodies.

6.2.1 Objectives of the Sub Component

To bring about total sanitation leading to a cleaner environment by integrating personal hygiene, household sanitation and environmental sanitation improvements

6.2.2 Activities under the Sub Component

The following activities will be undertaken under the component:

- Promote community awareness on the need for maintaining better personal hygiene and household sanitation
- Increase community consciousness on preventing pollution of the environment by dumping solid and liquid waste
- Provide improved latrine facilities to economically weaker sections
- Pilot Solid and Liquid Waste Management Models in selected Grama Panchayats having acute problems

6.2.3 Choice of Technology

Like in the case of water supply, the community will take informed decision on choice of technology options for environmental sanitation. A selection matrix will be developed and offered to the community to guide them in this process. A sample selection matrix for Solid Waste Management is furnished in **Table 6.1.**

6.2.4 *Implementation Arrangement*

The User Groups will identify a team of volunteers including school children to spread the messages of hygiene and environmental sanitation. A lot of community promotion events like *Kalajadha* and street plays will be organised to sensitise the community. Promotion materials like posters, pamphlets, and video films etc. will be developed to support this. The services of an advertising agency having experience in conducting mass media campaigns on community-based issues will be contracted to develop and run mass media campaigns in the District through television and radio network.

a. Sanitary Latrines

Sanitary latrines of appropriate technology will be provided to BPL families enrolled within the User Groups under the Programme. The beneficiaries will be identified in the Grama Sabhas, could be formed to a separate sub-committee of the UG for sanitation. This will mostly be provision of twin-pit sanitary latrines. In Alappuzha District, twin-pit sanitary latrine is a failure and appropriately modified or alternate technologies will be provided. The assistance from the Programme includes Rs. 1,000, which will be mainly provided in the form of materials.

The User Committee will decide about the modalities of material procurement, community contracting etc. The advantages of collective procurement/community contracting are:

- Ensures proper utilisation of funds
- Saves transportation and material cost (bulk purchase)

The exact administration of the component will be developed during inception phase.

b. Solid Waste Management

Decentralised community-managed Solid Waste Management systems will be piloted in selected Grama Panchayats in both the districts. One Grama Panchayat in Alappuzha and one in Idukki will be selected on a demonstration basis. If found successful, the model will be replicated in one more Panchayat in both the districts. Even within the Grama Panchayats, densely populated Wards will be focused. Intensive motivation and education of all originators of waste will be an important activity of the component. An integrated system to manage waste at source, a collection and transportation system and a disposal system will be attempted with community participation. The technology options for various stakeholders which will be integrated in the pilot is given in Table 6.3

Table 6.3: Technology Options for Stakeholders

Aspect	Situation						
	Small Towns	**Rural Shops**	**Rural Housing Colony**	**Scattered Rural Houses**	**Small hotels in rural area**	**Fish, Meat & Chicken market in rural areas**	**Vegetable markets in rural areas**
Solid Waste Disposal	CAC	IAC	CAC	IVC	IAC	CAC	CVC
Animal parts, paper, wood, basket Vegetable/ Fruits, food waste,	CVC	IVC	IVC/CVC	IVC	IVC	-	SS&IMR
Glass, metal Plastics and synthetic waste	SS&CMR, SS, CMR & LF	SS&IMR SS, IMR & LF	SS&CMR SS, CMR & LF	SS & IMR	SS&IMR SS, IMR & LF	SS&IMR SS, CMR & LF	SS, CMR & LF
Liquid waste disposal	CST&RB	-	SP	SP	IRB	IRB	-

CAC: Collective aerobic composting
CVC: Collective vermi-composting
SS&CMR: Sort at source & collective marketing for recycling

LF: Land Filling
IRB: Individual Read Beds

IAC: Individual aerobic composting
IVC: Individual vermi-composting
SS&IMR: Sort at source & individual marketing for recycling
CST&RB: Collective Septic Tank & Read Beds
SP: Soak Pits

These technology options, which are discussed below will not only be environmentally sound and user-friendly but also create plenty of local employment and income generating opportunities.

CAC : **Collective aerobic composting**
Organic solid waste mixed with/consisting of meat based waste needs to be handled carefully. Aerobic composting seems to be the most appropriate solution. When small housing colonies/towns/market/municipalities are involved, a system to sort, collect and transport to a central composting plant, aerobic composting, sieving, packing and marketing needs to be established. CDS can take lead.

IAC : **Individual aerobic composting**
Household meat based waste can be composted using aerobic composting.

CVC : **Collective vermi-composting**
Organic solid waste consisting of non-meat based waste can be efficiently composted using vermi-culture. When small housing colonies/towns/market/ municipalities are involved, a system to collect and transport to a central composting plant, Vermi- composting, sieving, packing and marketing needs to be established. CDS can take lead

IVC : **Individual vermi-composting**
Household vegetable waste can be treated using individual vermi-composting

SS&CMR : **Sort at source & collective marketing for recycling**
Non-organic, recyclable waste of small housing colonies/towns/market/ municipalities can be sorted at source and collectively marketed.

SS&IMR : **Sort at source & individual marketing for recycling**
For scattered households, the non organic recyclable waste can be sorted at home, and then sold to waste traders

LF : **Land Filling**
Non-organic, non-recyclable waste can be collected and used for land filling

CST&RB : **Collective Septic Tank & Read Beds**
For liquid waste from small housing colonies/towns/ market/ municipalities can be disposed of using collective heimoff (septic) tank and reed beds (Root Zone Treatment)

IRB : **Individual Read Beds**
Liquid waste from non-water logged small hotels/markets etc can be disposed with individual read-beds

SP : **Soak Pits**
For individual scattered houses, the liquid waste will be treated using soak pits. Soak Pits are dug up pits filled with coarse sand and gravel into which the gray water is brought using subsurface pipes allowed to soak and seep down

6.2.5 Detailed Planning

A detailed action plan including designs, estimates, implementation modalities, commissioning, O&M arrangements etc will be prepared by the User Groups with the active support of the Village Resource Cadres who will be offered on-the-job training in these aspects. A detailed Manual for planning and designing of Environmental Sanitation Programmes will be developed during the Inception Phase.

The process of working out and approving Schedule of Rates, formal approval by the User Groups, Grama Sabha, and the Grama Panchayat and Technical Sanction by the Technical Advisory Committee will all be similar to Water Supply Components.

6.2.6 Implementation

Implementation responsibility of small/individual schemes will be that of the respective User Groups. For larger schemes, the federated body of the User Group will be involved in implementation. The Programme will provide 75% of the capital investment requirement with Grama Panchayat contributing 25%.

The process of resource mobilisation, material procurement, physical construction record maintenance, commissioning etc. will all be similar to Water supply components

Thorough on-the-job training will be given to the Village Resource Cadre in assisting in implementation of the ES facilities. User Groups will be offered special training in implementation arrangements.

6.2.7 O&M Arrangements for Environmental Sanitation System

The operation and maintenance cost will be met by collecting fees from waste generators, especially institutions and economically sound households. There will be some income generated from the byproducts like compost. All operating costs will be recovered. The detailed O&M manual, especially for the community-managed systems, will be prepared during the Inception Phase.

6.3 Setting up of a Self Regulatory Community Monitoring System

Many WATSAN programmes, which are successfully completed, have later run into serious trouble and many have even collapsed. The reasons are said to be absence of any follow up support services/ regulatory mechanism and lack of any knowledge as to the real causes of problems. In order to avoid such a situation in the Programme Grama Panchayat, it is proposed to establish a community managed Follow Up and Monitoring System for the WATSAN Systems and Services. External support/regulatory systems tried in the past have failed. Similarly elaborate and complicated monitoring arrangements such as separate wing to collect, analyse and create dynamic data base via standard data formats etc. have also failed due to lack of interest by the user community. Hence it is proposed to initiate a very simple self-regulatory monitoring and support system to resolve problems as and when they crop up and ensure sustainability.

6.3.1 Objective of the Sub Component

To establish a simple self regulatory, support and monitoring system of WATSAN systems and services created during the Programme in order to resolve problems and ensure system sustainability.

6.3.2 Performance Monitoring

As discussed in earlier chapters, a Grama Panchayat level federation of User Groups will meet monthly to share and resolve the problems of managing their respective schemes. In special cases, representatives of suppliers of pumping and conveyance equipments, representatives of health, electricity, ground water, etc. will also be specially invited if the situation warrants.

Conveners of the User Groups will present their problems in writing. The method of problem reporting will mostly be narrative, rather than through standard formats, which are seldom filled up properly. These problems will be discussed and recommendations will be made for resolutions of the same. In most of the cases, the resolution can be done at the Federation Level. In special circumstances, such as occurrence of water borne diseases, frequent breakdown of particular equipments/components, constant electricity supply problems, drastic reduction in the yield of the water source etc. the matter will be referred to the concerned person/department. The records of minutes of such meetings, including the written complaints from the User Groups are properly maintained in order help in analysing the regional trends and design of long term WATSAN policies.

Initially, the Village Resource Cadres will be provided on the job training to help the Federation to conduct such monthly meetings smoothly and usefully. Slowly the Village Resource Cadre will withdraw unless insisted by the federation for their continued presence in such meetings.

6.3.3 Water Quality Monitoring

Water Quality Surveillance (WQS) is an important activity that ensures sustainability of sources environmental stability and health of the community. An efficient, effective and sustainable arrangement will be established for this purpose.

Many experiences in the past by multilateral and state level agencies in the field of water quality surveillance have failed due to varieties of reason. The government run district level labs failed due to absence of a water sample collection facilities, inadequate supply of reagents, inadequate operating staff etc. Yet another important reason for failure of WQS is lack of seriousness by consumers until they fall sick or the water turns out to be unpalatable as a direct consequence of source pollution.

The responsibility of management and operation of the water quality surveillance system can be entrusted with women groups called Water Quality Surveillance Group (WQSG) as a self-employment programme. It will operate as follows:

- For every Block (300 – 500 sources), there will be one WQSG consisting of one trained lab technician, and two sample collectors
- The WQSG will be thoroughly trained in simple techniques of collection and analysis of water sample using the Water Sample Analysis Kit promoted by UNICEF.
- After successful completion of the training, the WQSG will be given one Water Sample Analysis Kit along with reagents and accessories necessary for one year
- Subsequently, the sample collectors will collect and analyse water samples from all the predetermined sources (all public sources in use, all private sources of those who wish to pay and

get their samples analysed) once in every month. In addition to Bacterial Quality, the Kit can analyse all important chemical parameters as well.

- Assuming that there will be about 300 sources under each WQSG, they will collect and analyse about 10 samples every day in a rotation, so that every source will be visited on a fixed day every month. A source-wise, date-wise calendar of visits/sample collection and analysis will be made.
- Assuming a rate of Rs. 20/sample, and assuming 300 sample/month, each WQSG can generate a fund of Rs.6000/month, which will not only cover the salary & incidentals of 3 persons but also create sufficient surplus for buying reagents and replacements. Reagents & replacements can be supplied at a subsidised rate either by UNICEF or Health Department.
- While User Groups and private owners will pay the WQA charges for their respective sources, the Block Panchayat could pay for checking the water quality of sources such as public ponds, public wells and other non-UG public sources against production of reports countersigned by the users of these sources
- The monthly analysis report will contain not only the WQA results but also broad remedial measures.
- These will be discussed in the meetings of the User Groups federation and if the remedies cannot be done by the User Groups then this will be brought to the notice of the concerned authorities.

6.4 Programme Exit

The exit of programme activities from a community or Grama Panchayat will not be abrupt and standardised. The levels of empowerment and success demonstrated by the User Groups in managing the facilities will be used as an indicator to decide on the exit. If the User Committee is able to trial run and ensure hassle free operation, as expressed by the satisfaction of the User Group members on the services, the Programme can exit. It will also be ensured that a successful system of computing the O&M charges, demanding it from the members and members remitting the same without delay etc. Any major anomaly or defect in the physical or social system will be corrected and resolved.

6.5 *Ensuring sustainability*

As mentioned repeatedly at many parts of this document the ultimate aim of the Programme is to ensure sustainability of:

- A perpetually performing User Group and
- Sustainably water resource

a. Perpetually performing User Group

The Programme aim to develop and nurture a perpetually performing User Group, which is totally internally driven with lesser or little dependence on external support systems including GOs and NGOs. The Programme will carefully monitor all the partners in the Programme to warn against any one of them pursuing activities, consciously or not, which will create continued dependency by the User Groups on external sources.

The most important non-negotiable principle under the process mode of the Programme is to spin off self-propelling and sustainable community organisations sufficiently empowered to manage their own solutions through the least externally dependent route.

b. Source Sustainability, need for IWRM

One of the most critical problems that face almost all water supply schemes is source failure. Source failure takes place either by rapid depletion of the source (drying up of wells/streams) or by quality deterioration (salt water intrusion, water pollution). It is well known that these problems are caused by unscientific mater management practices such as overexploitation on one hand and poor conservation measures, and inefficient environmental control/protection measures on the other. While we all know that a long term Integrated Water Management (IWRM) Strategy would lead to source sustainability, it is easier said than done, at least in the context of Kerala. Some of the great uncertainties that discourages initiation of very specific and clear IWRM activities are as follows:

- Fragmented land holding and varying land/water use preference, a unique feature of Kerala, that brings about highly conflicting interests as far as managing water resources as a common property is concerned.
- Multiplicity of departments that tackles programmes related to land and water and total lack of coordination between them. Added to this is the problem of conflicts between administrative boundaries and watershed boundaries, which is much more pronounced in Kerala because of the strong political alienation between NHGs, Wards, GPs and Districts.
- Limited experience/knowledge on artificial recharging, impact of watershed interventions liquid waste management, wetland management, management of coastal aquifers etc.. in the Kerala context.

For this reason, various components of IWRM are proposed to be taken up under Participatory Action Research discussed in the following chapter.

Chapter 7

Participatory Action Research and Studies

Solutions to water supply and sanitation problems of the community will be largely using technologies and methodologies, which are time tested and successfully demonstrated in the Kerala context. However, the knowledge domain for the sector has a lot of gaps in terms of such ready-to-apply technologies. There are many problem areas such as water conservation, artificial recharge, solutions to specialised problems like medium sized schemes, sanitary technologies in water logged areas of Kuttanad, institutional and management models for specialised situations etc. for which there are no readily applicable solutions at least in the Kerala context.

The Programme Implementation starts with a Grama Panchayat level situation analysis aimed mainly to identify problem clusters. Later on the focus of activity is within the problem clusters. Even though such an approach is very pragmatic to solve the drinking water and sanitation related problems, it looses its micro-meso-macro linkage in managing water resources in an integrated manner. Integrated water resources management is yet to emerge as a priority in Kerala context. Lack of awareness, absence of a policy perspective, non-availability of demonstrated models with proven benefits etc. are some of the reasons for this.

Kerala presents very diverse topographical, geological and environmental features of high lands, mid lands and coastal areas. The problems pertaining to water resources management, water supply and environmental sanitation are thus more complex to tackle. The Programme districts of Idukki and Alappuzha typically represent this diversity of Kerala. In addition to the high land, mid land and coastal complexity, Alappuzha with its vast water logged Kuttanad area further compounds the severity of the problem. Hence it is neither feasible nor is it possible to prescribe standardised solutions to the problems.

The Programme propose to initiate Participatory Action Research (PAR) to bridge the current gaps in understanding the depth, causes and ramifications of existing problem situations as well as to develop solutions which could be feasibly applied by the communities. A series of action research programmes will be initiated to test, pilot and recommend ranges of options, which could be adopted by communities in solving their problems for which solutions are not readily available currently. Before recommending for mass replication, the PAR component of the Programme will evaluate the social, institutional, technical, environmental and economic implications of such solutions and adapt them to suit the special conditions prevailing in Kerala context.

7.1 Objectives of the Component

- To identify and explore important technological, institutional and process related deficiencies and gaps in WATSAN sector within the physiographic, hydro geologic and socio-economic peculiarities of Idukki and Alappuzha districts
- To develop and implement PAR programmes primarily aimed at developing prototypes of new solutions as well as adaptations of solutions, which are proven elsewhere to suit specialised situations in the project area
- To encourage and support creative and innovative local initiatives to find solutions to WATSAN problems within the Programme districts

- To consolidate the learning from PAR into an Integrated Water Resources Management Policy for the state

7.2 Activities under the Component

The activities under the component broadly fall into two categories:

- To pilot technologies, processes and institutional models proven elsewhere with the aim of adapting the same within the context of the Programme districts
- To develop new prototypes of solutions, test and fine tune them for field level application

The following activities will be carried out:

- Conducting district level and Grama Panchayat level interaction workshops to identify problems for which there are no ready-to-apply solutions or deficiencies in the currently available solutions
- Developing a research and development action plan for problems identified and prioritised to develop solutions
- Working out the institutional and procedural arrangement for carrying out research and development activities
- Implementing the R&D Programme, consolidating and documenting the results, conducting wider stakeholder consultations to fine tune the recommendations and scaling up the results

7.3 PAR Themes

The themes and problems to be taken up for PAR cannot be exhaustively listed now since many of them will surface during implementation. Based on the PRA and technical study done as part of Programme preparation, the following themes are identified now:

- To test the impact of various water conservation and recharging measures under the different situations in the Programme districts and to recommend most suited methods and methodologies
- To develop and pilot an appropriate Programme Design for tribal habitations by exploring and understanding the demographic, socio-economic, institutional and environmental uniqueness of tribal habitations and consolidate the learning to scale up water supply and sanitation systems and services for Scheduled Tribes
- To test and adapt technical options for improving drainage
- To protect and develop traditional water sources in coastal areas
- To design and test artificial recharging methods in coastal areas
- To test and adapt an institutional model for community based medium water supply schemes – new as well as rehabilitated
- To design, test and adapt technical options for roof water harvesting for various situations
- To test and adapt water purification systems at the community/household levels
- To design, develop and test non-polluting and user-friendly toilets for water logged and water scarce areas
- To develop innovative support system for planning, implementing and managing small water utilities through community based organisations
- To financially support innovative initiatives in water supply and sanitation by creative individuals and institutions

7.3.1 Micro Watershed Management

Traditionally Kerala had very sound systems of conservation and management of natural resources of which water conservation was integral part. These systems not only ensured adequate water available for both irrigation and domestic needs, but also conserved rainwater to offset any deficiency in the monsoons.

This situation has totally changed today. The pressure on land is very high with a very high density of population. Commercialisation of agriculture, development of road networks, extensive construction activities etc. have resulted in large-scale deforestation, land degradation and depletion of water resources. Massive deforestation and unscientific farming practices have destroyed our hill ranges resulting disappearance of springs, heavy soil erosion, landslides and floods. Paddy fields and ponds are being reclaimed either for constructing houses or for cash crop plantations. Heavy pumping from deep bore wells has caused significant lowering of groundwater tables resulting in drying up of the shallower open dug wells. This drastic reversal of water development strategies (over-exploitation on one hand and neglect of conservation measures on the other) has resulted in large-scale water shortages.

The Programme districts offer contrasting scenarios. While Idukki district is mostly rocky and mountainbus, Alappuzha presents waterlogged situations. Idukki has the lowest density of population in the state (252 persons per Sq.km.) while Alappuzha has the highest density of population (1489 persons per Sq.km.), which is almost 4.5 times the national average.

The physiographic, hydro-geologic, socio-economic and demographic conditions of the districts differ greatly from other districts in Kerala and also from the neighboring states. Hence the watershed management models developed in those areas cannot be directly applied here.

So far there are no demonstrated, successful attempts neither in Kerala context nor are there in the Programme districts to dovetail watershed management activities, water recharge activities and water conservation activities with water supply schemes.

The Programme will implement the following activities to test and adapt a process of application and the impact of various water conservation and recharging measures to suit different physiographic, hydro-geologic and socio-economic conditions of the Programme districts with an aim to ensure sustainability of water sources:

- Selecting micro watersheds representing the various physiographic, hydro-geologic and socio-economic conditions of the Programme districts - Idukki and Alappuzha
- Delineation of micro watershed for improvement
- Formation of watershed committee from among User Group members, non User Groups members, Panchayati Raj Institutions members etc. from the area.
- Participatory mapping of watershed
- Decision on various improvements, and agreement from land owners
- Preparation of detailed Watershed Action Plan including plans & estimates, implementation modalities, monitoring arrangements etc.
- Executing the improvement works
- Establishing a Watershed Monitoring System in order to continuously monitor the environmental, social and economic impact of Watershed Management
- Documenting, discussing and disseminating the processes, methods and other learning from the work done

A total of 10 micro watersheds will be selected representing the various geographic, hydrogeologic and socio-economic features of Idukki (7) and Alappuzha (3) districts. These micro-watersheds will be from the probable catchments area of the water sources developed for building a water supply scheme under the Programme. A separate watershed development Committee comprising of User Group members, non-User Group members who have land in the micro-watershed, PRI representatives from the area etc.

Through appropriate participatory methodologies, watershed improvement plans will be prepared with estimated costs. All improvements on public lands will be met from Programme funds at 50% of the cost with the balance contributed by the GP. All improvements on private lands will be 50% cost sharing by the landowner and 50% shared equally by Programme funds and Grama Panchayat. The work will be executed through community procurement methods discussed in *section 6.1.6.*

A detailed Micro Watershed Development, Water Recharging and Water Conservation Manual will be developed for implementation, during the Inception Phase which will be updated using the learning from the PAR activity.

7.3.2 Water Supply and Sanitation Service Delivery Models for Scheduled Tribes

The rapid reconnaissance study on the tribal settlements carried as part of the Programme preparation in Idukki district has indicated the need for separate and specialised approaches in providing water supply and sanitation services to the tribal settlements. The following characteristics have been identified in support of this:

- There are 9 separate tribes in the district each having unique, ethnic, anthropological and socio-economic characteristics
- The tribal settlements have unique geographic features with 65% of the settlements inside the forest, 33% near the forest and only 2% are near the towns
- The housing conditions, education levels, availability of safe drinking water etc. presents a very pathetic condition
- The hygiene sanitation and health conditions need substantial improvement

The findings of the reconnaissance study is given in **Attachment 3.4.**

a. Customised Implementation Strategy for Tribal Habitations

The socio-economic as well as environmental background justifies such a preferential attention. The reconnaissance study indicated the requirement of major changes in approach, processes and technologies in implementing the Programme to benefit the tribal population of the district. The preliminary assumptions are summarised below:

- There can be no standardised Programme for different tribes and different type of settlements
- The Technology Choice need to consider critical aspects such as difficulties in transporting materials, difficulty in ensuring O&M support systems, power availability/reliability, deep rooted socio-cultural values/ethos etc.
- The institutional arrangement must reckon the existing Oorukoottams, leadership patterns, tribal volunteers etc.
- The implementation must redefine the roles of Grama Panchayats, Tribal Development Department, Forest Department, NGOs etc. in bringing about co-ordinated implementation

- The demand driven approach of the Programme need to be suitably adjusted to enhance participation of the tribal communities
- The cost sharing concepts need to be redefined in the Tribal Settlements
- There must be conscious effort to assess the capacity gaps and to develop innovative methodologies to develop capacity
- The Programme may require an extended duration of capacity building, planning and implementing water supply as well as sanitation activities
- To be successful the Programme may carry out participatory need analysis and bundle various other activities along with water supply and sanitation

Based on these preliminary findings, the Programme has included the special component activity of providing water supply and sanitation systems and services under its PAR activities. Such an approach will facilitate special attention and preferential focus to develop most appropriate designs and its variance required for successful implementation. The models so developed could then be successfully implemented in the various tribal settlements.

b. Activities

Considering the special nature of the activity, the follows implementation arrangement is suggested:

Developing alternate models to suit the diverse anthropological, sociological and environmental factors of different tribes

During the Inception Phase a special study will be conducted to explore and analyse in-depth the peculiarities and requirements of the tribal population in Idukki district. The activities to be carried out specifically are:

- Conducting detailed investigations into the anthropological, socio-economic and environmental setting of the tribal habitations with a view to analyse the in-depth peculiarities and requirements
- Undertaking detailed socio-technical study on the water supply and sanitation related aspects of tribal settlements
- Developing special Technology Selection Matrix for tribal areas (Some examples are, gravity systems, solar pumps, hydraulic rams etc.) through a participatory process
- Developing alternate institutional models, Programme processes and Programme activities with adapted guidelines suiting the peculiarities and requirements of tribal habitations

Piloting implementation of representative models in selected habitations of each category

The models developed will be separate for different tribes as well as habitation patterns, considering the uniqueness of each group. During the Phase-I of the Programme, these representative models will be piloted and fine tuned as follows:

- Piloting implementation of alternate models of service support to selected tribal habitations
- Study of techno-economical cal feasibility of the structures and its O&M implications, institutional viability, socio-cultural compatibility/acceptability, environmental impact if any etc.
- Initiating consultations to perfect the model and adapt the same for the different tribal settlements
- Replicating the models in other tribal settlements

7.3.3 Improvement of Drainage

Disposal of liquid waste for households, industries and institutions pose major environmental problem in many parts of Alappuzha district. Yet another problem, which the residents in Alappuzha face is problems in maintaining the small canals which used to network the habitations and provide the much needed navigation and water for non-drinking domestic purposes. These two aspects are causing acute environmental degradation and health problems.

As mentioned earlier, the eco-system of Alappuzha is so fragile and dependent on the Water Resource System Dynamics, and a slightest disturbance in any of its sub-systems, will cause severe ecological crisis. Very exhaustive studies have already been done about the Kuttanad and Alappuzha Water Resource Systems and its sub-systems. However, no follow-up actions have been initiated so far. This means that, while one may be very clear about the nature, extent and severity of the Water Management Problems of Alappuzha, one has very little information on workable solutions yet. Hence before taking up remedial solutions on a mass scale, one has to pilot alternative techno-socio-institutional solution models and study their impact.

a. Liquid Waste Management

Different technical options will be tested and adapted for liquid waste management of households, industries and institutions in Alappuzha district. The activities will consist of testing the technical and institutional viability of various technical options in safe disposal of liquid wastes produced by Industries, Hotel Owners, Shop Owners and Community under different conditions:

- Selection of sites/ Institution
- Formation of Stakeholder Group (Industries, Hotel Owners, Shop Owners, Community)
- Participatory survey and planning
- Technical Design of the System
- Physical construction of treatment system
- Monitoring system performance and user acceptance
- Handing over the units to the community/institution

Seven locations in Alappuzha District will be selected to carry out the PAR (One Storm Water Drainage, One Coir Industry Effluent Treatment, One Peeling Shed Effluent Treatment, Three Gray water Treatment). The PAR is expected to be completed in 3 years time.

b. Protection of Backwater Canals

Traditionally, Alappuzha District had excellent arrangement for maintaining the backwater canals, which served the purpose of navigation and non-drinking domestic purposes. Over the years, these canals have been neglected resulting in heavy pollution causing environmental threats. It is proposed to revive these traditional canals by testing and adapting different technical options for revival and management.

Seven locations in Alappuzha District will be selected for the PAR. Broadly the activities to be undertaken, which will be completed in 3 years are:

- Selection of sites/ institution
- Formation of local level support group

- Participatory mapping and planning
- Cleaning of canals
- Designing of Revival Measures
- Physical construction of control systems
- Monitoring system performance and user acceptance
- Handing over the units to the community/institution

7.3.4 Protection and Development of Traditional Water Sources in Coastal Areas

The Programme will implement another theme of PAR to study the causes of contamination of water sources and to test various technical options for protecting open wells and ponds from physical and bacteriological contamination in coastal and adjoining low lying, water logged areas.

This theme will be implemented through active community participation, by temporarily taking over representative traditional water sources (2 ponds and 2 wells) and applying various protection measures. These sources will be and continuously monitored to know the impact of the treatments by comparing with the sources in the controlled condition. The main activities to be implemented are:

- Introduction meeting at Block Panchayat level and selection of Grama Panchayats
- Grama Panchayat level meeting
- Selection of sites through field visit and getting the concurrence of owners
- Formation of local level support group in assisting action research
- Physical construction of structures
- Water quality monitoring using field kit
- Handing over the structures to the community

One pond and one well will be selected in coastal area and one pond and one will be selected in Kuttanad area to undertake the PAR, which are expected to be completed in 1-½ years.

7.3.5 Artificial Recharging Methods in Coastal Areas

The coastal belt of Alappuzha presents a peculiar problem of acute water scarcity during summer months due to saline intrusion. A separate theme for the PAR will be implemented to design and test various technical measures for artificially recharging the coastal sandy aquifer in order to improve the fresh water availability and check saline intrusion.

The activities, which will be implemented, are:

- Introduction meeting at Block Panchayat level and selection of Grama Panchayat
- Grama Panchayat level meeting
- Selection of sites through field visit and getting the concurrence of owners
- Formation of local level support group in assisting action research
- Isolating a large patch of clean and lesser-populated sand dune, constructing subsurface barrier all around it and thus storing rainwater in subsurface sandy aquifers
- Diverting roof water into sand dunes through porous pipes
- Identifying observation wells and monitoring the water level and water quality before and after intervention with active community participation

7.3.6 Rehabilitation of Multi Panchayat KWA Schemes

The institution model and management methodologies for medium sized schemes covering large populations through the community participation route are non-existent at least in Kerala context. The size of the number of households covered by medium sized schemes may be larger and not feasible to be organised into one User Group. Such situation may arise in acute water scarce areas where local sources cannot be developed. During such extreme cases, problem clusters in one Grama Panchayat or even neighboring Grama Panchayat need to be coalesced to find solutions through medium sized schemes.

The Programme propose to adapt and test different institutional options for sustainably managing medium sized schemes through community participation. The PAR will be undertaken in the context of rehabilitating a Multi Panchayat Water Supply Scheme currently owned and operated by the KWA. Appropriate adaptations required for mobilising the User Groups, defining its roles and responsibilities, federating arrangements, linkages with Grama Panchayats, arrangements for technical assistance and maintenance support etc. will be explored.

The activities to be implemented mainly cover the following:

- Introduction meeting at District/Grama Panchayat level and selection of the Model Schemes for Rehabilitation
- Grama Panchayat level meeting
- Organise present/potential Consumers into User Groups/Federation of User Groups
- Setting up of District Level and Grama Panchayat Level Rehabilitation Committees with wide stakeholder participation
- Formation of local level support group in assisting action research
- Participatory Assessment of Rehabilitation needs
- Physical construction of structures
- Monitoring system performance and community acceptance
- Handing over the structures to the User Committee

The PAR will be implemented by rehabilitating one scheme in Idukki and one scheme in Alappuzha District.

7.3.7 Technology Options in Roof Water Harvesting

Yet another theme for PAR is to design and test various technical options in individual, institutional and community managed roof water harvesting systems. This will be done through the active participation of community and institutions, suitable locations will be identified, appropriate technologies (storing on the flat RCC terrace, Underground Designs etc.) applied and impact monitored including performance, water quality and acceptance by the community.

The main activities are:

- Introduction meeting at Block Panchayat level and selection of Grama Panchayats
- Grama Panchayat level meeting
- Selection of sites through field visit
- Formation of local level support group in assisting action research
- Physical construction of structures

- Monitoring system performance, water quality and community acceptance
- Handing over the structures to the community

This will be implemented both in Idukki and Alappuzha Districts.

7.3.8 Water Purification System

About 80% of rural population of Kerala is solely dependent on open dug wells for domestic water supply needs. It is a well-known fact that majority of these wells is contaminated. It is neither easy nor desirable to wish away these open-well sources because massive investment has already been made by the private sector. Hence, the most feasible solution lies in developing some simple cost effective and affordable device to treat the water at household /community level.

The Programme will implement a PAR to design and test a simple and cost-effective household/community level water purification device.

The PAR will be implemented through the active participation of community, suitable households and locations will be identified and water purification structures installed. The users will monitor the impact including performance, economics, water quality and acceptance.

The main activities are:

- Introduction meeting at Block Panchayat level and selection of Grama Panchayat
- Grama Panchayat level meeting
- Selection of households and sites through field visit
- Formation of local level support group in assisting action research
- Physical construction of structures
- Monitoring system performance, water quality and user acceptance
- Handing over the structures to the community

7.3.9 Non-polluting and User-friendly Toilet for Water-logged and Water Scarce Areas

The sanitary latrines of all the households are directly opening to the water bodies in the entire Kuttanad region in Alappuzha District. Water becomes highly polluted especially during the summer months and also when there is poor drainage. Available technology for sanitary latrines are either non-feasible in waterlogged areas or are not user-friendly. The Programme will undertake PAR to design, develop and test a user friendly and non-polluting toilet model suitable for the water logged and water scarce areas.

The PAR activities to be undertaken to develop and install toilet models at suitable locations with active community participation are:

- Design and develop models
- Grama Panchayat level meeting
- Selection of sites and households through field visit
- Formation of local level support group in assisting action research
- Physical construction of structures
- Monitoring system performance and user acceptance
- Handing over the units to the community

Five number of units in Alappuzha and 5 numbers in Idukki will be planned.

7.3.10 Innovative Support Systems

During the PRA exercise it was revealed in some pockets in Alappuzha and Idukki Districts that majority of the community members are factory workers or estate labourers, who may not find time to participate in a community driven implementation mode. Their working hours are such that it may not be feasible for them to participate in the normal community activities as planned in the Programme. They are not so rich either. They suffer from all the maladies of water scarcity as well as sanitation problems. They are willing to take up responsibilites of decision-making as well as resource management. They may require extra support in the day-to-day planning, implementation and management of water supply schemes.

Simultaneously there are community based organisation like Area Development Societies, Community Development Societies and neighbourhood groups of women successfully running income-generating activities in many Grama Panchayats. These units are sufficiently organised and have capacities to take up turn-key project implementation and water supply service providers on behalf of the User Groups. In some of the Grama Panchayats, there will be pockets of not-so-poor clusters of houses majority of whom may have gainful employment in farming, fish processing etc. who may not find time to participate in the social mobilisation and other programme implementation activities. For such communities, the ADS and CDS institutions will be able to implement water supply schemes, and in certain cases, operate and maintain it on behalf of the communities. All major decisions are invariably taken by the community members and ADS/CDS will act as the service provider.

It is proposed to undertake such a support mechanism on an experimental basis in selected Grama Panchayats as an off-stream activity. Two such systems in each programme district will be attempted to develop, constitute commission and test the feasibility, effectiveness, and sustainability of a programme support system for Water Supply & Environmental Sanitation Sector under the Grama Panchayat Level Community Development Society.

The main activities to be undertaken are:

- Select Grama Panchayats
- Constitute a Grama Panchayat Level Working Committee
- Study the existing Capacity gaps of Grama Panchayat, Scope for setting up enterpreneurship in the field of water supply and sanitation
- Prepare an Action Plan
- Mobilise User Groups, select User Committee and train them to monitor the arrangement
- Deploy/contract Team
- Train the Team
- Set up a Grama Panchayat Level WATSAN Service Centre
- Assign Special Tasks
- Monitor Performance
- Document learning and scale up if found successfuly

Two Grama Panchayats each in Idukki and Alappuzha Districts will be selected for implementation.

7.3.11 Trend Setters' Fund

The Programme aims to consolidate the reform agenda of Government of India and Government of Kerala in rural water supply and sanitation sector. The Programme design and component activities have addressed these issues in a wider scale. However, creative and innovative proposals further reinforcing the reform agenda can emerge from the field. Such proposals can further improve the parameters set under the Programme. They may also set new trends and shifts in carrying forward the reform principles.

In order to encourage, support and learn from trend setting initiatives to creatively and innovatively deepen the implementation of reform principles in water supply and sanitation sector from initiatives by Grama Panchayats, NGOs, community based organisations, User Groups etc. the Programme will set apart a portion of its financial resources to fund them. The proposals are expected to bring about further improvements in any of the following areas:

- Deepening decentralisation
- Capital cost sharing over 50% by users
- Rejuvenating traditional water sources
- Efficient, power saving and sustainable technological innovations
- Further bonding the linkages with community-based organisations
- Innovative improvements in service levels and user satisfaction
- Innovative institutional linkages among Panchayati Raj Institutions, User Groups and civil society institutions

The following activities will be undertaken to implement the PAR:

- The Programme will invite innovative proposals from Grama Panchayats and User Groups
- The Working Committee (RWSS) of the District Panchayat will examine the proposals and recommend to the Programme. The Co-ordinating and Monitoring Unit will constitute an Evaluation Committee, which will technically appraise the proposals for innovativeness, feasibility, sustainability, equity of benefit sharing, inclusion of vulnerable sections, scope for good governance etc. The conformity of the proposal to maximum number of principles set out above will also be examined. The Programme Management Unit only will sanction such proposals.

7.4 Implementation Arrangement

The primary responsibility of implementing the PAR is with the Co-ordinating and Monitoring Unit. During the Inception Phase each PAR theme will be further elaborated into an action plan with detailed cost estimates. The Co-ordinating and Monitoring Unit will invite expression of interest from public institutions, private institutions, NGOs, User Groups, community based organisations etc. that are interested in participating the PAR activities. The themes will also be advertised and expressions of interest will be specific for each theme. The District Level Monitoring Committee of stakeholders, and experts will be constituted to monitor the PAR component of the Programme. A State Level Monitoring Committee of experts will be constituted to monitor and evaluate the results of the PAR and recommend wider application of the finding of the PAR.

The cost-sharing pattern for the PAR activities will be slightly different. The District Panchayat and the Block Panchayats will earmark financial resources for the PAR. 10% cost of all physical construction and hardware will be shared by them. Wherever activities are conducted on

private lands with benefits accruing to land owners, a nominal contribution will be collected from them. In the case of Multi Panchayat Water Supply Schemes, the normal cost-sharing pattern of the Programme will be followed. The cost-sharing norm for special tribal plan will be decided after the study during the Inception Phase. In fact the PAR will come with findings on feasible cost-sharing pattern for all the activities.

Chapter 8

Capacity Building Support

The common thread running across all the component activities of the Programme is a change strategy. A change in how water supply and sanitation services are planned implemented and sustainably managed. The changes the Programme is trying to bring in can be summarised as:

- Mobilisation of User Groups and their empowerment through experiential learning
- Transforming existing Panchayati Raj Institutions and state level institutions perform a guiding and facilitating role
- Strengthening NGOs and local resource persons to provide handholding and technical support services to the User Groups

Those who resist the change are doing so by raising the issue of lack of capacity of User Community, Panchayati Raj Institutions, local resource persons NGOs etc. Capacity Building and Empowerment cannot be attained without devolution of roles and responsibilities. The best form of learning is learning by doing. As has already been stated, Capacity Building cannot be segregated as an independent and isolated activity. It runs through the activity cascade of the User Communities, Panchayati Raj Institutions, other institutions, NGOs and local resource persons. The Programme propose to build the capacity of individuals and institutions performing various roles and tasks under the Programme through the following route:

- Building the institutional capacity by providing organisation development, infrastructure and other resources
- Building the financial capacity by providing financial resources coupled with local resource mobilisation and cost effective decision-making to promote self-reliance and sustainability
- Building the human resource capacity through a careful mix of various knowledge support activities aimed at imparting the required knowledge, skills and attitudes of all those involved in the Programme

Activities to build the institutional and financial capacity have already been discussed under the various components earlier. In this component, the activities to build the human resource capacity of all those involved in the Programme are described. Even within this, the experiential learning aspects through actually performing the roles and responsibilities entrusted with the different stakeholders have also been elaborated in the previous components. Here in this component the formal methods of building the human capacity like exposure visits, interaction sessions, on-the-job and classroom trainings, networking for learning and empowerment etc. are discussed.

8.1 Objectives of the Component

- To build the core competencies in User Committee members and User Group members so as to enable them perform the crucial tasks of building up WATSAN Systems and Services
- To improve the functioning of the facilitating organisations like Grama Panchayats, Block Panchayats and District Panchayats including State Level Programme Management Cell, District level Co-ordinating and Monitoring Unit etc.

- To internalise and strengthen capacities of local communities by training and developing Village Resource Cadres as local resource persons and NGOs

- To create an enabling and supporting environment for Programme implementation by raising the awareness levels of indirect influence groups like elected representatives (MLAs, MPs), media persons, other Government officials, civil society organisations etc.

8.2 Activities under the Component

- Participatory capacity building need assessment of all important stakeholders of the Programme through a process of role and task analysis
- Developing and implementing a capacity building programme based on the need analysis
- Monitoring the capacity building programme's effectiveness in achieving community empowerment, system sustainability and developing long-lasting partnerships of organisations
- Developing various manuals required at the community level and operational guidelines for Programme management
- Documenting and disseminating key lessons in Programme implementation

8.3 Building Competencies for Programme Implementation

The User Groups, the Panchayati Raj Institutions, NGOs, local resource persons, Programme Management Institutions are all having new sets of roles to perform in a manner suiting the Programme goals and objectives. The roles and responsibilities of all these entities have been already described. Here through a detailed analysis of the roles, the required competencies and the tools and methods to acquire them is summarised in Table 8.1.

Table 8.1 Roles and Activity Analysis of Key Programme Players

Roles and Activities	Required Competencies	Tools and Methods
A. User Groups		
• Understanding socio-technical feasibility of rehabilitating existing water supply schemes • Understanding outputs from semi detailed technical studies for new schemes • Adopting bylaws and registering the User Group • Deciding on technology choices • Participating in detailed technical survey • Approving DSR and WATSAN Action Plan • Monitoring scheme implementation • Social Audit • Discussing and approving Scheme Completion Report and expenses • Approving O&M arrangements • Monitoring implementation of Sanitation and Hygiene Promotion	• Knowledge on various options for water supply service delivery • Knowledge on the dynamics of water resources, need for conservation and judicious use • Knowledge on institutional aspects and bylaws • Knowledge on community managed Water Supply and Sanitation Systems and Services • Evaluating skills • Skills to work in groups, collective action • Willingness to contribute financial resources and time • Mutual trust, co-operation • Belief in community's strength • Belief in the role of women • Respect towards principle of equity, inclusion, transparency Willingness to compromise personal gains to collective benefits	• Handholding by NGO • Facilitation and leadership by UC members • Experiential learning through involving participatory activities • Regularly attending GS and UG meetings • Neighbourhood meetings and discussions • Exposure visits • Attending UG level training programmes and participating in the discussions • Role plays, observation from participatory maps and other diagrams • Community manuals, posters etc.

Roles and Activities	Required Competencies	Tools and Method
B. User Committee		
• Studying and interpreting development report on WATSAN sector • Studying and interpreting feasibility of rehabilitation • Studying and interpreting feasibility of new schemes • Understanding technology selection matrix • Presenting various technology options to UGs and suggesting appropriate solutions • Conducting detailed technical survey • Preparation of DSR • Seeking approval of DSR from UG and GS • Following up technical approval • Procurement of works, goods and services • Supervising implementation • Preparation of Scheme Completion Report and seeking approval from UG • Operating and maintaining the facilities • Planning and implementing sanitation and hygiene promotion activities	• Knowledge on environmental issues and water resources management • Detailed technical knowledge on different technical options, advantages, disadvantages • Knowledge on decentralised planning • Knowledge on procurement methods and quality assurance • Knowledge about record keeping, accounting • Skills in data collection, surveying • Skills in participatory methodologies • Skills in group facilitation, communication • Skills in monitoring, supervising and quality assurance • Attitudes of respecting group members • Willingness to do voluntary work • Sacrificing personal advantage to group benefits • Good listening skills and conflict resolution skills • Belief in team work, collective action, need for accommodating everyone's interest • Faith in Programme principles of equity, inclusion, cost effectiveness and transparency	• Handholding by NGO • Working with VRC trainees as well as with VRCs later • Action learning and experience sharing • Exposure visits • Networking and interaction with UC members from other locations • Field based training programmes • Other training programmes • Attending workshops and other interaction opportunities with PRIs Programme management institutions etc. • Special programmes on gender mainstreaming, inclusions of marginalised • Community Manuals
C. NGO		
• Conducting sensitisation and awareness building activities • Conducting participatory RWS&S situation analysis • Preparation of development report including resource map preparation • Presenting the situation analysis report to GPs, GS and community • Identifying and developing VRCs • Facilitating socio-technical formation of UGs • Facilitating planning by UC	• Expertise in conducting campaigns • Expertise in the tools and techniques of participatory methodologies, resource mapping, community empowerment • Experience in working with PRIs • Handholding skills • Skills in community mobilisation, conflict resolution, group management • Facilitation skills • Acceptance of UGs/UCs as employer, client and partner • Respect to decentralisation and PRIs • Concern for the marginalised • Faith in Programme principles of equity, inclusion, cost effectiveness and transparency	• Orientation programmes • Interaction workshops, reviews • 360° feedback from community • Experience sharing workshops • Vertical interaction programmes

Roles and Activities	Required Competencies	Tools and Methods
D. VRC • Successfully completing traineeship • Helping UC in understanding development report on WATSAN sector • Supporting UC in interpreting feasibility of rehabilitating and new schemes for water supply • Assisting UC in preparing technology selection matrix • Helping UC in presenting options to the UG and technology selection • Assisting UC in conducting detailed technical survey • Assisting UC in preparation of Detailed Scheme Report • Assisting UC in preparing WATSAN Action Plan • Supporting UC in procurement of works, goods and services • Assisting UC in supervision and quality monitoring • Assisting UC in preparation of Scheme Completion Report • Rendering assistance to the UC in maintenance and operation of the scheme • Supporting GP in conducting activities of the UG federation • Assisting the GP in preparing GP level WATSAN Action Plan • Assisting UC in sanitation and hygiene promotion activities • Helping UC and GP in securing technical sanction	• Willingness to learn and a commitment to develop • Volunteerism and commitment to the community • Thorough understanding of environmental issues and water resources management • Sound knowledge on all technical aspects of different options for water supply and sanitation • Knowledge of technical surveys, data collection, estimating, preparing engineering drawings etc. • Thorough understanding of decentralised planning and working of PRIs • Thorough understanding of all Programme guidelines • Skills in communication, documentation, record keeping, accounting • Skills in participatory methodologies and facilitating community action • Acceptance of User Groups/User Committee as employer, client and partner • Concern for the BPL households, women and other marginalised sections • Faith in Programme principles of equity, inclusion, cost effectiveness and transparency	• On the job training by NGO • Specialised training on community based water supply and sanitation technologies • Interaction workshops and performance reviews • Experience sharing workshops • 360° feedback from communities • Vertical interaction programmes
E. PRI • Providing and enabling environment for the NGOs, VRCs and UGs to work in partnerships • Devolving decision-making and financial resource responsibility to UG • Facilitating and monitoring Programme implementation • Administrative and technical sanctions to the WATSAN Action Plan prepared by the UGs • Converging line department activities and pooling financial and other resources • Resolving conflicts	• Sufficient orientation on community based approaches • Thorough knowledge on Programme guidelines • Willingness to devolve powers and recognise UGs • Skills for facilitating and monitoring Programme implementation • Willingness to work in partnership with NGOs and UGs • Willingness to pool resources • Faith in Programme principles of equity, inclusion, cost effectiveness and transparency	• Orientation programmes • Interaction workshops to share experience • Exposure visits • 360° feedback from community • Vertical interaction programmes
F. Programme Management Staff • Developing guidelines for implementation • Co-ordinating and monitoring Programme implementation • Ensuring smooth flow of financial resources • Reviewing performance of VRCs, NGOs • Arranging special support services for UGs • Implementing PAR	• Expertise in all functional areas of Programme implementation • Facilitation and monitoring skills • Concern for women, BPL households and other marginalised sections • Accepting UGs as the employer, client and partner • Belief in team work and collective action • Faith in Programme principles of equity, inclusion, cost effectiveness and transparency	• On the job training • Specialised training programmes • Exposure visits • Constant interaction and working with the communities • Experience sharing workshops • 360° feedback from community • Vertical interaction programmes

8.4 Levels of Capacity Building Programmes

The capacity building programme will follow the roles and activities analysis and will have activities for the different functional levels and roles of the Programme as follows:

a. *Programme Implementation Level*
The participants are User Group members and User Committee members who have the primary implementation responsibilities of the Programme

b. *Programme Support Level*
The participants are the Village Resource Cadres and NGOs who provide handholding and technical support to the User Groups

c. *Programme Facilitating Level*
The participants are PRI elected representatives, PRI officials etc.

d. *Programme Management Level*
The participants are Programme staff of Programme Management Cell and Co-ordinating and Monitoring Unit

e. *Programme Enabling Level*
The participants are people's representatives, civil society members, line department staff etc.

f. *Vertical Interaction Programmes*
Cutting across the various level boundaries and role domains, specialised programmes involving participants from all the other levels will be frequently conducted to promote mutual understanding, partnership building and collective performance.

8.5 Categories of Capacity Building Programmes

The capacity building programme will follow the evolving process perspective of the Programme and provides for delivering preplanned packages as well as modules to suit specialised demands during implementation. The capacity building activities are broadly categorised into four as follows:

- Core programmes
- Specialised programmes
- Management development programmes
- Demand based programmes

8.5.1 Core Programmes

The core programmes delivered to each and every partner in Programme implementation will highlight uniform contents like Programme objectives, Programme components, Programme implementation arrangement, Programme institutional model etc. The core programmes are mainly intended to orient participants towards the Programme philosophy. These programmes are of sensitising and awareness building nature.

8.5.2 Specialised Programmes

A specialised programme vary very much in its contents specifically suiting the knowledge and skill development of specific stakeholders keeping in line with the roles and responsibilities entrusted to them. Since preparation of detailed training programme will be the task of the Capacity Building Service Provider, this is not discussed in this document. However, the specialised programmes can be broadly classified into:

a. Community Development Programmes

The community development programmes shall cover the following:

- Participatory resource mapping – methods, tools and applications
- Participatory tools
- Social action
- Sanitation and hygiene promotion
- Community mobilisation methods
- Group management
- Interpersonal communication
- Effective use of audio-visual equipment
- Mainstreaming vulnerable groups
- Group sustainability issues
- Participatory monitoring mechanism
- Team building and group conflict resolution
- Community Programme Planning

b. Engineering and Technical Programmes

- Hydro geological techniques for water source identification and assessment
- Technical Surveys for planning WATSAN programmes
- Planning for watershed development/water resource management programmes
- Solid Waste Management
- Liquid Waste management and drainage
- Water quality monitoring
- Techno-economic feasibility analysis of schemes
- Technology choices for water supply
- Technology choice for environmental sanitation
- Cost effectiveness in technology choice and implementation
- Engineering designs and cost estimates
- Selection of engineering goods/components/materials
- Community procurement of goods, works and services
- Construction supervision
- Construction quality monitoring
- Time management in construction
- Cost management in construction
- Operation and maintenance of water supply systems
- O & M of Drainage Systems
- I & M of Solid/Liquid Waste Management Systems

- Water recharge measures for source sustainability
- Environmental concerns in water resource management
- Traditional water sources development
- Rehabilitation of existing water supply schemes

c. *Finance and Accounting Management Programmes*

- Accounting methods for community based implementation
- Accounting for capital contribution, O & M
- Accounting for labour contribution
- Accounting for community procurement
- Simple auditing and internal auditing techniques
- Simple financial control systems
- Preparation of final accounts

8.5.3 Management Development Programmes

The management development programmes are aimed at building the institutional capacities of different partners in Programme implementation. These will include general management systems and procedures, management information system development etc

8.5.4 Demand-based Programmes

While implementing Programme activities there will be specific demands for capacity support on emerging issues and likely bottlenecks. Such demands raised by User Groups, Panchayati Raj Institutions, Village Resource Cadres etc. need to be addressed to by organising special programmes of capacity support.

8.6 Implementation Arrangement

The Programme proposes to follow a dynamic implementation arrangement, which will closely follow the Programme implementation at the field level. A state level documentation-cum-learning centre exclusively dedicated to WATSAN sector is yet to emerge. There are training and research institutions in the areas of water and land resources, decentralisation etc. A meaningful collaborative effort in capacity building between these institutions and field level implementers are also non-existent. The Programme has activities to meet the capacity building requirements of implementing the community empowerment process and is limited in its scope to achieve the specific requirements. However, the arrangement is expected to generate enough experience to guide GoK to institutionalise the effort through setting up a centre of learning and documentation exclusively for the sector in a later stage.

It is proposed to hire a capacity service provider who will be able to co-ordinate the various institutions and experts in the WATSAN sector and deliver the capacity requirements of the Programme considering the following advantages:

- Drawing together expertise from the existing training institutions, research and development institutions, implementing institutions, Panchayati Raj Institutions, NGOs, general resource pools etc.
- Develop meaningful public private partnerships in capacity building by assimilating variety of learning including from NGOs to suit the requirements of the stakeholders

- Providing a dynamic, flexible and synchronous capacity support in tune with implementation compared to the ritualistic, stereotyped, training for training sake approach of institutions
- Results based monitoring and payments linked to results
- No permanent institutional and overhead costs burdening the sector institutions

8.6.1 Approaches in Capacity Building

Considering the specialised requirements of the Programme, the capacity building will be in accordance with the following approaches:

- Greater emphasis on community motivation aimed at promoting self-reliance and confidence among the User Groups and User Committee members
- Establishing the need and inculcating the willingness to change the current modes of service delivery among the Panchayati Raj Institutions and Programme management institutions
- More emphasis on field-based learning and attitudinal changes through provision of meaningful interactions
- Focus on refining, systematizing and reinforcing the experiential learning by implementing the Programme at the community level
- Delivering appropriately balanced intermix of social and community development aspects with engineering and technical aspects rather than segregating the hardware and software aspects
- Capacity building shall not undermine the handholding and technical support services provided by the NGOs and Village Resource Cadres, instead must supplement their efforts
- The Technical Assistance component of the Programme will bring in national and international expertise for Programme implementation and the same shall support capacity building activities

8.6.2 Tasks to be performed by the Capacity Service Provider

The service provider must be able to deliver an output-based capacity building support for Programme implementation. It is output-based in the sense that there is demand for the Programme in the selected Grama Panchayats as expressed by community commitment to adopt Programme principles and community contribution. The output of the capacity building are also expressed in terms of User Groups not getting dropped out of the Programme, but progressing successfully through the Programme processes in conformity with the avowed Programme principles of equity, inclusion, transparency etc. The number of User Groups fully empowered to operate and maintain the schemes is yet another impact of the service. Effectiveness of the meaningful partnerships emerging among User Groups, Village Resource Cadres and NGOs, the willingness and actual devolution of implementation responsibility to the User Groups by the Panchayati Raj Institutions and the Programme management structures etc. are the other manifestations of an effective capacity service support.

A detailed ToR will be developed during the Inception Phase, covering the following specific activities to be performed by the service provider:

- Conducting participatory capacity building need assessment of all important stakeholders of the Programme
- Identifying the areas and details of knowledge, skills and attitudes to be included in the capacity building programmes
- Developing training methodologies, training plans and training calendar for implementing the capacity building programme synchronous with the Programme implementation schedule
- Developing training modules and learning events to suit the Programme's capacity needs

- Preparing and updating a rostrum of Resource Persons and Resource Institutions to draw expertise from to cause the capacity building programmes
- Raising the awareness as well as acceptance for participatory and self-help based approaches by the communities in solving their water supply and sanitation related problems
- Building awareness among all stakeholders on Programme philosophies, Programme components, Programme non-negotiable principles etc.
- Building appropriate competencies in all the stakeholders for successfully carrying out the roles and responsibilities entrusted to them by the Programme
- Orienting and further developing the handholding and technical support providing roles of the NGOs and Village Resource Cadres in a manner consistent with the Programme approach

8.6.3 Selection of the Service Provider

Reputed institutions, NGOs and other civil society organisations having past experience in implementing community-based water supply and sanitation schemes in the past will be initially short listed by the Programme. Since local language proficiency is a must for undertaking the activity, preference will be given to Kerala-based institutions. These short listed institutions will be requested to submit detailed technical proposals to provide the capacity building services to the Programme. Based on the suitability of the technical proposal in delivering the services so as to enable the Programme attain its objectives, the selection will be made. The selection process is based on fixed budget that the institutions will work out the best methodology within the available budget. Institutions are free to collaborate with other institutions, but the co-ordination mechanism shall be clearly elaborated in the proposal so that the service delivery is not affected because of different institutions coming together.

8.6.4 Contents of the Technical Proposal

The technical proposal shall clearly indicate the following details:

- Details of similar services carried out in the past with clear illustrations about the success of the assignments
- The details of the proposed team by each specialty with the roles and responsibilities which would be assigned to each staff team member showing time charts of presence/association
- Detailed curriculum vitae of professional staff showing endorsement of commitment of presence
- Schedule of work
- Detailed description of the methodology and clearly elaborated work plans for carrying out the assignment including a tentative training matrix
- Management and monitoring mechanism for carrying out the assignment

8.6.5 Sustainability of the Arrangement

A capacity building service provider may not be able to leave sustainable arrangements for capacity building in the State's sector. Hence, a fly by night consultancy arrangement will not be attempted. The methodology for providing the service must clearly indicate the mechanism for institutionalising the service provided within the sector. Hence, the service provider will be encouraged to anchor from an existing institutional framework within the sector, especially some of the external service providing institutions.

Chapter 9

Programme Monitoring and Learning

The most important purpose of monitoring in the two district RWS&S Programme is learning. Learning for the User Groups, learning for the Panchayati Raj Institutions and learning for state level institutions. At the state level the Programme management use the learning for operation decision-making whereas GoK use the learning for policy development and evolution of an IWRM policy. In order to facilitate such learning at all levels, the monitoring of the Programme will not hierarchically segregate the Programme partnering entities into those generating data, those analysing data, or those using the information for decision-making. All the three functions are simultaneous and co-existent at the User Group level, at the Panchayati Raj Institutions level and also at the state level.

The Programme propose to implement three types of monitoring arrangements:

- Setting up of a formal Management Information System (MIS) to track Programme implementation progress
- Periodic impact monitoring
- Self-regulatory community monitoring

9.1 Formal Management Information System (MIS)

The Programme will develop and implement a formal MIS to monitor Programme implementation progress and to monitor Programme transactions. KRWSA has developed a computerised financial information system for monitoring Kerala Rural Water Supply and Sanitation Project. The software for the same will be modified to suit the MIS requirement of the Programme. This will be done during the Inception Phase. The salient features of the MIS for the Programme are discussed here.

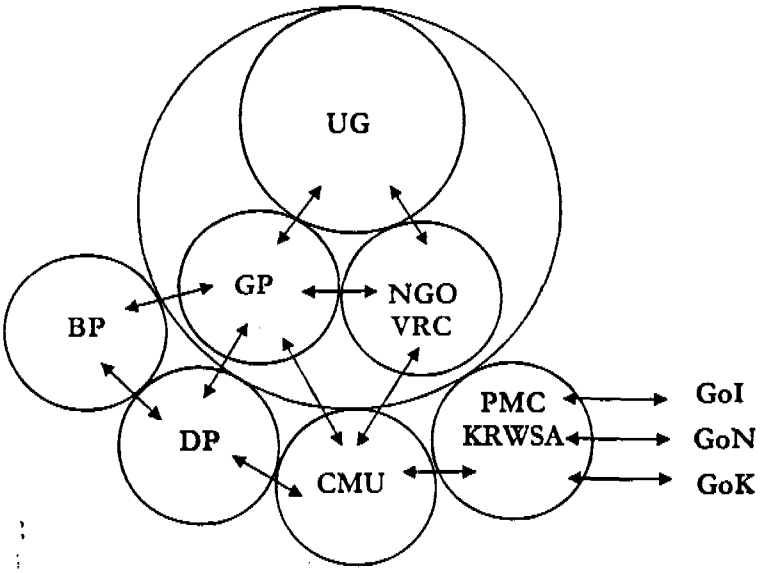
9.1.1 Information Flow

All the institutional entities partnering in Programme implementation will be collectively connected through an information flow. The information flow will not be unidirectional with one entity preparing a statement and forwarding to another. It will be bi-directional. For example, One User Group will be sending information about the progress of implementation to the Grama Panchayat. While the Grama Panchayat will be sending consolidated information on all the User Groups to the Co-ordinating and Monitoring Unit, a copy of the same will flow back to the User Group. This will not only enable them to understand the general progress of the Programme in the whole of the Grama Panchayat but also initiate activities to improve implementation at the User Groups level.

The User Groups, Grama Panchayats, the NGOs and Village Resource Cadre form the local partnership. There is intensive data flow among these three. The Grama Panchayat remain connected to the Block Panchayat and the District Panchayat. The District Panchayat and the Grama Panchayat have access with the Co-ordinating and Monitoring Unit. The Co-ordinating and Monitoring Unit will maintain its link with the Programme Management Cell within KRWSA. The Programme Management Cell provides all necessary information to GoK, GoI and the donor.

The information flow among the Programme partners is given in **Figure 9.1**.

Figure 9.1 Information Flow for the Programme MIS



UG: User Groups GP: Grama Panchayat VRC: Village Resource Cadre BP: Block Panchayat
DP: District Panchayat CMU: Co-ordinating and Monitoring Unit PMC: Programme Management Cell

9.1.2 Information Packages and Periodicity

Each of the Programme partners will generate information relating to the activities associated with them. The MIS will ensure the data needs of the Programme which are summarised in **Table 9.1**.

Table 9.1 MIS Data Packages and Periodicity

Data Source	Data Package	Periodicity
A. UG	• Progress Report • Financial Report • WATSAN Situation Analysis Report • Detailed Scheme Report • WATSAN Action Plan • Contribution Mobilisation Report • Financial Utilisation Report • Procurement and Stores Reports • Work Supervision and Quality Monitoring Report • Scheme Completion Reports • System Performance Report • VRC Performance Report • Health, hygiene and environmental cleanliness Report	• Monthly • Fortnightly • When activity is completed • When activity is completed • When activity is completed • Monthly • Before release of installments • During implementation • During implementation • On completion of scheme • Monthly during operation of scheme • Monthly • Monthly
B. NGO	• Progress Report • Activity Summary Report • Process Documentation Report	• Monthly • Fortnightly • Before exit
C. Village Resource Cadre	• Progress Report • Activity Summary Report • Work Supervision Report • Procurement and Quality Monitoring Report • System Performance Report • Process Documentation Report	• Monthly • Fortnightly • Weekly during implementation • Weekly during implementation • Weekly during operation • Before exit

Data Source	Data Package	Periodicity
D. GP	▪ Progress Report ▪ Fund Disbursement Report ▪ Grama Panchayat level WATSAN Action Plan ▪ Progress of Administrative Sanctions	▪ Monthly ▪ Fortnightly ▪ At the end of planning ▪ Monthly
E. BP	▪ Progress of Technical Sanction ▪ Progress of release of BP level Financial Resources to Grama Panchayat	▪ Fortnightly ▪ Fortnightly
F. DP	▪ Progress Report ▪ Progress of Technical Sanction ▪ Progress of release of DP level Financial Resources to Grama Panchayat	▪ Monthly ▪ Fortnightly ▪ Monthly
G. CMU	▪ Progress Report ▪ NGO/VRC Performance Report ▪ Financial Report ▪ Technical Sanction Monitoring Report ▪ Procurement Report ▪ Works Monitoring Report	▪ Monthly ▪ Monthly ▪ Fortnightly ▪ Monthly ▪ Monthly ▪ Fortnightly

The detailed format for the Reports with description on specific data items to be included will be developed during the Inception Phase.

9.1.3 Indicators and Data Items

Indicators and data items for monitoring progress of Programme implementation have been elaborated for each of the component activities and are given in *Table 3.1* The Programme Design Summary in *chapter 3.*

9.2 Impact Monitoring

The Programme MIS will be providing mostly quantitative data and are intended to generate information on progress of implementation and details of the various transactions taking place during implementation. In addition to the Programme MIS, there will be an arrangement for monitoring the impact of the various Programme activities as well as the outputs produced by the Programme. Impact refers to positive and negative effects or outcomes on the functioning/performance of institutional, human and physical entities as a result of the Programme activities. The Programme has been designed with the following important impact expectations:

- Community empowerment
- PRI strengthening
- Facilitating Programme management

9.2.1 Community Empowerment Monitoring

The success of the Programme pivot around the most important impact of "community empowerment." The community empowerment cannot be directly measured the way projects measure physical progress and financial disbursements. It is an aggregated manifestation of various underlying factors, which lead to empowerment. The manifestations of community empowerment is expected to occur in the following manner:

- The dynamics of decision-making
- Levels of system performance
- Pro-active management in dealing with problems, issues, system failures and conflict resolution

a. Dynamics of Decision-making

The User Groups are in a very unique position. The judicious combination of "plan-implement-assess" roles at the User Group level offers the greatest advantage of taking optimal decisions perfectly matching the local setting and conditions. The indicators for decision-making are:

- **Level of autonomy/degree of dependence** by the User Groups visa-vis NGOs, Village Resource Cadres and Panchayati Raj Institutions
- **The extent of User Group member participation** in participatory situation analysis, planning sessions, implementation review meetings etc. along with attendance and participation in deliberations by women, BPL families and other marginalised sections of the community
- **The style and functioning of User Committee** members as indicated by democratic consultations with the User Group members, extent of explorations and search for alternate solutions, commitment to the community above self-interest, quest and insistence for cost-effectiveness etc.
- **Level of transparency** as indicated by how knowledgeable are the members on the budget size, sources of procurement and prices at which items are procured, how procurements were made, total receipts and expenses, problems encountered etc.
- **Level of knowledge** of User Committee members and User Group members on various aspects of the project like awareness levels of advantages and disadvantages of various options the community discussed before decision-making, awareness levels on need for integrated water resources management, advantages of community initiatives and social action etc.
- **Cost-effectiveness of the decisions** as indicated by per household amount of capital contribution, capital investment per kilo litre of water produced, extent of coverage, inclusion of BPL and marginalised households in terms of amount of capital contribution visa-vis affordability etc.
- **Linkage of the decisions with sustainable water resources management** as indicated by revival of traditional systems, relationship established between usage and planned draw of water and potential, measures to protect, conserve and develop source, integration of sanitation with water use etc.

b. Levels of System Performance

The need and requirement for a process programme aimed at community empowerment resulted from the poor, sub optimal or inefficiency of water supply and sanitation service delivery mechanisms in the past. If User Groups can attain optimum levels of performance by the systems and services they plan, implement and manage, it is a clear indication of the empowerment of the community. The system reliability is a function of the source, conveyance, delivery, quality, cost-effectiveness etc. Hence the indicators for system performance are:

- **Improved service** as indicated by the level of satisfaction of User Group members about the services they themselves have set up. This includes consistency of performance during the days as well as across seasons, water quality, frequency of breakdown and time taken for restoration of service etc.

- **Cost-effectiveness of operations** is indicated by the per household operational expenses actually demanded visa-vis affordability by BPL and other marginalised households, differential tariff sectors to recover operational cost from above average users, innovativeness in collecting user charges, level of maintenance fund and system replacement funds built up, innovative measures for operational cost minimisation, level of variability in operational cost etc.
- **Attainment of human well being** is the most important impact of good system performance as indicated by optimal use of water, hygienic use of water, household water quality improvement like boiling, personal hygiene practices, innovative methods to prevent contamination during water use, optimal use of latrines, cleanliness at home, management of solid waste and liquid waste, multiplication and spread of flies and mosquitoes, incidence of water borne diseases etc.

c. *Pro-active Management*

Pro-active management styles exhibited by User Groups are manifestations of higher levels of empowerment. User Groups have reached a level of innovation where they are able to visualise issues and problems, which can come up and take advance measures to tackle them before the same actually affects them. The indicators for pro-active management styles are:

- **Arrangement for maintenance** of the systems and services indicated by building up of separate funds for maintenance and replacement of assets, levels of preventive maintenance etc.
- **Judicious water resources management** as indicated by measures for regulating water use, protecting contamination of the source, linking other use of water with drinking water supply etc.
- **Conflict resolution** as indicated by mechanisms to ensure equitable sharing of benefits, mechanisms for mediating clash of interests among members, social events to build community cohesiveness and co-operation

9.2.2 Monitoring PRI Strengthening

The second most important impact of the Programme is strengthening of the decentralisation process and performance of Panchayati Raj Institutions. The Programme is expected to bring in a major change from Panchayati Raj Institutions directly implementing schemes to devolving financial, planning and implementation responsibilities to the users. Whether the Programme is able to strengthen the Panchayati Raj Institutions' development governance, can be understood by the following indicators:

- **Stream lining the decentralised planning process** by preparing WATSAN Action Plans through local situation analysis and discussion and approval from the Grama Sabha. The approval of WATSAN Action Plan, the constitution of User Groups federation and its effective working as sub group for WATSAN sector, support and guidance extended by sub committee of Technical Advisory Committee at the BP level, support and guidance extended by technical committee of the DLTC etc. are the other indicators.
- **Strength of local resource mobilisation** by the Panchayati Raj Institutions at all levels from own resources as well as from other programmes and schemes and channeling the same to the Grama Panchayat and User Groups
- **Non-interference in the decision-making roles of User Groups** in every activity reserved for them by elected members, officials of the Panchayati Raj Institutions is an important indicator about the willingness to devolve responsibilities to the User Groups.

- **Co-ordination of three tiers of PRIs** can be judged by the three tiers respecting the principles of subsidiarity and the higher tiers not chalking out schemes and activities which can be better done by a lower tier and passing on resources to that tier. Yet another strong indicator will be that the approaches, principles and philosophies of the Programme get applied to all the other programmes of the Panchayati Raj Institutions. Also that the three levels decide that all funds coming into the district for water supply and sanitation programmes relating to different schemes of GoK or GoI will be implemented in the same manner as the Programme. The higher tier Panchayati Raj Institutions will not interfere or influence the decision-making of a lower tier in activities exclusively reserved for them like selection of NGO by the Grama Panchayat.

9.2.3 Facilitating Programme Management

The Programme management functions are not of controlling and directing implementation, instead supporting and guiding. The third important impact of the Programme is the changed management style of the Programme co-ordination and management set up. The indicators of change are:

- **Autonomy and freedom to CMU and PMC** as indicated by non-interference by GoK in the activities of the Co-ordinating and Monitoring Unit and Programme Management Cell like selection of personnel, selection of Grama Panchayats, selection of NGOs etc. Within the framework of KRWSA Memorandum and Articles of Association and approved Programme implementation document, the Co-ordinating and Monitoring Unit and Programme Management Cell are free to manage implementation. GoK, GoI and the donor will be informed of all the activities and progress through well defined reports prepared by the management information system. One important indicator will be the directions and Government Orders to support Co-ordinating and Monitoring Unit and Programme Management Cell to implement the principles and philosophies set out in the approved Programme Implementation Document (PID).
- **The tone and prescriptive manner** in which the CMU and PMC communicate with the Panchayati Raj Institutions, NGOs and User Groups will be an important indicator on the authoritarian or participatory style of management. All guidance needs to be suggestive in nature to develop partnership and mutual learning. The style with which review meetings and workshops are conducted need be two way process for improvement than for finding fault and pushing targets.
- **Field based mobility of Programme management staff** is yet another indicator. How familiar are the Programme managers about field realities, availability of Programme management staff at field level meetings, confidence exhibited by User Group members, NGOs and Village Resource Cadre in approaching Programme management staff for support etc. are the other indicators for successful Programme management.

9.2.4 Implementation Arrangement

The Review, Support and Monitoring Missions as well as the **Midterm Review Mission** will undertake a special task of evaluating the Programme performance through impact monitoring. The framework given above will be utilised to evaluate the impacts. The missions will file a separate note on the progress of realisation of the impacts as per the framework. Actions and factors, which are adversely affecting the attainment of the indicators, will be clearly brought by the Mission. The mission will also recommend corrective actions and the parties involved will be briefed about the impediments and advice corrective measures. Serious flaws noted will be used as a disincentive for further release of Programme funds and even cancellation of the Programme.

9.3 Self-regulatory Community Monitoring System

The most important benefactors of the learning process from the feed back of the monitoring system are the users themselves. In addition to the MIS and impact monitoring a self-regulatory community monitoring system will be instituted, the details of which have already been described in *section 6.3*. During the Inception Phase, the overall framework for community monitoring will be worked out.

9.4 360⁰ feedback

The User Group members will be assessing the performance of the User Committee members, the User Committee will be assessing the support and guidance from the Grama Panchayat, the Grama Panchayat will be assessing the Block Panchayat and the District Panchayat performance and all these agencies together will assess the performance of Co-ordinating and Monitoring Unit and Programme Management Cell. This will be an open and frank assessment to give feedback on the effectiveness of the activities performed by each one of them. The feedback mechanism will be an annual exercise and a simple to use format will be developed during the Inception Phase.

9.5 Social Audit

The social audit will be conducted by an Audit Team of User Group members appointed by the General Body of each User Group. The Social Audit Team will consist of experienced and respectable persons who in no way are connected with Programme implementation. The Social Audit Team proposed by the User Group will be approved by the Grama Sabha. The social audit will be done in three stages, immediately after the planning stage, during implementation and during the O&M phase. The Social Audit Report will not be submitted to User Committees or other agencies. The Report will be presented and discussed in the User Groups General Body first, and later in the Grama Sabha. The Social Audit Reports as approved by the Grama Sabha will be submitted to the Grama Panchayat and CMU. The Social Audit Report will also specify the corrective actions and instructions will be immediately issued to the User Committees and other agencies for rectification of the defects.

9.6 Experience Sharing

Experience sharing is part of internal learning and also to maintain transparency of Programme activities. The following activities will be undertaken:

- Newsletter – to facilitate intra-UG/GP experience sharing
- Notice boards and wall paintings – to facilitate intra-UG/GP information sharing. All major events are put up in the notice board with outcomes of the events. All procurement details estimates and expenditure details are also exhibited
- Exchange visits – to facilitate cross learning both from other UGs and also from other institutions (vertical)
- Interactive workshops

Chapter 10

Programme Phasing and Action Scheduling

The peculiar geographic and climatic factors prevailing in Kerala with severe summer from December till June cause acute drinking water scarcity during summer months. There is too much enthusiasm in everyone to solve the problems of water scarcity during these months. With the commencement of monsoon rains in June, the enthusiasm withers away to return only during the next summer. Almost all past water supply initiatives in Kerala have been suffering from the twin curses of, neglecting drinking water problem during rainy season and over anxiety to build physical structures in the name of water supply schemes. This was pointed out by one of the learned participants during a consultation workshop conducted for the preparation of the PID.

The success stories from Olavanna and Cheekode have not so far been fully translated into wide spread application. Kerala's WATSAN sector is yet to witness a fully community driven Programme aimed at empowerment of User Groups in a wider scale. Even though many of these principles are applied on the ground in Kerala Rural Water Supply and Sanitation Project, the project mode of overemphasis on physical targets and financial disbursements over a tight schedule have raised many issues about sustainability and community empowerment. The changed approach the Programme will follow visa vis a project mode was discussed in *section 5.2.3*.

The Programme propose to use a gradual and evolving community empowerment approach to solve their water supply and sanitation related problems. The emphasis will be more on community capacity building and conserving water resources aimed at building sustainable, cost effective and affordable solutions based on traditional practices, local wisdom and involvement of every one in the community barring all social, economic and political colors. Such a concerted effort aimed at leaving long lasting impacts at the community level cannot be rushed through external acceleration.

10.1 Pace of Programme Implementation

The Programme will not be implemented with a prescriptive and straightjacketed list of activities squeezed into a tight time schedule with focus on physical outputs. The Programme will allow enough time for the communities to implement activities, collect feedbacks and learn from their own actions. Such learning will be used as inputs in fine tuning and adjusting the later activities.

One most important aspect, usually overlooked while Programme planning, is the pace of implementation. The capacity to spend money and speed to show physical progress are not fair indicators of success. At the same time, undue delay will result in frustration and people loose interest. Hence a judicious mix of ensuring process efficiency, output quality (institutional, physical and intangibles like community confidence) and speed in the same order of significance will be envisaged while deciding the pace of implementation, which is called the "Optimal Pace of Implementation". The Programme will use this concept in deciding the duration of the overall Programme as well as stages of implementation.

The Programme recognises that communities are not physical resources, which get groomed into any predetermined shape within a given time. It also do not believe in the folly that communities

will fall in line with the externally driven commands of NGOs or GOs shedding off their creativity, innovativeness and centuries old knowledge systems and practices. It recognises that communities will respond positively to get organised pooling all their resources in an effort to get their rights over managing the natural resources especially water resources and in solving themselves their current problems using long lasting solutions. The Programme will allow sufficient time, while at the same time not unnecessarily dragging and delaying the fruits of long lasting benefits.

Considering the socio-economic variability and diversity of User Communities, their natural geo-physical and environmental setting, the natural institutional background of Panchayati Raj Institutions etc., the Programme provides for an optimal duration of 36 months to complete one development cycle. This is the time required to mobilise and empower User Groups and allowing the User Groups to plan and implement solutions themselves.

One development cycle consists of a cascade interdependent critical activities like awareness building, mobilising, empowerment through experiential learning, capacity building, community implementation etc. as explained in *chapter 4* and *chapter 6*.

10.2 Critical Assumptions

The Programme Phasing has been worked with the following assumptions:

- Government of Kerala submits the PID to Government of India 31st December 2002
- Government of India clears the PID 31st January 2002
- Government of Kerala receives approval from RNE 31st March 2003
- Agreement formalities GoN/GoI/GoK 15th April 2003

10.2.1 GoK Commitments

Consistent with the GoK commitment towards the reforms in water supply and sanitation sector and strengthening the ongoing decentralisation process, it is suggested that GoK may pursue issuance of the following Government Orders and other initiatives. These suggested actions are reckoned as some of the preparatory activities for Programme implementation, which is summarised in **Table 10.1.**

Table 10.1 Suggested Programme preparatory activities

Action	Timeframe
1. Issuing of a Government Order approving the PID	31-12- 2002
2. Issuing Government Order for restructuring and repositioning KRWSA	15-02-2002
3. Administrative sanction for the two district RWS&S Programme and appointment of Programme Manager	28-02-2002
4. Issuing Government Orders to apply project principles and guidelines in all other programmes implemented in the district in WATSAN sector and recognising the User Groups and sub groups at the GP level, the sub committee of TAC at the BP level, technical committee (WATSAN) at the DLTC as agencies responsible for such programmes	31-03-2002
5. Release of funds for the initial expenses like setting up of PMC and CMU	15-03-2002
6. Release of a policy statement committing GoK's willingness to pursue Rural Water Supply and Sanitation initiatives through community participation facilitated by Panchayati Raj Institutions and preparation of a sector policy guideline synthesising from the learning of all community based initiatives evolving towards an Integrated water Resource Management ((IWRM)	31-03-2002
7. Issuing Government Orders to dovetail the Programme planning process with planning by Panchayati Raj Institutions and creation of sub groups at Grama Panchayat level, sub committee of TAC at BP level, technical committee of DLTC, methodology for basing the estimates with market rates etc.	31-03-2002
8. Issuing a Government Order to set up policy support core group	15-04-2002

10.3 Programme Phasing

The overall Programme implementation will follow a gradual evolution consisting of the following phases:

- **Inception Phase** of nine months for completing preparatory activities for implementation
- **Initial Batch of 8 Grama Panchayats**, 4 in each districts to fully understand field level realities to fine tune and adapt Programme design and
- **Three Subsequent Batches** of Grama Panchayats where the Programme will be scaled up.

10.3.1 Inception Phase

Before the commencement of activities in the initial batch of Grama Panchayats, there will be an Inception Phase of nine months duration to complete various preparatory activities. The Inception Phase will be managed by the Programme Manager appointed by the GoK with technical assistance from the donor. The Programme Manager will recruit through open advertisement essential staff to manage activities in the Inception Phase and the initial batch of Grama Panchayats.

The various activities to be completed during Inception Phase are:

- Appointment of supporting staff for Programme Manager and Co-ordinating and Monitoring Unit through open advertisement. The entire complement of staff will not be recruited. Essential staff needed to manage activities in the initial batch of the Grama Panchayat alone need to be recruited
- Setting up offices for Programme Management Cell and Co-ordinating and Monitoring Unit
- Providing budgetary provision for the Programme and release of funds to the Programme Management Cell
- Development of an operational guideline for Programme implementation consisting of formats for WATSAN Action Plans, guidelines for community procurement, O&M Manual, detailed ToR for NGOs, ToR and model contract for Village Resource Cadres detailing payment guidelines during training as well as during contracts, format for MoU between Grama Panchayat and User Groups, ToR for socio-technical study for rehabilitation, format for Detailed Scheme/Rehabilitation Report, guidelines for collection of market rates and outturn of labour, community procurement guidelines, format for Scheme Completion Report, Manual for planning, designing and O&M of Environmental Sanitation and Manual for Micro Watershed Development
- Developing guidelines for participatory action research
- Prepare detailed budget for different activities refining on the existing budget
- Finalising detailed constitution of sub committee (WATSAN) of Technical Advisory Committee at BP level and technical committee (WATSAN)
- Finalising ToR for detailed tribal study and preparation of Tribal Development Plan for Idukki district
- Developing ToR Capacity Service Provider
- Developing monitoring guidelines including adaptation of MIS, community participatory monitoring, format for 360^0 feedback
- Identifying and contracting NGOs for undertaking social mobilisation and handholding in consultation with the Batch-I Grama Panchayats
- Issuing and operationalising the various Government Orders as elaborated in *Table 10.1* as preparatory milestones
- Preparing and finalising IEC materials through participatory workshops

- Fielding the following technical missions: –

  Organisation Development Mission
  Technical Assistance at CMU
  Policy and Advocacy Mission

10.3.2 Initial Batch (Batch-I)

The preparation of the Programme implementation document followed a participatory process. The district level stakeholder consultation workshop attended by all the Grama Panchayats in the district, self-selected 4 Grama Panchayats in each district. The 4 Grama Panchayats were selected from the natural physiographic divisions within the districts. Detailed PRA exercise was conducted in 5 out of the 8 Grama Panchayats. Detailed participatory collections of data on technical aspects were done in all the 8 Grama Panchayats. The design of the PID is based on the data generated through these exercises and also a hydro geologic data collection done at the district levels.

The Programme propose to continue with activities of implementation in the 8 Grama Panchayats where the initial PRA and technical studies were undertaken. This will form the first batch of Grama Panchayats. The reasons for this approach are:

- These Grama Panchayats were selected through a self selection by the district level consultation meeting attended by the District Panchayat representatives, Grama Panchayat representatives and other district level stakeholders through open discussion
- These Grama Panchayats ideally represent the hydro-geological and socio-economic zones within each districts
- The PRA exercise and technical studies have already generated the rapport for the Programme with Panchayati Raj Institutions representatives, existing community based organisations, NGOs, local experts and the communities at the grass root and raised expectations and interest at these levels
- The Programme design and budgets were prepared based on the representative setting of these Grama Panchayats and the same can be fine tuned for scaling up by further learning from the same Grama Panchayats
- Enough information has already been generated on these Grama Panchayats for a smooth and early kick off for the Programme in these Grama Panchayats

The details of the first batch of 8 Grama Panchayats is summarised in **Table 10.2.**

Table 10.2 Geographic distributions of Batch-I Grama Panchayats

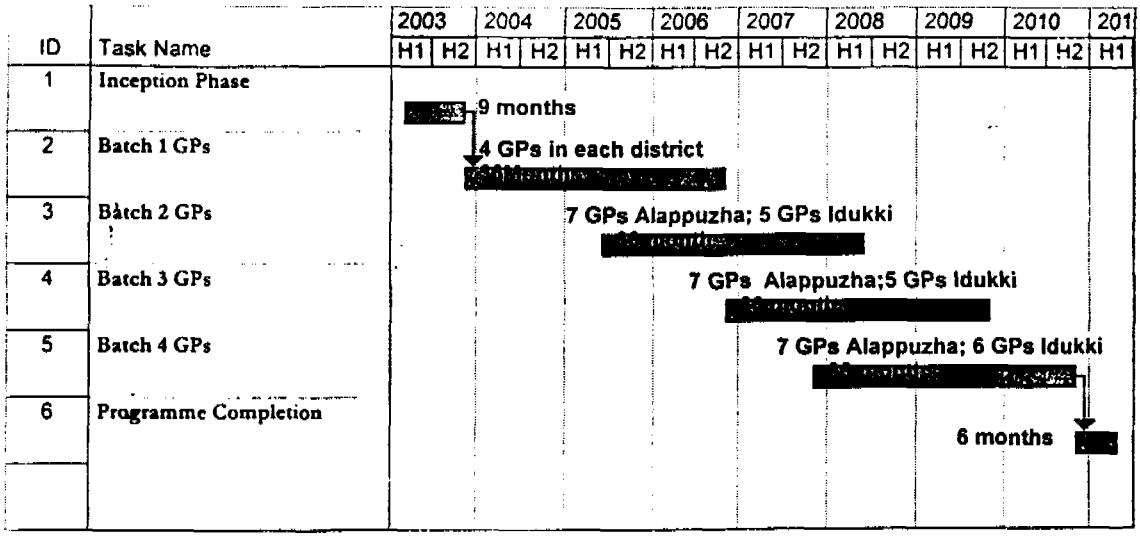
Name of GP	Natural Geographic Region	Awareness building, Rapport Building Socio-technical problem study	Technical Data Collection	PRA
A. Idukki District				
1. Muttom	Lower Region	Yes	Yes	Yes
2. Nedunkandam	Middle Region	Yes	Yes	Yes
3. Peruvanthanam	Middle Region	Yes	Yes	No
4. Kanthalloor	High Region	Yes	Yes	Yes
B Alappuzha District				
1. Neelamperur	Upper Kuttanad	Yes	Yes	Yes
2. Aroor	Coastal	Yes	Yes	Yes
3. Kainagiri	Kuttanad	Yes	Yes	No
4 Puliyoor	Eastern Region	Yes	Yes	No

10.3.3 Subsequent Batches

It is proposed to cover 25 Grama Panchayats in Alappuzha and 20 Grama Panchayats in Idukki as explained in *section 4.6.2*. The Grama Panchayats other than the Batch-I Grama Panchayats will be covered in 3 batches. In each Grama Panchayat, the Programme will be implemented with duration of 36 months. Thus there will be 4 batches of Grama Panchayats and the total implementation of the Programme including the Inception and Programme Completion Phases will take 8 years.

The overall phasing of the Programme is given in **Table 10.3**.

Table 10.3 Overall Programme Phasing



10.4 Programme Development Cycle

Chapters 4 and *5* elaborated the detailed socio-technical processes and activities with which the Programme will be implemented in each Grama Panchayats. Once the Programme arrives at the Grama Panchayat, the activities happen in evolving stages leading to attainment of the Programme objectives. A listing of all the activities, likely durations to complete each stage, issues to be flagged in each of the activities etc. are presented in the form of a Gant Chart using MS Project. This Chart is named as Programme Development Cycle and is given in **Attachment 10.1.**

Table 10.4 summarises the socio-technical Programme implementation phases.

Table 10.4 Programme Implementation Phases

Sl.No	Name of Phase	Duration	Milestones
1.	Sensitisation and awareness building Phase	5 weeks	General public awareness on Programme principles Commitment from Grama Panchayat leadership
2.	Participatory RWS&S Situation Analysis	19 weeks	Local leaders identified VRCs identified and being trained on the job Participatory resource assessment completed Bench mark survey completed Development Report on WATSAN Sector completed
3.	Institutional Phase	19 weeks	Rehabilitation Study Reports Community consensus on technology User Groups registered and User Committee selected User Groups federation formed
4.	Community Planning Phase	26 weeks	Detailed Scheme Report prepared WATSAN Action Plan prepared Grama Sabha approves WATSAN Action Plan Grama Panchayat level WATSAN Action Plan prepared Technical sanction by DLTC 50% of community contribution mobilised NGO prepares process documentation and exit
5.	Community Implementation Phase	78 weeks	Water Supply and Sanitation Schemes commissioned Upfront O&M collection Scheme Completion Report prepared Social Audit done
6.	O&M Phase	18 weeks	O&M by communities Village Resource Cadre prepares process documentation Programme exit

Chapter 11

Programme Budget and Funding

11.1 Programme Budget

The overall budget for the Programme is presented in **Table 11.1**. The detailed cost analysis is presented in **Attachment 11.1**.

Table 11.1: Overall Budget
(Rs. Lakhs)

Item	Total Cost(Rs)	GUG Share	PRI Share	GoK Share	Programme Share	Cost for Batch-I
A.Mobilising and Empowering User Groups						
1. Sensitation and Awareness Building/1	45.00		4.50		40.50	8
2. Preparation of GP level WATSAN Development Report/2	22.50		2.25		20.25	4
3. Payment to NGOs/3	496.80				496.80	88.32
4. Subsistance payment to VRC trainees/4	45.00				45.00	8
5. Payment to VRCs/5	350.36				350.36	62.29
Subtotal	**959.66**	**0.00**	**6.75**	**0.00**	**952.91**	**170.61**
B. Institutional Support						
B1. Panchayati Raj Institutions Strengthening						
Support to GP level co-ordination/6	64.80				64.80	9.26
B2. Co-ordinating and Monitoring Programme Implementation						
PMC						
Investment Cost/7	32.00				32.00	15.00
Operational Cost/8	382.36			217.95	164.41	65.34
Co-ordinating and Monitoring Unit						
Investment Cost/9	108.00				108.00	63.00
Operational Cost/10	441.24			251.51	189.73	63.03
B3. Sector Policy Development/11						
B4. Technical Assistance/12						
Subtotal	**1028.40**	**0.00**	**0.00**	**469.45**	**558.95**	**215.63**
C. Building Water and Sanitation						
C1. Building Water Supply Services/13	17518.07	2627.71	1751.81		13138.55	1786.72
C2. Sanitation and Hygiene Promotion/14	234.60				234.60	158.20
C3. Water Quality Monitoring	6.00				6.00	1.00
Subtotal	**17758.67**	**2627.71**	**1751.81**	**0.00**	**13379.15**	**1945.92**

Item	Total Cost(Rs)	UG Share	PRI Share	GoK Share	Programme Share	Cost for Batch -1
D. Participatory Action Research						20.00
1. Micro watershed management/15	608.00		152.00		456.00	108.09
2. WATSAN for Scheduled Tribes/16	163.03	8.15	24.45		130.43	40.76
3. Hardware cost for other initiatives/17	381.80		38.18		343.62	95.45
4. Software Support to PAR/18	197.96				197.96	28.28
5. Innovative support systems/19						
6. Trend setters' fund/20	100.00			10.00	90.00	25.00
Subtotal	1450.79	8.15	214.63	10.00	1218.01	297.58
E. Capacity Building/21	1021.00			102.10	918.90	207.20
Subtotal	1021.00			102.10	918.90	207.20
Grand Total	22218.52	2635.86	1973.19	581.55	17027.92	2836.93

Assumptions

1. Sensitisation and Awareness Building Cost include cost of conducting street plays, workshops, preparation of posters leaflets etc. estimated @ Rupees 1 Lakh per GP, to be shared 10% by GP

2. Includes cost of conducting participatory benchmark survey, participatory data collection, preparation of GP Resource Map, Documentation etc.estimated @ Rs. 50,000 per GP to be shared 10% by GP and 90% by Programme

3. Cost include payments to the team leader and 2 mobilisers @ Rs.40,000 per month for 24 months and cost of overheads @ Rs.6,000 per month

4. The VRC trainees will be paid a subsistance allowance of Rs. 1,000 per month during the training period of about 10 months.
The cost of travel, boarding and lodging expenses to attend trainings conducted outside the GP will be met by the Programme and is included in the Capacity Building Cost

5. The payment to VRCs include the cost for undertaking design, estimation and work supervision calculated at 2% of the hardware cost for water supply

6. Includes incentive allowance for a designated officer @ Rs. 1,500 pm. (salary met by GP), logistic support, cost of running activities for UG federation, stationary, other co-ordinating expenses @ Rs. 3,000 pm.

7. As per details given in Table 1 in Attachment 11.1

8. As per details given in Table 1 in Attachment 11.1, cost to be shared by GoK in the ratio 0%, 20%, 40%, 60%, 80% and 100% during year 1, 2, 3, 4, 5 and afterwards respectively

9. As per details given in Table 1 in Attachment 11.1

10.As per details given in Table 1 in Attachment 11.1, cost to be shared by GoK in the ratio 0%, 20%, 40%, 60%, 80% and 100% during year 1, 2, 3, 4, 5 and afterwards respectively

11. There is no separate budgetary provision for Sector Policy Development, Expenses will be met from budget for PMC and Capacity Building

12. Budget separately provided under TA which will be directly administered by RNE

13. As per details in Table 2 in Attachment 11.1

14. As per Table 3 in Attachment 11.1

15. As per details given in Table 4 in Attachment 11.1, to be shared 25% by PRI and 75% by Programme

16. Includes both Hardware and Software Costs to be shared @ 5% by UG, 15% by GP and 80% from Programme funds. Worked out at 2% of water supply cost for Idukki District

17. As per details given in Table 4 in Attachment 11.1, to be shared by GP 10%, and Programme 90%

18. Includes institutional, logistic and other software cost for undertaking PAR estimated at 20% of hardware cost to be borne entirely by the Programme

19. No separate budget needed will be met from the general budget for water supply, empowering UG etc.

20. A lumpsum of 100 Lakhs to be provided initially, to be shared by GoK 10%, and Programme 90%

21. As per Table 5 in Attachment 11.1 to be shared 10% by GoK and 90% by Programme

11.2 Explanations on the Budget

The detailed budget for the main items are separately given in **Attachment 11.1**. The Programme proposes an initial Batch I Phase in those Grama Panchayats where the Panchayati Raj Institutions and technical studies have been conducted as part of preparation. All the assumptions included in the budget can be realistically verified during the Batch I Planning Phase. Quality estimates can only be arrived at by field testing during Batch I. The budget for Batch 2 to 4 will be suitably reworked after finalisation of the WATSAN Action Plan of Batch I. Hence budget has been split for the Batch I and the remaining batches. During the Inception Phase more clarity will emerge on activities like Participatory Action Research and the budget will be suitably revised.

a. The basis for arriving at estimates of physical facilities

- The technical study carried out in 8 Grama Panchayats generated enough information on the approximate percentages of problem households representing each geographic region within the district. The target for coverage was hence fixed realistically considering the future population as well. Detailed cost analysis has been carried out contacting the market and contractors. Actual measurement and detailed inventory were carried out on different types of existing investments to workout realistic estimates for rehabilitation. Similarly, typical estimates were also prepared for new schemes of different sizes and technology choices.
- For sanitation activities typical estimates were prepared during the technical study. The rates for sanitary latrines are the subsidy provided from the Programme. The typical estimate for solid waste management was prepared based on similar projects implemented in Malappuram by SEUF
- The estimates on the physical activities of Participatory Action Research are purely based on assumptions, as we do not know the size and other details of these components. These are tentative allocations, which will be refined during Inception Phase.

11.3 Programme Funding

The total cost of the Programme is Rs. 2221.85 Million to be funded by Government of Netherlands, Government of Kerala, Panchayati Raj Institutions and User Groups. The overall allocation for the four agencies are in the ratio 76:3:9:12, and in actual terms is indicated below:

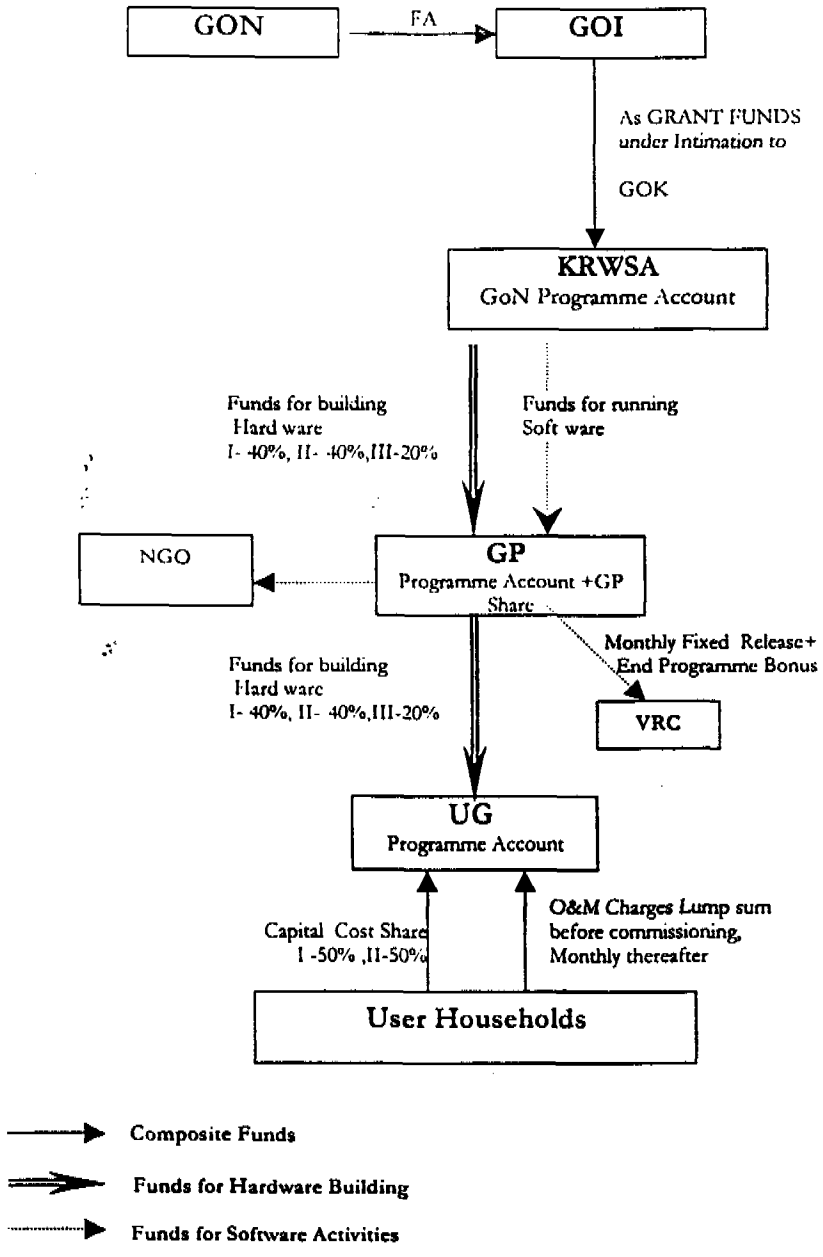
		Rs. (million)
a.	Government of Netherlands in the form of grant	1702.79
b.	Government of Kerala	58.16
c.	Panchayati Raj Institutions	197.32
d.	User Groups through capital contribution	263.59

The GoK's contribution is mainly to share the operational costs of the Programme Management Cell and Co-ordinating and Monitoring Unit in the ratio 0%, 20%, 40%, 60%, 80% and 100% during the Programme years 1,2,3,4,5 and thereafter. In line with the decentralisation policy of GoK the Panchayati Raj Institutions are expected to generate local resources and funds from other schemes to be utilised for undertaking activities in water supply and sanitation sector. In line with this policy, the three tier Panchayati Raj Institutions will contribute their share of Programme implementation. The exact percentages of their contribution will be dependent on the item of activity. Similarly the capital contribution by User Groups will vary depending upon components.

11.4 Programme Fund Flow

The fund flow arrangement for the Programme is given in **Figure 11.1.**

Figure 11.1: Programme Fund Flow Arrangement



11.4.1 GoN Funds

The assistance from Government of Netherlands for the Programme is released to Government of India as Financial Assistance (FA) relating to all costs directly chargeable to investments under this Programme. The technical assistance for providing services of international

and national experts as elaborated under *section 6.4.6* will be directly administered by Royal Netherlands Embassy, New Delhi. The entire assistance from GoN is a grant to Government of India.

11.4.2 Government of India Funds

Government of India will release the funds for Programme implementation directly to KRWSA to the credit of a designated Programme account, under intimation to Government of Kerala. Such an arrangement is highly essential owing to the following reasons:

- The entire assistance is in the form of grants from Government of Netherlands
- Timely and uninterrupted fund availability for field level Programme implementation
- About 25% of the Programme cost is contributed by PRIs and Beneficiaries
- To have a direct correlation of fund release with physical and financial progress of Programme implementation

11.4.3 Government of Kerala Funds

Government of Kerala will fund the operational cost of running the Programme Management Cell and the Co-ordinating and Monitoring Unit in a graded manner starting with 0% in year 1 to gradually taking over with 100% during year 5 onwards. GoK will also fund 10% of trendsetters' fund to be created. The capacity building cost will be funded by GoK to the extent of 10% of the total cost.

11.4.4 Funds for Building Hardware

The funds for building the various physical works under the mainstream activities will be classified as hardware funds and released to the User Groups through the GPs. Except for construction activities undertaken at the GP level for environmental sanitation, drainage etc., the bulk of the expenditure under hardware will be expended by the User Groups.

The funds for building hardwares is released in 3 installments as follows:

- Installment No. 1 – 40% of the estimated cost of the schemes upon approval of the plans by Technical Advisory Committee and capital contribution of UG and GP
- Installment No. 2 – 40% of the estimated cost of the schemes upon purchase of goods and materials, and submission of Utilisation Certificate
- Installment No. 3 – 20% of the estimated cost upon submission of Utilisation Certificate

11.4.5 Funds for Software Activities

Funds for software activities include all operational costs for various institutional entities, capacity building costs, costs towards services, research and development etc. The compensation for the VRCs and payments for the NGOs and other service providers are expended by the GPs.

11.4.6 Funds for Participatory Action Research

The Participatory Action Research activities are implemented by NGOs, individuals and institutions contracted for the purpose. In addition, the capacity building support will also be provided by a contracted service arrangement. These payments are directly effected by KRWSA.

11.5 Programme Disbursements

If Government of India and Government of Kerala agree to release Programme funds directly to KRWSA, it necessitates that Government of Netherlands will release an one time pre-finance advance to cover about 9 months' Programme implementation. During the inception phase, yearly fund requirements will be worked out so as to enable calculation of the pre-finance advance required. The KRWSA will prepare 6-monthly financial and physical progress report and will submit it to RNE for processing. Considering a process time of 3 months, the 9 months' working advance is suggested. Based on the financial and physical progress, the advance amount will be replenished fully. After mid-term review, the working advance will be adjusted against future replenishment claims. However, Government of Netherlands will release payments only upon successful physical and financial progress and its verification through various Review, Support, Advisory and Monitoring Missions.

11.6 PRI Funds

The Programme implementation needs to be fully integrated with the planning process under the decentralisation. The estimates prepared for implementing the schemes and plans under the Programme will be fully reflected in the plans prepared by the PRIs. The contribution by the PRIs shall be clearly earmarked. Government of Kerala will release the PRI contribution under the plan funds with priority so that the Programme implementation is not affected. The PRIs will earmark funds towards their contribution on a priority basis. The release of Programme funds to PRIs is conditional to crediting PRI contribution to the designated Programme account at the GP level.

The Tenth Plan Guideline have clearly indicated that the Panchayati Raj Institutions can re appropriate from the three sectors under which plan funds and allotted to them for meeting expenses connected with water supply.

11.7 Capital Contribution by Beneficiaries

Out of the capital contribution arrived at based on the estimated scheme costs, the User Groups shall remit at least 50% of the upfront cash contribution in their bank account before submitting their plans to the GPs. The GPs will accord necessary administrative sanction and recommend the plan for technical sanction to the TAC only after ensuring that the first installment of capital contribution has been mobilised by the UG.

The remaining capital contribution will be mobilised before receipt of the first installment of Programme funds from the GP.

The User Group members have an option to contribute labour towards capital contribution up to 50% of the amount of capital contribution worked out for them. The GPs will not subsidise the User contribution.

Chapter 12

Financial Management

The Financial Management system for the Programme will draw heavily from those now in vogue in KRWSA. Wherever possible, the existing arrangements will be followed. During the inception phase, a review of the Financial Management arrangement will be done to assess the exact position.

The Financial Management for the Programme will be elaborated for two levels, which are:

- At the Programme management level for PMC and CMU
- At the Programme implementation level for GPs and User Groups

12.1 Financial Management Information System

KRWSA has developed a financial management system for managing the World Bank Project, which is operationalised at the levels of GP, District DPMU and PMU. The system at GP is application software, which is a subset of a full system at DPMU and PMU. The system is quite comprehensive and apart from accounting functions, includes useful reports for monitoring of physical and financial performance.

However, considering this software has been developed for World Bank Project, specific adaptations have to be made for the GoN supported programme. This will be undertaken by the Programme during the inception phase. A user manual will also be developed for the system during the inception phase.

12.2 Manual of Financial Procedures

KRWSA already has a manual for Finance and Accounts Rules. This covers basic financial accounting procedures and accounting and reporting formats. It includes rules on authority for incurring expenditure, accounting, flow of funds from PMU, procurement etc. However, as this manual at present is World Bank Project oriented, suitable adaptation, wherever necessary, especially on many aspects such as reporting, fund-flow, approval procedures, etc., including changes due to many of the implementation strategies will be necessary. The programme will identify such necessary changes and prepare an amended manual for the GoN supported programme during the inception phase. This manual will contain detailed guidelines on fund-flow arrangements. It will clearly lay down financial responsibilities at all levels. It will lay special emphasis on developing of annual budgets for the programme, particularly at the levels below PMU.

KRWSA has developed a simple manual accounting system for implementation at UG level for the World Bank Project. The same system, with suitable amendments, is to be adopted for the GoN supported programme. Simple, precise guidelines in Malayalam will also be prepared during the inception phase for grass-root organisations such as UGs & Panchayats. The guidelines will cover

procedures for community contracting and procurement. These guidelines will become the basis of any financial training for these organisations.

For reporting purpose, KRWSA has already developed simple and easy to understand formats for UGs and GPs. Similar formats, in Malayalam, will be used in the GoN supported programme. Lead periods for processing of documentation etc. will be identified, so that minimum of delays in transfer of funds takes place. Indicators of financial management efficiency e.g., timeliness of reporting and disbursements, etc., will be identified and indicated so that the funds are available at the appropriate places in time.

12.3 Planning and Budgeting

During the Inception Phase, KRWSA will prepare the plans for batch 1 GPs and for Programme management. Detailed budgets will be also be elaborated. Thereafter, annual plans will be prepared along with detailed budget for Programme implementation.

12.4 Accounting system

Currently, KRWSA is following double entry system of accounting through its computerised accounting system. The KRWSA has also developed simple manual accounting system for the UGs. These systems will be adapted by incorporating necessary changes to suit the Programme.

The GP level and UG level accounting will be streamlined with the involvement of VRC. Even though UGs are following a manual system of accounting, the details will be collected by the VRC on a monthly basis and will be reported to KRWSA electronically.

12.5 Finance Personnel

The PMC of the Programme will be staffed with a Additional Programme Manager (Finance) who will manage the finance function. At the CMU, a Co-ordinator, Financial Management will smoothen Programme implementation by providing financial management support.

12.6 Financial Capacity Building

Large number of User Groups will be intensively implementing schemes under the Programme by receiving Programme funds. They will also be collecting User contributions both towards capital contribution and for meeting operational and maintenance expenses. At least a portion of the capital contribution needs to be collected in the form of labour contribution.

All the dynamic functions of Financial Management like accounting, record keeping and reporting are to be maintained at the User Group level. Simple and transparent systems will be developed for Financial Management at UG level.

The VRC volunteers will be given special training to impart necessary Financial Management principles, who will train UC members in charge of financial matters at the UG. The VRC members will be providing on the job training to UC members.

12.7 Reporting

An utilisation of funds statement will be prepared on half-yearly basis. The half-yearly report should accompany the report on achievement of physicals.

12.8 Auditing

The Programme accounts will be audited by a firm of independent Chartered Accountants. The statutory auditor will audit the Programme activities and issue reports on the utilisation of funds, adequacy of internal controls, procurement procedures etc.

The accounts of UG and GP will be audited by Chartered Accountants from a panel prepared by KRWSA.

The Programme implementation will be also audited by Comptroller of Auditor General.

Chapter 13

Programme Benefit Analysis

The Programme is expected to bring in a series of benefits to all the stakeholders and institutions. The challenge will be how the benefits are sustained. The category-wise benefits accruing on implementation of the Programme are as follows:

13.1 User households

- Access to safe drinking water
- Improved personal hygiene
- Better household and environmental sanitation
- Confidence to participate
- Better mindset for self help
- Better service levels and satisfaction
- Savings on water supply and sanitation related expenses

13.2 Women

- Reduced drudgery on water collection
- Greater involvement in social action
- Better privacy for sanitation
- Greater confidence
- Improved leadership
- More opportunities for self help
- Increased happiness due to healthy family members

13.3 Vulnerable and marginalised sections

- Better mainstreaming
- Equity of benefits
- Better social status
- Savings on water supply and sanitation related expenses

13.4 User Groups

- Increased capacity for social action
- Confidence to address other social issues
- Ability to perform transparent and efficient operations
- Better information processing skills
- Better community development skills
- Better engineering skills
- Increased social concerns
- Increased financial management skills
- Increased resource mobilisation capacity building

- Reduced external dependency
- Increased decision-making competence

13.5 NGO

- Increased capacity to manage development programmes
- Established institutional image
- Better linkage with Panchayati Raj Institutions
- Increased roles in decentralised processes
- Capacity improvement

13.6 VRC

- Capacity Building
- Recognition and involvement in development process
- Improved financial position

13.7 Grama Panchayat

- Improved governance
- Better resource allocation reflecting community priorities
- Better co-ordination of line departments
- Integration of different water supply and sanitation schemes
- Better management of water resources

13.8 Grama Sabha

- Improved purpose and relevance
- Increased attendance
- Scientific identification of beneficiaries
- Uphold principles of inclusion, equity, transparency and efficiency

13.9 District Panchayat

- Improved governance
- Better Panchayati Raj Institutions co-ordination
- Quick and efficient technical sanction
- Better integration of water supply and sanitation schemes
- Development of water supply and sanitation policy for the District

13.10 KRWSA

- Enhanced role in GoK policy support
- Improved process management capacity
- Better monitoring functions
- Increased devolution of powers to Panchayati Raj Institutions

- Improved efficiency for Programme management
- Improved partnership and collaboration with external organisations

13.11 GoK

- Development of water resources management policy
- Better convergence of water supply, sanitation, rural development, health, tribal, forest, sectoral activities
- Improved financial position
- Better institutions reaping synergy in partnerships and collaboration
- Improved public image

Chapter 14

Programme Risk Analysis

The Programme design is based on a number of assumptions as listed in *Table 4.1*, the Programme logical framework. If some or all of these assumptions vary, the Programme may fail to bring in the benefits described in *Chapter 13*. Even if some of these benefits are attained, their sustainability will be questioned. Hence the Programme has taken care of in its design, various mitigation measures to thwart the impact of such variability and ensure that the Programme objectives are met as well as sustained.

The Programme risks are elaborated along with the mitigation measures below:

The risks are mainly classified:

- Policy environment
- Institutional risks
- Process related risks
- Human resource related risks
- Financial risks
- Technical risks
- Natural resources related risks

14.1 Policy Environment

Risks	Mitigation Measures
Governments at various levels including Local Government may not devolve decision-making to the lowest appropriate level – User Group	The Programme will set up policy and advocacy support to shape up policy and bring about an enabling environment for change
Multiple and divergent water supply and sanitation programmes may confuse beneficiaries	The Working Group on water supply and sanitation set up by the District Panchayat will prepare an integrated plan for the sector converging all schemes into the Programme methodology.
GoK remain committed to water supply and sanitation sector reforms	The Tenth Plan approach of GoK states its commitment to reforms
GoK remain committed to decentralisation policy	The Tenth Plan earmarks one-third of planned recsources to be devolved to the Local Governments

14.2 Institutional Risks

Risks	Mitigation Measures
KRWSA may fail to adapt itself to a Programme mode	KRWSA will restructure to accommodate separate division to implement the Programme independent of the World Bank assisted Project
The PRIs reluctant to change to a facilitator's role	The state level policy development, state level policies will be converted into operational guidelines detailing the new roles for the PRIs.

Risks	Mitigation Measures
The VRC selection may not be proper	The VRCs are identified during the social mobilisation phase by the NGO through demonstrated commitment and volunteerism. There are no salaries or fixed payments. The payment during training period will be just to cover subsistence and later closely linked with jobs assigned
User Groups may not be empowered to carry out activities themselves	The Programme provides for a process mode aimed at fully empowering User Groups to manage their own affairs without developing dependency on external entities
District Panchayat may assume a hierarchical relationship	The Grama Panchayats are independent to co-ordinate and facilitate the Programme implementation in their areas
The Programme Management Unit and CMU may be anxious to put pressure on implementing institutions to deliver outputs	The Programme monitoring system is more focused on process monitoring
The PRI representatives may tempt to control the Programme	The roles and responsibilities of all the institutional entities are clearly defined. The Programme will organise special sessions to bring about necessary attitudinal changes among PRI members
User Committees not sufficiently empowered to manage and sustain facilities by themselves	The monitoring system will capture the level of empowerment imparted by the Programme and resort to corrective actions
Functional and financial autonomy of KRWSA may not be maintained	The Programme will seek GoK commitment to restructure and reposition KRWSA with necessary autonomy to manage Programme implementation
The institutional entities in the institutional arrangement may fail to orchestrate into a meaningful partnership	The roles and responsibilities of each of the institutions are clearly defined. Regular and periodic interaction sessions will be organised.

14.3 Process Related Risks

Risks	Mitigation Measures
Long gestation period and community may lose interest	The Programme will be implemented with a clearly drawn up process mode allowing for learning and empowerment with focus on sustainability through active involvement of the community to sustain their interest and motivation.
Target orientation to push results on the ground	The Programme monitoring system designed to measure qualitative improvements along with physical achievements. The Programme physical outlays are now fixed based on a technical study. The Programme phasing has been done to set a desirable pace for the Programme to provide room for community innovation and learning. The Programme physical outlays and schedules will be revised based on batch 1 GP experience.
Standardised social mobilisation irrespective of regional peculiarities	The social mobilisation process provides for a highly participatory mode to dovetail prevailing social and regional peculiarities
Vulnerable and marginalised may get excluded	The Programme design provides for inclusion of the vulnerable and marginalised households through its linkage with existing CBOs and Grama Sabha

Risks	Mitigation Measures
Programme information reach may be limited to a few influential people	The implementation process include widespread information dissemination campaigns at the GP level aimed at reaching everyone
NGOs and VRCs overtake User Groups	The institutional arrangement is such that the performance of NGOs and VRCs are assessed by the User Groups and payments are linked with such performance rating by the UGs
Political influence on selection of GP and scheme areas	The Programme promotes normative indicators for selecting GPs and scheme locations
Bureaucratic systems and procedures in managing the Programme	The Programme management gives importance to efficiency and focus on User Groups as the most important stakeholder
Principles of transparency and equity may be undermined	The Programme provides for Review and Support Missions and also provides for other monitoring studies
The tight Programme schedule tend to ignore Programme principles	The Programme implementation cycle provides for a longer duration of 36 months which will be readjusted based on batch 1 experience
Vagaries in climate may upset field level implementation	The Programme provides for flexibility to suit local situations
Women may show reluctance to participate in decision-making	The involvement of existing CBOs, Grama Sabha and NGO will ensure meaningful participation by women in decision-making
User Groups fail to own the facilities	In order to inculcate the feeling of ownership, no decisions are imposed on the User Group. Community contribution towards capital cost and O & M are ensured
External influence to manipulate Programmes	The Programme will conduct orientation sessions for all the stakeholders who directly or indirectly influence the Programme

P.C 36 month

14.4 Human Resource Related Risks

Risks	Mitigation Measures
The community members skeptical on the Programme concept	The GP selection is purely on normative basis justifying need and demand. The Programme launch is through a careful participatory process to communicate Programme philosophies and principles. Throughout the Programme implementation, the community remains in the driver's seat learning and negotiating the Programme forward.
The Programme may not be able to attract managers having required knowledge and right attitude	The recruitment of Programme personnel will be on merit basis. There is sufficient incentive system to attract and retain best talents.
The User Committee members may try to ascribe power	The Bylaw for the User Group provides provision for removal of unsuitable User Committee members
The VRC members and NGO staff acquire an employee attitude	The payments are purely based on performance appraisal by the User Groups based on deliverable outputs. Their contract is with the GP and accountability is with the User Groups.

Continue with GP accountability with Users | ? ∴ no incentive systems at all

Risks	Mitigation Measures
The PRI members may not be interested or oriented	In addition, knowledge support activities like cross-visits, workshops will be organised to re-orient the members
The Programme management staff may assume an aggressive and forceful posture posing ownership of the Programme	The Programme will recruit management staff having assertive attitudes (with no power orientation), pro community orientation, willingness to learn and adapt, flexible to accommodate field level variations, partnering and team spirit etc.

14.5 Financial Risks

Risks	Mitigation Measures
The GP may fail to prioritise resources to contribute its share	The resources for water supply and sanitation will be earmarked on a priority basis. The planning of Programme schemes is in convergence with the decentralised planning process.
UGs may select investments not affordable by members	Before finalising technology, the UG members will discuss a menu of options considering the technical and financial feasibility and arrive at an informed decision democratically arrived by including each and every one in the group.
Hardware costs will be overestimated to book adjust local contribution	The Programme has a *foolproof methodology for* publishing current market rates and outturn of labour. The Programme will develop simple software to aid estimation of costs, which will be used by Panchayat Engineer and VRC. The Technical Advisory Committee will also vet the plans.
Programme fund release may be delayed	GoK will agree with Government of India in releasing Programme funds directly to KRWSA. GoN will release advance funds to KRWSA who in turn will ensure that Programme implementation is not affected due to bureaucratic delays in fund release.
UGs may fail to collect O & M	The operation and maintenance arrangement and cost sharing will be decided in advance by UG. The NGO and VRC will support the UCs in instituting a collection mechanism
Ucs may procure costly goods and services	Community procurement guidelines will be developed to guide UCs in procuring goods and services cost-effectively
Financial transactions may not be properly recorded	The accounting and record keeping system at the UG level will be implemented with the support of VRC. The UC members will be trained on financial management aspects on the job.

14.6 Technical Risks

Risks	Mitigation Measures
All UGs may opt for standardised piped water supply	The Programme provides for a menu of technology options to User Groups to select from including traditional sources, rehabilitation of existing schemes and new schemes. The technology selection will follow an informed decision-making process.
UC may procure low quality materials	The procurement guideline will prescribe how communities can conform to quality standards while procuring materials. The VRC and Panchayat Engineer will support the User Committees.
UC may not be able to ensure quality of construction	The Programme will impart construction supervision training to User Committee members. In addition, there will be work measurement and quality certification by the Panchayat Engineer.
The facilities may break down affecting service quality	The UC members will be trained on operation and maintenance of the system. A manual on preventive maintenance will be developed for the guidance of the community.
Fail to incorporate traditional wisdom	The technology selection process and location of water sources follows a highly participatory methodology having provisions to incorporate existing traditional practical wisdom.

14.7 Natural Resources Related Risks

Risks	Mitigation Measures
Uncontrolled abstraction of water resource	The User Groups will be encouraged to work in a self-regulatory environment adequately conscientised on water resources conservation and management. The Programme will develop methodologies for water recharge and water management aimed at ensuring sustainability of the sources.
Neglect of traditional water sources	The Programme's technology offers include traditional water harvesting structures like *Vallams*, restoration of ponds, springs etc.

PROPOSED RWS&S PROGRAMME KERALA

PROGRAMME IMPLEMENTATION DOCUMENT

(draft for review)

ATTACHMENTS

December 2002

PID Formulation Misison

C. S. Renjit, Team Leader
K. M. Namboodiri, Community Engineering Expert
Anu Sharat, Social Expert

Attachment 1.1

Participatory PID Formulation Activities

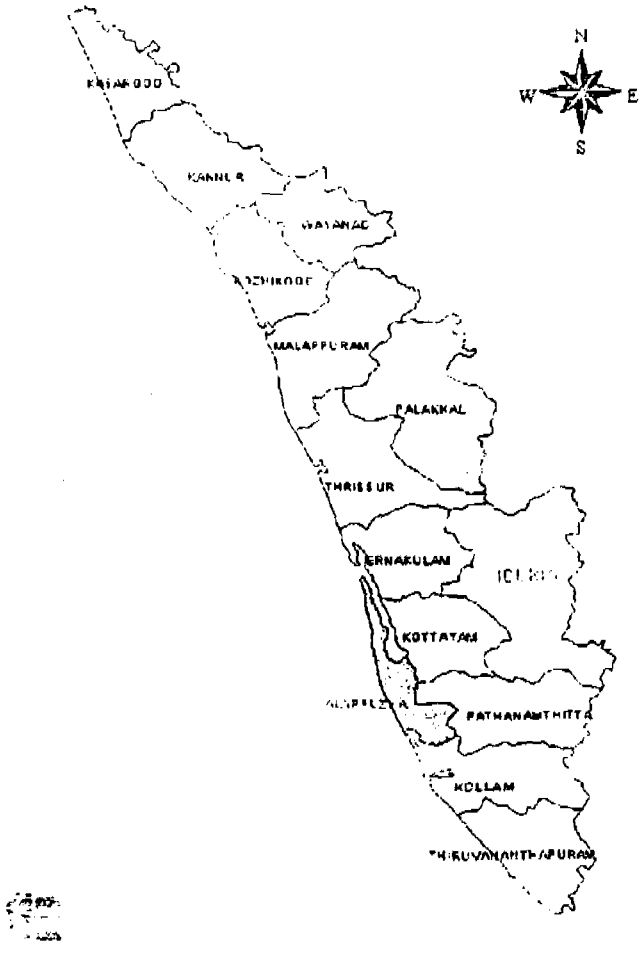
The activities undertaken by the Formulation Misison to draft the PID in a participatory manner is summarised below:

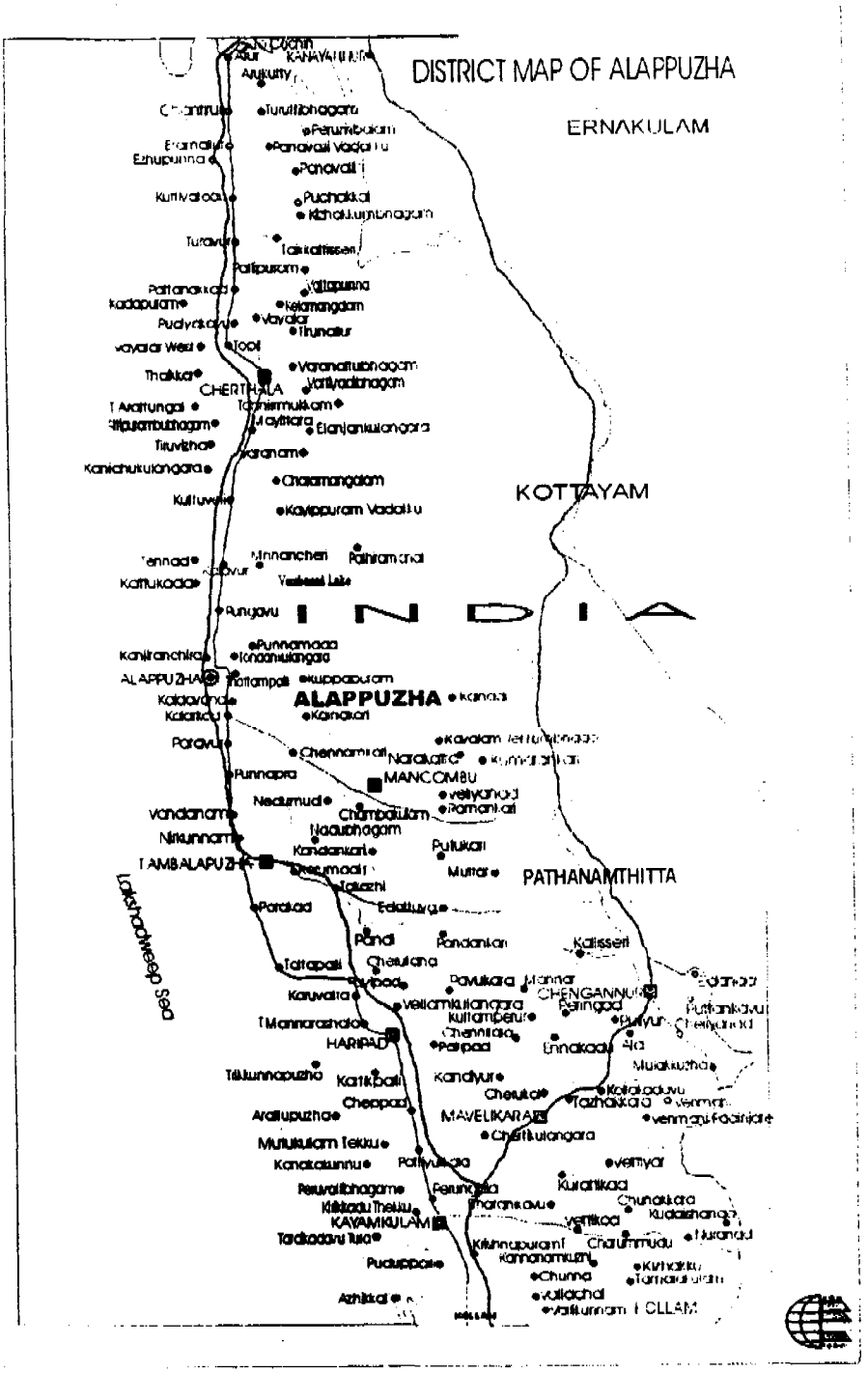
21.03.2002	Core Stakeholder Meeting at Thiruvananthapuram
23.03.2002	Meeting of partnering institutions to finalise ToRs for the PRA study
01.04.2002	First District Level Consultation Workshop with district level stakeholders – Alappuzha district
02.04.2002	First District level Consultation Workshop with district level stakeholders – Idukki district
04.04.2002 to 06.04.2002	Technical study at Kainagiri and Puliyoor Grama Panchayats in Alappuzha district
08.04.2002 to 12.04.2002	PRA and Technical Study at Muttom Grama Panchayat in Idukki district
13.04.2002	Joint review (1) of PRA and technical studies findings – feedback – among Mission members and study partners
15.04.2002 to 19.04.2002	PRA and Technical Study at Kanthallur (Idukki district) and Aroor (Alappuzha district)
21.04.2002	Joint review (2) of PRA and technical studies findings – feedback – among Mission members and study partners
22.04.2002 to 26.04.2002	PRA and Technical Study at Nedunkandam (Idukki) and Neelamperur (Alappuzha) and Technical Study at Peruvanthanam (Idukki)
29.04.2002	Joint review (2) of PRA and technical studies findings – feedback – among Mission members and study partners – Report finalisation
17-05-2002	Second District level consultation workshop with District Level stakeholders – Alappuzha District
18-05-2002	Second District level consultation workshop with District Level stakeholders – Idukki District

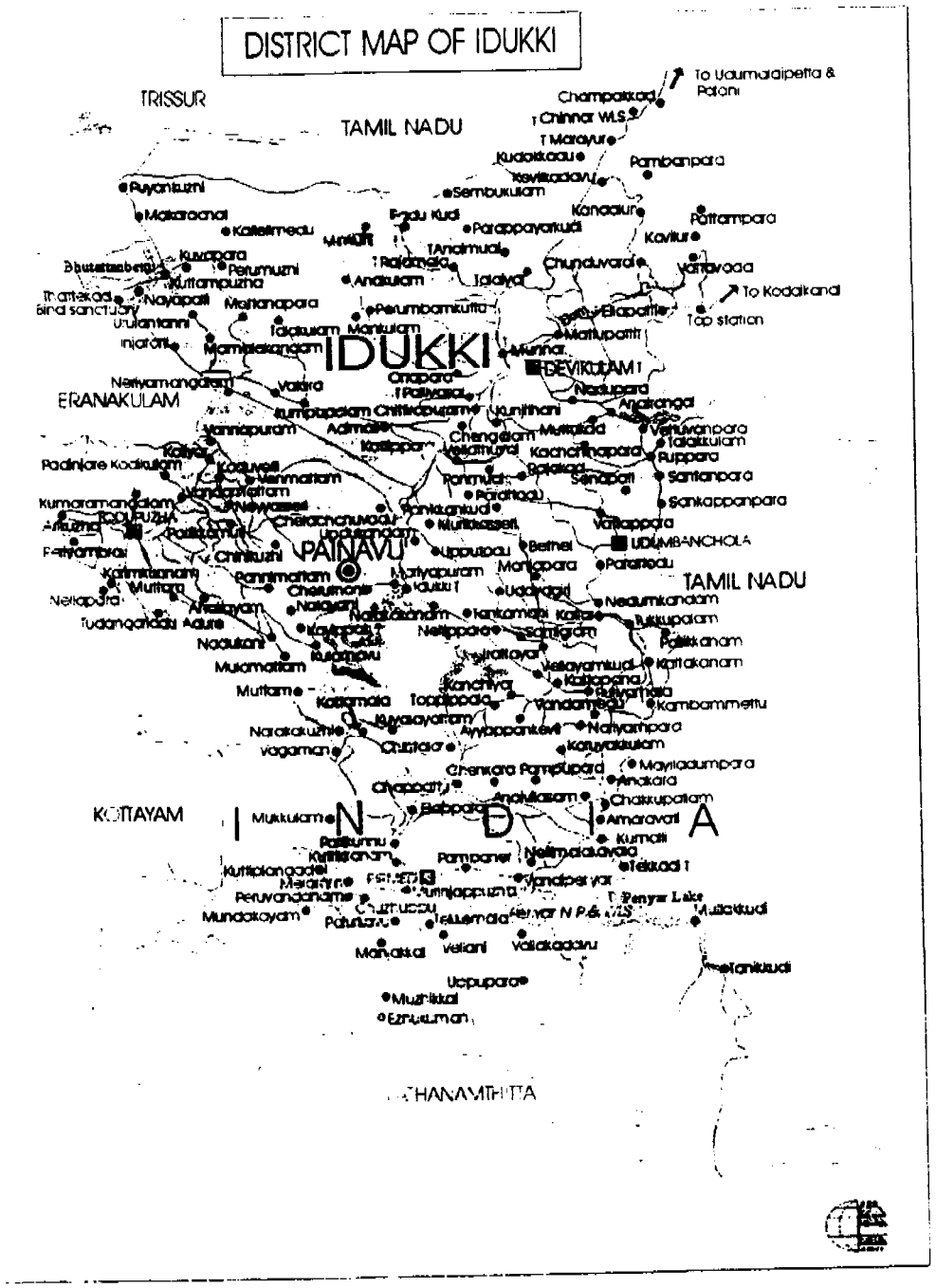
Attachment 3.1

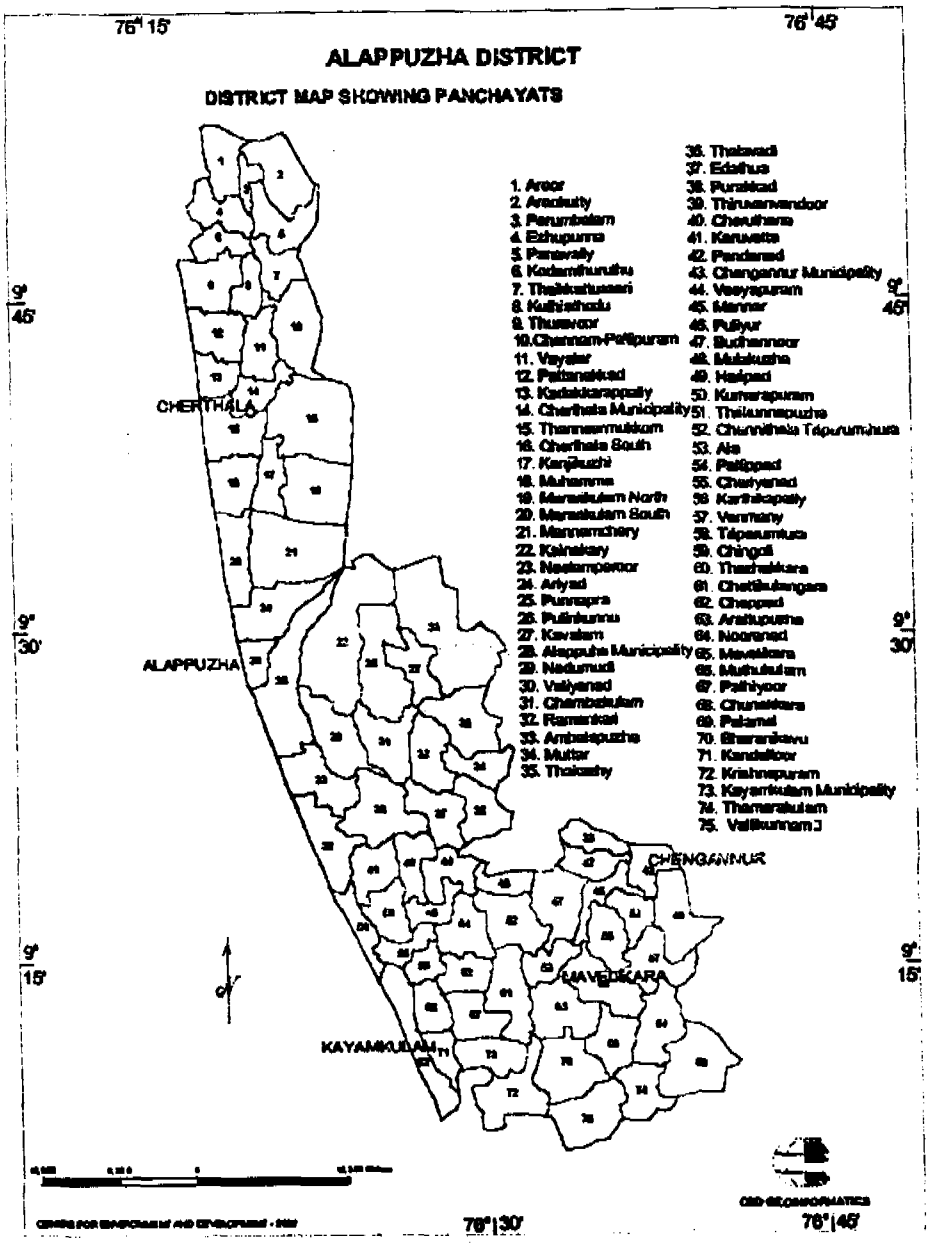
Map of Kerala Showing Programme Districts

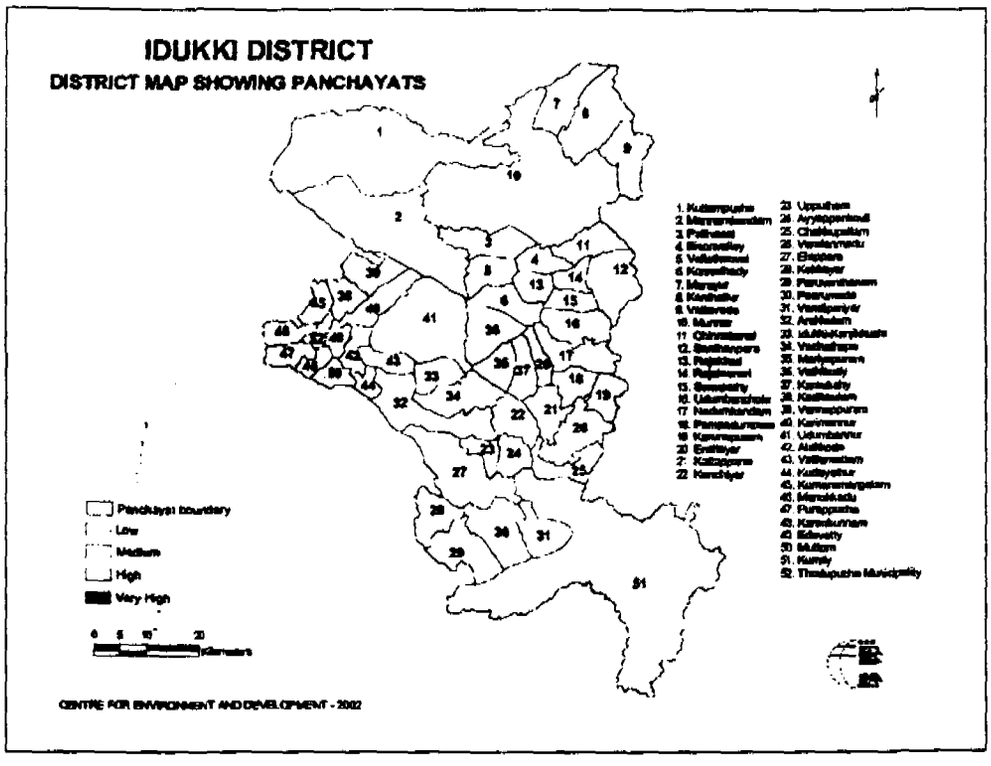
MAP OF KERALA SHOWING ALAPPUZHA AND IDUKKI DISTRICTS




DISTRICT MAP OF ALAPPUZHA
ERNAKULAM
KOTTAYAM
PATHANAMTHITTA
KOLLAM
INDIA
ALAPPUZHA
CHERTHALA
MAVELIKARA
HARIPAD
KAYAMKULAM
CHENGANNUR
MANCOMBU
TAMBALAPUZHA
Lakshadweep Sea


DISTRICT MAP OF IDUKKI
TRISSUR
TAMIL NADU
ERANAKULAM
KOTTAYAM
PATHANAMTHITTA
IDUKKI
PEERUMEDU
DEVIKULAM
PAINAVU
UDUMBANCHOLA
TAMIL NADU
To Udumalaipetta & Palani
To Kodaikanal
Champakkad
Chinnar W.L.S.
T Marayur
Pambanpara
Kudakkadu
Kovilkadavu
Sembukulam
Puyankutty
Makaracchal
Kallarmedu
Kanadur
Pattrampara
Kavilur
Parappayarkudi
Kuzhipara
Perumuzhi
Kuttampuzha
Anakkulam
Chunduvarai
Vandiyada
Thattekad Bird sanctuary
Nayapati
Mariyanapara
Perumbamkuzha
Ellapatty
Top station
Urulanthanni
Idakkulam
Mankulam
Injarathi
Mankulakanam
Muniar
Nariyamangalam
Vakkra
Anapara
Pallivasal
Nadupara
Kumpukkam
Chittidapuram
Kunjithani
Angarangal
Vannapuram
Admali
Chengalam
Muttukad
Veluvanpara
Kattippar
Kochariyapara
Ruppara
Kaliyar
Padinjare Kodikulam
Kaduvatti
Vanmariam
Pannimudi
Sanapati
Santanpara
Kumaramangalam
Vandigalattam
Pandaranadu
Sankappanpara
Chittuzhi
Chelachuvadu
Muttukkadai
Vattappara
Uppukkandam
Uppupadu
Bethel
Parathodu
Mariyapuram
Mankpara
Pannimattam
Udachagiri
Neadumkandam
Nadukani
Kuppapuzha
Nellippara
Kattakanam
Muamattam
Kanchiyar
Kattappana
Kambammettu
Muttam
Kattamala
Thoppipara
Vandanmedu
Nariyampara
Vagamon
Chuzhalai
Kanjirakkulam
Mayiladumpara
Chenkara
Pampupara
Anakkara
Chappati
Anakkasam
Chakkupallam
Elappara
Amaravati
Kumali
Pallikunnu
Kuttikanam
Pamponar
Nedumkadayaga
Tekkadi
Kuttiyanganadi
Meenachil
Vandiperiyar
Peruvandanam
Vandanmedu
Munjappuzha
Periyar Lake
Mundakayam
Pathanad
Idukki
Periyar N.P.& W.S.
Mulakkudi
Manakkad
Veliani
Valakkadavu
Kanikkudi
Ucpupara
Muzhikkal
Ezhumalan


ALAPPUZHA DISTRICT
DISTRICT MAP SHOWING PANCHAYATS
76° 15'
76° 45'
9° 45'
9° 30'
9° 15'
CHERTHALA
ALAPPUZHA
CHENGANNUR
MAVELIKARA
KAYAMKULAM
1. Aroor
2. Arookutty
3. Perumbalam
4. Ezhupunna
5. Panavally
6. Kodamthuruthu
7. Thalakkattusseri
8. Kuthiathodu
9. Thuravoor
10. Channam-Pallipuram
11. Vayalar
12. Pattanakkad
13. Kadakkarappally
14. Cherthala Municipality
15. Thannermukkom
16. Cherthala South
17. Kanjikuzhi
18. Muhamma
19. Mararikulam North
20. Mararikulam South
21. Mannanchery
22. Kainakary
23. Neelamperoor
24. Ariyad
25. Punnapra
26. Pulinkunnu
27. Kavalam
28. Alappuzha Municipality
29. Nedumudi
30. Valiyanad
31. Chambakulam
32. Ramankari
33. Ambalapuzha
34. Muttar
35. Thakazhy
36. Thalavadi
37. Edathua
38. Purakkad
39. Thiruvanvandoor
40. Cheruthana
41. Karuvatta
42. Pandanad
43. Changanncor Municipality
44. Veeyapuram
45. Mannar
46. Puliyur
47. Budhanoor
48. Mulakuzha
49. Haripad
50. Kumarapuram
51. Thalavadipuzha
52. Chunnithala Thazhumuttom
53. Ala
54. Pallippad
55. Chettyarvad
56. Karthikapally
57. Venmony
58. Thazhumuttom
59. Chingoli
60. Thazhakkara
61. Chettikulangara
62. Chapped
63. Arattupuzha
64. Nooranad
65. Mavelikara
66. Muthukulam
67. Pallichal
68. Chunakkara
69. Palamel
70. Bharanikavu
71. Kandalloor
72. Krishnapuram
73. Kayamkulam Municipality
74. Thamarakulam
75. Vallikunnam
CDS-GEOINFORMATICS
76°|30'
76°|45'


IDUKKI DISTRICT
DISTRICT MAP SHOWING PANCHAYATS
Panchayat boundary
Low
Medium
High
Very High
CENTRE FOR ENVIRONMENT AND DEVELOPMENT - 2002

Attachment 3.2

Hydrogeologic Setting of the Programme Districts

1. Idukki District

Idukki district is the second largest district of Kerala State .The district is bounded by North latitudes 9°15' and 10°22' and East longitudes 76°33' and 77°24' and fall in Survey of India topographical maps Nos.58B, C, G and F. It has an area of 5019 Sq.km and is bounded on the north by Thrissur and Coimbatore districts, on the east by Madurai and Ramanathapuram districts, on the south by Kollam district and on the west by Kottayam and Ernakulam districts. The district is subdivided into four taluks viz. Devikulam, Peermedu, Udumbanchola and Thodupuzha for administrative purposes and for developmental activities, it is divided into four blocks viz. Azhutha, Devikulam, Elamdesom and Thodupuzha.

The district takes its name from the prestigious hydro-electric project constructed across river Periyar and the word Idukki is derived from "Idukku" which means a gorge. The district has a total population of 1079369 and which is 3.71 % of the state population with a population density of 215 persons per sq.km. as per the census of 1991. The district stands first in the production of electricity, by having different hydroelectric projects like Idukki, Pallivasal, Sengulam etc.

The district essentially covers parts of high ranges of the Western Ghat hill ranges and the foothills, major part of the district is covered by forests and plantations. However, in the post independence period, with the construction of different hydroelectric and other projects there had been large-scale migration of people from other districts, encroaching the forest areas and resulting in the development of new colonies and habitations. Initially the population depended on surface water for their domestic requirements and the agricultural operations were limited to rainfed conditions. However with the increase in the populace, more and more developmental activities are taking place and the demand for water is ever-increasing. Agricultural practices are being switched over to irrigated agriculture and by virtue of the highly rugged topography, the scope of developing irrigation from surface water resources is limited. As such, the development of ground water resources assumes considerable importance.

1.1. Transportation networks

This is the only district in Kerala in which the National Highways and Indian Railways do not touch. The Cochin - Munnar road, Kottayam - Kumili road, Thodupuzha - Idukki road and Kumili - Munnar road are the important roads. Major towns and villages of the district are easily accessible by all weather roads. However the interior habitation of the forest area are accessible only by footpaths.

1. 2. Physiography

Physiographically the district is characterised by a hilly terrain and essentially forms part of the Western Ghat hill ranges. However, three different physiographic units viz. the foot hill region, the plateau region and the high land region can be identified.

i) Foot Hill Region:

The westernmost part of the district is covering parts of Peermedu and Thodupuzha taluks and running parallel to the hill ranges (in a northwest – southeast direction) from the foot hill region. This tract is about 5 to 6 km. in width and ranges in elevation from about 80 to 200 m above mean sea level (m.s.l). There is an abrupt rise in the topography to the east of this region. This region is characterised by the presence of small hillocks with very steep slopes and deep valleys and is representative of some sort of bad land topography.

ii) Plateau Region:

The area lying to the immediate east of the foot hill region is characterised by the presence of escarpments and sudden rise in the topography from about 200 to about 1000m above m.s.l. The region 10 to15 kilometers in width from east to west is a plateau streaked with hill ranges. The Peermadu - Vandiperiyar section is having a gentle slope to the east, while in the northern sector, the slope is only towards west. The plateau region is also incised by number of deep cutting streams indicating the youthful nature of the landform, which has formed due to the block faulting and upliftment.

iii) High Land Region:

The area lying east of the plateau region, about 5 to 10 km in width, upto the water divide and the Kerala border, represents a topographic unit with high hills having elevation about 1500 m above m.s.l. This region has very steep hills rising over 2000 m and forms the highest section of the Western Ghat Mountains of Kerala. The highest peak on the Western Ghat, the Anaimudi (2695 M) is located in this district.

1.3. Climate

By virtue of its geographical position, the district enjoys a variable climate, ranging from tropical to sub-tropical to temperate. While the foothill region experiences a tropical humid climate, the plateau region and the high land region experiences a cool temperate climate, especially in winter months. During the cold weather season, the hilly tracts lying above the elevation of 2000m. Occurrence of frost is common in the high ranges comprising major part of Peermedu and Devikulam taluks.

i) Rainfall

The district gets the benefit of both southwest and northeast monsoons. Major part of the rainfall, ie., 60-70% is contributed by the south-west monsoon during the period from June to August and the remaining 30 to 40% by north-east monsoon from October to December. The annual rainfall of district varies from 2500 to 3700 mm. The average rainfall increases towards the highlands. The Marayur-Kanthaloor tract falling on the eastern slope of Munnar Plateau forms a rain shadow region where the average annual rainfall is about 1500 mm only. On the otherhand the heaviest rainfall is experienced in the Munnar-Edamalayar area and is of the order of 4400 to 5400 mm. However due to the uneven rainfall distribution, the district experiences a conspicuous dry-weather season for a period of about four months from January to April and in certain years when there is failure of northeast monsoon even drought conditions are experienced.

The average rainfall in this district is 2635 mm. There is high variability of rainfall in this district than in any other district in the State. Due to the presence of Western Ghats there is steep decline in the rainfall from west to east and northeast from about 3500 mm to less than 1000 mm. Rainfall increases northwesterly to over 5500 mm and southwesterly to over 4000 mm. The standard deviation of rainfall over the district is as high as 1243 mm and the coefficient of variation 47%. The pre-monsoon rainfall accounts for 11 %, Southwest monsoon 63% and Northeast monsoon 18 % of the annual rainfall. The frequency of normal annual rainfall is about 110 days. The pre-monsoon rainfall accounts for 17 %, Southwest monsoon 56 % and Northeast monsoon 21 % of annual frequency.

Table 1: Average Monthly Rainfall in the District

No	Month	Rainfall (mm)
1	January	00
2	February	1.0
3	March	00
4	April	121
5	May	254
6	June	935
7	July	1026
8	August	553
9	September	354
10	October	316
11	November	230
12	December	4
Total		**3794**

(Source: District Plan Document, 2001)

The rainfall variation across the District is given in **Map 1** given at the end of this Attachment.

ii) Temperature and Relative humidity:

The District generally shows a wet climate and the Relative Humidity will come to 90% in monsoon months. The temperature generally ranges between 18 to 27°C.

Table 2: Average Monthly Temperature in Different Places

Sl. No	Month	Places					
		Udumbanchola	Idukki	Kattappana	Vandiperiyar	Kulamavu	Marayur
1	January	21.12	24.57	23.09	23.30	22.54	14.52
2	February	23.19	25.93	24.21	23.18	23.46	14.99
3	March	25.00	27.27	25.52	24.60	24.72	17.47
4	April	25.87	27.92	24.89	26.19	25.05	20.49
5	May	24.73	27.03	24.97	26.77	24.29	21.10
6	June	21.38	24.88	23.35	25.71	21.38	20.77
7	July	21.89	23.62	24.14	25.67	20.92	20.60
8	August	21.28	23.75	22.01	25.76	20.85	18.85

9	September	22.57	24.65	23.24	26.00	21.89	19.71
10	October	22.13	25.23	23.42	25.73	22.28	18.99
11	November	22.05	24.88	23.16	24.95	22.71	17.24
12	December	21.05	24.88	23.42	23.89	22.81	14.97
Yearly Average		22.68	25.38	25.53	25.14	22.71	18.30

(Source: District Plan Document, 2001)

iii) Wind:

The wind speed in the eastern area of high ranges is comparatively high. The highest wind speed has been calculated at Ramackalmedu

Table 3: Details of Wind

No.	*Place*	Average Speed (Km / Hr)
1	Ramackalmedu	30.04
2	Panchalimedu	20.06
3	Kolahalmedu (Kuttikkanam)	18.04

(Source: District Plan Document, 2001)

1.4. Terrain System

The District consists of 7 different Terrain Units, such as Flood plain / Valley fills, High level Fluvial Terrace, Moderately Undulating Terrain, Highly Undulating Terrain, Hilly areas, Residual / Elongated hill and Scarp slope.

Based on the Terrain System the District has been classified into 3 Agro-Ecological Zones.

Zone 1 - Midland areas of Muvattupuzha, Pambar and Manimala river basins.
Zone 2 – Steep High land areas of Periyar river basin
Zone 3 – The Midland areas of Pambar river basin

1.5. Agro-climatic zones:

Kerala is divided into 5 agroclimatic zones,viz., Northern zone, Southern Zone, Central Zone, High Altitude Zone and Problem Area Zone (NARP Classification). The Idukki district comes under the High Altitude Zone which consists of area above 750 msl.

1.6. Water Resources of the District

Though the District has comparatively better water resources, the management of resources poses many problems. The utilizable water sources in the district have been calculated as 2363 M

(CWRDM 1999) , out of which the ground water sources comes to around 323 Mm^3 . This comes to about 13.7% of the utilizable water sources.

Table 4: Details of Water Resources of the District

No.	*Types*	Availability (Yearly)	Utilizable
1	Surface water (Mm3)	9406	2040
2	Ground water (Mm3)	431	323
3	**Total**	**9837**	**2363**

(Source: District Plan Document, 2001)

The Periyar and Thodupuzha are the two important rivers that drain the area. The Periyar River is the largest of all the rivers in Kerala and also has the largest potential. This west-flowing river has its origin in the Sivagiri group of hills at an elevation of about 1830 m above m.s.l. It flows through the Peermedu, Udumbanchola and Devikulam taluks before entering the neighbouring Ernakulam district. In its entire course, it is joined by major tributaries like Perumthura, Kattipanayar, Cheruthoni, Chittar, Perinjankutty and Muthirapuzha. Thodupuzha river which is a tributary of Muvattupuzha River originate in the Taragankarayaru hill at 1094 m above msl. and it has a westerly flow direction before reaching Thodupuzha and thereafter it is joined by numerous tributaries. Part of the Periyar river course is undoubtedly controlled by the geological structures. Its drainage course is along a fracture.

The Thodupuzha river receives the tail end waters of the Idukki hydel project. The Manimala River and Meenachil rivers have their origin in this district and flow through Peermadu taluk before reaching the Kottayam district. Rectilinear drainage is predominant in the area indicating the structural control.

The District is having 15 major Reservoirs, which includes both hydel as well as irrigation Reservoirs. There are four Fresh water lakes in the district, viz., Eravikulam, Devikulam, Elephant Lake and Periyar Lake. The District is fortunate to have a large number of perennial springs and the yield from these springs range from 1 LPM 2000 LPM. The CWRDM has done a detailed study related to the springs of the District. It has been calculated that more than 2000 people get their water for drinking from these perennial springs.

The streams and reservoirs in the District is given in **Map 2.**

Table 5: Major Reservoirs In Idukki District

Sl.No.	Reservoir	River Bank	Aim	Area (Ha)
1	Idukki	Periyar	Hydel	6160
2	Ponmudi	Periyar	Hydel	260
3	Anairangal	Periyar	Hydel	433
4	Kundala	Periyar	Hydel	230

5	Mattuppetty	Periyar	Hydel	324
6	Chenkulam	Periyar	Hydel	33
7	Neriamangalam	Periyar	Hydel	415
8	Bhoothathankettu	Periyar	Hydel	608
9	Periyar lake	Periyar	Irrigation	608
10	Malankara	Moovattupuzha	Irrigation	_
11	Lower Periyar	Periyar	Hydel	_
12	Erattayar	Periyar	Diversion	_
13	Kallar	Periyar	Diversion	_
14	Guhanathapuram	Pambar	Irrigation	_
15	Kallarkutty	Periyar	Hydel	_

(Source: District Plan Document, 2001)

Table 6: Data On Springs In Idukki

Sl. No.	Location	Panchayat	Discharge LPM.	Use	Populatio Benefited
1	Mettukuzhy	Kattapana	400	Water supply	1440
2	Muthenmudy	Rajakkad	35	"	1200
3	Pathipally	Arakulam	30	"	1500
4	Karippalingadu	"	13	"	600
5	Elappally	"	6	"	360
6	Vathikudy	Vathikudy	25	"	1200
7	Kadamakuzhi	Kattappana	7	"	400
8	Keerithode	Kanjikuzhi	7	"	410
9	Chakkakanam	Karunapuram	6	"	360
10	Peringassery	Udumbanoor	12	"	600
11	Poochappara	Velliyamattom	15	"	960
12	Poomala	"	6	"	240
13	Naliyani	"	5	"	240
14	Methotty	"	8	"	480
15	Moolekkadu	Udumbanoor	15	"	980
16	Uppupara	Peruvanthanam	15	Domestic	20
17	Kadavappam	"	6	"	150
18	Mettubagham	Peermade	600	"	1000
19	Kallar	Peermade	3	"	20
20	Valanchankanam	"	1200	Nil	-
21	Pattamudi	"	12	Domestic	600

(Source: Springs of Kerala, CWRDM)

Table 7: Details of Public Ponds and Wells in the District

Sl.No.	Block	Wells	Ponds, Tanks	Others
1	Adimali	41	20	4
2	Azhutha	178	67	-
3	Devikulam	34	4	25
4	Elamdesam	65	8	2
5	Idukki	54	9	-
6	Kattappana	87	10	14
7	Nedumkandam	87	27	3
8	Thodupuzha	53	16	14
9	Thodupuzha Municipality	16	-	-
Total		**615**	**161**	**62**

(Source: District Plan Document, 2001)

1.7. Geomorphological details of the District

The most important criterion in Geomorphic analysis is the' Form'. The Form can be described as a combination of Relief, Slope and Drainage lines. Relief is the expression of the interaction of several different phenomenon and processes within the earth's crust and on its surface. The size and shape of Relief ie, whether straight, flat, convex / concave hill forms or narrow / wide valleys, etc., has an important bearing on land use.

The Kerala State Land Use Board had carried out detailed Geomorphological studies of the district using Aerial photographs and prepared maps in 1:15,000 scale (1982). They have identified the areas, which have either been affected by erosion or are susceptible to erosion, which fall into the following categories:

- Rills and Gully erosion
- Erosion in and along the River banks
- Soil creep
- Land slides

In Idukki District, the Rills are frequently seen in Tea gardens. Rills gradually get converted into Gullies when water accumulates in narrow channels and over short periods removes the soil from this narrow area to a considerable depth. Gullies are closely related to drainage characteristics. In many areas of Idukki district, main contribution to the sediment yield is produced by Rill and Gully erosion.

When the streams and rivers are in early youthful stage, they erode their banks and beds. During the floods, the riverbeds get scoured and the eroded material is carried further down and re-deposited downstream. Man made dams play an important role in changing the stream behaviour, regulating stream flow and leading to the deposition of the sediment load carried by streams in the Reservoir. Large amount of sediment load is being deposited in the Idukki Reservoir.

One of the striking features of soil creep areas is the presence of abandoned channels. It is quite possible that a large amount of soil is deposited in valleys. As this slope is not steep, the capacity of flowing water to carry the load gradually decreases and the sediments are deposited on valley floor and gradually the stream gets abandoned. All these abandoned channels were once active streams as marked on Topographic Maps.

1.8. Land use / Vegetation of the District

Land use data is one of the important pre-requisite for determining the availability and demand of water resources in an area. Idukki district, occupying a place of pride because of the plantation crops, shows much change in land use within a short period of time. The pressure on land has resulted in agricultural crops being grown on even very steep slopes against conventional land use practices. Much change has occurred in Land use of the area and so, we interpreted the Remote Sensing data to prepare Land Use map of the area. The landuse map of the District is given in Map 3.

The area has 11 broad land use categories, namely evergreen forest, deciduous forest, degraded forest, forest plantations, other plantations, barren rocky area, built up land with or without scrub, double crop area, reservoir area and settlements are plotted in the Map.

Being a hilly terrain, major parts of the district remained as forestlands with thick vegetation of tropical and subtropical flora. Teak, Rose wood, Sandalwood and other species of tropical timber trees and bamboos grew abundantly in these highland areas. The plateau regions are characterised by the presence of tall grass varieties. However with the arrival of the English people and identification of the highlands as suitable area for plantation crops like tea, coffee, cardamom, large tracts of lands have been converted into plantations. The foothill regions were converted into rubber plantations and at present the district is left with 1580 sq.km. only of forest lands. The district has a unique status of accommodating two large tracts as reserve forests and having the famous Periyar Wild Life Sanctuary and the Eravikulam National Park

1.9. Geological Setting

Geologically the district belongs to Pre-Cambrian metamorphic terrain. In recent years the systematic geological mapping of the area had been carried out by Geological Survey of India (GSI). The main rock types met with in the district are charnockites, hornblende-biotite gneisses, migmatites, granites and granite gneisses. The tentative geological succession of the region after GSI is as below

Recent to Sub-recent	*	Soil, Alluvium, laterite
Intrusives granites	*	Dolerite Gabbro, Pematites and quartz Veins,
Pre-Cambrian	*	Migmatites, Granite Gneiss, Hornblende- biotite gneiss

* Pyroxene Granulites, Khondalites
Charnockites

i) Pre-Cambrian Rocks

Charnockites are the main pre-cambrian rocks occuring in the southern, south-eastern and eastern parts of the district especially in the Peermadu-Vandiperiyar-Thekkadi belt. The rock is mostly well foliated with foliation in NNE-SSW to N-S direction and moderate dip towards west. As one travels from north to central part of the district, these charnockites gradually grade into migmatities especially north of Idukki. These are essentially made up of the quartz and of feldspars with hypersthene. These rocks are more resistant to weathering.

Garnet-sillmanite-gneisses (Khondalites) are seen in the eastern parts of Thodupuzha taluk, forming the foothill region. Being a meta-sedimentary rock derived from argillaceous sediments, this rock type is more susceptible to weathering than other rocks and the depth of weathering over this rock type is observed to be of the order of 8 to 10 m. These rocks occur as thin unmappable units.

Pyroxene ,granulites are seen as thin lenticular bodies conformable with the foliation of charnockites and parallel to the foliation of the khondalites. These are found as unmappable units about 1 to 3 m in thickness. These are essentially made up of calcic plagioclasses and clino-pyroxenes and are considered as earlier lava flows or dykes, which on metamorphism has given rise to the pyroxene granulites.

ii) Hornblende-biotite Gneisses

Hornblende-biotite gnesses are the rock types that occupy large areas in the north and northwestern portions of the district. Compared to charnockite, it is light coloured and is characterised by the presence of hornblende as the chief ferromagnisian mineral instead of the hypersthene. It is essentially quartzo-feldspathic gneiss with hornblende and biotite. It is believed that these minerals have formed out of hypersthene due to retrograde metamorphism. These rocks also follow the regional foliation trends. But at places the rocks show effects of shearing and fracturing.

iii) Migmatities (Composite Gneisses)

Large areas in the west central portion of the district are covered by migmatites or composite gneisses. The bands and veins of granitic material intruding the hornblende-biotitie-gneisses along the foliation have given rise to the migmatites.

iv) Calc Gneisses

The calc granites and gneiss are seen at places in the migmatite terrain. These may be relict bodies of an earlier meta-sedimentary terrain.

v) Quartzite

A few bands of the impersistent lenses of para-quartzite are seen at places in the migmatites. These are relect bodies of an earlier meta-sedimentary terrain. These are essentially made up of quartz with few grins of feldspars and mica.

vi) Granite Gneisses

Well-foliated granitic gneisses occur in the northern parts of the district especially around Marayur-Kanthalur and towards the Tamil Nadu border. These are pink to grey in colour. The rock type is believed to have been formed due to granitisation process. The rocks are fairly well-joined and the horizontal joining is very prominent. Thjs area being a very hilly terrain with very steep slopes, the soil cover is only very thin and superficial over this rock type.

vii) Granites

Outcrops of intrusive granite are seen around Munnar and east of Marayur. These are massive and compact rocks without much jointing.

viii) Dolerite and Gabbro

Dolerite and Gaboroied rocks are seen as minor unmappable bodies in the gneissic terrain.

ix) Quartz and Pegmatite Veins

Isolated occurrence of quartz and pegmatite veins traversing the gneissic terrain are observed at few places.

x) Laterite

Laterite is seen only in the western fringe of the district overlying the charnockites and the gneisses. The average thickness of the laterite in the region is of the order of 8-10 m but at places it attains a thickness of about 15 m.

xi) Alluvium

Even though the district is characterised by the presence of number of rivers and streams most of these are flowing along 'V' shaped valleys and the streams themeselves are flowing on rock bed and there is not much a deposition of sediments and as such the alluvium is very scanty in the area. River alluvium is seen along Periyar valley south of Adimali and in Thodupuzha valley west of Arakulam. The thickness of alluvium in this area is of the order of 5 to 8 m only. Alluvium in the form of valley fill material is seen in all the narrow 'V' shaped valleys. Thickness of this horizon is usually of the order of 3 to 5 m only.

1.10. Soils

The Soil Survey Department has prepared the soil map of the district. Being hilly terrain with steep slopes most of the soils formed are eroded immediately and the deposit more or less in the entire area is very thin. However, the soils of the district fall in four different categories viz., forest loams, lateritic soils, brown hydromorphic soils and riverain alluvium. More than 60% of the area is covered by forest loams, which are the products of weathering of crystalline rocks under forest cover. They are dark reddish brown to black in colour with loam to silty loam in texture. The dark colour of the surface horizons is due to presence of organic matter derived from vegetation. The western part of the district is covered by lateritic soils forming the second abundant soil type. They are mostly reddish brown to yellowish brown in colour with texture ranging from gravelly loam to gravelly clay-loam. Patches of brown hydromorphic soils, occur in the valley bottoms between undulating topography. They are formed as a result of transportation from adjoining hills and

deposition. They are very thick and brownish in colour and the texture varies from sandy loam to clay. Riverain alluvium occurs as thin strips along the banks of Periyar and the Thodupuzha rivers. The **Map 4** depicts the important soil types in the District.

1. 11. Geological structures

The Structural Geology Map of the District prepared by State Land Use Board in 1:15,000 scale was utilised for preparing the Structural Geology Map at 1:50,000 scale. The Maps thus prepared are digitized into two layers viz., Linearment Map and Trend line Map. These maps have been utilised to draw final Hydrogeomorphology Map showing the potential Ground Water area.

Geologically the area has suffered major structural deformations. It is believed that the Western Ghats attained the present level of elevation due to block faulting and subsequent upliftment. The major portion of the district forms a horst area with the fault zone running along the western foot hill region. Major lineaments have been identified along Periyar Edamalayar etc. Some of the streams are found running along some fracture zones.

The following major geological structures are described

i) Folding

Drainage characteristics, sometimes aid in identifying and delineating the folding pattern. Where folds are plunging, major streams commonly curve around the nose of the fold , the convex side of the curve indicating the direction of the plunge of anticlinal folds.

ii) Fractures

Fractures refer here to probable faults, joints, or lineaments. They appear in satellite imageries as linear features. In idukki district the fractures represent two prominent sets having trend NW-SE and NE-SW and intersect at right angles. This results in parallel and rectangular/ angular type of drainage.

1.12 Drainage Pattern

Two types of drainage pattern are inferred, i.e., dendritic and parallel. Dendritic pattern comprises of courses of insequent streams which lack a preferred orientation and resemble the complex branching of trees. This system lack structural control and develop mostly on homogenous rock. Parallel drainage system usually develops along parasllel faults and fracture patterns. Angular or rectangular pattern develops along the intersections of faults, fractures etc.

On angular or rectangular drainage pattern, the streams are subsequent ie, controlled by structural features. A combination of both these patterns suggests a homogenous mass, ie, charnockites (in Idukki region) traversed by major faults or joints at relatively wide intervals.

The possibility of infiltration of surface water is more in the case of parallel drainage and in such cases, ground water potential is high.

1.13 Ground water status

Geologically the Idukki district is, by and large, underlain by the Pre-Cambrian crystalline. Hence the occurrence and movement of ground water are dominantly controlled by the joint fracture, porosity and thickness of the weathered zones. This limits the ground water potential and also the occurrence and movement varies from formation to formations and with topography.

Table 8: Block Wise Ground Water Resources

Sl. No.	*Block*	Total Repl.GWre charge (MCM)	Domestic Industrial and other Uses (MCM)	Available Net GW resource for Irrgation (MCM)	Utilisable Net GW resource for irrigation (MCM)
1	Arudai	146.00	21.90	124.10	111.69
2	Elamdesam	20.97	3.15	17.82	16.04
3	Devikulam	82.62	12.39	70.23	63.20
4	Thodupuzha	23.59	2.54	20.05	18.05
5	Adimalai	47.47	7.1	40.35	36.31
6	Nedumkandam	27.27	4.09	23.18	20.86
7	Kattappana	27.01	4.05	22.96	20.66
8	Idukki	83.10	12.47	70.64	63.57
	Total	**458.03**	**68.70**	**389.33**	**350.39**

(Source: Report of Central Ground Water Board, 1993)

Table 9: Block Wise Ground Water Draft and Balance

SL. No.	Block	Gross GW draft as on 31.3.98 (MCM)	Net GW draft as on 31.3.98 (MCM)	Balance GW resource for future use (MCM)
1.	Arudai	6.51	4.56	119.54
2.	Elamadesam	8.20	5.74	12.08
3.	Devikulam	4.01	2.81	67.41
4.	Thodupuzha	4.98	3.49	16.57
5.	Adimalai	8.55	5.79	34.36
6.	Nedumkandam	8.82	6.17	17.01
7.	Kattappana	6.24	4.37	18.59
8.	Idukki	4.89	3.42	67.22
	Total	**52.21**	**36.55**	**352.78**

(Source: Report of Central Ground Water Board, 1993)

Based on the very limited hydrogeological data available, the occurrence and movement of ground water in different rock types are presented below:

i) Ground Water in Charnockites

The ground water occurrence and movement in this formation is mostly controlled by the nature and degree of the weathering and joints and fractures present in the rock. Ground water occurs under water table in the weathered zone and semi-confined conditions in the fractures of the charnockites. The wells tapping charnockite aquifers range in depth from 3.20 to 9.23 m.bgl. with diameters varying from 2.30 to 3.75 m. The depth to water levels in them varies from 2.05 to 8.48 m.bgl. The joint in these rock types does not extend to a great depth. In general, the scope for ground water development is very limited in the charnockite terrain.

ii) Ground Water in Hornblende-Biotite-Gneisses

Unlike the charnockites, the hornblende-biotite–gneisses are more susceptible to weathering and hence the thickness of weathered zone is more in these rocks. In biotite-gneiss, porosity in the weathered mantle as well as in the foliation planes which are well developed in these rock types constitute the main receptacles for ground water occurrence and movement. Ground water occurs both under water table and semi-confined conditions and the wells piercing this formation vary in depth from 4.57 to 7.90 m.bgl. with diametes ranging between 2.34 and 2.90 m. The depth to water levels in them vary from 2.30 to 4.60 m.bgl.

Table 10: Block Wise Yield Range of Bore Wells

Yield range of bore wells in lph						
Sl. No.	Name of Block	<500	500-2000	2000-10000	>10000	Total
1.	Adimali	1	1	4		6
2.	Azhutha	8	24	23	10	65
3.	Devikulam	1	7	5		13
4.	Nedumkandam	4	12	9	5	30
5.	Idukki	4	6	6	1	17
6.	Kattappana	5	19	8	2	34
7.	Thodupuzha	4	3	3		10
8.	Elamdesom	22	30	26	14	92
	Total	**49**	**102**	**84**	**32**	**267**
	%	**18.30**	**38.30**	**31.5**	**11.9**	**100**

(Source: Report of Central Ground Water Board, 1993)

iii) Ground Water in Laterites

The foot hill area and the undulating areas being the midland areas in the eastern parts of the district are covered by laterites. The thickness of laterite is more in the area covered by biotite-gneiss. The laterites are highly porous and permeable and appear to be better aquifers from the point of view of occurrence and movement of ground water. Some of the wells peircing these laterites vary in depth from 9.50 to 12.25 m. with diameters ranging from 2.50 to 2.65 m. The depth to water levels in them ranges between 8.80 and 10.51 m.bgl.

Map 5 shows the Block-wise groundwater potential of the District.

1.14. Quality of ground water

A study of the quality of ground water is also important as it determines the suitability of the water for use to domestic, irrigation or industrial purposes. It depends on the concentration of total dissolved solids, chloride content and even trace elements, which are determinal for health, agriculture and industrial purpose. Further the concentration of various salts in ground water depends on the rock type environments and drainage conditions. Any quality hazard will pose problems when excessive amounts of salts are present which affects the structure and fertility of the soil. The data available with the Central Ground Water Department and the District Administration on quality of water is given here.

Table 11: Water Quality of Surface Water Sources in Selected Areas

	Periyar	Thodupuzha River	Kodakkad River	Idukki Reservoir	Kulamavu Aquifer	Amayar (Vandanmedu)
Physical Appreance	Clear, Sediments present	Clear, Sediments Present	Clear,sediments present	Clear, Sediments present	Clear, Sediments present	Clear, brown,Sediments present
Colour, Taste, Odour	-	-	Absent	-	-	-
PH value	6.9	6.9	6.8	6.9	6.9	7.0
Electrical Conductivity .	-	-	-	-	-	-
Chemical Alkalinity (PPM)	16.0	18.0	8.0	12.0	12.0	28.0
Chlorides (PPM)	10.0	6.0	6.0	10.0	10.0	8.0
Nitrites (PPM)	-	-	-	-	-	-
Nitrates (PPM)	1.5	0.10	-	0.1	0.05	oil
Sulphates (PPM	-	-	Trace	-	-	-
Oxygen absorbed (PPM)	1.2	0.50	0.2	0.1	0.50	1.8
Ammonia free of saline (PPM)	Trace	Trace	-	Trace	0.05	Trace
Ammonia Albuminoid (PPM)	Trace	Trace	Nil	Trace	Trace	Oil
Total Solids (PPM)	60.0	5.0	52.0	46.0	40.0	116.0
Hardness (Total)	26.0	14.0	10.0	18.0	22.0	26.0
Iron	Trace	Trace	Nil	Trace	0.30	0.2
Bacteriolo-gical No.of colonies on agar in 24 hrs.	10	10	Overgrown	2	10	65

No.of colonies on agar in 48hrs.	25	25	Overgrown	6	22	Overgrown
Presence of Lactose fermenting organisms in 24 hrs.	+10	+10	+50	+1	+0.1	+0.01
Presence of Lactose fermenting organisms in 48 hrs.	+1	+1	+50	-	-	+0.01
MPN	**170**	**170**	**180**	**500**	**6000**	**18000**

(Source: District Plan Document, 2001)

It is also observed that quality of water in the springs are very fresh with E.C of less than 100 micromhos/cmat 25oC.

Table 12: Quality Of Ground Water Sources

Village	Well	Water collected Date	PH	EC	Ca	Mg	Na	KFe	CO_3	HC O_3	SO_4	CI NO_3	F	Si Tot al	TD S
Munnar	S0402	26/11/98	7.8	143	19.5	8.3	20.8	2.9	41.5	14.3	4.2	12	0.01	53.6	75.0
Vellathooval	S0403	26/11/98	7.6	94	49	12.9	26	9.8	0	39.4	6.1	8	0.12	102	51.0
Kudayathur	S0404	24/11/98	7.5	77	44	15.3	24.7	6.1	0	116	4.0	6	0.21	107	41.0
Kudayathur	S0405	24/11/98	7.6	138	39	43	38	5.8	33.2	49.8	2.7	11	0.09	92.5	75.0
Kudayathur	S0406	24/11/98	7.8	130	44	14.2	30.9	6.9	0	18.6	5.2	10	0.11	1.50	71.0
Idukki	S0407	28/11/98	8.0	153	58.5	11.8	2.9	1.8	0	43.5	4.6	11	0.15	107	80.0
Pooppara	S0408	27/11/98	8.1	560	44	16.5	51.8	2.4	8.3	116	3.0	70	0.1	112	288
Kanthalloor	S0409	26/11/98	8.4	193	29.2	8.3	48.2	14.3	0	64.3	2.9	31	0.2	63.3	108
Udumban-chola	S04010	27/11/98	8.2	215	24.4	8.3	39.2	9.8	0	22.8	5.7	37	0.38	58.5	108
Aiyappancoil	SO4011	28/11/98	8.5	197	43.8	14.2	47	6.8	0	176	0.7	32	0.42	102	109
Kalkunthal	SO4012	27/11/98	7.9	110	53.6	14.3	28.5	12.8	20.7	199	3.3	16	0.39	112	55.0
Elappara	SO4013	28/11/98	7.8	51	34.1	4.8	36.2	15.2	0	80.9	5.6	4	0.51	53.6	28.0
Udumbannoor	SO4015	24/11/98	8.0	189	43.8	27.3	40.7	19.8	12.4	36.8	2.9	34	0.08	156	108

(Source: District Plan Document, 2001)

2. Alappuzha District

Alappuzha is the smallest district in the State but with the highest population density. It is bound between north latitude 09° 05' : 09° 54' and east longitudes 76° 16' : 76° 46'. It lies south of Ernakulam district and in the east it is bounded by Kottayam and Pathanamthitta districts and in the south by Kollam district. The district has an area of 1414 sq.km. and a population of 20.01 lakhs (1991 census). The district has 81.7 km of coastline. Administratively the district has been divided into 5 Municipalities, 73 Grama Panchayats, and 12 Block Panchayats. A considerable area of the district lies in the Kuttanad region.

2.1 Physiography of Alappuzha District

Alappuzha District has three distinctly different regions with unique physiographic, hydrologic and hydrogeologic characteristics.

a. Eastern Region

Bharanikkavu, Chengannur and Mavelikkara Blocks
Southeastern parts of Alappuzha District bordering Kottayam & Pathanamthtta Dist.
Elevation Less than 50 mt above msl
Lateretic and river alluvium soil
Gently sloping
Laterites followed by crystalline rocks such as charnockites and gneisses (Generally poor Aquifer) :
Occassional occurrence of fracture zones, lineaments, fault zones, shear zones, favourable for Bore Wells, and valleys with deep weathering suitable for open wells
Rainfall is more than 4000 mm
Irrigation Canals help in maintaining the water table in wells. Springs are rare
Adequate water sources

b. Kuttanad –A unique area in Kerala

Chambakkulam and Veliyanad Blocks
Waterlogged area surrounded by Vembanad Lake and canals
Elevation more below sea level to less than 5m above msl
Clayey alluvial soild
Thinly populated with scattered dwellings along canals
Sedimentary formations of quartenary and tertiary age offering excellent scope for deep artician tube wells. But the quality of water of these aquifers is often non-potable
Due to influence of sea, the surface water bodies turn out to be saline during summer months
Rainfall varies from more than 4500 mm in the west to less than 2500 in the East
Traditionally, the area had many rainwater harvesting ponds (vallams) and shallow wells, well protected from floods and contamination that supplied fresh water for all domestic purposes.

Kuttanad, the rice bowl of Kerala comprises around 1100 Sq. Km of which about 304 Sq. Km lies 1 metre below sea level. The land, which is presently inhabited by human population is developed by reclaiming land over the years. The low-lying paddy land, locally called "Padasekharams" is protected from the influence of water by bunds. In total there are about 1,100 small polders with a total bund length of roughly 2000 kms.

Kuttanad is drained by a network of rivers and manmade channels. The main feature of the drainage system is the Vembanad lake and the four rivers originating from the Western Ghats region. viz. Meenachil, Manimala, Pamba and Achancovil., which ultimately drain into Kuttanad. The human interventions and the resulting land use changes in the up streams of these rivers cause serious consequences in the ecological status of the downstream areas. The total basin area of these four rivers comes to around 5838 Sq. Km.

The floodwater enters Kuttanad from the upstream catchments during the monsoon period. Also during the rainy season the upper catchment area of rivers especially of Meenachil is prone to landslides. The floodwater from these rivers carries considerable sediment load that spread out on the lowland. During high floods the water over flow "bunds" into the roads and homesteads and causes serious havoc to agriculture.

Agriculture is the main occupation of the people of the Kuttanad. Paddy cultivation predominates on the low land and coconut on bunds and raised lands. The reclamation of land for habitation and raising homestead cultivation has reduced the available area for flood storage resulted in the rise of flood levels.

The total population of Kuttanad is around 2 million living in 6 towns spread over 74 villages. The area suffers regularly from

Flooding and salt intrusion, which limit the growing season to a few months
Lack of drinking water in the dry season because of salinity intrusion, various types of pollution etc.
Lack of dry land on which to build settlements, leading to very high population densities on the reclaimed bunds
Poor road transport system because of the number of criss- crossing watercourses, leading to a dependence on water transport

The problem of Kuttanad is mainly attributed to the mismanagement of its hydrological regime. When the development was under going, hydrological aspects were not given due consideration which finally resulted in its present ecological crisis.

c. Coastal Region

Harippad, Mudukulam, Ambalappuzha, Aryad, Kanjikuzhi, Pattanakkad & Thykkatusheri Blocks
Seashore in the west and Vembanad Lake in the east
Sandy Soil
Coastal sand followed by clay and gravel beds yielding saline water
Fresh water occurs in shallow sands and deep-seated sedimentary aquifers (Vaikkom, Varkkailai etc.)
Main occupation of people is fishing

2.2 Terrain system

The district is classified into 5 major Terrain units (table 1.1). Major part of the district comes under coastal plains with a small part in the east forms part of midland. The general elevation of the coastal plains is less than 6m.+ msl. with some of the areas below sea level in the range of 1-2m. below msl, constituting Kuttanad area. It is also characterised by the typical coastal geomorphic features such as beaches, shore platforms, spits and bars, beach ridges, estuaries, mudflats and tidal flats. The major

Terrain units in the district and name of the panchayats, which comes under each terrain units are as follows:

Table 13: Terrain units in the district

Unit	Characteristics	Region	Area %
C	Coastal plain including beach, Mud flats and strand lines	Sand deposits in between Lakshadweep sea and Vembanad lake	27.4
PC	Paleo Coastal plain	Grayish Onattukara Soil	13.0
A1	Old alluvial plain (deltaic)	Clay dominated soil in upper Kuttanad region	7.6
A2	New alluvial plain (deltaic)	Heavy clay dominated Soil type seen in the border of Southern part of Vembanad lake	17.9
D1	Low rolling terrain	Eastern border of the district	25.1
	Water body		9.5

(Source: District Plan Document, 2001)

2.3. Climate

i) Rainfall

The average rainfall in the south-west monsoon in the district is calculated as 1511mm. and that during the north–east monsoon is 832mm.

The rainfall variations in the District is given in **Map 6.**

ii) Temperature

An analysis of the temperature for a period of 5 years shows an average temperature of 30°C except in June to August. But in March, April and May it comes upto 33.5°C.

iii) Relative Humidity

The Relative Humidity in the district is generally high. The maximum average R.H in the district is in the range of 85-94 and the minimum is in the range of 71-77.

2.4. Drainage

The district is traversed by 2 major rivers, viz., Pamba and Achencoil which originates from the southern western ghats, drains in to Kuttanad and finally joins the Vembanad Lake. Achencoil enters Kuttanad at Pandalam and joins Pamba river at Veeyapuram. Pamba river has a total basin area of 2235 sq.km with a length of 176 km. The average annual stream flow of Pamba river is 3423.7 Mm³.the river has a navigable length of 73.6 km. The Achencoil river has a total basin area of 1484sq.km and a length of 128 km. The average annual stream flow is 1484 Mm3 and has a navigable length of 32 km. The Vembanad lake, the largest back water lake in the State forms the north-eastern part of the district. A large number of ponds are seen in many parts of Alappuzha district, which serves the purpose both drinking and other domestic uses. The criss-crossed canals especially in the Kuttanad region forms one of the major water sources for a large number of households even though the quality of water in these canals in very poor.

The drainage system of the District is given in **Map 7.**

2.5. Agro-climatic zones

Kerala is divided into 5 agro-climatic zones viz., northern zone, Southern zone, Central zone, High Altitude zone and Problem zone (NARP classification). The Alappuzha district falls in the Problem zone.

2.6. Transportation and Communication

Most of the areas in the district is till recently were accessible only by water ways especially in the Kuttanad region. But, during the last few years, a considerable area has been connected by roads. One of the major roads which has brought a major breakthrough in the transportation network in the district was the Alappuzha–Changanacherry Road .The National high way (NH47] from Kanyakumari to Salem passes through the district. The Main Central road (MC road) passes through the south–eastern part of the district. The Madras –Thiruvananthapuram broad guage line passes through the south- eastern portion connecting Kayamkulam, Mavelikkara and chengannur towns. Alappuzha town is connected by the Ernakulam–Alappuzha–Kayamkulam broad gauge line. Water transport is the common transport system in the district and most of the interior places are connected by water transport. Alappuzha town is criss-crossed by navigable canals and is also connected to Kochi in the north and other important towns in the east. The entire district is closely connected by telecommunication network.

2.7. Soils

On the basis of morphological and physico-chemical properties the Soil Survey Department of Kerala have classified the soils of the district into four types viz., 1) Coastal alluvium (Entisols), 2) Riverine Alluvium (Inceptisols), 3) Brown hypidiomorphic soil (Alfisols), 4) Lateritic soil (Oxisols).

a) *Coastal alluvium (Entisols)*

These soils are seen along the western parts of the district all along the coast and have been developed from recent marine sand estuarine deposits. The texture is dominated by sand fraction and are extensively drained with very high permeability. These soils have low content or organic matter and of low fertility level.

b) *Riverine alluvium (Inceptisols)*

These soils occur mosly in the central pedi-plains and eastern parts of the area along the banks of Pamba river and its tributaries and show a wide variation in their physico-chemical properties depending on the nature of alluvium that is deposited and characteristic of the catchment area throughwhich the river flows. They are very deep soils with surface textures ranging from sandy loam to clayey loam and moderately supplied with organic matter, Nitrogen and Potassium.

c) *Brown hypidiomorphic soil (Alfisols)*

These are mostly confined in the western low-lying areas of the district along the coast. These soils have been formed as a result of transportation and sedimentation of material from the adjoining hill slopes and also through deposition by rivers and exhibit wide variation in their physical and chemical properties. They are poor in drainage condition and are moderately supplied with organic matter, Nitrogen, Potassium and deficient in lime and phosphate.

d) *Lateritic soil (Oxisols)*

The lateritic soil is the result of weathering process of Tertiary and Crystalline rocks under tropical humid conditions and are seen in the south-eastern part of the district. Heavy rainfall and temperature prevalent in the area are conducive to the process of formation of this soil type and have been formed by leaching of bases and silica from the original parent rock with accumulation of oxides of Iron and Aluminium. They are poor in Nitrogen, Phosphorous, Potassium and low in bases. The organic content is also low and are generally acidic with pH ranging from 5.0 to 6.0. These soils are well drained and respond well to management practices.

The soil map of the District is given in **Map 8**.

2.8. Land Use

Since the density of population is very high there is acute pressure on land in Kerala. Alappuzha district is no exception to this. Detailed land use map of the district was prepared from remote sensing data at 1:50,000 scale. The major land use categories identified are, Mixed Crop(774.6 sq.km),Paddy area (319.9 sq.km), Built-up land (63sq.km), Water logged land (73 sq.km), Sandy area (19.9 sq.km) and water area/lake (164.2 sq.km). **Map 9** shows the landuse pattern of the District.

2.9. Geology

Alappuzha district consists of coastal alluvium comprising of sand and clay along the coast and flood plain deposits in Kuttanad region. Residual Laterite formations are encountered in the south-eastern parts of the district and occurrence of granites are encountered in and around Chengannur area. The surfacial distribution of various geological formations in Allappuzha district is as below:

1.	Coastal sediments and flood plain deposits	:	1158 sq.km
2.	Laterite	:	253 sq.km.
3.	Crystalline formation	:	3 sq.km.

The drilling by Central Ground Water Board and by various other agencies has brought out interesting facts on regional geology of the district and are given below:

The coastal alluvium and flood plain deposit rest on crystalline basement formations, comprising charnockites and khondalites. The lithological and electrical logs of bore holes in the coastal area indicated that Tertiary sediments (equivalent in age to Cuddalore and Rajahmundry sandstones of east coast) comprise of four distinct units namely Alappuzha, Vaikkom, Quilon and Warkalai beds.

Thickness of the Tertiary formation is varied in the basin and the drilling down even up to 600m between Kattoor and Trikkunnapuzha has not encountered basement crystalline rock and hence the maximum thickness of Tertiary formations are still unknown. All the four beds are encountered in bore holes drilled between Nallanickal and Arthungal. The geological mapping aided by sub-surface data has brought out the following geological sequence of formations in the district.

Table 14: Stratigraphic Succession in Alappuzha District

	Age	Formation	Lithology
	Recent	Alluvium	Sand and clays along the coast and flood plain deposits of Kuttanad
Quartenary	Sub-recent	Laterite	Laterite cappings over crystalline and sedimentary formations
	Lower Miocene	Warkalai beds	Sandstones and clays with thin bends of lignite
	Lower Miocene	Quilon beds	Limestone and clay
Tertiary	Oligocene to Eocene	Vaikkom beds	Sandstone, clay and thin bands of lignite
	Eocene	Alappuzha beds	Carbonacious clay with minor lenses of fine sand
			Archaean (Crystalline formation) Charnockites, Khondalites and granites

(Source:Report No. 33 of Central Ground Water Board,1983)

A brief description of different litho units in the district is given below:

i) Archean formation

Charnockites, khondalites and granites form the basement. Outcrops of granites are seen in midland areas near Chengannur in the south-eastern part of the district along M.C. Road over an area of 3 sq.km. They are also encountered in canal excavations, railway cuttings and are lateritised on the surface. Charnockites and khondalites are not exposed in the district except along deep-cut valleys in the east. However, they are encountered in bore holes.

ii) Tertiary formations

Due to the limited exposure much information was not available earlier. Drilling by Central Ground Water Board and State agencies like Kerala Water Authority and Ground Water Department in the coast and off-shore drilling by Oil and Natural Gas Commission have thrown much light on the sub-surface geology and nature of semi-consolidated sediments and has brought out valuable data. In most of the areas these sediments are overlain by laterite or alluvial sediments.

The description of the four sequences are given below

a) Warkalai bed

These forms the youngest formation of the Tertiary sequences of Kerala. Exposures of these are mostly eroded and are mostly capped by laterites. Typical outcrops are seen along cliff section. Best exposures of this sequence is seen in the cliff sections of Varkala beach which forms the type area. These are made up of alternate layers of fine to medium grained sand, clay and thin bands of lignite and the maximum thickness of Warkali is 140 m as encountered at Kalarcod.

b) Quilon beds

Underlying the Warkalai bed, there is a horizon of hard, compact and ash grey limestone, calcarious clay and marl and is generally associated with fine to medium sand. The maximum thickness of this formation is 116 m. as encountered at Nirkunnam.

c) Vaikom beds

These beds were not known till recently and these were first considered as part of Warkalai. On a detailed study, these were found to underlie the Quilon beds and extend almost over the entire sedimentary basin. Best exposures are in the laterite sequence south-east of Vaikom and is termed as Vaikom beds. The thickness of the formation in bore holes ranges from 25 to 288 m. with maximum thickness in the western part of the district. In the east it is lateritised on the surface. This sequences consists of thick sequence of coarse to very coarse sand, gravel and pebble bed interbedded with ash grey clay and thin bands of lignite and peat.

d) Alleppey beds

This oldest Tertiary formation unconformably overlying the crystalline Archaean basement is mainly composed of carbonaceous clay with minor lenses of sand. The maximum thickness of the formation is not known since no bore hole has encountered in the deeper bore holes drilled between Arthunkal and Nallanickal section. The palyanological studies carried out by Birbal Sahni Institute have reported a rich palynological assemblage which conforms to Eocene age.

iii) Laterite

The laterite of sub-recent age is opposed in the eastern parts of the district and overlie the crystallines. In the western part, laterites are encountered in bore holes overlying Warkali beds with a maximum thickness of 74 m as encountered at Thrikunnapuzha.

iv) Recent formation

The unconsolidated coastal formations comprising sand, clay, flood plain deposits and deposits extending over an area of 1156 sq.km in the district forms dominant geological formation overlying Tertiary formation and quarternary formations.

The recent formations comprise glass sands, silt, dark gray beach sands, red tonned sands and black clay. The thickness of this formation varies from 4m. to more than 100m. as seen around Thottapalli, Kattoor and Nirkunnam. Burried forest covers are reported in parts of Kuttanad area between Ambalapuzha and Pallipad.

The geology of the District is depicted in **Map 10.**

2.10. Geological Sections

The Central Ground Water Board has prepared geological sections to bring out thickness and behaviour of various formations as apart of al Kerala Ground Water Project. These sections indicate that Tertiary basin along the west coast is deep towards south and south-west having thick pile of sediments where as in the north it is deposited over basement at shallow depths.

2.11. Ground Water Status

Alappuzha is the only district in Kerala where domestic water requirement is met from ground water source on a large scale. Requirements for drinking water in respect of entire

Alappuzha area and Kuttanad are met with from a large number of tube wells. The major abstraction of ground water in the district is from Tertiary sedimentary formation.

i) Ground water in crystalline formations

The crystalline formation occurs in the south-eastern part of the district in the midland area mostly capped by thick laterite formation. Outcrops of granite are seen around Chengannur. The ground water occurs under phreatic and semi-confined conditions in the crystallines. The bore well at Chengannur drilled down by CGWB to a depth of 200.53m.bgl encountered weathered fractured and massive granite. The well had a discharge of 0.91 Ips.

The bore well at Vettiyar drilled down to a depth of 229.01m.bgl encountered 14m. laterite, 25m. of Tertiary formation comprising peat and clay and 190m. of khondalite intruded by dolerite dyke. The bore well has a discharge of 1.80 Ips.

ii) Ground water in Tertiary formations

The Tertiary formations constitute the major aquifer in the district, with total thickness of sediments range from 90 to > 600m covering extensive area. They are underlain by crystalline basement and overlain by laterite and unconsolidated formations.

iii) Ground water in Warkalai beds

The Warkalai aquifer overlying the Quilon beds is composed of medium to fine grained sand with an effective grain size of 0.21 mm to 0.30mm. This bed is the most extensively developed aquifer in the district. Ground water occurs in semi-confined to confined conditions with the cumulative thickness of granular zone varying from 6 to 44m.

The tube wells have depth range of 22-258m and have discharge in the range of 6-120m3 / hr. with drawdown of less than 1 to 5.60 m. for a duration of pumping of 600 to 3000 minutes. The specific capacity is in the range of 98.01 to 168.00 1pm/m.

iv) Ground water in Quilon beds

Compared to the underlying Vaikom beds the ground water potential from the Quilon bed is not very promising. Central Ground Water Board has constructed two piezometers one at Karthikappalli and another one Thuravur for tapping this aquifer. The thickness of granular zones tapped in this aquifer is between 6m and 10m and is composed of fine sand.

v) Ground water in Vaikom beds

Vaikom beds overlying the Alappuzha bed with thickness varying from 25m to 238m is the highly potential aquifer among the Tertiary formations of the district. They comprise of gravel, coarse sand, clay and seams of lignite. They are exposed in south-eastern part of the district in the midland area and are highly lateritised on the surface. The thickness of the granular zones tapped in the tube wells constructed in this aquifer ranges between 5m and 210m with discharge in the range of 11 to 96m3/hr. However, the water from Vaikom aquifer in Kuttanad region and in coastal zone west of Vembanad lake are more mineralised. Some of the tube wells with high discharge of 57.6m3 /hr. to 96.7m3 /hr. have draw downs in the range of 2.23m to 6.76m. The tube wells at Karuvatta, Karumadi, Karthikappalli and Kandiyur have free flow with water level in the range of 1.44 to 4.29m.agl.

v) Ground water in Alappuzha bed

The bottom most units of Tertiary sedimentary formations, the Alappuzha bed, comprising of highly carbonaceous clay with intercalations of sand was encountered in tube wells at Trikunnapuzha below 522 m. bgl and at Kottaram below 299m. bgl. The thickness of Alappuzha bed was 70m at Karumadi and 23m at Kottaram, whereas at Kalarkode it was more than 106m and basement was not encountered. The formation water is brackish in quality as revealed by electrical logging. Ground water in laterites:-

The ground water occurs in phreatic conditions in the midland area. The depth of dug wells tapping laterite is in the range of 4.6 m to 12 m. bgl and depth to water level is in the range of 1.46 to 8.65m.bgl. The dug wells sustain pumping for 1-3 hrs/day with a discharge ranging from 0.8 to 2.5 m3 / hr. Laterite encountered in the coastal tube wells has thickness in the range of 6 to 75 m and are discontinuous in their occurrence. They are overlain by alluvium and clay.

Table 15: Ground water availability – Block-wise

Sl.No.	Name of Block	Total Ground water/ YearIn MCM
1	Ambalappuzha	56.74
2	Aryad	23.63
3	Bharanikavu	24.90
4	Chambakulam	75.46
5	Mavelikara	38.94
6	Chengannur	28.94
7	Harippad	48.19
8	Muthukuiam	33.07
9	Veliyanadu	59.76
10	Kanjikuzhi	56.32
11	Pattanakkad	39.34
12	Thykattusseri	28.09

(Source: District Plan Document, 2001)

vi) Ground water in unconsolidated formations

Spread over an area of 1158 sq.kms in the district the recent unconsolidated formation constitutes major potential phreatic aquifer comprising coastal sands all along the coast and flood plain deposits in interior Kuttanad area. Large number of shallow dug wells for domestic use and in a limited extent for irrigation and industrial purpose, uses this aquifer. The water table is generally shallow. Depth of wells tapping coastal sediments ranges between 2.75 to 10.60m.bgl with depth to water level in the range of 1.0 to 2.0 m.bgl. Open wells when tested for yield by Central Ground Water Board sustained pumping in the range of 20-80 minutes and had discharge in the range of 11.76 to 12.90 m3/hr. for a draw down ranging from 0.7 to 5.58m.

The Block-wise groundwater potential is shown in **Map 11.**

2.12. Depth to water table

The depth to water table in the district does not show much variation, being a plain area except in the southeastern fringes of the district where it forms part of the midland region. The depth to water table is shallowest in the western and central parts of the district. It can be seen that the depth to water level is between 0.64 m to 3.0 m.bgl. in the west and central parts of the district, whereas in the south-eastern parts of the district it is between 4.0 m to 14.0 m.bgl. During the post-monsoon period (Nov.'91) the depth to water level in the western and central parts of the district varies between 0.45 to 1.55 m.bgl. whereas in south-eastern parts of the district it ranges between 3.50 to 11.0 m.bgl.

i) Impact of Rainfall on Water Table

The water table in phreatic acquifers is controlled by rainfall pattern in the area. The study of water level data in hydrograph stations shows that the deepest water level is in April/May. Generally the premonsoon showeres are sometimes heavy and cause rise in water level in the month of May itself.

Analysis of the data for the earlier periods indicates the important role of Northeast monsoon in sustaining the ground water system. A lesser southwest monsoon does not affect the water levels much, whereas Northeast monsoon though contributing only 20.3% of total annual rainfall effectively recharges into the ground water system. About 60% of the rainfall in the southwest monsoon is enough to recharge the ground water systems.

The long-term behaviour of water level in dugwells is controlled mainly by rainfall pattern, return flow of irrigation waters and abstraction viz., draft for domestic, irrigation and industrial use, or transpiration losses through the deep rooted vegetation.

ii) Water level behaviour in deeper aquifers

To understand the water level behaviour in deeper aquifers, the piezometeric surface of the deeper confined aquifers were monitored by Central Ground Water Board. The hydrographs of piezometers tapping the Warkalai, Quilon and Vaikom aquifers are given . It can be seen from the hydrographs that in Warkalai aquifers at Karthikapalli the premonsoon water level recorded in 1.8 m.bmsl during April/May period and during June to August period the piezometric surface rests around 1.25 m. bmsl. Whereas in Kandiyoor it is 1.6 m. amsl and 3.45 m.amsl. respectively. In the Quilon aquifer at Karthikapalli the elevation in the piezometric level is of the order of 1.5 m.amsl., during premonsoon period in April/May months whereas in June to August it varies from 2.1 to 2.3 m.amsl.

In the Vaikom aquifer at Kandiyoor the piezometric head rests at 4.45 m. amsl. during the period from November to December (Postmonsoon W.L.) and declines to 3.80 m. amsl. during pre-monsoon period (January to May).

2.13. Quality of ground water

The chemical characteristics of the ground water in the shallow and deep aquifer of the district are being monitored by the Central Ground Water Board through a net work of shallow domestic wells, tube wells and bore wells. In addition to this, the water quality in the water supply wells of Kerala Water Authority is also being studied. The premonsoon (April '91) water quality of 45

numbers of network hydrograph stations indicates that the waters are fresh with electrical conductivity ranging from 50 to 2400 micromhos/cm at 250C.corresponding to a total dissolved solid content less than 1500 mg/l. and chloride values varying between 4.3 and 675mg/l.except Purakkad, where the hydrograph station is located within 10m. from sea wave breaker and hence the water is saline. Thus the waters are nearly neutral. The nitrate and fluoride levels are generally low, falling below 20 and 0.5mg/l respectively The shallow ground water is resh and is suitable for drinking and other domestic needs as wells as for agriculture and indistrial purposes. The shallow ground water close to the coast (within 1 km.) is also fresh in general indicating absence of any significant seawater intrusion in these aquifers. The shallow well at Purakkad within 10m from the coast registers saline water (electrical conductivity above 10,000 micromhos/cm at 250C) during dry periods and the water turns fresh with pre-monsoon rains.

The recent formations and the sediments of the Tertiary age from deep aquifers in the western parts of the district are extensively used for public water supply and industrial purposes. The deep aquifers of the recent formations yield fresh water with electrical conductivity in the range 400 to 1100 micromhos/cm at 250C corresponding to 250 to 700 mg/l of total (and with chloride content in the range 15 to 250 mg/l) dissolved solids.

The deep aquifers of the Warkalai formations also yield fresh water in the district with electrical conductivity in the range 350 to 1000 micromhos/cm at 250C corresponding to a total dissolved solids content between 200 and 650mg/l. The chloride content ranges between 5 and 180 mg/l. The nitrate levels are low in the range of zero to 17 mg/l. The ion content is in the ranges zero to 0.3 mg/l in the water supply wells tapping the Warkalai formations in the Alappuzha town, whereas the iron content in such wells in Kuttanad region is in the range 0.7 to 10mg/l with a mean of 3.0 mg/l. The fluoride content of the Warkalai formations in the district are in the range 0.3 to 2.6 mg/l, the higher range of 1.5 to 2.6 mg/l, with a mean of 2.0 mg/l being observed in Alappuzha area.

The water from the recent and Warkalai formations are suitable for domestic, agricultural and industrial uses in general. However, the fluoride levels in parts of those aquifers are slightly above the potable limits of 1.5 mg/l. The Warkalai aquifers in the district show zonation of the geochemical types of the water. Fresh water of Ca-Hco_3 type occurs in these aquifers in areas south of the district boundaries. The water type changes to Ca-$NaHCo_3$ type in the southern parts upto Ambalapuzha. Further north in the Ambalapuzha – Alappuzha – Shertalai, zone, fresh water of $NaHCo_3$ type is observed. The interaction between the recharging fresh water and the Tertiary sediments have resulted in the observed variation, which indicate a freshening process and a water movement towards north western direction.

Table16: Water quality in deep wells in Alappuzha area-Effect of pumping for about 50 years

Location	Date/Period	TDS(mg/l)	Cl(mg/l)
Alappuzha			
Well No.1	3.3.43 to 2.8.45	366	72
Well No.2	25.3.43 to 2.8.45	400	70
I. Thookukulam	21.2.88	400	80
II. Thottapally	16.3.38	246	13
	21.2.88	243	12
III. Mancombu	3.5.41	398	127
	4.4.87	499	149

(Source: Report No.33 of Central Ground Water Department, 1983)

The above data clearly indicate that the quality of water from the pumping wells in the Tertiary aquifers has not undergone any significant variation during the past half a century and that there is no threat of sea water intrusion in the future also.

2.14. Ground water resource, draft and development

i) Ground water recharge in shallow phreatic aquifer

The Central Ground Water Board had carried out detailed studies on the recharge characteristics of the different aquifers. The computation of the resources of phreatic aquifer was done based on the water level fluctuation method. There is a close network of 45 observation wells in the district. The water levels are monitored 4 times in a year and the data is available from 1979 onwards. The block wise ground water resource in the districts was computed in accordance with the recommendations of the Ground water Estimation Committee, (GEC), Government of India (1992). The average annual recharge to the phreatic aquifer was calculated to be 572 mcm in the district. In Alappuzha district the draft of ground water from phreatic aquifer is mainly through dug wells and filter point wells.

ii) Ground water potential of deeper aquifers

Among the deeper confined aquifers of Tertiary group, Warkalai and Vaikom aquifers are potential and hence development is mostly restricted to these aquifers. The Quilon bed is poor aquifer and is with out any development Alappuzha bed contain brackish formation waters. Hence the ground water resources have been computed for the potential Warkalai and Vaikom aquifers. The aquifer-wise ground water potential available in the district is as follows.

Warkalai aquifer

Warkalai aquifer is the most potential fresh water aquifer in the Tertiary formations. Hence the maximum ground water development has taken place in this aquifer catering to the dense coastal population. The total ground water potential available in the aquifer is 36 MCM. Many piezometers have been constructed in this aquifer by Central Ground Water Board to monitor the ground water development.

Vaikom aquifer

Next to Warkalai aquifer, Vaikom aquifer is highly potential. The total ground water potential available in this aquifer is worked out to be 10 MCM.

2.15. Ground water development perspective

Based on the studies carried out in the district by Central Ground Water board, State Government agencies and institutional financing agencies, in respect of yeild, command area, and returns, the wells in alluvium are recommended to have a diameter of 1.5 to 2.0 m and depth ranging from 5 to 7.0 m. tapping a thickiness of 4.0 m. of aquifer material. The filter points are feasible in the western parts of the district, where the thickness of staturated sand formation exceeds 5 m. Tube wells down to a depth of 50m. tapping 10-12 m. thickness of aquifer material is feasible in alluvium and yield of these structures vary from 50 to 70 m^3/day in the district.

It is observed that the filter points are economical in alluvial areas compared to dug wells. However filter points are feasible only in areas where the granular zones have a minimum saturated

thickness of more than 5m. Tube wells tapping Warkalai and Vaikom aquifers are the most economical structures wherever feasible.

2.16. Socio-Economic and Demographic Characteristics

Primary data on the socio-economic profile of the District was collected by undertaking Participatory Rural Appraisal studies in 2 Grama Panchayats in Alappuzha District and 3 Grama Panchayats in Idukki Districts. The ToR and methodology for the study was finalised at a state level stakeholder Workshop. At a District level Workshop, the GPs for the study were selected.

A 4-member Team of experts in participatory techniques conducted the PRA, which was undertaken through a 5-day intensive interaction at the GP level. The Report on the PRA study is available in the PID file. The main findings are summarised in **Attachment 3.**

The Panchayats selected for study mainly follow two paths. Among the agricultural produce are paddy and coconut. The industrial sector includes coir making, marine products, processing and exporting of lime. About 7,000 women are employed in the prawn-peeling centre in Aroor.

2.17 Water Supply Situation

Alappuzha symbolizes the paradox of "water, water everywhere but not a drop to drink !".

In order to understand the water supply problems of Alappuzha District, a reconnaissance technical study was conducted in 4 selected GPs. The study results are furnished as **Annexures 3.3.1, 3.3.2, 3.3.3 and 3.3.4.** Based on the findings of these studies and available secondary data, they are discussed regionwise below:

i. <u>Eastern Region</u>

This consists of the Bharanikkavu, Chengannur and Mavelikkara Blocks of Alappuzha District falling in the eastern border. Lateritic soil, slightly, sloping lands and semi-urbanised nature makes this region distinct from the rest of the District.

Deep laterites followed by crystalline formations (Hard rock) marks the geology. Shallow ground water occurs in the laterites and weathered mantle up to 7-10 metres, tapped through open wells located in valleys/topographical lows. Bore wells can tap deep seated aquifers such as fracture zones, shear zones etc.

Traditionally, the major source of water for all domestic purposes used to be privately and publicly owned open dug wells. Even today, privately owned open wells constitute the major source of water for domestic purposes. Private and public ponds used to meet the non-drinking requirements, many of which are in disuse nowadays, thanks to the modern lifestyle, shower, washing machine etc. There is one irrigation canal that passes through all the GPs of this region, which helps in meeting the non-drinking water requirements. About 40% of households own satisfactorily functioning open wells.

KWA has installed large Piped Water Supply Schemes in all the Panchayats, covering about 20% of the population. These schemes pump water mostly from open wells and sometimes from bore wells into overhead tanks and supplies water by gravity through public stand posts. Due to varieties of technical problems, almost all these schemes are functioning (if at all) very poorly.

In the water supply front, most of the initiatives consisted of extending pipe lines from the existing KWA Schemes and construction of additional water tanks. No attempts were made by any quarters to ensure adequacy and sustainasbilty of water sources. Sporadically well schemes were taken up for SC colonies under special centrally sponsored schemes.

The water supply situation of the area is summarized below:

Table 17.1: Existing Water Supply Systems in Eastern region - Alappuzha

Type of schemes	Source	Ownership	Coverage	Problems
Medium Pumping Schemes	Open Well, Bore Well	KWA	20%	Water Inadequate in Open Wells Pumping & conveyance system need repair
Directly using	Canals	Irrigation Department	5%	Dry in summer
Directly using	Wells	Private/Public	75%	Tends to dry

ii. Kuttanad Region

This consists of Chambakkulam and Veliyanad Blocks of Alappuzha District covering the entire Kuttanad Region. Water logged, and falling on the sides of Vembanad Lake and numerous back water canals, Kuttanad poses unique problems

Waterlogged area surrounded by Vembanad lake and canals. Clayey alluvial soil, cultivating paddy. Sedimentary formations of quartenary and tertiary age. Due to occurrence of clay, the shallow zones are not favourable for ground water. Moderately deep aquifers generally yield poor quality water. Occasional occurrence of deep seated fresh water aquifers. Due to influence of sea, the surface water bodies turn out to be saline during summer months. Surface water bodies are heavily contaminated.

Traditionally, the area had many rainwater harvesting ponds (*vallams*) and shallow wells, well protected from floods and contamination, which supplied fresh water for all domestic purposes. Promise of fresh water through pipe lines on one hand and prevention of salt water intrusion by Thanneermukkam bund on the other resulted in total neglect of these traditional systems. Now that the promised piped water supply schemes did not come (thanks to the total failure of the KWA schemes) and the Thannermukkam bund is kept open during summer in response to the popular demand from the fishermen attracting saline water, the people are left with no reliable drinking water source

All the traditional water sources have disappeared due to neglect and instead, ambitious massive piped water supply schemes were introduced. But due to source and system failure all these schemes have miserably failed. Presently, drinking water is supplied through boats by the district authorities

KWA has installed large Comprehensive Piped Water Supply Schemes in all the Panchayats, covering multiple Panchayats. These schemes are designed to pump water deep tube wells into overhead tanks and supplies water by gravity through public stand posts. Very poor quality of tube well water and difficulty in laying pipes in the waterlogged areas have resulted in total collapse of the schemes.

In the water supply front, most of the initiatives consisted of extending pipelines from the existing KWA Schemes and construction of additional water tanks. No attempts were made by

any quarters to ensure adequacy and sustainabilty of water sources. Recently, several mini-purification plants that pump water from the canals, purifies the water using pressure filters and supplying the same through public stand posts were introduced in Kuttanad. These systems failed due to salt-water intrusion during summer.

The entire population of Kuttanad region is deprived of clean and potable drinking water.

Comprehensive Piped Water supply Schemes are absolutely not feasible for Kuttanad. Probably due to ignorance, certain lobby still believes that large comprehensive piped water supply schemes are the only solution to Kuttanad water supply problem. Unless immediate measures are taken to effectively address the drainage problem and water pollution problem, no sustainable solutions can be found for the drinking water problems of Kuttanad.

iii. Coastal Region

This region is bounded by the seashore in the west and Vembanad lake in the east. This region is spread from north to south of the District covering Thaikkattusseri, Pattanakad, Kanjikkuzhi, Aryad, Ambalappuzha, Harippad and Mudukulam Blocks. The region has sandy soil and is cultivated by coconuts and seasonal vegetables. Coastal sand followed by clay and gravel beds of quaternary and tertiary age. Fresh water occurs in shallow sands (3 m), which is tapped by shallow wells/ponds and filter points. Deeper layers yield saline water. There is impending danger of salt water intrusion due to over pumping from the shallow sandy aquifer (ice factories, peeling shed, industries). Deep-seated sedimentary aquifers (Vaikkom, Varkkailai etc.) occasionally yield moderately good quality water.

Traditionally, the coastal region depended up on shallow ponds dug up in sand beds for all domestic purposes. Although most of these sources were owned by landlords, even the poor people living on landlords lands had access to these sources. Ever since the poor communities (fishermen, SC) were allotted house plots, landlords refuse to allow them to use these sources. Narrow diameter open concrete ring wells and filter points (hand drilled shallow tube wells) were introduced towards early sixties.

KWA has installed large Comprehensive Piped Water Supply Schemes in all the Panchayats, covering multiple Panchayats and covering about 50% of the population. These schemes are designed to pump water from shallow and deep tube wells into overhead tanks and supplies water by gravity through public stand posts. Poor pumping and conveyance system has resulted in poor performance of most of the schemes. Poor quality has also been reported in few schemes.

In the water supply front, most of the initiatives of PR systems consisted of extending pipelines from the existing KWA Schemes and construction of additional water tanks. No attempts were made by any quarters to ensure adequacy and sustainability of water sources. Few mini-piped water supply schemes were introduced under the People's Planning Campaign, which pump water from open/shallow tube wells. Although there is adequate ground water potential available in the shallow coastal sandy aquifer, its total mismanagement has resulted in severe quality deterioration.

Table 17.2: Existing Water Supply Schemes in Coastal Regions

Type of schemes	Source	Ownership	Coverage	Problems
Medium Pumping Scheme	Tube wells	KWA	50%	Pumping & conveyance system need repair
Small Pumping Schemes	Filter Points and Open Wells	GP/DP/GWD	20%	Pumping & conveyance system need repair
Hand Pumps	Tube Well	GWD	Nil	Rusted pipes, rejected by users
Directly using	Wells/Ponds	Private/Public	30%	None

2.18 Environmental/Household Sanitation

The rural household sanitary latrine coverage of the state is given in **Table 3.16**

Table 3.18: Rural Household Sanitary Latrines Coverage (1991) – *in lakhs*

Sl. No	Description	Total	Rural
1	No. of households	55	47.09
2	Households with latrines	28.74	24.54 (28.74 %)

The birth rate for Kerala is 18.2 per 1000(1998) compared to the national average of 26.4. Death rate is 6.4 per 1000 when compared to the all India level of 9.IMR is 12, and life expectancy at birth 68.23 for men and 73.62 years for women. Water and sanitation related high morbidity rates are reported.

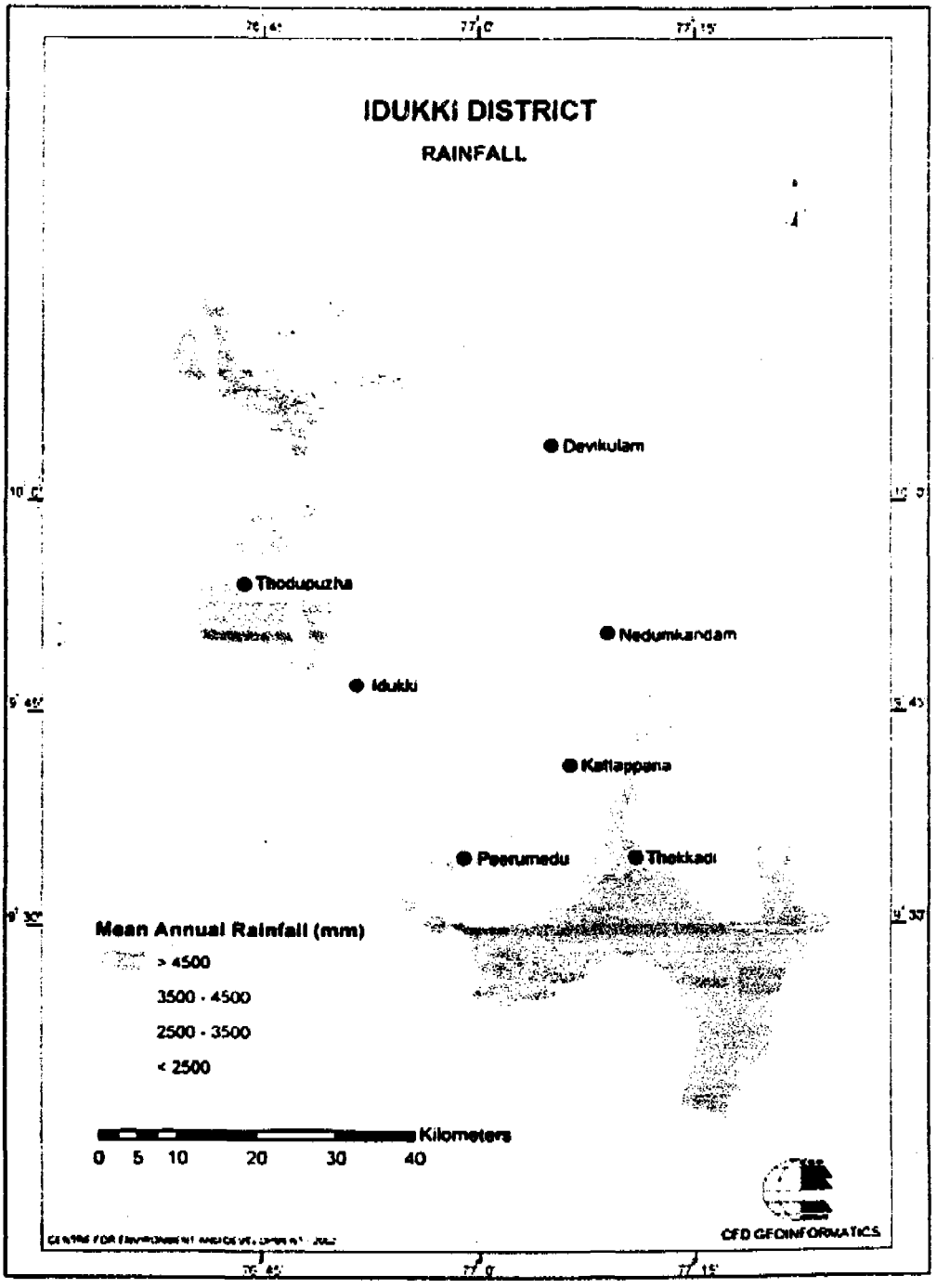
Out of the 5.5 million people 2.9 million do not have individual sanitary latrines.(1991). Overall coverage is reported to be over 50%. In rural areas 2.9 million HH do not have latrines of them 2.5 millionare are BPL families.

Very high biological contamination of water, especially with the spillover of the sanitary latrines during monsoon. Depositing of waste in the water is another problem. Saline water intrusion, traces of heavy chemical fertilisers and pesticides from the paddy cultivated region, coir retting and processing marine products, waste from the ice factories, use of water ways for transport, construction of roads, bridges across the fields have all directly or indirectly affected the quality of health, especially the poor. Common case reported are typhoid, cholera, skin ailments, dysentery

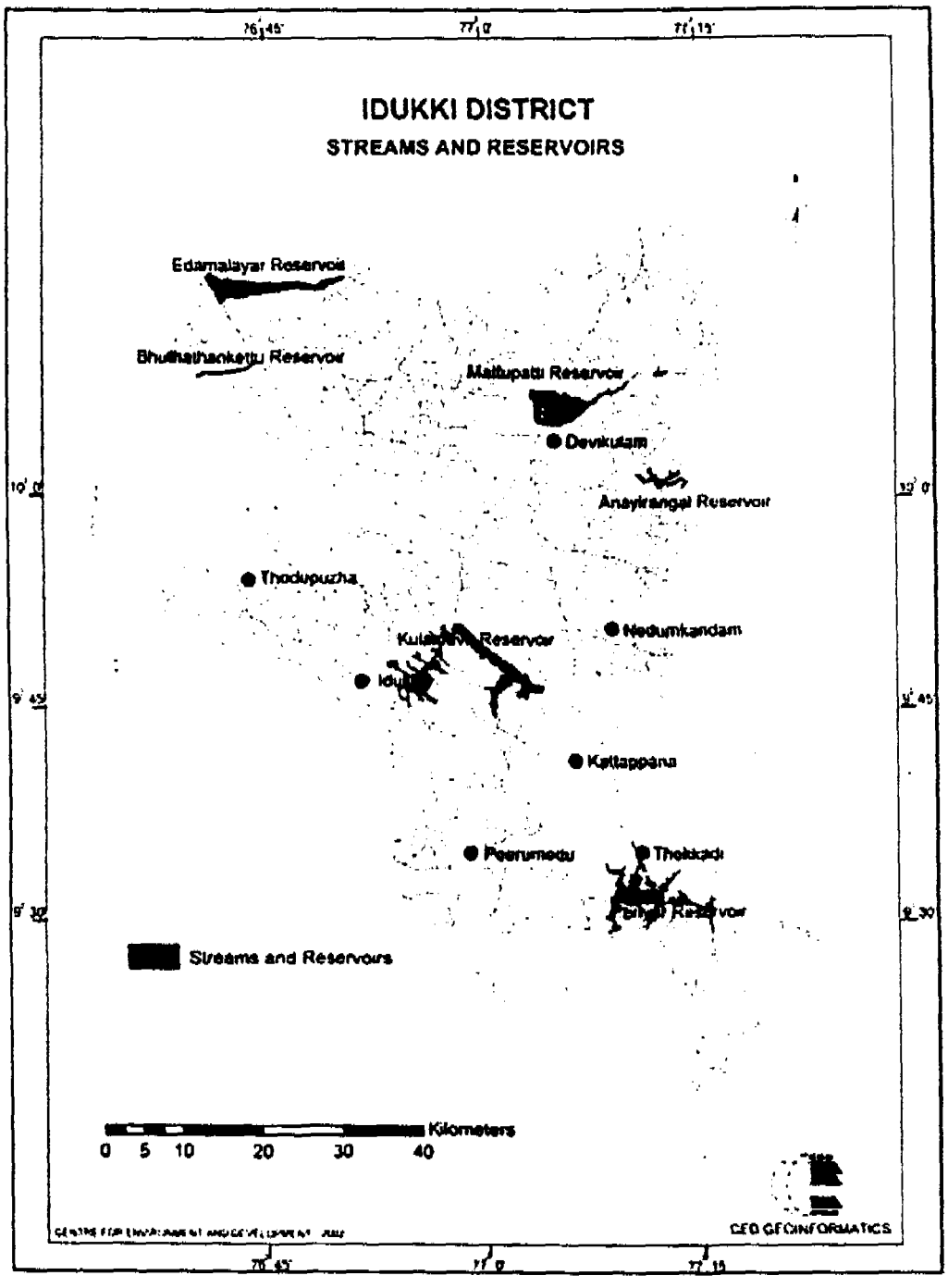
Kuttanad is the worst effected region in Kerala as far as environmental sanitation is concerned. Failure of two pit latrines, open defecation, stagnation of water bodies due to closure of Thannermukkam Bund, disposal of domestic and market wastes into the water bodies, usage of heavy doses of chemical fertilisers/ pesticides and introduction of houseboats have contaminated the water bodies to extremely high levels

Incidence of waterborne diseases is very high and frequent In the sanitation front, typical subsidised latrine construction programmes were initiated. No effective steps are taken up to tackle the liquid/solid waste disposal.

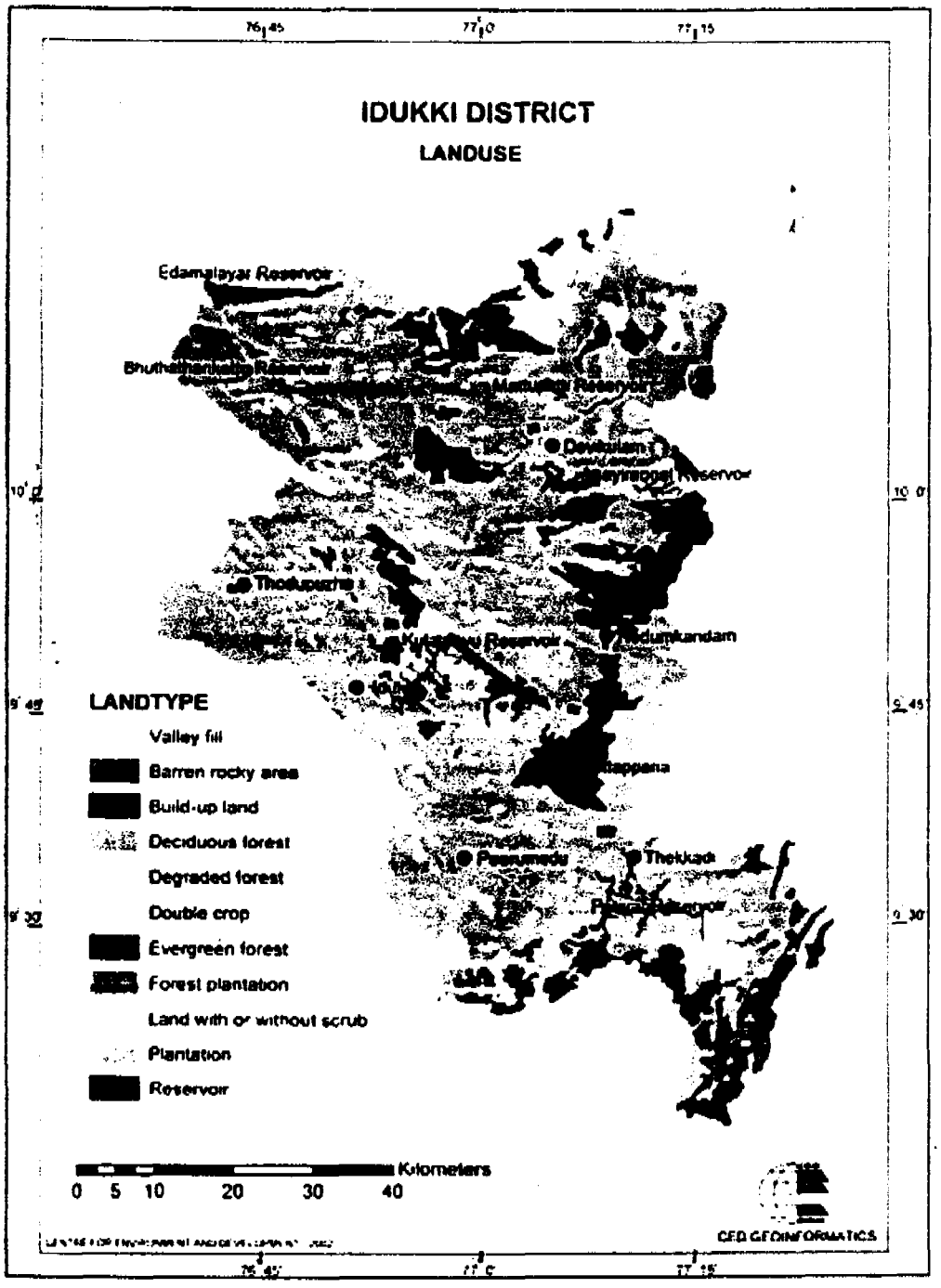
Map 1: Rainfall Variation – Idukki District



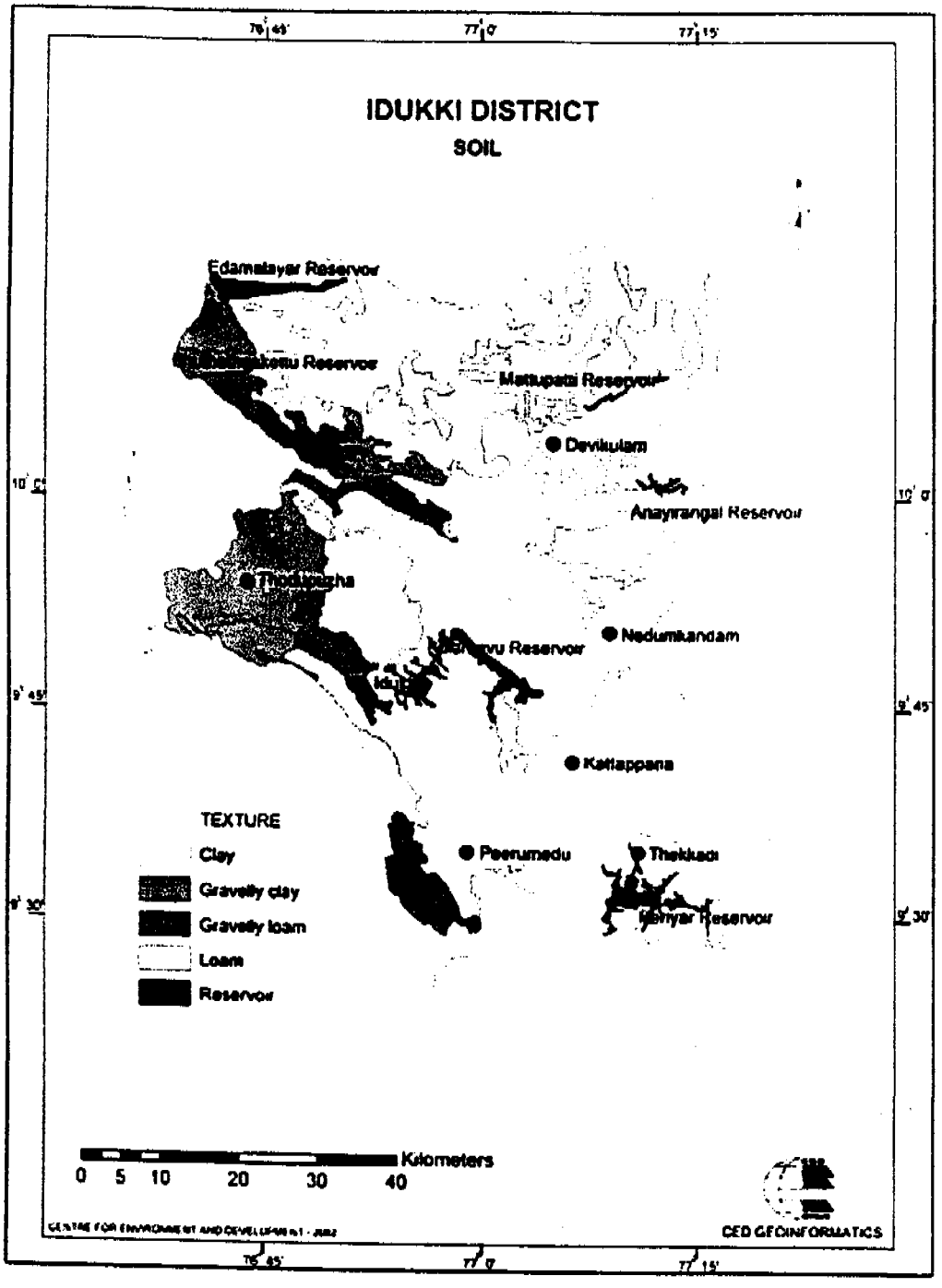
Map 2: Streams and Reservoirs in Idukki District



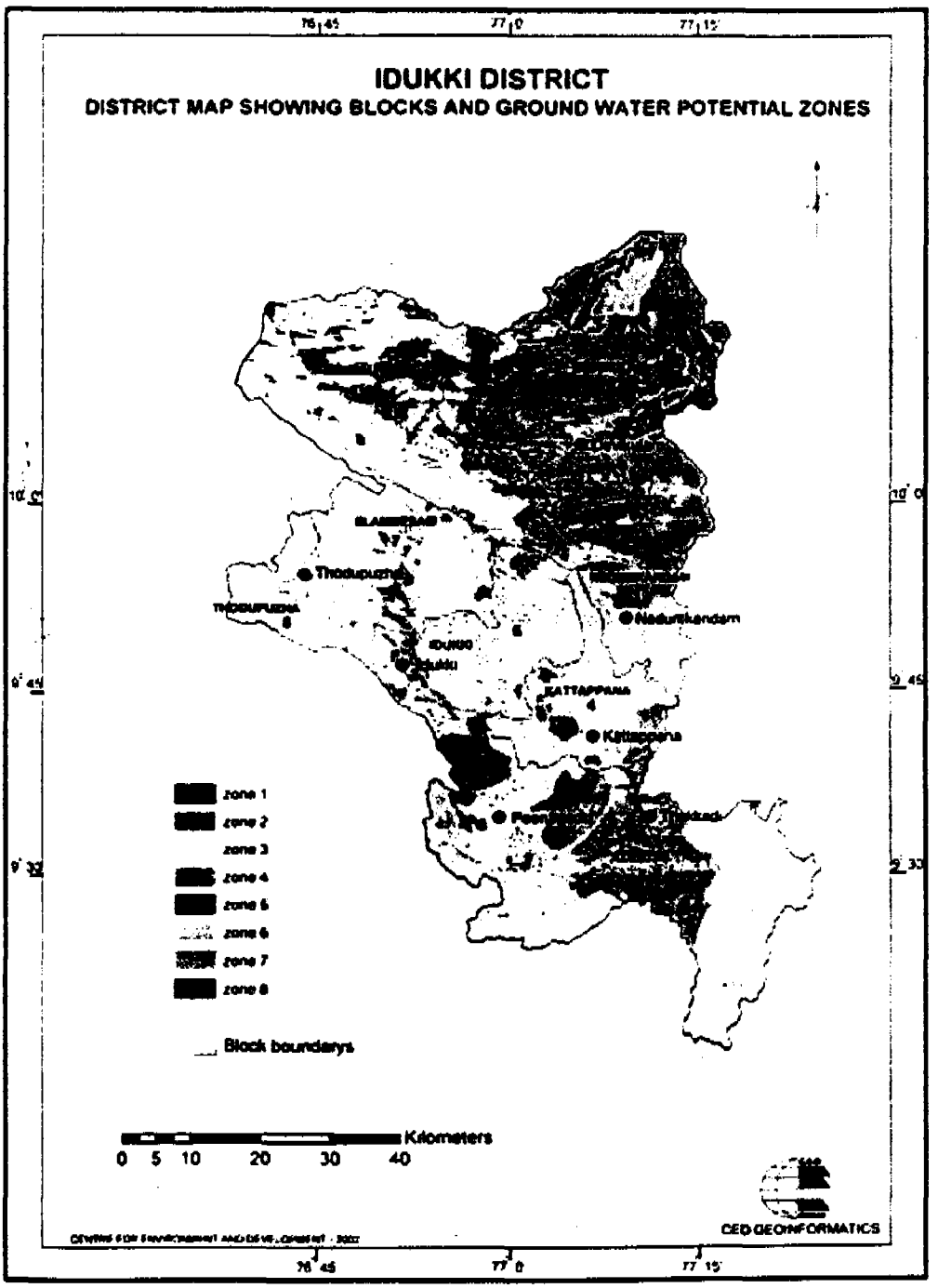
Map 3: Land use and Vegetation Pattern – Idukki District



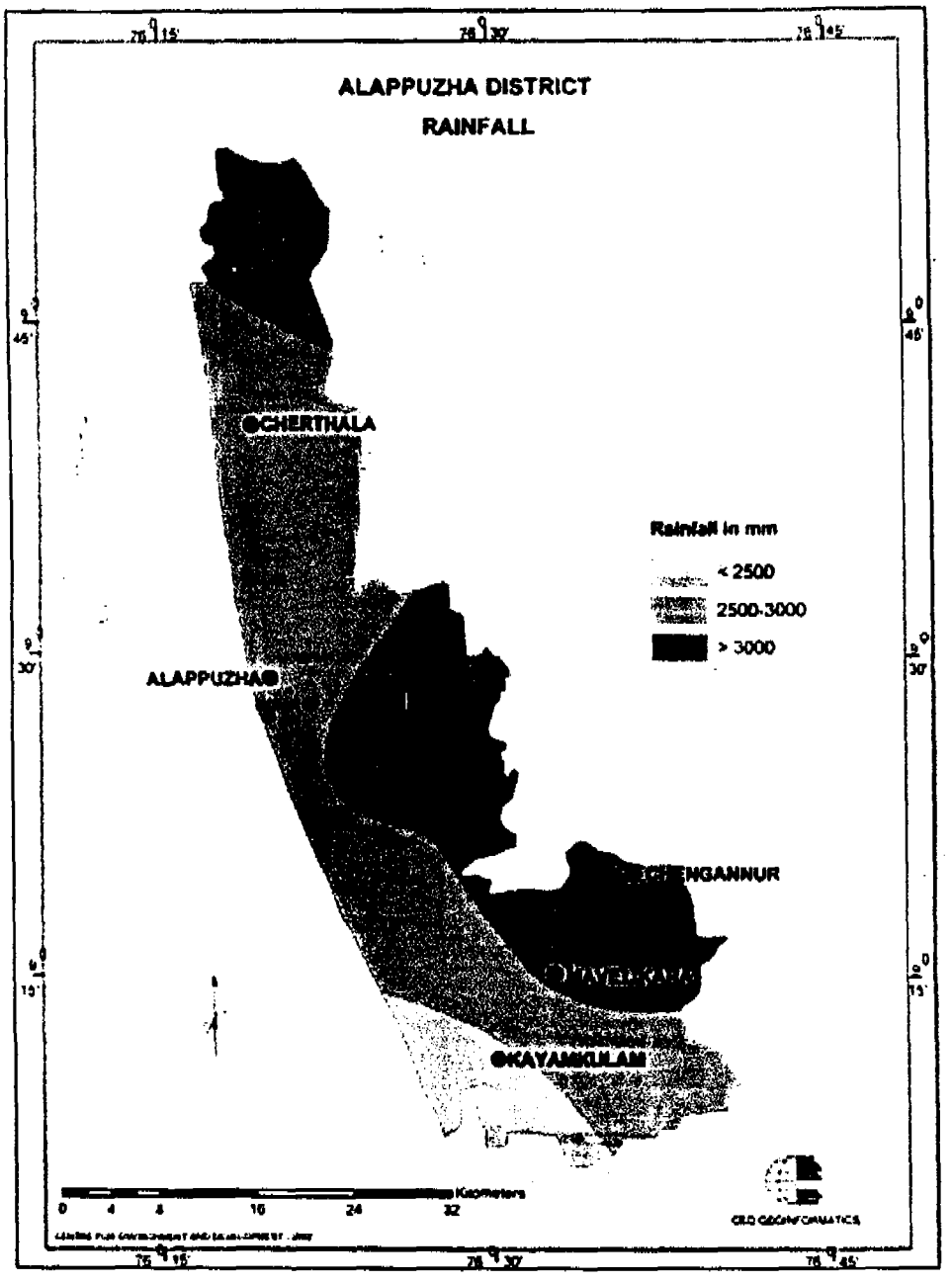
Map 4: Important Soil Types – Idukki District



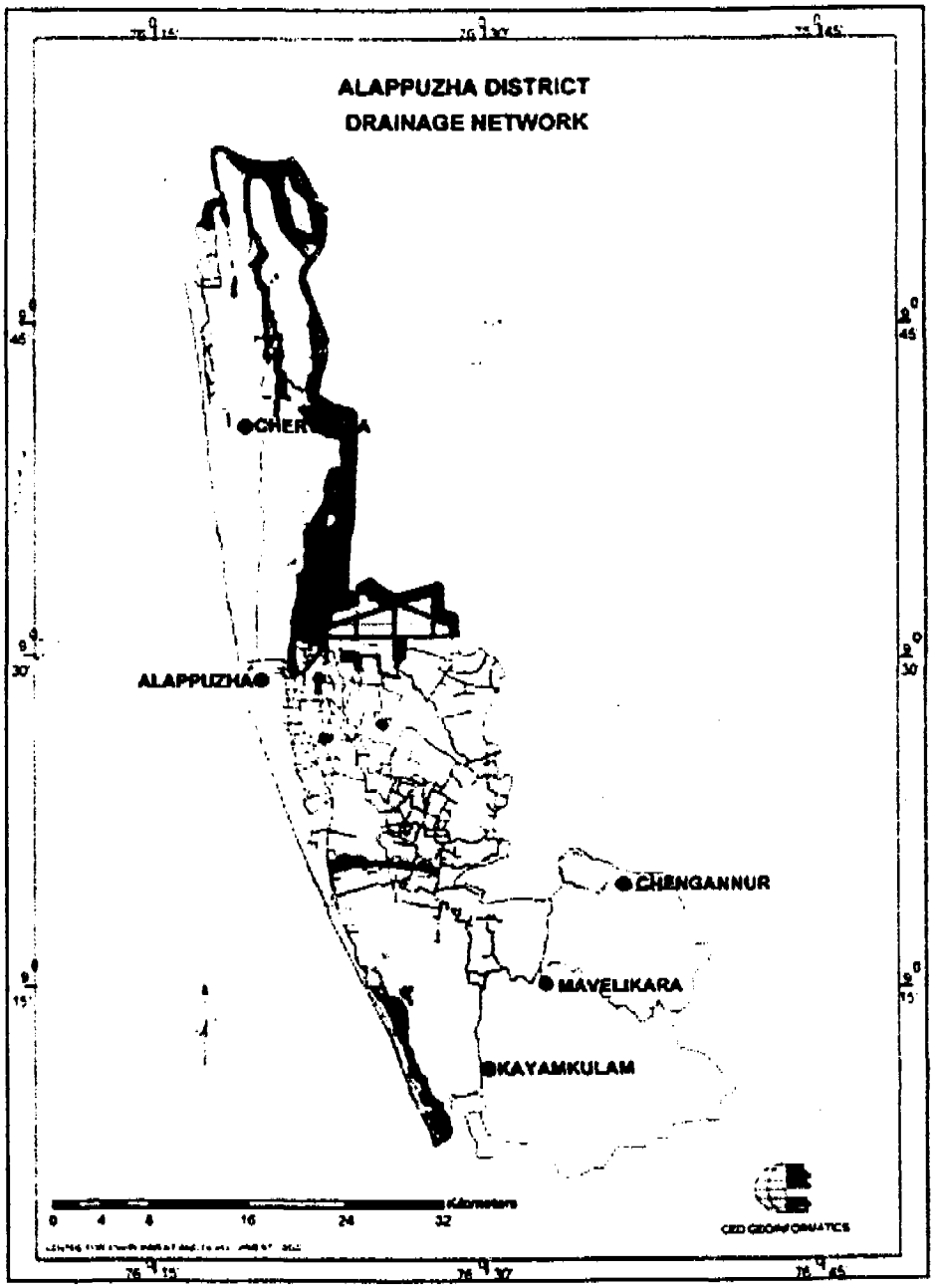
Map 5: Ground Water Potential Zones – Idukki District



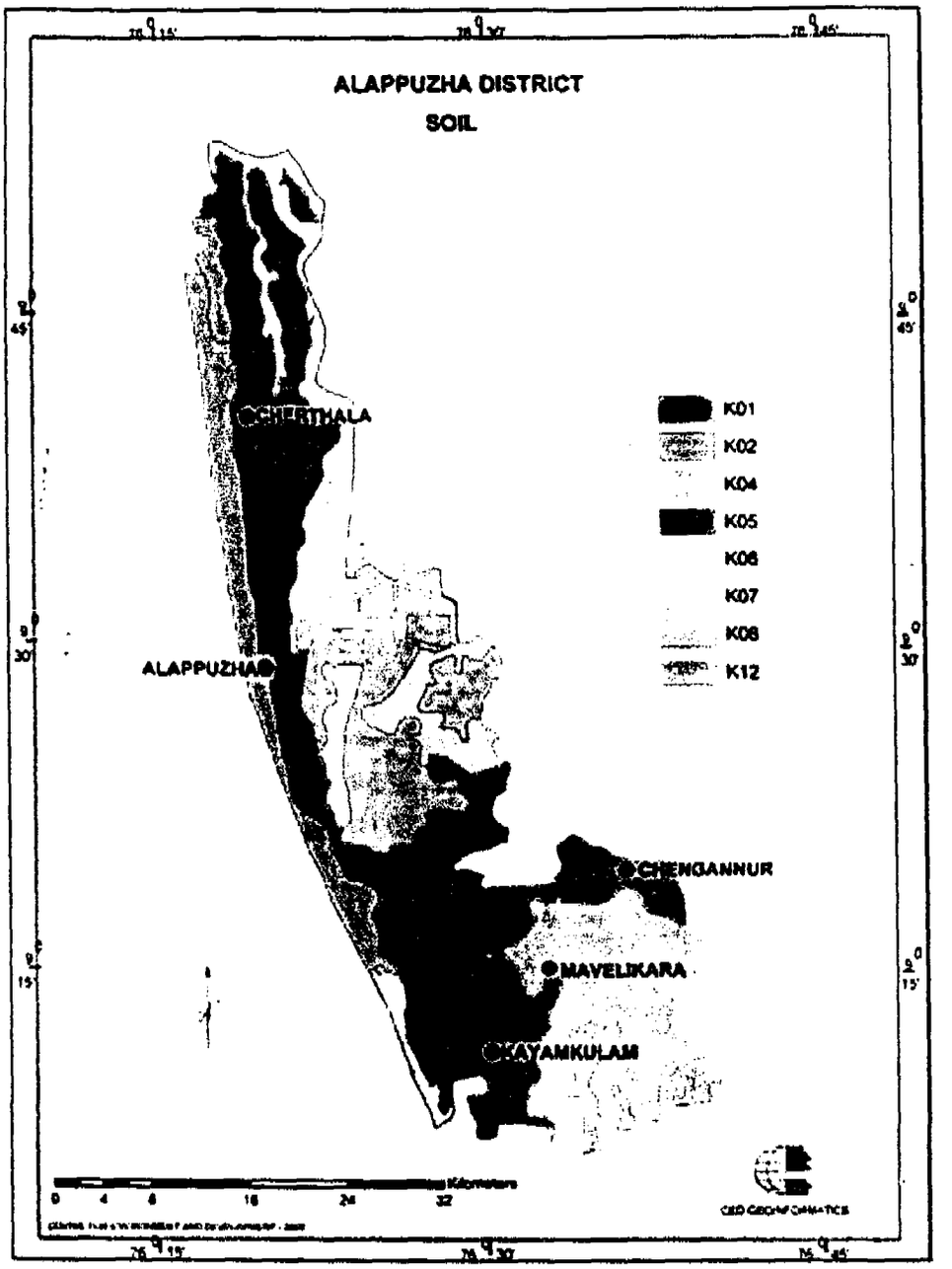
Map 6: Rainfall Variation in Alappuzha District



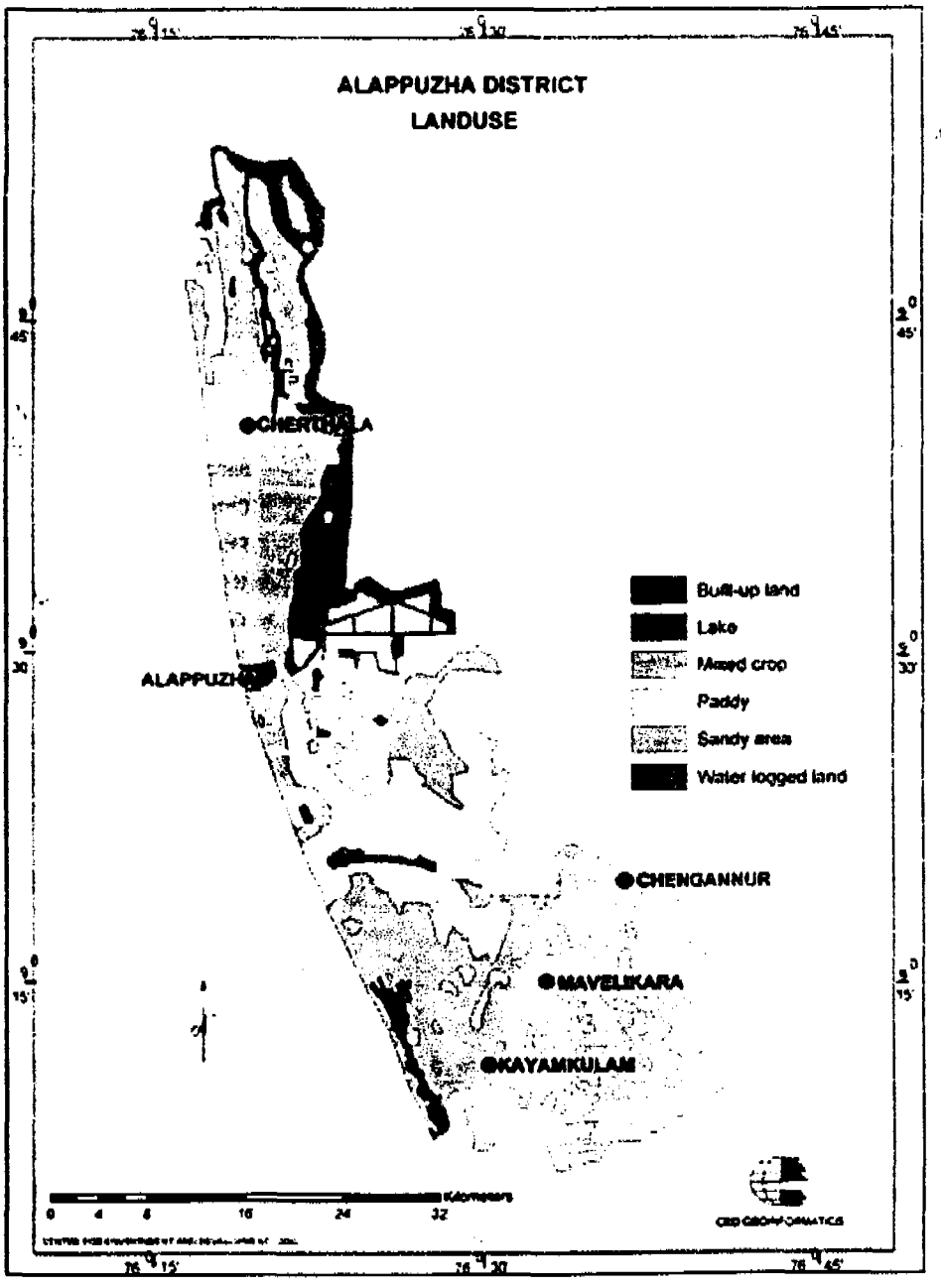
Map 7: Drainage Network – Alappuzha District



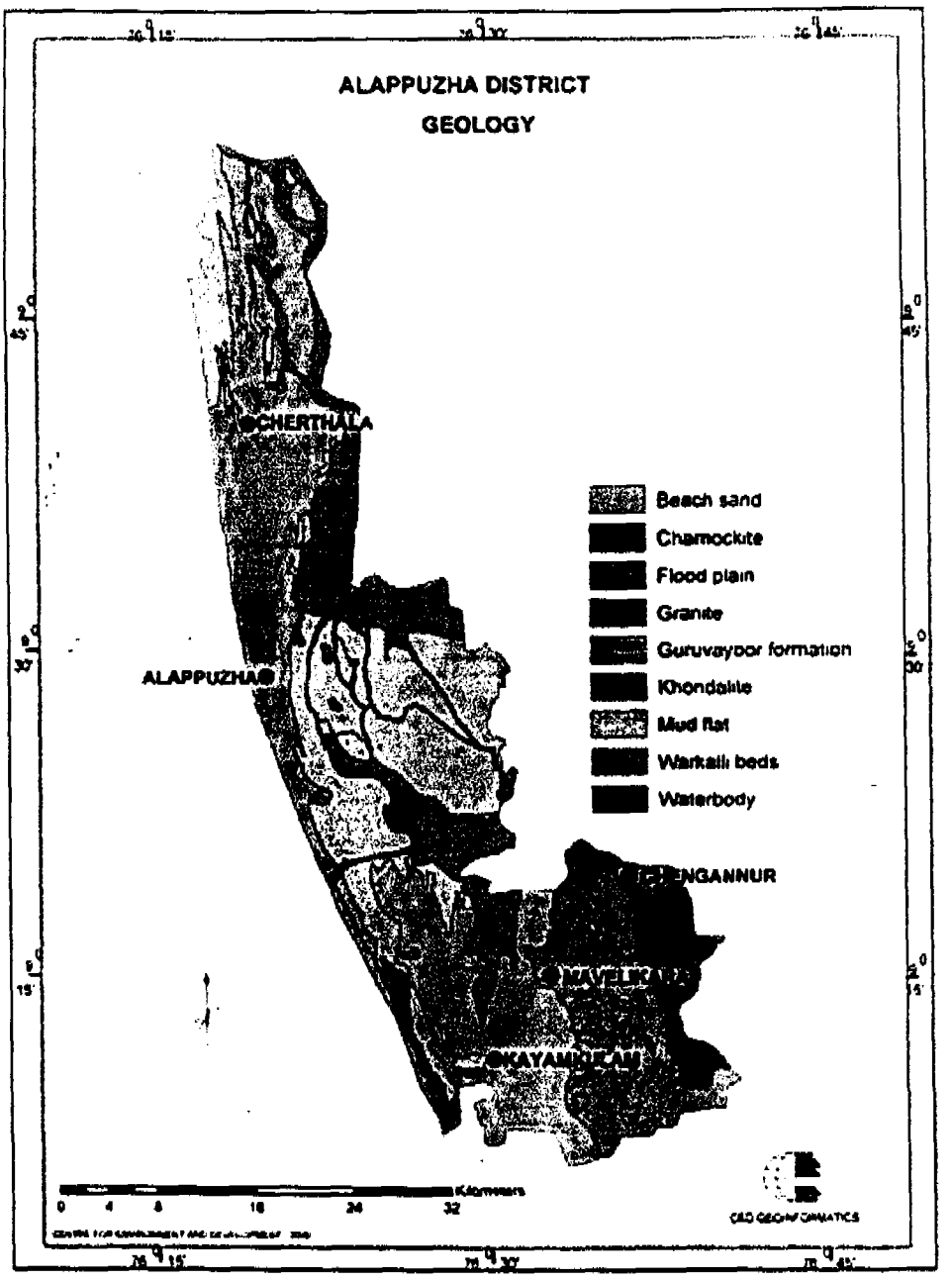
Map 8: Soils in Alappuzha District



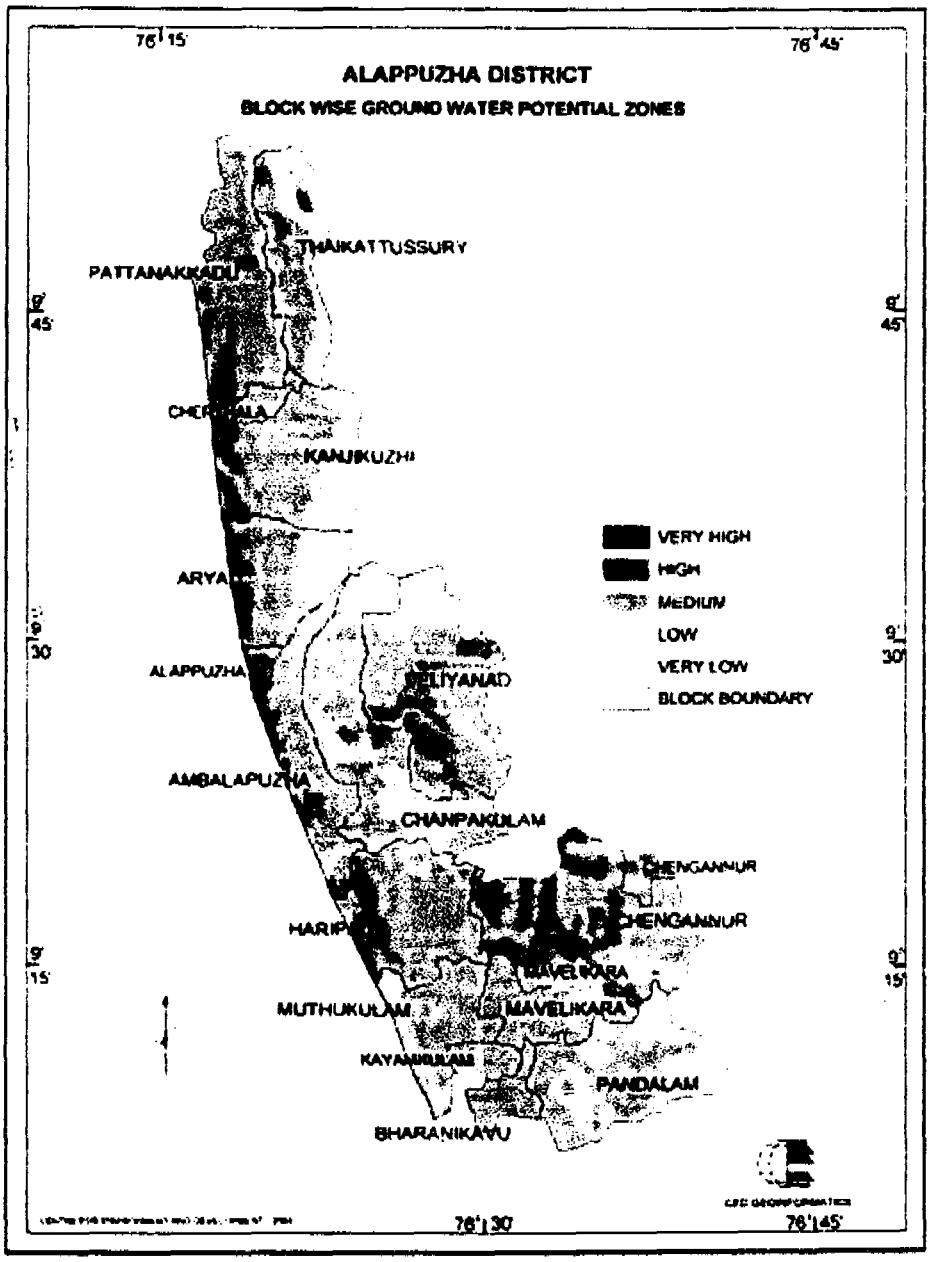
Map 9: Landuse Pattern – Alappuzha District



Map 10: Geology of Alappuzha District



Map 11: Block-wise Groundwater Potential – Alappuzha District



Attachment 3.3

Summary of Participatory Rural Appraisal Study Done in Idukki and Alappuzha Districts

Participatory Appraisal of the Water and Sanitation Sectors in Idukki and Alappuzha Districts for the Dutch Assisted Rural Water Supply and Sanitation Project

1. Background to the Study

Government of Netherlands is considering an assistance to Government of Kerala to implement a Rural Water Supply and Sanitation Programme in Idukki and Alappuzha Districts. As part of the programme formulation, Government of Netherlands fielded a formulation mission to draft the programme implementation document. The ToR for the Mission has been finalized at a State Level Core Stakeholder Meeting held on 21st March 2002 and approved by Government of Kerala. It was decided that primary data on water supply and sanitation sector status at the GP level would be collected through Participatory Rural Appraisal Studies in 2 Grama Panchayats in Alappuzha District and 3 Grama Panchayats in Idukki district. The responsibility for conducting the Participatory Rural Appraisal was entrusted to PLANET KERALA- a network of participatory practitioners. The PRA study team in Alappuzha District was assisted by volunteers from "Mochitha", a federation of women Self Help Groups in the District and volunteers of Kudumbasree" in Idukki District. "Mahila Samakhya" volunteers were involved in the formulation of the study.

2. Objectives of the Study

The overall objective of the Participatory Study is to generate qualitative data on Grama Panchayat level socio-economic, environmental, water resources and sanitation related situation. Such qualitative information collected through the participatory appraisal must be suitable to enable the Mission to draft the Programme Implementation Document. With this broad objective, the specific objectives are as follows;

i) To endorse the consultative process in practice
ii) To ensure facts, opinions and concerns of people get reflected in preparation of a realistic and ready to implement PID.

3. Period of the Study

The District level Workshop was held on 01.04.2002 at District Panchayat Conference Hall, Alappuzha. Grama Panchayat Presidents, Block Panchayat Presidents, members of the District Panchayat, representatives of NGOs and various Government departments participated in the meeting. The District level Workshop for Idukki District was conducted on 02.04.2002 at Collector's Conference Hall. In Idukki, 48 out of the 51 Grama Panchayat Presidents participated in the Workshop.

The Workshops discussed the methodolgy for PRA study and the technical study and incorporated the feedback from participants. The GPs for the PRA study and the technical study

were identified by the Workshop participants. The dates for the study in different GPs were also finalised.

Participatory Appraisal was undertaken in three Panchayats of Idukki district and two Panchayats of Alappuzha District. The period of study in the Panchayats were as follows

Idukki District

Muttam Panchayat	8.4.02 to 12.4.02
Kanthalloor Panchayat	15.4.02 to 19.4.02
Nedunkandam Panchayat	22.4.02 to 26.04.02

Alappuzha District

Aroor Panchayat	15.4.02 to 19.4.02
Neelamperoor Panchayat	22.4.02 to 26.04.02

The major findings from the PRA study and technical study were presented at a second District level Workshop. The Workshop for Alappuzha District was held on 17th May 2002 at District Panchayat Conference Hall. The Workshop for Idukki was held at Collector's Conference Hall on 18th May 2002.

4. Study Process at the GP Level

The participatory study process at the GP level consisted of a five-day module. Day – 1, Panchayat level workshop; The chief objectives of the Panchayat level workshop was to collect data through mapping, depicting salient features such as demographic, physical and infrastructural aspects of the Panchayat, focusing on water and sanitation. The Panchayat level workshop will also select specific wards/localities and communities for indepth study on the subsequent day. Day 2 to 5 consisted of detailed detailed study, Panchyath level validation and report writing. Detailed daily processes followed during the participatory study is given below.

Day – 1 Panchayat Level Primary Stakeholder Workshop. The participants in the workshop are Grama Panchayat Members, former members, representatives of potential user communities, local resource persons in the water supply and sanitation sector, representatives from the existing community based organizations, NHGs, SHGs, NGOs, key informants and representatives from related government departments. A very brief inaugural session was also held at all the Panchayats.

Day – 2&3: Problem Appraisal. The PRA study team visited problem areas identified in the Panchayat Level Primary Stakeholder Workshop for detailed data gathering using participatory tools. Members of the local households, members and representatives of SHGs, key informants and representatives of all organizations related to the local situation participated in the field level exercises.

Day – 4 Reflection, Triangulation and validation of PRA findings. The core stakeholders of the Panchayat are invited for a second interface with the study team on the fourth day of the study. Findings from the field appraisal are presented to the stakeholders. Collective reflections, group discussions and triangulation exercises are undertaken during this workshop. Additional field visits for triangulation and cross –verification are undertaken to supplement the information.

Day- 5: Reporting. The study team remained at the GP to consolidate the GP level report.

Limitations

Following are the main limitations of the study.

- There were no women facilitators in the study team.
- There were only two days to visit the problem localities and collect data by interacting with the people.
- Large turn out of people in the Panchayat level workshop was a limitation in undertaking intensive and indepth analysis.
- Review of Secondary data could not be adequately undertaken due to time constraints.
- The participatory appraisal can be considered to be an exploratory study, which chiefly focused on qualitative data collection.
- Data collection was limited to sample communities in the GP.

5. PRA Study Report

5.1 History of the GP

There are three GPs from Idukki district and two GPs from Alappuzha district, which have been selected for the participatory study. A brief history of these GPs is provided below.

Idukki District

Muttam GP

Muttam Grama Panchayat came into existence on 15th August 1953. Inhabitation of the areas of the Panchayat began nearly 120 years back. People started migrating from the plains of Meenachil. The land in the Panchayat originally belonged to the Temples and upper caste hindus as well as tribal communities. Land from these original and large land owners were transferred to tenants on the basis of Pattam, 'Verum Pattam', 'Kanam'and 'Micha Varam'.The land of the Malankara Rubber Estate was purchased in 1910 from Kadamaruku Namboodiri and was planted with Rubber in the following years. Small farmers and farm labourers were brought to Muttam by a prominent farmer from places such as Kuruvilangadu, Palai, Kadanau and Ramapuram. Educational institution was established by CSI church in 1926, which was later upgraded to a High School in 1945. This brought local educational opportunities and paved way for social and economic transformation. (Samagra Vikasana Rekha- Muttam Panchayat)

Kanthalloor GP

Majority of the people in the Panchayat migrated from Tamil Nadu. They settled in this place centuries ago. During the pre- independence period this area was under Madurai rulers. Later this area was conquered by Poonjar Kings from Kerala and brought under the Kingdom of Travancore. In the early 50's the Chief Minister of Travancore-Cochin, Mr. Pattam Thanupillai established settlement colonies of Keralites by providing large area of land, with the purpose of recapturing Idukki district areas from the Tamil influence. Establishment of such settlement colonies paved the way for migration of people from the plains of Central Travancore. Kanthalloor also was thus influenced by the wave of migration. Kanthalloor Panchayat was

formally constituted in 1954. In 1958 as part of the land reformation movement big land holdings were redistributed to small farmers. Centuries ago people lived in stone houses and these type of houses are still seen in many places of the Panchayat. They are known as "Muniyarakal". This Panchayat is famous for sugar candy, vegetables especially 'garlic' and very rare variety of fruits in south India such as apple, plum, etc.,

Nedunkandam GP

Migration to the Panchayat area commenced in 1949. Before that period, the Nedunkandam Panchayat area had substantial Tamil Population. Tamilians also held large estates in and around the Panchayat. Lot of workers were brought from Tamil Nadu to work in the estates. Tamil workers were settled at several locations of the Panchayat even as early as the days of Rani Lakshmi Bai, the ruler of Travancore. With the increase in migration from the plains of Kerala, the Tamilians sold off their estates and property to Keralites. The Kallar Pattam Colony was established in 1955 and consequently thousands of families were given land here under the 'Grow More Food Campaign'. This set in motion a process of migration to the Nedumkandam area and the adjoining parts of the Highranges.

The Nedukandam Panchayat was established in 1968 by a Government order dated 1.7.1968 (GO – MSNO- 342/1/681/D), dividing Udumbanchola Panchayat into Nedunkandam and Udumbanchola Panchayats. The first Panchayat Council consisted of 5 members and was nominated by Government of Kerala on 1.7.1968. Nedunkandam is also the head quarters of the Udumbanchola Taluk and Nedunkandam Block Panchayat.

Alappuzha District

Aroor Grama Panchayat

The name "Aroor" is believed to be the extension of "Athiroor" meaning that it was the border between the former Travancore and Cochin Kingdoms. Athiroor in the course of time came to be known as Aroor. It became a Panchayat in 1953. Before the Panchayat was divided, it consisted of the present Ermalloor-Ezhupunna areas. The Panchayat was divided in to Eramalloor and Aroor in 1953. It had originally 10 ward divisions and was further divided in to 13 wards in 1994. However, as the Panchayat has substantial density of population, it further divided into 17 wards in 2000. The density of Aroor Panchayat is three times that of the state average density. (Aroor Panchayat Development Report)

Aroor was more an agricultural area until the 1970s. However, its occupational and landuse pattern began to change substantially after the 1970s. From a primarily agricultural area, it has become more of an industrialized area today. The chief industrial units of Aroor fall into fishery related sector. Prawn rearing is an important activity in Aroor. The lowlands of the Panchayat that used to be paddy fields till early 1970s have now become Prawn rearing farms. As the Prawn rearing activity enhanced, it subsequently gave rise to several Prawns pealing and processing units in the Panchayat. Besides Prawn pealing and processing another important industrial activity in the Panchayat is Ice making. Both these have a telling effect on the environment of the Panchayat. These industrial units offer employment to the men and women in the Panchayat. These draw heavily on the precious ground water reserves of the Panchayat on one hand and pollute the water and air as a result of their activities. Employment gives the people a basic economic security, while the environmental pollution destroy the natural resource base and threaten livelihood security. The people of the Panchayat are torn between these two realities.

Neelamperoor Grama Panchayat

This Panchayat falls in the Kuttanad agro-climatic zone. Kuttanad has been reclaimed from Vembanadu Lake and its surrounding marshy lands and lies 0.5 to 2.5 Meters below the sea level. Neelamperoor lies surrounded by natural water bodies and streams. Neelamperoor was part of Kurichy village union, which was formed in 1948. Kurichy village union consisted of Neelamperoor, Kurichy and Ithithanam. Neelamperoor village Panchayat was formed in1952. The first elections to the Panchayat were conducted in1953. There are 10 wards in the Panchayat. The Panchayat has a rich socio-cultural history. Nearly 85% of the land in their Panchayat belonged to landlords and feudal chieftains. The Panchayat has witnessed substantial struggles against feudalist set up and oppressive practices. Formal educational institutions began in the Panchayat early this century. This has influenced the history and social processes of the Panchayat substantially.

5.2 Demography, Socio-Economic Status.

Idukki

Demography

Idukki has the lowest density of population in Kerala ie.210 per Sq.Km. The population growth rate of the district is 11%. Infant mortality rate in the district is 10.48 per 1000 and birth rate is 17.67 per 1000.

Panchayat	Total Area in sq.km	Total Population as per 1991 Census	Sex ratio women for 1000 men	Density of Population per sq.km as per 1991 Census
Muttam	25.44	10,228	1012	402
Kanthalloor	116.29	10,265	945	88.49
Nedunkandam	71.95	36,969	968	514

Panchayat	Population growth rate	Work participation in percentage		
		Men	Women	Total
Muttam	13.30	53	13	33
Kanthalloor	10.37	57	43	51
Nedunkandam	11.98	57	23	40

Socio- economic status

Occupation

The chief occupation of the people of the above Panchayats is as follows. Agriculture, Agricultural laborers, Work in the forest and minor forest collection, Animal Husbandry, Stone Quarrying, Cottage industry, Small industry, business, Construction work, Transport, Communication, etc,. Major crops are rubber, pepper, coffee, tea, cardamom, Tapioca, paddy, coconut, areca nut, ginger, plantain, banana, vegetables, fruits, sugar cane, etc,. Average annual income of a family is Rs. 15550/- (1998).

Panchayat	Literacy rate		
	Men	Women	Total
Muttam	98	94	96
Kanthalloor	80	61	71
Nedunkandam	92	90	91

Alappuzha District

Demography and socio-economic aspects

Panchayat	Total Area in sq.km	Total Population as per 1991 Census	Density of Population per sq.km as per 1991 Census
Aroor	15.15	32662	2156
Neelamperoor	16.50	14427	874

Socio- economic status

The chief occupation of the selected Panchayats is agriculture and industries. Coconut and Paddy cultivation form the chief agricultural practices. In the industrial sector, traditional industrial activities like coir marine products processing and exporting and lime collection and processing are prominent.

5.3 Water Supply, Sanitation and Health Scenario (Including Environment)

The participatory appraisal in Idukki and Alappuzha districts and the consequent interactions with the communities have revealed the following aspects relating to water supply, water scarcity, sanitation and health. There is some difference in these aspects between Idukki and Alappuzha districts. Therefore these are provided under separate subheads numbered 6.3.1 and 6.3.2.

Idukki District

- The District experiences seasonal water scarcity in approximately 60% of the areas.
- Approximately 75% of the people of the district experience water scarcity.
- Water scarcity is experienced by people who live on the ridges and upper slopes of the district.
- Water scarcity adversely affects livelihood of people. As substantial time and energy are invested by poor people in collecting water during the summer scarcity. The women from poor households loose employment opportunities as they are given the roles of water collection.
- Water holding capacity of soil is poor due to shallow depth
- Largescale denudation of vegetative cover of the soil has reduced water percolation, soil moisture and water availability in natural sources like springs and streams.
- Biological (eg- Kanthalloor) and chemical contamination of the water sources is an acute problem in the district
- Water scarcity has a direct linkage to the environmental aspects, especially those relating to forests, cropping pattern and vegetative soil cover, change in climatic pattern (eg. change in the pattern of rainfall from the so called *Nool mazha* -drizzling

rains occurring for a long period of time) to heavy down pours experienced now in intense short spells.)

- Sanitation facilities are poor in the district. Sanitary latrines are inadequate in quantity and quality especially for poor people living on the ridges and slopes.
- PRIs and KWA have implemented water supply schemes to address the problem of water scarcity. However, the efficiency of the water supply schemes is poor on the ground of inadequate supply of water, poor quality of water supplied, irregular water supply, poor maintenance and technology related problems. (Tanks and canals are kept open, leading to flooding and contamination). Money is invested in water supply schemes, without completing the scheme in time, leading to wastage of money. Water supply schemes are attempted at locations where there is no surety of yielding water, the emphasis being more on the schemes and less on ensuring adequate water supply.
- Water borne diseases such as dysentery and jaundice are reported from the district in the summer months, after the first summer rains.

Alappuzha District

- The Alappuzha district experiences water scarcity throughout the year. Monsoon rains provide clean drinking water.
- Biological contamination of the water sources is very high. Sanitary latrines spill over into the water bodies during the monsoon season. As the water table rises, it affects the latrine tanks, bringing faecal matter out into the water sources.
- Waste processing does not have much facility and therefore waste materials are disposed into the water bodies.
- Heavy application of chemical fertilisers and pesticides are reported from the Kuttanadu region for Paddy cultivation, affecting the quality of water.
- Saline water intrusion occurs in the summer into the inland water bodies in the coastal region of Alappuzha. Salt-water intrusion into wells and ponds of the low-lying areas in commercial Prawn rearing areas is reported.
- Coir retting and processing marine products cause pollution of water bodies in Alappuzha. The local bodies or for that matter any department or institution of the government seem to be exercising any control over the pollution.
- Large number of people, including women depends upon these pollution causing industrial units for employment and livelihood and therefore, this is used as a ploy to justify the existence of such industrial concerns. Ice plants are supporting industrial units for the prawn pealing and processing units. Ice plants draw heavily from the fresh water table to make ice, mining out the top fresh water layer and denying fresh water for the community.
- Construction of roads and bridges was one of the thrust development areas of the Government and local bodies. This tendency has continued even during the People's Planning Campaign. Construction of roads and bridges has resulted in blocking of water flow and consequent uneven distribution of floodwaters, water transportation and fertility of land.
- Scarcity is not only for drinking water but for washing and bathing purposes as well.
- Neglect and destruction of traditional water sources like ponds and '*Vallam*' is noticed in the coastal and Kuttanadu regions of Alappuzha.
- The poor people are more adversely affected by the water crisis than the well to do people. The coping mechanisms to face water scarcity also differ between the poor and the rich. The poor try to face the scarcity by using additional physical effort, money and time to fetch water, while the rich meet water scarcity by spending more money and

arranging water supply through tanker lorries. There is also a difference in the habitational locality between the rich and the poor. The Poor live closer to the water bodies and are generally in the low lying areas, while the rich live in the upland portions, where the wells and ponds that provide fresh water.

- Water supply arrangements introduced and managed by agencies like KWA in Alappuzha are inadequate to meet the needs of the community. Water supply from such agency is poor by way of quantity and quality of water supplied.
- Petitions have been filed before the High Court of Kerala requesting the Court to intervene so as to direct the GPs and KWA to supply water through tanker lorries in summer.
- Water related health problems such as Jaundice, skin ailments, dysentery, typhoid, and cholera are reported from the district. Cholera related deaths have occurred in the current year in Alappuzha district.

- **Women and Water:** The relation between women and water has been examined during the community interaction. We summarise the following findings for both the districts.

    - Women bear most of the burden of bringing water for the households. Bringing water take away two to three hours of time of women during the day in summer months. They have to negotiate on an average 1 to 2 kms for bringing water in summer. It affects women's health, both physical and mental. Women get less or no rest at all during the water scarce season. Only less than 20 % of women receive assistance from their men folks in fetching water. Girl children supplement the water fetching effort of women more than the boys. Women bring water on their head while the men that help in bringing water in coastal areas of Alappuzha district fetch water on bicycles or boats. Mechanical devices such as these make the water fetching easy, but it aids only the men and not the women.

6. Perceptions of the Community

Four important issues relating to the water supply and sanitation project in the rural areas were raised during the interactions with the community. These were again raised and reiterated during the Panchayat level workshops. The issues raised during the community interactions and the perceptions of the community are given below.

a. ***Ownership*** *– Community owned, operated and managed water supply schemes- the perceptions of the community*

- The people demand ownership of the water supply schemes. They have no control over those water supply schemes that are currently run by agencies like KWA.
- PRIs have implemented water supply schemes and have handed them over to the community. But the ownership feeling of the community is poor on such schemes. One possible reason for this lack of ownership feeling is that the people are not involved in the scheme from the conceptualizing stage to planning and implementation. When the community receives the scheme, it has in all probability suffered resource loss, leakages, technological snags and have ignored local wisdom in planning and implementing them.
- The ownership feeling of community is seen high wherever, the community has been and is involved in planning and management of water supply schemes (Ref to Manjapparamedu water supply scheme in Nedumkandam Panchayat- page 25) and Cherukara water supply scheme- Page 21 of Neelamperoor GP)

- The People are not keen on owning, operating and managing large water supply as they feel it is too complicated for them to manage on their own. (Ref page – 20 Neelamperoor GP Report)

b. ***Management*** *– of water supply schemes by local community giving specific management roles to women.*

- The community has expressed their willingness to manage small water supply schemes on their own. However, they have opined that there is a need for role clarity in management of water supply schemes. Timely management functions such as repair and maintenance of schemes, assuring quality and adequate quantity of water, resolving conflicts in time, monitoring of the resource base and efficiency of the scheme etc are not properly undertaken. Women are ready to undertake management functions such as collection of water fees, payment of electricity charges and management of funds (custody of funds/ operating bank accounts etc), simple pump operations and water distributions.

c. ***Contribution*** *– Are people willing to contribute towards the cost of the water schemes such as construction, operation and maintenance?*

- People are ready to contribute cash, kind and labour in establishing schemes. The rate of contribution cannot be uniform in all communities. Poorer communities should have the option to contribute more of their labour and less of cash contribution towards the construction of the scheme. The rate of contribution willingness ranged from 5% to 30%, five percent in the case of poorest families and thirty percent for the better off families. The general agreement was on making 10% cash contribution towards construction of the schemes and 100% contribution towards operation and maintenance. The rate of contribution is related to ownership, control, quality of service and the type of institutional form. Contribution willingness is shown in planning and management of schemes, organizing and educating community, linking and networking with other institutions, conflict resolution and formulating and enforcing rules and regulations for management.

d. ***Equity (Weaker Sections and Women)*** *How will the community maintain equity in water supply schemes?*

- Include the most vulnerable section / community in formulation of guidelines, criteria, rules and regulations relating to the planning and management of water supply schemes.
- Cost sharing, budgeting etc can not have one common tariff or pattern. It should be community, location and wealth class specific.
- Women and vulnerable sections demand good representation in the decision making bodies attached to schemes
- Follow participatory process and approaches throughout the project life.
- Adopt flexibility in the formulation of rules and regulations and incorporate provisions to address risk factors such as financial incapability of the poorest to contribute and undertake management functions.

7. GP Status and involvement in the water supply, Sanitation and Health

- GPs have invested money in constructing open wells, ponds and extension of existing pipelines.
- Fragmented and piecemeal approach in implementing water supply schemes, mainly due to financial crunch that a single scheme cannot be completely implemented in a year. This is on the ground that the GP councils avoid conflicts by dividing the total allocation for a sector between the wards.

- Follow up by the PRIs/ GPs so as to manage the schemes after implementation is poor. GPs do not seemed to have any concrete ideas on follow up and management.
- GP intervention is more on the physical implementation of new schemes. It pays less attention to improve the efficiency of existing schemes, even if such an effort is possible by mobilizing people, participation, seeking expert advice etc. Such inputs do not require financial inputs

8. Decentralisation and its outcomes

Positive

- Constituted user committees
- Mobilizing people's contribution.
- Formed and developed local leadership, building local confidence and capacities in undertaking local projects
- Increased awareness on local democracy and governance
- Increased sensitivity on corruption
- SHGs formed and strengthened
- Women came to the forefront at the Panchayat level
- Panchayat level consensus on local development cutting across partisan and sectarian politics
- Participation of the local community in project planning, implementation and monitoring.
- Provided women and SC and ST focused projects.
- Panchayat members receive much more involvement and cooperation of the community.
- Panchayat level process became more transparent, reducing corruption, leakage of resources and involvement of power brokers.

Negative

- Failure of income generation programmes
- Beneficiary culture developed. Gram Sabha seen as a forum for distributing benefits.
- Lack of attitudinal change of the bureaucracy and consequent procedural problems.
- Delayed allocation and releasing of funds for the projects.

Attachment 3.4

Tribal Reconnaissance Study

1. **Maithri,** an NGO was entrusted the responsibility of the reconnaissance study

- Study Period; May 4-12, 2002
- A multidisciplinary Team of 18 member formed into 4 groups
- Area of study - 5 out of the 8 blocks, 12 settlements out of 274, and 8 out of the 9 tribes

2. Methodology of study

2.1. Collection of secondary data from District Planning Office
Source of information- ITDP and other sources (data available 1991census)

2.2. Discussions with:

- Registrar Cooperative Societies, GOK (Mr. James Verghese)
- Executive Director, Kudumbashree, former DC Idukki, (Mr. Jose)
- Present DC (Mr. Rajesh Sinha)
- Tribal Extension Officers
- Deputy Planning Officer (Mr. MC George)
- Tribal Extension Officer (Mr. Arunagiri)

2.3. Use of participatory techniques – PRA, Semi structure interviews, focus group discussions

3. Main findings

- Tribal settlements are unique and all interventions need to address them so.
- The planning for the area need to take into consideration the Tribal Sub Plan outplay of the Districts, the forestry departments involvement and other Government departments
- People want a comprehensive development programme
- Some GPs have a combination of tribals and non tribal settlements forming the GS and Oorukoottams (specific to the tribal population)
- There is need to fix a `deprivation index' as a selection criteria
- The DDA validity needs to be established in the settlements
- The project implementation cycle will also vary- more time will have to be allotted for the preparatory phase, taking into consideration the education, awareness levels and the distance
- Technological options, cost calculations, O&M cost calculations, non-conventional energy resources, environmental degradation – should adopt a different scale for planning
- Support programmes for supplementing income levels should form part of the plan

4. Survey Specifics

- No. of families surveyed 238, population 993. Family size 4.17, Male:female 0.95.

- Children below 5 years 133
- Adult Literacy rate 42.03
- Occupation agriculture(138), coolie(87, government (7), others(6)-nil
- Drinking water sources- Well(87), Ooli(76), stream(34), river(19),pond(15), thodu(5)and pit(2)- of these 3 families own a well.
- 107 families < 100 mts, 49 families between 100-300, 36 between 300-1000 and 46
- Families >1000 mts
- Only 49 families have latrines
- Existing community contributions- Rs. 20/- to ANERT monthly since year 2000
- Willingness to participate/contribute- willing, payment in kind, equivalent to Rs.1000/- per HH
- O&M – upto Rs.10/- per month
- Management of the scheme- a committee formed from among the members of the colony, require engineering assistance, finances by women
- Preference for technology- gravity scheme to reduce costs
- Latrines can not be afforded due to high costs
- Income generation-revive weaving with assured marketing and additional skill inputs

5. Socio- Econbmic status of the Tribes

Most of the tribes today live in nuclear families, but sometimes sharing accommodation. And the tribes who are nomadic do not have any permanent structures. The houses range from a single room to shared accommodation to large houses.

Agriculture is the main source of income. Type of crops include paddy, cardamom, The lands are either owned by them or are taken on lease from the Forest Department. Ex. Malapulayas work as casual laborers, while the Muthuwans own land The Mala pandarams and the Mals arya tribes are the nomadic tribes and are found to be very poor, with no lands of their own but depending on forest products for a living. They do not possess any skill either. Small family norm seems to be followed in most of the settlements. Men are the decision makers. The girl child is not allowed to go out of the community after attaining puberty. Some tribes are integrated into the mainstream. And are comparatively well off, while the Malapulaya are considered the most backward. Ex.Muthuwans. Majority of the tribes possesses ration cards and depends on solar energy provided by ANERT. Most of these tribes still have an elder in the community, who is often referred to as King or elder or leader and exhibit control over the community

6. Main tribal Groups

The details of families belonging to different tribes are given in **Table 1.**

Table 1: Families belonging to different Tribes

Sl.No.	Tribe	Number of families
1	Mala araya	4765
2	Muthuvan	3351
3	Mannan	2100
4	Oorali	1364
5	Malappulaya	969
6	Ulladan	592
7	Paliyan	576
8	Malavedan	39
9	Mala pandaram	7

7. Geographic Features of Settlements

The location-wise classification of different settlements of tribal families is given in Table 2.

Table 2: Tribal Settlement Colonies

Sl.No.	Block	No. of Settlements	Inside Forest	Near Forest	Near Towns
1	Adimali	48	43	5	0
2	Azhutha	14	7	7	0
3	Devikulam	90	60	30	0
4	Idukki	48	24	24	0
5	Elamdesam	38	27	11	0
6	Kattappana	21	10	11	0
7	Nedumkandam	13	10	3	0
8	Thodupuzha	5	0	0	5
	Total	277*	181	91	5
		In percentage	65	33	2

Tribal sub plan expenditure on water supply and sanitation is given in Table 3.

Table 3: TSP Expenditure on water supply and Sanitation During 1998-99 (Rs. In Lakhs)

	GP	BP	DP	Municipality	Total
Construction of water sources	3.9	0.5	3	0	7.4
Pipeline Extension	0	0.45	3.1	0.18	3.73
Rehabilitation of existing schemes	3.05	0	5	0	8.05
Water supply schemes	15.12	9.82	0	0	24.94
Strengthening of existing sources	1.65	0	2.5	0	4.15
Sanitation	6.27	0	0	0.33	6.66
Total	**29.99**	**10.77**	**13.6**	**0.51**	**54.87**

*As per the publication of Idukki District Planning Committee.

The electrification status, distance to primary schools, distance to public distribution system and distance to health centres from different tribal settlements are given in Table 4 to 6.

Table 4: Electrification status in the tribal settlements

	Settlements	Houses
Electrified	119	6857
Partially electrified	6	443
Not electrified	144	6337
Data not available	5	127
Total	277	13764

*As per the provisional census 2001.

Table 5: Distance to Primary Schools

	Settlements	Houses
Less than one Km	42	2177
One to five Km	151	7366
Five to ten Km	36	1740
More than ten Km	20	809
Data not available	25	1672
Total	277	13764

*As per the provisional census 2001.

Table 6: Distance to Health Centres

	Settlements	Houses
Less than one Km	27	1978
One to five Km	124	5532
Five to ten Km	47	3146
More than ten Km	57	1894
Data not available	19	1214
Total	277	13764

*As per the provisional census 2001.

8. Existing Water Supply Schemes

The details of existing water supply schemes collected from 114 settlements is given below:

Table 7: Details about the existing schemes

No. of Schemes				Type				Implemented by					
Functional	Non functional	Partially Functional	Not known	Pumping	Gravity	Well	Unknown	GP	BP	DP	KWA	RGNDWM	Not Known
19	16	6	10	9	31	2	9	11	2	1	23	9	5

Attachment 3.5

Indicators for ranking and Prioritisation of Grama Panchayats based on BPL Survey Conducted by Government of Kerala

A. Idukki district

			No. of Families Below Poverty Line			
Sl. No	Name of Panchayat	No. of BPL Families	No Toilet	< 100 M	100-200 M	No Water Source within 200 M
1	Adimali	1870	841	1084	420	366
2	Konnathadi	1416	538	590	444	382
3	Kuttampuzha	1009	626	717	200	92
4	Bisenvali	553	366	201	172	180
5	Vellathooval	1102	247	510	273	319
6	Pallivasal	418	140	216	139	63
	Davikulam					
7	Marayoor	362	311	177	95	90
8	Moonnar	751	236	584	78	89
9	Kanthallur	388	338	263	100	25
10	Vattavada	224	212	101	51	72
11	Shanthanpara	753	333	386	227	140
12	Chinnakkanal	230	79	223	25	-18
	Nadumkandum					
13	Pampadumpara	677	333	286	269	122
14	Senapathi	218	109	51	120	47
15	Karunapuram	556	177	237	212	107
16	Rajakkadu	412	219	192	142	78
17	Nedumkandam	940	356	490	305	145
18	Udumpanchola	352	68	169	106	77
19	Rajakumari	184	61	92	70	22
	Elamdasam					
20	Vannappuram	1164	641	629	407	128
21	Udampannoor	882	489	433	271	178
22	Kodikkulam	387	213	312	57	18
23	Alakkode	485	135	264	130	91
24	Velliyamattom	1274	461	774	394	106
25	Karimannoor	893	491	664	167	62

			No. of Families Below Poverty Line			
Sl. No	Name of Panchayat	No. of BPL Families	No Toilet	< 100 M	100-200 M	No Water Source within 200 M
26	Kadayathur	493	302	311	94	88
	Edukki					
27	Idukki-Kanjikkuzhi	1124	422	478	306	340
28	Vathikkudi	1024	261	665	209	150
29	Arakkulam	1062	717	522	304	236
30	Kamakshi	901	493	468	277	156
31	Vazhathope	859	330	486	242	131
32	Mariyapuram	271	122	96	90	85
	Kattapana					
33	Kattapana	1317	448	800	338	179
34	Upputhara	702	187	302	289	111
35	Vandanmedu	2324	1563	1380	633	311
36	Kanjiyar	864	368	228	511	125
37	Irattayar	765	513	459	235	71
38	Ayyappankovil	232	74	133	70	29
39	Chakkupallam	145	44	95	35	15
40	Edavetti	4	0	4	0	0
	Thodupuzha					
41	Kumaramangalam	373	201	244	66	63
42	Muttom	379	265	254	73	52
43	Edavetti	356	179	273	60	23
44	Karinkunnom	255	144	170	57	28
45	Manacadu	353	213	233	71	49
46	Purappuzha	479	360	239	116	124
	Azhutha					
47	Peruvanthanom	223	116	121	70	32
48	Kumili	532	349	337	164	31
49	Kokkayar	636	296	407	131	98
50	Peerumedu	168	87	117	33	18
51	Elapara	328	209	268	49	11
52	Vandiperiyar	716	417	603	84	29

B. Alappuzha District

Sl. No	Name of Panchayat	No. of BPL Families	No. of Families Below Poverty Line			
			Having no Toilet	< 100 M	100-200 M	No Water Source within 200 M
	Thikattuserri					
1	Arikuttv	1773	970	1273	300	200
2	Cherumpallippuram	3171	1514	2807	330	34
3	Panavally	3254	1899	2625	559	70
4	Perumpalam	1155	730	942	128	85
5	Thaikkattusseri	2115	1033	1741	286	88
	Panakakadu					
6	Kadakkarapally	1629	940	1277	267	85
7	Vayalar	2802	917	2059	501	242
8	Pattanakkade	4390	1817	3712	515	163
9	Thuravoor	3990	2251	2569	835	586
10	Kuthiathode	2413	873	1427	598	388
11	Kodemthuruth	2416	1155	1675	499	242
12	Ezhupunna	2874	1414	1916	605	353
13	Mararikulam	4050	1662	3303	559	188
	Kanzhikuzhi					
14	Mararikulam	866	351	761	100	5
15	Kanzhikuzhi	3024	779	2823	189	12
16	Thannermukkom	4529	1744	3486	762	281
17	Muhamma	2896	951	2695	184	17
18	Cherthala	4466	1591	3900	487	79
19	Aroor	2209	721	2073	124	12
	Aryadu					
20	Aryadu	2770	752	2635	125	10
21	Mannancheri	3621	801	3346	165	110
22	Mararikulam South	4335	1382	4197	137	1
	Ambalapuzha					
23	Ambalapuzha	5177	2381	4595	530	52
24	Punnapra	5273	2444	4703	490	80
25	Purakkadu	3414	2025	2911	403	100
	Champakulam					
26	Thalavadi	1913	946	1470	301	142
27	Edathva	1960	1052	1475	369	116
28	Thakazhi	2078	1109	1267	596	215
29	Nedumudi	1499	828	1228	231	40
30	Champakulam	1427	357	936	321	170
31	Kinakari	2144	1544	1832	244	68
	Valiyanadu					
32	Muttar	778	355	515	214	49
33	Valiyanadu	1322	823	939	229	154

			No. of Families Below Poverty Line			
Sl. No	Name of Panchayat	No. of BPL Families	Having no Toilet	< 100 M	100-200 M	No Water Source within 200 M
34	Neelamperur	1233	688	852	283	98
35	Kavalam	1652	967	1268	305	79
36	Pulinkunnu	2116	1277	1678	346	92
37	Ramankari	1352	869	1077	178	97
	Changanoor					
38	Mulakkuzha	2063	1249	1990	43	30
39	Venmani	1472	710	1466	3	3
40	Cheriyanadu	1926	329	1844	67	15
41	Ala	1047	504	1019	25	3
42	Puliyoor	1522	565	1367	152	3
43	Bhudhannur	1963	930	1310	43	610
44	Manmar	1870	856	1800	66	4
45	Pandanadu	1133	615	1050	76	7
46	Thiruvanvandoor	1415	641	1410	3	2
	Harippadu					
47	Chingoli	1421	907	1344	67	10
48	Karthikapally	2207	1452	1502	437	268
49	Thrikkunnapuzha	570	306	327	205	38
50	Kumarapuram	807	418	697	100	10
51	Karuvatta	664	343	581	57	26
52	Harippadu	541	229	514	23	4
53	Pallipade	888	323	845	30	13
54	Cheruthana	988	664	900	72	16
55	Veeyapuram	800	368	759	35	6
	Mavelikkara					
56	Chettikulangara	3290	1520	3190	76	24
57	Thripperumthara	2611	1337	2467	129	15
58	Thekkekara	2761	1566	2715	42	4
59	Thazhakkara	3336	1690	3234	82	20
	Bharanikkavu					
60	Nooranadu	1184	526	1136	47	1
61	Vallikkunnam	1048	630	947	99	2
62	Bharanikkavu	2110	845	2086	22	2
63	Thamarakkulam	1393	726	1304	79	10
64	Chunakkara	741	284	723	15	3
65	Palamel	1904	1087	1889	14	1
	Muthukulam					
66	Pathiyoor	1606	723	1588	14	4
67	Kandallur	1707	810	1450	247	10
68	Cheppadu	2201	884	2181	22	-2
69	Muthukulam	1599	871	1547	37	15
70	Arattupuzha	3156	2549	1918	711	527

			No. of Families Below Poverty Line			
Sl. No	Name of Panchayat	No. of BPL Families	Having no Toilet	< 100 M	100-200 M	No Water Source within 200 M
71	Krishnapuram	2133	694	2117	14	2
72	Devikulangara	1939	597	1810	121	8

Attachment 6.1

Technology Choice for New Water Supply Schemes

The number of options in technology choice depends upon the following matrix

Row : The feasible and appropriate source which depends up on many parameters such as yield, simplicity and cost effectiveness of treatment if any, simplicity and cost effectiveness of possible and preferred method of conveyance (manual, gravity, diesel electrical pumping) which depends up on the horizontal & vertical distance from the source

Column : Type of treatment and supply (manual draw, stand posts, house connections) that depends up on simplicity and cost effectiveness of possible and preferred method of supply which again depends up on the density of households, socio-economic conditions etc.

Sets of tentative (sample) technology selection matrix for Water Supply is furnished as Table 5.2. These will however be modified, if necessary, during the actual micro-level planning.

SPC-M : ***Spring Protection Chamber – Manual***

For scattered, and/or small clusters of households particularly in tribal population, if springs are available within reasonable vertical and horizontal distance from the habitation, preferably, simple spring protection measures can be taken up with an overflow pie from which community can directly collect water manually

GWSS : ***Gravity Water Supply Scheme***

For colonies and population bigger than 20 households, if perennial springs or streams with adequate summer flows is available at higher elevations than the habitations within reasonable horizontal distance, these can preferably be tapped by constructing simple collection/diversion systems such as spring protection chamber for a spring and a diversion weir for streams.

The water is brought by a gravity pipe into a storage tank constructed at a convenient location near the habitation and then supplied through stand posts or house connections (or both) as preferred by the community. If the water is tapped from the stream, then simple household purification plants will be supplied at each individual household level (HWPS).

HWPS : ***Household Water Purification System***

When surface water (Streams, Ponds, Dam etc.) that is not subject to chemical contamination to objectionable levels, is used as the source, the most cost effective and sustainable method of treating the same is providing simple treatment gadgets at household level. A prototype design developed and tested by SEUF that costs less than Rs.500/- and negligible O&M cost can be adapted after few modifications. These gadgets which can be maintained even by an illiterate village housewife, can remove bacterial and physical contamination (turbidity, iron, colour and odour) completely. This method also gives the freedom to the user to treat only that quantity of water that needs treatment (drinking, cooking, bathing,) and use untreated water for other (toilet, washing clothes, animals) purposes.

WI-M : *Well Improvement (Manual Draw)*

There are many public and privately owned dug wells in Alappuzha & Iduuki Districts, which are defunct due to poor yield, poor quality, and/or poor construction. Where the population is scattered, where piped water supply is infeasible, and where the scope of reviving these wells exists, they can be revived. While public wells can be revived as any other community managed schemes, individual wells belonging to BPL families can be revived by the owners with some interest-free loan through CDS. A seed money of Rs.100000/- can be provided for each GP from the project fund. This way the number of uncovered problem families can be reduced.

HP : *Hand Pump*

There are many hand pumps lying idle in both the districts. The major reason for these hand pumps remaining unused are the poor quality water, caused by rusting of pump parts due to stagnation during non-use period (monsoon). The second major reason of nonfunctioning of Hand Pumps are mechanical break downs, which can be repaired and the future O&M brought under the proposed District Level O&M set up. Wherever these HPs can be rehabilitated, it will be done and wherever there is additional scope/demand new schemes will be taken up.

PWSS : *Pumping WaterSupply Scheme*

When there are no water sources at higher elevation within reasonable distance, one has to look for sources at lower levels within reasonable horizontal and vertical distance that needs pumping. If electricity is not available within reasonable distance, then diesel pups will be selected. For tribal areas, 100% subsidy schemes such as Solar Pumps (low head, low discharge) and Hydrams (Water Falls) can be availed.

If quality, summer yield and the distance (horizontal & vertical) are acceptable, the existing sources will be preferred over new sources.

Considering the cost of construction, sources for pumping schemes can be chosen in the following order of preference: Spring, Stream, shallow filter points (coastal area), Pond, Bore Well, Open Well.

The water is pumped up into a storage tank constructed at a convenient location near the habitation and then supplied through stand posts or house connections (or both) as preferred by the community. If the water is tapped from a surface water source, then simple household purification plants will be supplied at each individual household level (HWPS).

VIP : *Vallam Improvement Programme*

In Kuttanad area, the most appropriate, if not the only, sustainable solution is revival of traditional system. Large rainwater harvesting ponds locally known as "*Vallams*" used to meet the domestic water requirements of the people of Kuttanad for decades (if not centuries). Due to sheer neglect, these are defunct now. These *Vallams* can hold and supply water to about 50 families. Besides, for Kuttanad, where the habitations occur as small clusters along the canals and field bunds, these are ideal. A strong desire to revive them is expressed by the community. This involves, deepening and widening of these ponds to regular shapes, applying clay paste on the interiors to prevent seepage and providing shutter arrangements to let in fresh water during rainy periods and shutting off salt/contaminated water during non rainy season. The water can be taken either by a hand pump or using

solar/electric pump pumped to an OHSR, supply water to individual houses by stand posts or house connection as preferred by the community and provide household purification systems (HWPS).

RWHS : Roof Water Harvesting Systems

Where none of the above alternatives are not feasible, the rainwater that falls over the roof is collected in Ferro-cement tanks and used during lean periods. The schemes can be either individually owned or collectively owned as preferred by the community. For individually owned schemes, subsidy will be given only to BPL families.

Table 1: Technology Selection Matrix for RWSS

A. Idukki - Higher Regions

Technical Parameters	Non-Technical Parameters						
	Tribal			Non Tribal			
	Dense <15	Dense (15-50)	Dense >50	Scattered	Dense <15	Dense (15-50)	Dense >50
Rehabilitation of Existing PWSS (Max distance of any house from existing pipelines < 100mts)	No	No	No	Yes (Combine Colonies)	Yes (Join with Other Colonies)	Yes (Combine Colonies)	Yes (Combine Colonies)
New Schemes							
Elevated Source yielding > 160 lpd/ family located at <10 m/family (Hor.&Vert.)							
Spring	SPC-M	SPC-M	SPC-M	SPC-M	GWSS	GWSS	GWSS
Stream	HWPS	HWPS	HWPS	HWPS	GWSHT	GWSHT	GWSHT
Elevated Source yielding > 160 lpd/ family and a gravity main length 10-50 m/family, Slope > 10%							
Spring	GWSS	GWSS	GWSS	GWSS	GWSS	GWSS	GWSS
Stream	GWSHT	GWSHT	GWSHT	GWSHT	GWSHT	GWSHT	GWSHT
Low lying Source yielding > 160 lpd/ family located at < 10 m/family, Slope < 20 %							
• Spring	SPC-M	SPC-M	PWS - S/HD	SPC-M	PWSS	PWSS	PWSS
• Open Well	WI-M	WI-M	PWS – S	WI-M	WI-M	PWSS	PWSS
• BoreWell	HP	HP	HP		HP	PWSS	PWSS
• Stream	HWPS	HWPS	HWPS	HWPS	PWSHT	PWSHT	PWSHT
Low lying Source yielding > 160 lpd/ family located at 10 -25/family, Slope < 20 %							
• Spring	PWS - S/HD	PWS - S/HD	PWS - S/HD	SPC-M	PWSS	PWSS	PWSS
• Open Well	PWS - S	PWS - S	PWS – S	WI-M	PWSS	PWSS	PWSS
• BoreWell	HP	HP	No	HP	PWSS	PWSS	PWSS
• Stream	HWPS	HWPS	PWSHT - S/HD	HWPS	PWSHT	PWSHT	PWSHT
Quality Problem (Bacterial, Turbidity, Color/Odor)	HWPS	HWPS	HWPS	HWPS	HWPS	HWPS	HWPS
No reliable (chemically safe > 120lpd/family) source within 25 m/family	RWHS	RWHS	RWHS	RWHS	RWHS	RWHS	RWHS

SPC-M: Spring Protection Chamber - Manual
HWPS: Household Water Purification System
PWSS: Pumping Water Supply Scheme
WI-M: Well Improvement (Manual Draw)
PWSHT: Pumping Scheme with HWPS
GWSS: Gravity WaterSupply Scheme
GWSHT: Grawity Scheme with HPWS
PWS-S/HD: PWSS with Solar/Hydram Pumps
HP: Hand Pump
RWHS: Roof Water

Assumption: Multi Panchayat Piped Water Supply Schemes are beyond the scope of this programme

B. Idukki - Lower Regions

Technical Parameters	Non-Technical Parameters						
	Poor (Non-Tribal)			Mixed			
	Dense <15	Dense (15-50)	Dense >50	Scattered	Dense <15	Dense (15-50)	Dense >50
Rehabilitation of Existing PWSS	Yes (Join with Other Colonies)	Yes (Combine Colonies)	Yes (Combine Colonies)	Yes (Combine Colonies)	Yes (Join with Other Colonies)	Yes (Combine Colonies)	Yes (Combine Colonies)
New Schemes							
Elevated Source yielding > 160 lpd/ family located at <10 m/family (Hor.& Vert.)							
Spring	GWSS	GWSS	GWSS	SPC-M	GWSS	GWSS	GWSS
Stream/Pond/Quarry	GWSHT	GWSHT	GWSHT	HHWPS	GWSHT	GWSHT	GWSHT
Elevated Source yielding > 160 lpd/ family and a gravity main length 10-50 m/family, Slope > 10%							
Spring	GWSS	GWSS	GWSS	GWSS	GWSS	GWSS	GWSS
Stream/Pond/Quarry	GWSHT	GWSHT	GWSHT	GWSHT	GWSHT	GWSHT	GWSHT
Low lying Source yielding > 160 lpd/ family located at < 10 m/family, Slope < 20 %							
• Spring	SPC-M	PWSS	PWSS	SPC-M	PWSS	PWSS	PWSS
• Open Well	WI-M	PWSS	PWSS	WI-M	WI-M	PWSS	PWSS
• BoreWell	HP	PWSS	PWSS		HP	PWSS	PWSS
• Stream	HHWPS	PWSHT	PWSHT	HHWPS	PWSHT	PWSHT	PWSHT
Low lying Source yielding > 160 lpd/ family located at 10 -25/family, Slope < 20 %							
• Spring	PWSS	PWSS	PWSS	SPC-M	PWSS	PWSS	PWSS
• Open Well	PWSS	PWSS	PWSS	WI-M	PWSS	PWSS	PWSS
• BoreWell	PWSS	PWSS	PWSS	HP	PWSS	PWSS	PWSS
• Stream/Pond/Quarry	PWSHT	PWSHT	PWSHT	HHWPS	PWSHT	PWSHT	PWSHT
Quality Problem (Bacterial, Turbidity, Color, Odor)	HWPS	HWPS	HWPS	HWPS	HWPS	HWPS	HWPS
Source chemically unsafe/distant/ inadequatte	RWHS	RWHS	RWHS	RWHS	RWHS	RWHS	RWHS

SPC-M: Spring Protection Chamber - Manual
HWPS: Household Water Purification System
PWSS : Pumping Water Supply Scheme
WI-M: Well Improvement (Manual Draw)
PWSHT : Pumping Scheme with HWPS
GWSS : Gravity WaterSupply Scheme
GWSHT: Grawity Scheme with HPWS
WS-S/HD : PWSS with Solar/Hydram Pumps
HP : Hand Pump
RWHS : Roof Water

Assumption: Multi Panchayat Piped Water Supply Schemes are beyond the scope of this programme

C. Alappuzha – Kuttanad Area

Technical Parameters	Non-Technical Parameters						
	Poor			Mixed			
	Dense <15	Dense (15-50)	Dense >50	Scattered	Dense <15	Dense (15-50)	Dense >50
Source yielding > 160 lpd/ family located at < 20 m/family							
• Improve Ponds/*Vallams*	HPWPS	PWSHT	PWSS	HPWPS	HPWPS	PWSHT	PWSS
• Wells	WI-M	PWSS	PWSS	WI-M	WI-M	PWSS	PWSS
• Non Saline Canals/Lakes	HHPS	PWSHT	PWSHT	HHPS	HHPS	PWSHT	PWSHT
Source chemically unsafe/distant/ inadequate	RWHS	RWHS	RWHS	RWHS	RWHS	RWHS	RWHS

HWPS: Household Water Purification System
WI-M: Well Improvement (Manual Draw) Hp
HPWPS: Hand Pump-based Water Purification System
PWSS : Pumping Water Supply Scheme
PWSHT : Pumping Scheme with HWPS
RWHS : Roof Water

Assumption: Multi Panchayat Piped Water Supply Schemes are beyond the scope of this programme

D. Alappuzha - Coastal Area

Technical Parameters	Non-Technical Parameters						
	Poor			Mixed			
	Dense <15	Dense (15-50)	Dense >50	Scattered	Dense <15	Dense (15-50)	Dense >50
Rehabilitation of KWA Schemes	Yes (Combine Colonies)	Yes (Join with Other Colonies)	Yes (Combine Colonies)	Yes (Combine Colonies)	Yes (Join with Other Colonies)	Yes (Combine Colonies)	Yes (Combine Colonies)
New Schemes							
Source yielding > 160 lpd/ family located at < 20 m/family							
• Ponds	HPWPS	PWSHT	PWSS	HPWPS	HPWPS	PWSHT	PWSS
• Wells	WI-M	PWSS	PWSS	WI-M	WI-M	PWSS	PWSS
• Filter Points	HHPS	PWSHT	PWSHT	HHPS	HHPS	PWSHT	PWSHT
• Tube wells	HP	PWSS	PWSS	HP	PWSS	PWSS	PWSS
Source chemically unsafe/distant/ inadequate	RWHS	RWHS	RWHS	RWHS	RWHS	RWHS	RWHS

HWPS: Household Water Purification System
WI-M: Well Improvement (Manual Draw)Hp
HPWPS: Hand Pump-based Water Purification System
PWSS : Pumping WaterSupply Scheme
PWSHT : Pumping Scheme with HWPS
RWHS : Roof Water
Assumption : Multi Panchayat Piped Water Supply Schemes are beyond the scope of this programme

E. Alappuzha - Eastern Lateritic Regions

Technical Parameters	Non-Technical Parameters						
	Poor (Non-Tribal)			Mixed			
	Dense <15	Dense (15-50)	Dense >50	Scattered	Dense <15	Dense (15-50)	Dense >50
Rehabilitation of Existing PWSS	Yes (Join with Other Colonies)	Yes (Combine Colonies)	Yes (Combine Colonies)	Yes (Combine Colonies)	Yes (Join with Other Colonies)	Yes (Combine Colonies)	Yes (Combine Colonies)
New Schemes							
Source yielding > 160 lpd/ family located at < 10 m/family, Slope < 20 %							
• Open Well	WI-M	PWSS	PWSS	WI-M	WI-M	PWSS	PWSS
• BoreWell	HP	PWSS	PWSS		HP	PWSS	PWSS
• Non Saline Surface Water (Canals/Ponds)	HHWPS	PWSHT	PWSHT	HHWPS	PWSHT	PWSHT	PWSHT
Low lying Source yielding > 160 lpd/ family located at 10 -25/family, Slope < 20 %							
• Spring	PWSS	PWSS	PWSS	SPC-M	PWSS	PWSS	PWSS
• Open Well	PWSS	PWSS	PWSS	WI-M	PWSS	PWSS	PWSS
• BoreWell	PWSS	PWSS	PWSS	HP	PWSS	PWSS	PWSS
• Stream/Pond/Quarry	PWSHT	PWSHT	PWSHT	HHWPS	PWSHT	PWSHT	PWSHT
Quality Problem (Bacterial, Turbidity, Color, Odor)	HWPS	HWPS	HWPS	HWPS	HWPS	HWPS	HWPS
Source chemically unsafe/distant/ inadequate	RWHS	RWHS	RWHS	RWHS	RWHS	RWHS	RWHS

HWPS : Household Water Purification System PWSS : Pumping Water Supply Scheme WI-M : Well Improvement (Manual Draw)
Hp : Hand Pump PWSHT : Pumping Scheme with HWPS RWHS : Roof Water
Assumption : Multi Panchayat Piped Water Supply Schemes are beyond the scope of this programme.

Attachment 6.2

Comparison of Labour Outputs Data Between PWD & Local

Aroor Grama Panchayat Labour out turn										
Name of work	Unit	Labour Requirement								Diff. in amount (1)-(2)
		PWD				Local				
		Labour type	Out turn	Local Rate (Rs)	Amount (1)	Labour	Out turn	Rate	Amount (2)	
Earth work	1m3	Boy	0.30	125.00	55.65	Boy	0.000	125	37.13	18.53
		Man	0.11	165.00		Man	0.225	165.00		
PCC 40mm	1m3	Mason	0.10	182.50	389.75	Mason	0.239	182.50	179.56	210.19
		Man	1.00	165.00		Man	0.717	165.00		
		Woman	1.40	147.50		Woman	0.120	147.50		
DR	1m3	Mason	0.35	182.50	282.625	Mason	0.330	182.50	139.46	143.17
		Man	0.70	165.00		Man	0.330	165.00		
		Woman	0.70	147.50		Woman	0.168	147.50		
ROLES AND RESPONSIBILITIES	1m3	Mason	0.70	182.50	288.75	Mason	0.338	182.50	195.08	93.67
		Man	0.35	165.00		Man	0.507	165.00		
		Woman	0.70	147.50		Woman	0.338	147.50		
Brick masonry	1m3	Mason	0.77	182.50	317.625	Mason	1.783	182.50	511.53	-193.90
		Man	0.39	165.00		Man	0.000	165.00		
		Woman	0.77	147.50		Woman	1.263	147.50		
Laterite work	1m3	Mason	1.50	182.50	405.25	Mason	1.267	182.50	557.03	-151.78
		Man	0.35	165.00		Man	1.267	165.00		
		Woman	0.50	147.50		Woman	0.792	147.50		
RCC 20mm	1m3	Mason	0.20	182.50	717.75	Mason	0.195	182.50	428.39	289.36
		Man	1.00	165.00		Man	1.076	165.00		
		Woman	3.50	147.50		Woman	1.460	147.50		
Steel work	1qtl	B.smith	1.00	200.00	444.2	B.smith	0.580	200.00	211.70	232.50
		Man	1.48	165.00		Man	0.580	165.00		
Form work	1m2	Carpenter	0.40	182.50	114.25	Carpenter	0.179	182.50	88.77	25.48
		Man	0.25	165.00		Man	0.340	165.00		
Wall plaster	10m2	Mason	0.90	182.50	409	Mason	0.887	182.50	292.61	116.39
		Man	0.50	165.00		Man	0.000	165.00		
		Woman	1.10	147.50		Woman	0.887	147.50		
Ceiling plaster	10m2	Mason	0.90	182.50	409	Mason	1.210	182.50	399.30	9.70
		Man	0.50	165.00		Man	0.000	165.00		
		Woman	1.10	147.50		Woman	1.210	147.50		

Puliyoor Grama Panchayat Labour out turn										
Name of work	Unit	Labour Requirement								Diff. in Amount
		PWD				Local				
		Labour	Out turn	Local Rate	Amount	Labour	Out turn	Rate	Amount	
Earth work	1m3	Boy	0.30	118.75	53.06	Boy	0.000	118.75	17.44	35.63
		Man	0.11	158.50		Man	0.110	158.50		
PCC 40mm	1m3	Mason	0.10	200.00	376.6	Mason	0.090	200.00	56.83	319.77
		Man	1.00	158.50		Man	0.120	158.50		
		Woman	1.40	141.50		Woman	0.140	141.50		
DR	1m3	Mason	0.35	200.00	280	Mason	0.400	200.00	133.89	146.11
		Man	0.70	158.50		Man	0.340	158.50		
		Woman	0.70	141.50		Woman	0.000	141.50		
RR	1m3	Mason	0.70	200.00	294.525	Mason	0.550	200.00	196.44	98.09
		Man	0.35	158.50		Man	0.340	158.50		
		Woman	0.70	141.50		Woman	0.230	141.50		
Brick masonry	1m3	Mason	0.77	200.00	323.978	Mason	0.610	200.00	245.11	78.87
		Man	0.39	158.50		Man	0.000	158.50		
		Woman	0.77	141.50		Woman	0.870	141.50		
Laterite work	1m3	Mason	1.50	200.00	426.225	Mason	0.650	200.00	262.74	163.49
		Man	0.35	158.50		Man	0.650	158.50		
		Woman	0.50	141.50		Woman	0.210	141.50		
RCC 20mm	1m3	Mason	0.20	200.00	693.75	Mason	0.020	200.00	39.49	654.26
		Man	1.00	158.50		Man	0.090	158.50		
		Woman	3.50	141.50		Woman	0.150	141.50		
Steel work	1qtl	B.smith	1.00	216.50	451.08	B.smith	0.540	216.50	202.50	248.58
		Man	1.48	158.50		Man	0.540	158.50		
Form work	1m2	Carpenter	0.40	200.00	119.625	Carpenter	0.060	200.00	26.27	93.36
		Man	0.25	158.50		Man	0.090	158.50		
Wall plaster	10m2	Mason	0.90	200.00	414.9	Mason	0.500	200.00	170.75	244.15
		Man	0.50	158.50		Man	0.000	158.50		
		Woman	1.10	141.50		Woman	0.500	141.50		
Ceiling plaster	10m2	Mason	0.90	200.00	414.9	Mason	0.900	200.00	307.35	107.55
		Man	0.50	158.50		Man	0.000	158.50		
		Woman	1.10	141.50		Woman	0.900	141.50		

Neelamberoor Grama Panchayat Labour out turn										
Name of work	Unit	Labour Requirement								Diff. in Amount
		PWD				Local				
		Labour	Out turn	Local Rate	Amount	Labour	Out turn	Rate	Amount	
Earth work	1m3	Boy	0.30	115.13	51.424	Boy	0.000	115.13	110.52	-59.10
		Man	0.11	153.50		Man	0.720	153.50		
PCC 40mm	1m3	Mason	0.10	203.50	371.95	Mason	0.170	203.50	97.48	274.47
		Man	1.00	153.50		Man	0.170	153.50		
		Woman	1.40	141.50		Woman	0.260	141.50		
DR	1m3	Mason	0.35	203.50	277.725	Mason	0.340	203.50	121.38	156.35
		Man	0.70	153.50		Man	0.340	153.50		
		Woman	0.70	141.50		Woman	0.000	141.50		
RR	1m3	Mason	0.70	203.50	295.225	Mason	0.400	203.50	166.86	128.37
		Man	0.35	153.50		Man	0.400	153.50		
		Woman	0.70	141.50		Woman	0.170	141.50		
Brick masonry	1m3	Mason	0.77	203.50	324.7475	Mason	0.480	203.50	169.08	155.67
		Man	0.39	153.50		Man	0.290	153.50		
		Woman	0.77	141.50		Woman	0.190	141.50		
Laterite work	1m3	Mason	1.50	203.50	429.725	Mason	1.190	203.50	538.03	-108.31
		Man	0.35	153.50		Man	1.190	153.50		
		Woman	0.50	141.50		Woman	0.800	141.50		
RCC 20mm	1m3	Mason	0.20	203.50	689.45	Mason	0.152	203.50	410.85	278.60
		Man	1.00	153.50		Man	0.954	153.50		
		Woman	3.50	141.50		Woman	1.650	141.50		
Steel work	1qtl	B.smith	1.00	203.50	430.68	B.smith	0.500	203.50	216.88	213.81
		Man	1.48	153.50		Man	0.750	153.50		
Form work	1m2	Carpenter	0.40	203.50	119.775	Carpenter	0.079	203.50	31.32	88.45
		Man	0.25	153.50		Man	0.100	153.50		
Wall plaster	10m2	Mason	0.90	203.50	415.55	Mason	0.800	203.50	276.00	139.55
		Man	0.50	153.50		Man	0.000	153.50		
		Woman	1.10	141.50		Woman	0.800	141.50		
Ceiling plaster	10m2	Mason	0.90	203.50	415.55	Mason	1.100	203.50	379.50	36.05
		Man	0.50	153.50		Man	0.000	153.50		
		Woman	1.10	141.50		Woman	1.100	141.50		

Kainagiri Grama Panchayat Labour out turn										
Name of work	Unit	Labour Requirement								Diff. in Amount
		PWD				Local				
		Labour	Out turn	Local Rate	Amount	Labour	Out turn	Rate	Amount	
Earth work	1m3	Boy	0.30	122.00		Boy	0.000	122.00		
		Man	0.11	162.50	54.475	Man	0.340	162.50	55.25	-0.78
PCC 40mm	1m3	Mason	0.10	225.00		Mason	0.810	225.00		
		Man	1.00	162.50		Man	0.810	162.50		
		Woman	1.40	150.00	395	Woman	0.270	150.00	354.38	40.63
DR	1m3	Mason	0.35	225.00		Mason	0.000	225.00		
		Man	0.70	162.50		Man	0.000	162.50		
		Woman	0.70	150.00	297.5	Woman	0.000	150.00	0.00	297.50
ROLES AND RESPONSIBILITIES	1m3	Mason	0.70	225.00		Mason	0.000	225.00		
		Man	0.35	162.50		Man	0.000	162.50		
		Woman	0.70	150.00	319.375	Woman	0.000	150.00	0.00	319.38
Brick masonry	1m3	Mason	0.77	225.00		Mason	2.080	225.00		
		Man	0.39	162.50		Man	0.000	162.50		
		Woman	0.77	150.00	351.313	Woman	2.080	150.00	780.00	-428.69
Laterite work	1m3	Mason	1.50	225.00		Mason	0.690	225.00		
		Man	0.35	162.50		Man	0.190	162.50		
		Woman	0.50	150.00	469.375	Woman	0.690	150.00	289.63	179.75
RCC 20mm	1m3	Mason	0.20	225.00		Mason	0.159	225.00		
		Man	1.00	162.50		Man	0.721	162.50		
		Woman	3.50	150.00	732.5	Woman	1.211	150.00	334.51	397.99
Steel work	1qtl	B.smith	1.00	225.00		B.smith	0.590	225.00		
		Man	1.48	162.50	465.5	Man	0.840	162.50	269.25	196.25
Form work	1m2	Carpenter	0.40	225.00		Carpenter	0.126	225.00		
		Man	0.25	162.50	130.625	Man	0.188	162.50	58.84	71.79
Wall plaster	10m2	Mason	0.90	225.00		Mason	0.400	225.00		
		Man	0.50	162.50		Man	0.000	162.50		
		Woman	1.10	150.00	448.75	Woman	0.400	150.00	150.00	298.75
Ceiling plaster	10m2	Mason	0.90	225.00		Mason	0.500	225.00		
		Man	0.50	162.50		Man	0.000	162.50		
		Woman	1.10	150.00	448.75	Woman	0.500	150.00	187.50	261.25

Peruvanthanam Grama Panchayat Labour out turn										
Name of work	Unit	Labour Requirement								Diff. in Amount
		PWD				Local				
		Labour	Out turn	Local Rate	Amount	Labour	Out turn	Rate	Amount	
Earth work	1m3	Boy	0.30	105.00	46.9	Woman	0.066	111.00	53.53	-6.63
		Man	0.11	140.00		Man	0.330	140.00		
PCC 40mm	1m3	Mason	0.10	200.00	315.4	Mason	0.160	200.00	711.60	-396.20
		Man	1.00	140.00		Man	2.000	140.00		
		Woman	1.40	111.00		Woman	3.600	111.00		
DR	1m3	Mason	0.35	200.00	245.7	Mason	0.310	200.00	114.64	131.06
		Man	0.70	140.00		Man	0.376	140.00		
		Woman	0.70	111.00		Woman	0.000	111.00		
RR	1m3	Mason	0.70	200.00	266.7	Mason	0.776	200.00	369.01	-102.31
		Man	0.35	140.00		Man	1.440	140.00		
		Woman	0.70	111.00		Woman	0.110	111.00		
Brick masonry	1m3	Mason	0.77	200.00	293.37	Mason	1.720	200.00	796.02	-502.65
		Man	0.39	140.00		Man	2.420	140.00		
		Woman	0.77	111.00		Woman	1.020	111.00		
RCC 20mm	1m3	Mason	0.20	200.00	568.5	Mason	0.670	200.00	348.37	220.13
		Man	1.00	140.00		Man	1.000	140.00		
		Woman	3.50	111.00		Woman	0.670	111.00		
Steel work	1qtl	B.smith	1.00	192.50	399.7	B.smith	1.875	192.50	605.94	-206.24
		Man	1.48	140.00		Man	1.750	140.00		
Form work	1m2	Carpenter	0.40	200.00	115	Carpenter	0.290	200.00	98.60	16.40
		Man	0.25	140.00		Man	0.290	140.00		
Wall plaster	10m2	Mason	0.90	200.00	372.1	Mason	0.710	200.00	220.81	151.29
		Man	0.50	140.00		Man	0.000	140.00		
		Woman	1.10	111.00		Woman	0.710	111.00		
Ceiling plaster	10m2	Mason	0.90	200.00	372.1	Mason	1.194	200.00	371.33	0.77
		Man	0.50	140.00		Man	0.000	140.00		
		Woman	1.10	111.00		Woman	1.194	111.00		

Kanthaloor Grama Panchayat Labour out turn										
		Labour Requirement								Diff. in Amount
		PWD				Local				
Name of work	Unit	Labour	Out turn	Local Rate	Amount	Labour	Out turn	Rate	Amount	
Earth work	1m3	Boy	0.30	84.75	37.855	Woman	0.476	88.00	91.61	-53.75
		Man	0.11	113.00		Man	0.440	113.00		
PCC 40mm	1m3	Mason	0.10	196.50	255.85	Mason	0.779	196.50	307.84	-51.99
		Man	1.00	113.00		Man	0.770	113.00		
		Woman	1.40	88.00		Woman	0.770	88.00		
DR	1m3	Mason	0.35	196.50	209.475	Mason	0.816	196.50	319.22	-109.75
		Man	0.70	113.00		Man	1.149	113.00		
		Woman	0.70	88.00		Woman	0.330	88.00		
RR	1m3	Mason	0.70	196.50	238.7	Mason	1.502	196.50	493.51	-254.81
		Man	0.35	113.00		Man	0.891	113.00		
		Woman	0.70	88.00		Woman	1.110	88.00		
Brick masonry	1m3	Mason	0.77	196.50	262.57	Mason	2.080	196.50	765.20	-502.63
		Man	0.39	113.00		Man	2.080	113.00		
		Woman	0.77	88.00		Woman	1.380	88.00		
RCC 20mm	1m3	Mason	0.20	196.50	460.3	Mason	0.670	196.50	446.79	13.52
		Man	1.00	113.00		Man	2.010	113.00		
		Woman	3.50	88.00		Woman	1.000	88.00		
Steel work	1qtl	B.smith	1.00	200.00	367.24	B.smith	0.610	200.00	206.75	160.49
		Man	1.48	113.00		Man	0.750	113.00		
Form work	1m2	Carpenter	0.40	196.50	106.85	Carpenter	0.135	196.50	45.74	61.11
		Man	0.25	113.00		Man	0.170	113.00		
Wall plaster	10m2	Mason	0.90	196.50	330.15	Mason	1.038	196.50	377.76	-47.61
		Man	0.50	113.00		Man	1.538	113.00		
		Woman	1.10	88.00		Woman	0.000	88.00		
Ceiling plaster	10m2	Mason	0.90	196.50	330.15	Mason	1.038	196.50	377.76	-47.61
		Man	0.50	113.00		Man	1.538	113.00		
		Woman	1.10	88.00		Woman	0.000	88.00		

Nedumkandam Grama Panchayat Labour out turn										
Name of work	Unit	Labour requirement								Diff. in Amount
		PWD				Local				
		Labour	Out turn	Local Rate	Amount	Labour	Out turn	Rate	Amount	
Earth work	1m3	Boy	0.30	131.25	58.625	Woman	0.100	150.00	67.50	-8.88
		Man	0.11	175.00		Man	0.300	175.00		
PCC 40mm	1m3	Mason	0.10	208.00	405.8	Mason	0.167	208.00	935.24	-529.44
		Man	1.00	175.00		Man	2.000	175.00		
		Woman	1.40	150.00		Woman	3.670	150.00		
DR	1m3	Mason	0.35	208.00	300.3	Mason	0.300	208.00	132.40	167.90
		Man	0.70	175.00		Man	0.400	175.00		
		Woman	0.70	150.00		Woman	0.000	150.00		
ROLES AND RESPONSIBILITIES	1m3	Mason	0.70	208.00	311.85	Mason	1.000	208.00	533.00	-221.15
		Man	0.35	175.00		Man	1.600	175.00		
		Woman	0.70	150.00		Woman	0.300	150.00		
Brick masonry	1m3	Mason	0.77	208.00	343.035	Mason	1.000	208.00	515.75	-172.72
		Man	0.39	175.00		Man	1.330	175.00		
		Woman	0.77	150.00		Woman	0.500	150.00		
RCC 20mm	1m3	Mason	0.20	208.00	741.6	Mason	0.600	208.00	449.80	291.80
		Man	1.00	175.00		Man	1.000	175.00		
		Woman	3.50	150.00		Woman	1.000	150.00		
Steel work	1qtl	B.smith	1.00	200.00	459	B.smith	2.000	200.00	837.50	-378.50
		Man	1.48	175.00		Man	2.500	175.00		
Form work	1m2	Carpenter	0.40	208.00	126.95	Carpenter	0.400	208.00	153.20	-26.25
		Man	0.25	175.00		Man	0.400	175.00		
Wall plaster	10m2	Mason	0.90	208.00	439.7	Mason	0.400	208.00	130.70	309.00
		Man	0.50	175.00		Man	0.100	175.00		
		Woman	1.10	150.00		Woman	0.200	150.00		
Ceiling plaster	10m2	Mason	0.90	208.00	439.7	Mason	0.500	208.00	167.75	271.95
		Man	0.50	175.00		Man	0.150	175.00		
		Woman	1.10	150.00		Woman	0.250	150.00		

Muttam Grama Panchayat Labour out turn										
		Labour requirement								
		PWD				Local				
Name of work	Unit	Labour	Out turn	Local Rate	Amount	Labour	Out turn	Rate	Amount	Diff. in Amount
Earth work	1m3	Boy	0.30	122.00	54.475	Boy	0.000	122.00	55.25	-0.78
		Man	0.11	162.50		Man	0.340	162.50		
PCC 40mm	1m3	Mason	0.10	225.00	395	Mason	0.810	225.00	354.38	40.63
		Man	1.00	162.50		Man	0.810	162.50		
		Woman	1.40	150.00		Woman	0.270	150.00		
DR	1m3	Mason	0.35	225.00	297.5	Mason	0.000	225.00	0.00	297.50
		Man	0.70	162.50		Man	0.000	162.50		
		Woman	0.70	150.00		Woman	0.000	150.00		
RR	1m3	Mason	0.70	225.00	319.375	Mason	0.000	225.00	0.00	319.38
		Man	0.35	162.50		Man	0.000	162.50		
		Woman	0.70	150.00		Woman	0.000	150.00		
Brick masonry	1m3	Mason	0.77	225.00	351.3125	Mason	2.080	225.00	780.00	-428.69
		Man	0.39	162.50		Man	0.000	162.50		
		Woman	0.77	150.00		Woman	2.080	150.00		
Cement brick work	1m3	Mason	1.50	225.00	469.375	Mason	0.690	225.00	289.63	179.75
		Man	0.35	162.50		Man	0.190	162.50		
		Woman	0.50	150.00		Woman	0.690	150.00		
RCC 20mm	1m3	Mason	0.20	225.00	732.5	Mason	0.159	225.00	334.51	397.99
		Man	1.00	162.50		Man	0.721	162.50		
		Woman	3.50	150.00		Woman	1.211	150.00		
Steel work	1qtl	B.smith	1.00	225.00	465.5	B.smith	0.590	225.00	269.25	196.25
		Man	1.48	162.50		Man	0.840	162.50		
Form work	1m2	Carpenter	0.40	225.00	130.625	Carpenter	0.126	225.00	58.84	71.79
		Man	0.25	162.50		Man	0.188	162.50		
Wall plaster	10m2	Mason	0.90	225.00	448.75	Mason	0.400	225.00	150.00	298.75
		Man	0.50	162.50		Man	0.000	162.50		
		Woman	1.10	150.00		Woman	0.400	150.00		
Ceiling plaster	10m2	Mason	0.90	225.00	448.75	Mason	0.500	225.00	187.50	261.25
		Man	0.50	162.50		Man	0.000	162.50		
		Woman	1.10	150.00		Woman	0.500	150.00		

Methodology

The technical study team personally contacted three local contractors each in all the selected Grama Panchayats in Idukki & Alappuzha Districts and collected the local rates for various construction materials and works. A check list was prepared and used for collecting this data. Also through informal discussion, we collected information regarding the labour requirement for various construction works. But we feel that eventhough the mini local contractors have fixed labour rates for specified works, they do not have a clear idea of the exact output of their labour force for various works. The names of contractors we met are listed below.

Sl No	Name	Panchayat	District
1	Shri. Sathishkumar	kainakari	Alappuzha
2	Shri. Saji, Puthuparambil		
3	Shri. Kuriakose		
4	Shri. Rajappa, Paraparambil	Neelamperoor	
5	Shri. Ashok kumar, chakkanad		
6	Shri. Xaviour, Pandiparambil	Aroor	
7	Shri. Srinivasan		
8	Shri. Gopinathan Nair, Chemdikizhakku	Puliyoor	
9	Shri. M. A Vijayan, Mudiyil		
10	Shri. Parameshwaran Pillai, Nadapulliyil		
11	Shri. Nelson Mesthiri, thaithara		
12	Shri. Radhakrishnan	Kanthaloor	Idukki
13	Shri. N. Rajan, Pattaikulam		
14	Shri. A.K Ramesh, Payin nagar		
15	Shri. P.H Yoonuse, Parakkal	Peruvanthanam	
16	Shri. Salim.		
17	Shri. Shakker, Ph: 380420		
18	Shri. Sasidharan	Nedumkandam	
19	Shri. Joseph		
20	Shri. Abdul Salam		

Table 4: Participatory Action Research – Detailed Hardware Cost

1. IDUKKI DISTRICT				
S.No.	Component	Number	Rate	Amount
	High & Middle Regions			
1	Non-Polluting User friendly Toilet for Water Scarce Areas	3	50000	1.50
2	Watershed Development	10	4000000	400.00
3	Technology Options in RWH	1	100000	1.00
	Lower Region			
1	Watershed Development	2	400000	8.00
2	Rehabilitation of Multi Panchayat Water Supply Scheme	1	4000000	40.00
	Total			**450.50**
2.ALAPPUZHA DISTRICT				
S.No	Component	Number	Rate	Amount
	Eastern Region			
1	Watershed Development	5	4000000	200.00
2	Technology Option for RWH	1	100000	1.00
	Kuttanad Region			
1	Non-Polluting user friendly toilet for Waterlogged areas	2	50000	1.00
2	Protection of Backwater canals	7	1000000	70.00
3	Technology Options for RWH	1	30000	0.30
4	Household Water Purification System	5	10000	0.50
5	Community Water Purification System	2	25000	0.50
	Coastal Region			
1	Development of Traditional Sources	4	100000	4.00
2	Artificial Recharging	1	4000000	40.00
3	Technology Options in RWH	1	100000	1.00
4	Rehabilitation of Multi Panchayat Schemes	1	4000000	40.00
5	Protection of Backwater Canals	4	1000000	40.00
6	Liquid Waste Management	7	2000000	140.00
5	Household Water Purification System	5	10000	0.50
6	Community Water Purification System	2	25000	0.50
	Total			**539.30**
	Grand Total Hardware Cost for PAR			**989.80**

Cost Estimates for Water Quality Monitoring				
S.No	Component	Number	Rate	Amount
1	Supplying UNICEF WQA Kit and Reagents/accessories for one year	30	20000	6.00
	Total			**6.00**

Table 5: Capacity Building – Detailed Cost

Item	Basis	Total Amount	Amount for Batch I
Infrastructure Cost/1	Lumpsum	35.00	10.00
Personnel and Resource Person costs/2		130.00	26.00
Other operational costs/3		21.00	4.20
Training events/4		525.00	105.00
Travel costs for participants		150.00	30.00
Staff training		50.00	10.00
Documentation centre/5		70.00	14.00
Study tours, cross visits etc.		40.00	8.00
Total		**1021.00**	**207.20**

1. Includes vehicles, computers, LCD and overhead projectors, reprographics
2. Includes all experts and Resource Persons, honourarium
3. Includes stationery, other consumables @ 3 lakhs p.a.
4. Includes Seminars, Workshops, training programmes for all stakeholders including VRTs, BCs, BGs etc.at all levels upto village level - the costs are venue, materials, boarding, lodging
5. Documentation Centre cost consists of infrastructure, subscription to periodicals, cost of books, videos etc.,'

Table 6: Detailed Costs (Dfl '000) - Technical Assistance

Category	Unit Cost Per Month	Person Months	Total TA
Policy and Advocacy Support			
Expatriate short term	40	12	480.00
National short term	12	36	432.00
Subtotal			**912.00**
OD Support to PMU			
Expatriate short term - Management	40	12	480.00
Expatriate short term – OD	40	12	480.00
National short term – MIS	10	24	240.00
National short term - HRD	8	24	192.00
Subtotal			**1392.00**
Field-Based Implementation Support			
Expatriate Advisor	25	60	1500.00
National Expert – Community Engineering	12	60	720.00
National Expert – Decentralisation	8	60	480.00
National Expert - Financial Management	8	60	480.00
Subtotal			**3180.00**
Support and Review Mission			
Expatriate short term	40	12	480.00
National short term	8	24	192.00
Subtotal			**672.00**
TOTAL			**6156.00**